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## References

- [1] List of Basic Software Modules  
AUTOSAR\_TR\_BSWModuleList
- [2] Software Component Template  
AUTOSAR\_TPS\_SoftwareComponentTemplate
- [3] Specification of RTE Software  
AUTOSAR\_SWS\_RTE
- [4] Unified diagnostic services (UDS) – Part 1: Specification and requirements (Release 2006-12)  
<http://www.iso.org>
- [5] Road vehicles – End-of-life activation of on-board pyrotechnic devices – Part 2: Communication requirements  
<http://www.iso.org>
- [6] Information technology – Universal Coded Character Set (UCS)  
<http://www.iso.org>
- [7] ISO 17356-4: Road vehicles – Open interface for embedded automotive applications – Part 4: OSEK/VDX Communication (COM)
- [8] ISO 17356-3: Road vehicles – Open interface for embedded automotive applications – Part 3: OSEK/VDX Operating System (OS)
- [9] Collection of blueprints for AUTOSAR M1 models  
AUTOSAR\_MOD\_GeneralBlueprints
- [10] Generic Structure Template  
AUTOSAR\_TPS\_GenericStructureTemplate
- [11] Specification of Safety Extensions  
AUTOSAR\_TPS\_SafetyExtensions
- [12] XML Path language (XPath)  
<http://www.w3.org/TR/xpath/>
- [13] Specification of COM Based Transformer  
AUTOSAR\_SWS\_COMBasedTransformer
- [14] SAE J1939-21 Data Link Layer
- [15] Transport Layer Security (TLS) Parameters  
<https://www.iana.org/assignments/tls-parameters/tls-parameters.xhtml>

# 1 Document Information and Content

This auxiliary document provides a collection of constraints for AUTOSAR models. All constraints are copied from template specification from the AUTOSAR Classic Platform, so this document does not introduce any new constraints.

A list of the documents that the constraints originate from can be found in the table of contents. Chapter 2 contains the collected constraints, grouped by source documents. All constraints from the same source document are contained within a single section.

## 2 Autosar Model Constraints

### 2.1 TPS\_BSWModuleDescriptionTemplate

**[constr\_1275] Applicability of reference `startsOnEvent` for `BswScheduleEvent`**  
[The reference `BswScheduleEvent.startsOnEvent` shall only refer to a `BswSchedulableEntity`.

]()

**[constr\_1276] Applicability of reference `startsOnEvent` for `BswOperationInvokedEvent`**  
[The reference `BswOperationInvokedEvent.startsOnEvent` shall only refer to a `BswCalledEntity`.

]()

**[constr\_4013] BSW service identifier** [For Standardized Interfaces, this identifier is defined in the AUTOSAR Software Specification (SWS) of the module. In case the C-function prototype represented by the entry is not standardized, it still can be used optionally, but its value shall differ from the standardized ones.

]()

**[constr\_4014] Call type and execution context** [Within a given `BswModuleEntry`, the following constraint holds for its attributes:

- `callType`==`'interrupt'` is not allowed together with `executionContext`==`'task'` or `'hook'`
- `callType`==`'scheduled'` is not allowed together with `executionContext`==`'interruptCat1'` or `'interruptCat2'`
- other combinations of these two enums are allowed

]()

**[constr\_4015] `calledEntry` constraints for direct calls** [The following holds if `callPoint` is aggregated as an instance of `BswDirectCallPoint`:

- `BswModuleEntity.callPoint.calledEntry.executionContext` shall be identical to `BswModuleEntity.implementedEntry.executionContext`
- `BswModuleEntity.callPoint.calledEntry.callType` shall have the value 'regular' or 'callback'

]()

**[constr\_4016] BswCalledEntity constraints** [

- `BswCalledEntity.implementedEntry.callType` shall be 'regular' or 'callback'
- `BswCalledEntity.implementedEntry.executionContext` is in general not restricted, but see [constr\_4076] for constraints on the server side of a Client-Server communication.

]()

**[constr\_4017] BswSchedulableEntity constraints** [

- `BswModuleEntity.implementedEntry.callType` shall be 'scheduled'
- `BswModuleEntity.implementedEntry.executionContext` shall be 'task'

]()

**[constr\_4018] BswInterruptEntity constraints** [

- `BswInterruptEntity.implementedEntry.callType` shall be 'interrupt'
- `BswInterruptEntity.implementedEntry.executionContext` shall be 'interruptCat1' if and only if `BswInterruptEntity.interruptCategory` is 'Cat1'
- `BswInterruptEntity.implementedEntry.executionContext` shall be 'interruptCat2' if and only if `BswInterruptEntity.interruptCategory` is 'Cat2'

]()

**[constr\_4019] BSW module identifier** [`BswModuleDescription.moduleId` shall refer to the identifier of the standardized AUTOSAR modules according to [1], if applicable<sup>1</sup>. Otherwise (e.g. for ICC2 clusters) the identifier shall either be empty or chosen differently from the ones given in [1].

]()

**[constr\_4020] Categories of `BswModuleDescription`** [Only categories listed in table 2.1 are allowed. Other values or an empty value are not allowed.

<sup>1</sup>Note that there may be more than one module in an ECU software with the same identifier, e.g. according to the standard Complex Drivers all have the same identifier.

]()

category	Explanation
<b>BSW_MODULE</b>	Specifies a single BSW module (ICC3 granularity).
<b>BSW_CLUSTER</b>	Specifies a BSW module cluster (ICC2 granularity).
<b>LIBRARY</b>	Specifies a Library (not restricted to be used within the BSW).

**Table 2.1: BSWMD Categories**

**[constr\_4021] Implementation policy of function pointer target [**

A `BswModuleEntry` can only be used as target of a function pointer (`SwPointerTargetProps.functionPointerSignature`), if its `swServiceImplPolicy` is 'standard'.

]()

**[constr\_4022] `BswModuleEntity` only uses the module's interface [**

- `BswModuleEntity.implementedEntry` shall refer to an element declared as `implementedEntry` of the enclosing `BswModuleDescription`
- `BswModuleEntity.callPoint.calledEntry` - where `callPoint` is instantiated from `BswDirectCallPoint` - shall refer to an element declared as `expectedEntry` or `implementedEntry` of the enclosing `BswModuleDescription`.
- `BswModuleEntity.callPoint.calledEntry` - where `callPoint` is instantiated from `BswSynchronousServerCallPoint` or `BswAsynchronousServerCallPoint` - shall refer to an element declared as `requiredClientServerEntry` of the enclosing `BswModuleDescription`.
- `BswModuleEntity.callPoint` - where `callPoint` is instantiated from `BswAsynchronousServerCallResultPoint` - shall refer to an `BswAsynchronousServerCallPoint` declared in turn as `callPoint` of the same `BswModuleEntity`.
- `BswModuleEntity.issuedTrigger` shall refer to an element declared as `releasedTrigger` of the enclosing `BswModuleDescription`
- `BswModuleEntity.managedModeGroup` shall refer to an element declared as `providedModeGroup` of the enclosing `BswModuleDescription`
- `BswModuleEntity.accessedModeGroup` shall refer to an element declared as `requiredModeGroup` of the enclosing `BswModuleDescription`
- `BswModuleEntity.dataSendPoint.accessedVariable` shall refer to an element declared as `providedData` of the enclosing `BswModuleDescription`
- `BswModuleEntity.dataReceivePoint.accessedVariable` shall refer to an element declared as `requiredData` of the enclosing `BswModuleDescription`

- an `accessedModeGroup` should be allowed to refer to an element declared as `providedModeGroup`

]()

**[constr\_4023] External trigger shall belong to the interface** [A `BswExternalTriggerOccurredEvent` shall refer to a `Trigger` that is declared via `BswModuleDescription.requiredTrigger` for the same module.

]()

**[constr\_4024] Semantics of BSW mode switch event** [If `BswModeSwitchEvent.activation` has the value `onTransition` `BswModeSwitchEvent` shall refer to two different modes belonging to the same instance of `ModeDeclarationGroup`, their order defining the direction of the transition. In all other cases, `BswModeSwitchEvent` shall refer to exactly one mode.

]()

**[constr\_4025] Modes used by BSW mode switch event** [The `ModeDeclaration` used by `BswModeSwitchEvent` shall belong to the `ModeDeclarationGroupPrototype` referred as `BswInternalBehavior.entity.accessedModeGroup` of the enclosing `BswInternalBehavior`.

]()

**[constr\_4026] Mode group used by BSW mode switch acknowledge event** [The `ModeDeclarationGroupPrototype` used by `BswModeSwitchedAckEvent` shall be referred as `BswModuleDescription.providedModeGroup` by the same module.

]()

**[constr\_4028] Semantics of memory section type** [`sectionType` shall be semantically compatible to the usage of the enclosing `SwAddrMethod`, this means especially that if `SwAddrMethod` is associated by `ExecutableEntity`-s, the `sectionType` shall be usable as code section, if it is associated by `SwDataDefProps`, `sectionType` shall be usable as data section.

]()

**[constr\_4029] Measured stack usage** [The attribute values of `MeasuredStackUsage` shall fulfill:

`minimumMemoryConsumption` <= `averageMemoryConsumption` <= `maximumMemoryConsumption`

]()

**[constr\_4030] Measured heap usage** [The attribute values of `MeasuredHeapUsage` shall fulfill:

`minimumMemoryConsumption` <= `averageMemoryConsumption` <= `maximumMemoryConsumption`

]()

**[constr\_4031] Analyzed execution time** [The attribute values of `AnalyzedExecutionTime` shall fulfill:

`bestCaseExecutionTime`  $\leq$  `bestCaseExecutionTime`

]()

**[constr\_4032] Measured execution time** [The attribute values of `MeasuredExecutionTime` shall fulfill:

`minimumExecutionTime`  $\leq$  `nominalExecutionTime`  $\leq$  `maximumExecutionTime`

]()

**[constr\_4033] Simulated execution time** [The attribute values of `SimulatedExecutionTime` shall fulfill:

`minimumExecutionTime`  $\leq$  `nominalExecutionTime`  $\leq$  `maximumExecutionTime`

]()

**[constr\_4034] Target and context of MC emulation reference** [Within one `ImplementationElementInParameterInstanceRef`, the `target` shall refer to a sub-element of the `ParameterDataPrototype` which is referred as `context`.

]()

**[constr\_4038] `bswModuleDependency` shall refer to a different module** [

- `BswModuleDescription.bswModuleDependency.targetModuleId` (if given) shall differ from `BswModuleDescription.moduleId`. This does not hold if the value is 254 (used for IO Hardware Abstraction modules) or 255 (used for Complex Driver modules).
- `BswModuleDependency.targetModuleRef` (if given) shall differ from the package location of the `BswModuleDescription` that owns the `BswModuleDependency`.

]()

**[constr\_4039] Semantics of `SwcBswMapping`** [An `SwcBswMapping` is only valid, if the referred `SwcInternalBehavior` is aggregated by a `ServiceSwComponentType`, `EcuAbstractionSwComponentType` or `ComplexDeviceDriverSwComponentType`.

]()

**[constr\_4040] Synchronized mode groups shall have same type** [`SwcBswSynchronizedModeGroupPrototype` can only refer to equally typed `ModeDeclarationGroupPrototypes`, i.e. which have identical `ModeDeclarationGroups`.

]()

**[constr\_4041] Synchronized mode groups shall have same context** [The mapping defined by `SwcBswSynchronizedModeGroupPrototype` implies that the component providing the one mode group prototype is also mapped to the module which provides the other mode group prototype by means of synchronizing their respective behaviors in `SwcBswMapping`.

]()

**[constr\_4042] Synchronized triggers shall have same context** [The mapping defined by `SwcBswSynchronizedTrigger` implies that the component providing the one trigger is also mapped to the module which provides the other trigger by means of synchronizing their respective behaviors in `SwcBswMapping`.

]()

**[constr\_4043] Period of `BswTimingEvent`** [`BswTimingEvent.period` shall be greater than 0.

]()

**[constr\_4044] Content of `McSwEmulationMethodSupport`** [The following constraints hold for the attributes of `McSwEmulationMethodSupport`:

- If `category` is `DOUBLE_POINTERED`, a `baseReference` shall exist.
- If `category` is `SINGLE_POINTERED`, a `referenceTable` shall exist.
- If `category` is `INITIALIZED_RAM`, one or more `elementGroups` shall exist.

]()

**[constr\_4045] `implementationConfigVariant` of preconfigured configuration** [An `EcucModuleConfigurationValues` element with the `implementationConfigVariant` set to the value `PreconfiguredConfiguration` shall only be referenced in the role `preconfiguredConfiguration` and no other value for `implementationConfigVariant` is allowed in this role.

]()

**[constr\_4046] `implementationConfigVariant` of recommended configuration** [An `EcucModuleConfigurationValues` element with the `implementationConfigVariant` set to the value `RecommendedConfiguration` shall only be referenced in the role `recommendedConfiguration` and no other value for `implementationConfigVariant` is allowed in this role.

]()

**[constr\_4047] Multiplicity of vendor specific configuration parameters** [The association `BswImplementation.vendorSpecificModuleDef` shall be implemented as reference to one or more instances of `EcucModuleDef` if the underlying `BswModuleDescription` has the `category` `BSW_CLUSTER`. In all other cases, it shall refer to exactly one instance of `EcucModuleDef` (the one belonging to this module).

]()

**[constr\_4048] Multiplicity of preconfigured values** [The association `BswImplementation.preconfiguredConfiguration` shall be implemented as reference to zero or more different instances of `EcucModuleConfigurationValues` if the underlying `BswModuleDescription` has the `category` `BSW_CLUSTER`. In all other cases, it shall refer to at most one instance of `EcucModuleConfigurationValues` (the one belonging to this module).

]()

**[constr\_4051] RoleBasedDataAssignment in BSW** [When used in the context of `BswServiceDependency`, the following restriction hold for data references described by `RoleBasedDataAssignment`:

- Within `RoleBasedDataAssignment.usedDataElement`, only the reference `AutosarVariableRef.localVariable` is applicable.
- Within `RoleBasedDataAssignment.usedParameterElement`, only the reference `AutosarParameterRef.localParameter` is applicable.
- The reference `RoleBasedDataAssignment.usedPim` shall not be set.

]()

**[constr\_4052] BswModuleEntry returnType direction** [ `BswModuleEntry.returnType.direction` shall not have the value `in` or `inout`.

]()

**[constr\_4053] BswModuleEntry argument direction** [ If `BswModuleEntry.argument.direction` has the value `out` or `inout`, the corresponding `BswModuleEntry.argument.swDataDefProps` plus eventually referred `ImplementationDataType` shall be such that they result in a pointer declaration.

]()

**[constr\_4054] Unambiguous links to addressing method** [ `MemorySection.executableEntity` shall not be defined, if `MemorySection.swAddrMethod` represents a data section. `MemorySection.executableEntity` shall not refer to an `ExecutableEntity` which is linked to a different `SwAddrMethod` than `MemorySection.swAddrMethod`.

]()

**[constr\_4056] BswModuleEntry with no returnType** [ In case of an empty return type (“void” in C) the reference `BswModuleEntry.returnType` shall not be set.

]()



**[constr\_4057] BswModuleEntry with no argument** [

In case of an empty argument list ("void" in C) no reference `BswModuleEntry.argument` shall be set.

]()

**[constr\_4058] Different mode groups in mapped BSWM and SWC shall have different names** [If an `SwcInternalBehavior` is mapped to a `BswInternalBehavior` the corresponding SWC and BSW module descriptions may not refer to different

`ModeDeclarationGroups` having the same `shortName` but different elements. This holds especially if these mode groups are not synchronized but used independently.

]()

**[constr\_4059] Different mode groups referred by a BSWM shall have different names** [A `BswModuleDescription` may not refer to different `ModeDeclarationGroups` (via `requiredModeGroup` and/or `providedModeGroup`) having the

same `shortName` but different elements.

]()

**[constr\_4060] Allowed values of Trigger.swImplPolicy for BSW** [The only al-

lowed values for the attribute `Trigger.swImplPolicy` are either `STANDARD` (in which case the `Trigger` processing does not use a queue) or `QUEUED` (in which case the processing of `Triggers` positively uses a queue).

]()

**[constr\_4061] Completeness of MC emulation reference** [If an `McDataInstance`

in the role of a `subElement` of another `McDataInstance` specifies an `instanceInMemory`, then the containing `McDataInstance` shall also specify an `instanceInMemory`. The `target` of the latter (i.e. upper level) `instanceInMemory` shall be identical (including array index, if defined) to the `context` of the first (i.e. lower level) `instanceInMemory`.

]()

**[constr\_4062] Mandatory symbol for McDataInstance root** [`McDataInstances`

directly aggregated in `McSupportData` shall have a valid `McDataInstance.symbol`.

]()

**[constr\_4063] Restrictions of ModeRequestTypeMap in BSW** [For every `Mod-`

`eDeclarationGroup` referenced by a `ModeDeclarationGroupPrototype` used in a `BswModuleDescription` a `ModeRequestTypeMap` shall exist that points to the `ModeDeclarationGroup` and also to an eligible `ImplementationDataType`.

The `ModeRequestTypeMap` shall be aggregated by a `DataTypeMappingSet` which is referenced from the `BswInternalBehavior` that is aggregated by the `BswModuleDescription`.

]()

**[constr\_4064] Synchronized triggers shall implement same policy** [The mapping defined by `SwcBswSynchronizedTrigger` is only valid if the attribute `SwcBswSynchronizedTrigger.swcTrigger.swImplPolicy` has the same value as the attribute `SwcBswSynchronizedTrigger.bswTrigger.swImplPolicy`.

]()

**[constr\_4065] Allowed values of `BswInternalTriggeringPoint.swImplPolicy`** [The **only** allowed values for the attribute `BswInternalTriggeringPoint.swImplPolicy` are either `STANDARD` (in which case the internal trigger processing does not use a queue) or `QUEUED` (in which case the internal trigger processing uses a queue).

]()

**[constr\_4066] `BswModeSwitchEvent` and the definition of `ModeTransition`** [For each pair of `ModeDeclarations` referenced by a `BswModeSwitchEvent` with attribute `activation` set to `onTransition` a `ModeTransition` shall be defined in the corresponding direction (i.e. from `exitedMode` to `enteredMode`). This constraint shall only apply if the respective `ModeDeclarationGroup` defines at least one `modeTransition`.

]()

**[constr\_4068] `McFunctionDataRefSet.flatMapEntry`'s semantic** [

- An `McFunctionDataRefSet` aggregated in the role of `McFunction.defCalprmSet` or `McFunction.refCalprmSet` shall only refer to `FlatInstanceDescriptors` that
  - either can be traced down to a `ParameterDataPrototype`
  - or can be traced down to a `VariableDataPrototype` of category `COM_AXIS`, `RES_AXIS`, `CURVE`, `MAP`, `CUBOID`, `CUBE_4`, `CUBE_5` or `VAL_BLK`
 and which are declared for calibration access i.e. have an associated `SwDataDefProps.swCalibrationAccess` set to `readWrite` or `readOnly`.
- An `McFunctionDataRefSet` aggregated in the role of `McFunction.inMeasurementSet`, `McFunction.outMeasurementSet` or `McFunction.locMeasurementSet` shall only refer to `FlatInstanceDescriptors` that can be traced down to either a `VariableDataPrototype`, an `ArgumentDataPrototype` or a `ModeDeclarationGroupPrototype` and are declared as measurable i.e. have an associated `SwDataDefProps.swCalibrationAccess` set to `readOnly`.

]()

**[constr\_4069] `McFunctionDataRefSet.mcDataInstance`'s semantic** [

- An `McFunctionDataRefSet` aggregated in the role of `McFunction.defCalprmSet` or `McFunction.refCalprmSet` shall only refer to `McDataInstances`

that are declared for calibration access i.e. are aggregated in the role `McSupportData.mcParameterInstance` or `McSupportData.mcVariableInstance` of category `COM_AXIS`, `RES_AXIS`, `CURVE`, `MAP`, `CUBOID`, `CUBE_4`, `CUBE_5` or `VAL_BLK`.

- An `McFunctionDataRefSet` aggregated in the role of `McFunction.inMeasurementSet`, `McFunction.outMeasurementSet` or `McFunction.locMeasurementSet` shall only refer to `McDataInstances` that are declared as measurable i.e. are aggregated in the role `McSupportData.mcVariableInstance`.

]()

**[constr\_4070] Applicability of `BswModuleEntity.activationReason`** [An `activationReason` shall not be set

- for instances of `BswInterruptEntity`
- for instances of `BswCalledEntity`

]()

**[constr\_4071] Synchronized runnables and schedulable entities shall be consistent** [In the case that a `RunnableEntity` is mapped to a `BswCalledEntity` or `BswSchedulableEntity` the RTE Generator emits an Entry Point Prototype only for the `BswCalledEntity` or the `BswSchedulableEntity` (depending on the specified events for SWC resp. BSW). The `SwcBswRunnableMapping` instance controlling this case is only valid if several attributes of the mapped `RunnableEntity` and `BswSchedulableEntity` are consistent, especially all of the following constraints apply to the attributes of the given instance of `SwcBswRunnableMapping`:

- `swcRunnable.symbol` shall be identical to the symbol of `bswEntity` as defined in [TPS\_BSWMDT\_04138].
- `swcRunnable.minimumStartInterval` shall be identical to `bswEntity.minimumStartInterval`.
- `swcRunnable.canBeInvokedConcurrently` shall be identical to `bswEntity.implementedEntry.isReentrant`.
- `swcRunnable.swAddrMethod` shall either be empty or shall have identical attributes as the `SwAddrMethod` defined via `bswEntity.swAddrMethod`. This is required to ensure a unique configuration for the memory segment of the underlying code entity.
- `swcRunnable.activationReason` and `bswEntity.activationReason` shall have identical `shortName` if they define the same `bitPosition` and shall have identical `bitPosition` if they define the same `shortName`

Please note also the SWS\_RTE for further details.

]()

**[constr\_4072] Constraints of `SectionNamePrefix.implementedIn` [**

- The `SectionNamePrefix` and the `DependencyOnArtifact` connected via this link shall belong to the same `BswImplementation`.
- The `DependencyOnArtifact` referred by this link shall be aggregated by `BswImplementation` in the role `requiredArtifact`.
- The `DependencyOnArtifact` referred by this link shall have the `category` value set to MEMMAP.

]()

**[constr\_4073] `McDataAccessDetails` shall refer to one ECU Extract** [Within one given `McDataAccessDetails`, all instances of `System` referenced as the base of any `McDataAccessDetails.variableAccess` or as the base of any `McDataAccessDetails.rteEvent` shall be identical and of `category` ECU\_EXTRACT.

]()

**[constr\_4074] Compatibility of `BswModuleClientServerEntry`-s** [Two `BswModuleClientServerEntry`-s are compatible if and only if all of the following conditions hold:

- Their synchronicity values are identical. These values are taken from the attribute `isSynchronous` or, if this is undefined, from `encapsulatedEntry.isSynchronous`.
- The two `BswModuleEntry`-s referred as `encapsulatedEntry` have completely identical attributes.

]()

**[constr\_4075] Constraints for `providedData` and `requiredData`** [Sender-Receiver communication in BSW is restricted to the pattern of so-called *explicit communication* (in the same way as described for software components in [2]) with queued behavior. This leads to some constraints for the `VariableDataPrototype` referred in the role `BswModuleDescription.providedData` or `BswModuleDescription.requiredData`:

- It shall not have an `initValue`.
- Its `swDataDefProps.swImplPolicy` shall be set to `queued`.
- Its `swDataDefProps.swCalibrationAccess` shall be set to `notAccessible`.

There are no further formal constraints on the attributes of the `VariableDataPrototype` to be used in these roles or on the underlying `AutosarDataPrototype`.

]()

**[constr\_4076] Constraints on `BswModuleEntry` used for Client-Server** [A `BswModuleEntry` used in the role `BswModuleClientServerEntry.encapsulatedEntry` shall have attribute values as follows:

- `callType` shall be `regular` or `callback`.
- `executionContext` shall be `task`.

]()

**[constr\_4077] Constraints for `BswModuleEntity.reentrancyLevel`** [

- If the attribute `isReentrant` of a `BswModuleEntry` referred by an `BswModuleEntity` in the role `implementedEntry` has the value `True`, then the attribute `reentrancyLevel` of the same `BswModuleEntity` (if it exists) can only have the values `singleCoreReentrant` or `multicoreReentrant`.
- If the attribute `isReentrant` of a `BswModuleEntry` referred by an `BswModuleEntity` in the role `implementedEntry` has the values `False`, then there are no restrictions for the values of the attribute `reentrancyLevel` of the same `BswModuleEntity` (if it exists).

]()

**[constr\_4078] Consistent usage of `BswOperationInvokedEvent`** [The `BswCalledEntity` referred by the attribute `BswOperationInvokedEvent.startsOnEvent` shall refer to the same `BswModuleEntry` (via its attribute `implementedEntry`) as the `BswOperationInvokedEvent` (via its attribute `entry.encapsulatedEntry`).

]()

**[constr\_4079] `calledEntry` constraints for client-server calls** [

- The `BswModuleClientServerEntry` aggregated as `calledEntry` in a `BswSynchronousServerCallPoint` shall have the attribute `isSynchronous` = `True`.
- The `BswModuleClientServerEntry` aggregated as `calledEntry` in a `BswAsynchronousServerCallPoint` shall have the attribute `isSynchronous` = `false`.

]()

**[constr\_4080] Existence of reception policy** [If a `VariableDataPrototype` is referred from a `dataReceivePoint` of any `BswModuleEntity` in a given `BswInternalBehavior`, then exactly one corresponding `BswDataReceptionPolicy` shall be aggregated by this `BswInternalBehavior`.

]()

**[constr\_4081] Mode group used by BSW mode manager error event** [The `ModeDeclarationGroupPrototype` used by `BswModeManagerErrorEvent` shall be referred as `BswModuleDescription.providedModeGroup` by the same module.

]()

**[constr\_4083] `BswDistinguishedPartition` shall be used only in the context of a particular `BswInternalBehavior`** [All instances of `BswEvent`, `BswModuleCallPoint` and `BswVariableAccess` which refer to a `BswDistinguishedPartition` shall belong to the same `BswInternalBehavior` that also aggregates the referred `BswDistinguishedPartition`.

]()

**[constr\_4084] Consistency of references of `InternalBehavior`** [The `SwcInternalBehavior` referenced by `SwcBswMapping.swcBehavior` in the `SwcBswMapping` determined by `SwcImplementation.swcBswMapping` shall be identical to the `SwcInternalBehavior` referenced by `SwcImplementation.behavior`.

]()

**[constr\_4085] Consistency of references of `InternalBehavior`** [The `BswInternalBehavior` referenced by `SwcBswMapping.bswBehavior` in the `SwcBswMapping` determined by `BswImplementation.swcBswMapping` shall be identical to the `BswInternalBehavior` referenced by `BswImplementation.behavior`.

]()

**[constr\_4086] invocation of `ExecutableEntity`s by direct function call dependent from `BswExecutionContext`** [For example, if we take the fourth column in table 2.2, the invocation of an `ExecutableEntity` with an `interruptCat1` can be implemented with a direct function call if the `BswExecutionContext` of the caller `BswModuleEntry` is set to `task`, `interruptCat2` or `interruptCat1`.

This applies to the invocation of a triggered `ExecutableEntity` by the `SchM_Trigger`, `SchM_ActMain` or `Rte_Trigger` APIs, or to the invocation of an `OnEntry ExecutableEntity`, `OnTransition ExecutableEntity`, `OnExit ExecutableEntity` or mode switch acknowledge `ExecutableEntity` by the `SchM_Switch` or `Rte_Switch` APIs. For more information about the technical terms refer to [3]

]()

caller's <code>BswExecutionContext</code> <sup>2</sup>	callee's <code>BswExecutionContext</code> <sup>3</sup>				
	task	interruptCat2	interruptCat1	hook	unspecified
task	Supported	Supported	Supported		Supported



<sup>2</sup>The execution context of a `RunnableEntity` is considered as `task`

<sup>3</sup>The execution context of a `RunnableEntity` is considered as `task`



interruptCat2		Supported	Supported		Supported
interruptCat1			Supported		Supported
hook					
unspecified	Supported				Supported

Table 2.2: Possible invocation of **ExecutableEntitys** by direct function call dependent from **BswExecutionContext**

**[constr\_4087] Usage of category "MACRO" [**

It is only allowed to use the category "MACRO" for **SwServiceArg** if the owning **BswModuleEntry** has its **swServiceImplPolicy** attribute set to macro.

]

**[constr\_4088] Existence of **RoleBasedDataTypeAssignment.role** vs. **RoleBasedDataAssignment.role** [**

The usage of a **RoleBasedDataTypeAssignment** with attribute **role** set to the value **temporaryRamBlock** is only allowed if **no** **RoleBasedDataAssignment** defined with attribute **role** set to value **defaultValue** exists in the owning **BswServiceDependency**.

]

**[constr\_4089] Association **callbackHeader** is only applicable for BSW modules [**

The association **callbackHeader** is only supported for **codeDescriptors** of **BswImplementation** and only permitted to reference **ServiceNeeds** owned by **BswServiceDependency**.

]

**[constr\_4090] The **callbackHeader** reference has to be consistent with behavior reference [**

The reference **callbackHeader** is only allowed to reference **ServiceNeeds** in the context of the **BswServiceDependency** which in turn is referenced by the **BswImplementation** behavior of the **BswImplementation** owning the **codeDescriptor**.

]

**[constr\_4091] **AccessCount.value** needs to be unambiguous [**

AUTOSAR model shall define at most one **AccessCount.value** per **countProfile** for a specific **AbstractAccessPoint**.

]

**[constr\_4092] Number of **ErrorTracerNeeds** in **BswInternalBehavior** [**

A Bsw InternalBehavior shall provide at most one **ErrorTracerNeeds** element.

]

**[constr\_4093] Entries linked to **BswModuleEntry**s shall have compatible signature [**

Matching **BswModuleEntry**s according to [TPS\_BSWMDT\_04130] are compatible if the following conditions are fulfilled:



- both or neither of them define a `returnType`
- when the `returnTypes` are defined, the `SwServiceArgs` in the role `returnType` shall be compatible
- both define the same number of compatible arguments in same order

]()

**[constr\_4094] compatibility of `SwServiceArg` in role `returnType`** [SwServiceArg in role `returnType` are compatible if they are identically typed

]()

**[constr\_4095] Compatibility of `SwServiceArg` in role `argument`** [SwServiceArg in role `returnType` are compatible if:

- they are identically typed

and

- if both do have the same `shortName`

]()

**[constr\_4096] Matching `BswModuleEntry`s should have compatible attributes** [Matching `BswModuleEntry`s according to [TPS\_BSWMDT\_04130] should be defined with identical values of the attributes

- `callType`
- `executionContext`
- `isReentrant`
- `isSynchronous`
- `serviceId`
- `swServiceImplPolicy`
- `bswEntryKind`

]()

**[constr\_4097] Limitation on the number of `BswExclusiveAreaPolicys`** [An `ExclusiveArea` can only be referenced by at most one `BswExclusiveAreaPolicy`.

]()

**[constr\_4098] No mode disabling for `BswOperationInvokedEvent`** [A `BswOperationInvokedEvent` shall not have a reference to a `ModeDeclaration` in the role `disabledInMode`.

]()



**[constr\_4099] Support of multiple instantiation** [If a BSW Module supports multiple instantiation the attribute `vendorApiInfix` is mandatory.

]()

**[constr\_4100] Uniqueness of module implementation prefixes** [Inside one ECU the Module implementation prefixes (Mip) of BSW Modules shall be unique.

]()

**[constr\_4101] Semantics of `McGroupDataRefSet.flatMapEntry`** [

- An `McGroupDataRefSet` aggregated in the role of `McGroup.refCalprmSet` or `McGroup.refCalprmSet` shall only refer to `FlatInstanceDescriptors` that can either be traced down to a `ParameterDataPrototype` or can be traced down to a `VariableDataPrototype` of category `COM_AXIS`, `RES_AXIS`, `CURVE`, `MAP`, `CUBOID`, `CUBE_4`, `CUBE_5` or `VAL_BLK` and which are declared for calibration access i.e. have an associated `SwDataDefProps.swCalibrationAccess` set to `readWrite` or `readOnly`.
- An `McGroupDataRefSet` aggregated in the role of `McGroup.refMeasurementSet` shall only refer to `FlatInstanceDescriptors` that can be traced down to either a `VariableDataPrototype`, an `ArgumentDataPrototype` or a `ModeDeclarationGroupPrototype` and are declared as measurable i.e. have an associated `SwDataDefProps.swCalibrationAccess` set to `readOnly`.

]()

**[constr\_4102] Semantics of `McGroupDataRefSet.mcDataInstance`** [

- An `McGroupDataRefSet` aggregated in the role of `McGroup.refCalprmSet` shall only refer to `McDataInstances` that are declared for calibration access i.e. are aggregated in the role `McSupportData.mcParameterInstance` or `McSupportData.mcParameterInstance` of category `COM_AXIS`, `RES_AXIS`, `CURVE`, `MAP`, `CUBOID`, `CUBE_4`, `CUBE_5` or `VAL_BLK`.
- An `McGroupDataRefSet` aggregated in the role of `McGroup.refMeasurementSet` shall only refer to `McDataInstances` that are declared as measurable i.e. are aggregated in the role `McSupportData.mcVariableInstance`.

]()

**[constr\_4103] Name convention for `SectionNamePrefix`** [In case a BSW module or Software Component is split into allocatable memory parts the `SectionNamePrefix` shall be set in the following form correspondingly:

- For BSW module: `<MIP>_<feature>`
- For Software Component: `<software-component symbol name>_<feature>`

where:

- <MIP>: is the capitalized Module Implementation Prefix
- <software-component symbol name>: is the symbol of the software component according to [TPS\_SWCT\_01000] in [2]
- <feature>: is the name of the sub-feature in the module or SWC denoting the allocatable memory part

]()

**[constr\_4104] Referencing of `MemorySections` to `SectionNamePrefix`** [In case a BSW module or Software Component is split into allocatable memory parts all `MemorySections` belonging to the same allocatable memory part shall reference the identical `SectionNamePrefix` representing the allocatable memory part.

]()

**[constr\_4105] Use of attribute `task` or `cat2Isr`** [Only one of the attributes is allowed to exist. Either `task` or `cat2Isr` should be configured.

]()

## 2.2 TPS\_DiagnosticExtractTemplate

**[constr\_1324] Existence of attribute `DiagnosticDataIdentifier.representsVin`** [Within the context of a given `DiagnosticContributionSet`, the attribute `DiagnosticDataIdentifier.representsVin` shall have the value `true` for only a single `DiagnosticDataIdentifier`.

]()

**[constr\_1325] Allowed attributes of `SwDataDefProps` for `DiagnosticDataElement.swDataDefProps`** [The allowed attributes of `SwDataDefProps` for the aggregation in the role `DiagnosticDataElement.swDataDefProps` are defined in table 2.3.

]()

Attributes of <code>SwDataDefProps</code>	<code>DiagnosticDataElement.swDataDefProps</code>
<code>additionalNativeTypeQualifier</code>	N/A
<code>annotation</code>	N/A
<code>baseType.baseTypeDefinition.baseTypeEncoding</code>	D
<code>baseType.baseTypeDefinition.baseTypeSize</code>	D
<code>baseType.baseTypeDefinition.byteOrder</code>	D
<code>baseType.baseTypeDefinition.memAlignment</code>	N/A
<code>baseType.baseTypeDefinition.nativeDeclaration</code>	N/A
<code>compuMethod</code>	D
<code>dataConstr</code>	D





Attributes of <code>SwDataDefProps</code>	<code>DiagnosticDataElement.swDataDefProps</code>
<code>displayFormat</code>	D
<code>displayPresentation</code>	N/A
<code>implementationDataType</code>	N/A
<code>invalidValue</code>	N/A
<code>swAddrMethod</code>	N/A
<code>swAlignment</code>	N/A
<code>swBitRepresentation</code>	N/A
<code>swCalibrationAccess</code>	N/A
<code>swCalprmAxisSet</code>	N/A
<code>swComparisonVariable</code>	N/A
<code>swDataDependency</code>	N/A
<code>swImplPolicy</code>	N/A
<code>swIntendedResolution</code>	N/A
<code>swInterpolationMethod</code>	N/A
<code>swIsVirtual</code>	N/A
<code>swPointerTargetProps</code>	N/A
<code>swRecordLayout</code>	N/A
<code>swRefreshTiming</code>	N/A
<code>swTextProps</code>	N/A
<code>swValueBlockSize</code>	N/A
<code>unit</code>	D
<code>valueAxisDataType</code>	N/A

**Table 2.3:** Allowed attributes of `SwDataDefProps` for `DiagnosticDataElement`.  
`swDataDefProps`

**[constr\_1326] Existence of a variable-sized array** [The value of the attribute `DiagnosticDataElement.arraySizeSemantics` **shall not** be set to `ArraySizeSemanticsEnum.variableSize` if the respective `DiagnosticDataElement` is referenced from a `DiagnosticServiceDataMapping`.

]()

**[constr\_1327] Multiplicity of `DiagnosticEcuInstanceProps.ecuInstance`** [The multiplicity of `DiagnosticEcuInstanceProps.ecuInstance` shall be limited to 1 and the enclosing `DiagnosticContributionSet` shall only refer to at most one `DiagnosticEcuInstanceProps` **if** the enclosing `DiagnosticContributionSet` is of `category` `DIAGNOSTICS_ECU_EXTRACT`.

]()

**[constr\_1328] Consistency of `DiagnosticEcuInstanceProps.ecuInstance` and `DiagnosticServiceTable.ecuInstance`** [Each `DiagnosticServiceTable` referenced by any given `DiagnosticContributionSet` in the role `serviceTable` shall define a reference in the role `DiagnosticServiceTable.ecuInstance` to an `EcuInstance` that is also referenced in the role `DiagnosticEcuInstanceProps.ecuInstance` by a `DiagnosticEcuInstanceProps` referenced by the mentioned `DiagnosticContributionSet` **if** the respective `DiagnosticContributionSet` is of `category` `DIAGNOSTICS_ECU_EXTRACT`.

]()

**[constr\_1329] Existence of concrete sub-classes of `DiagnosticServiceClass` in the context created by a `DiagnosticContributionSet`** [One of the following mutually exclusive conditions shall apply for the existence of any concrete sub-class of `DiagnosticServiceClass` in the context created by a `DiagnosticContributionSet`:

- The subclass of `DiagnosticServiceClass` shall only appear once in the context created by a `DiagnosticContributionSet`
- If the subclass of `DiagnosticServiceClass` appears multiple times in the context created by a `DiagnosticContributionSet` then all instances shall have identical values for all of their attributes.

In case of aggregations the number of aggregated elements shall be identical and the values of primitive attributes of aggregated elements shall again be identical.

]()

**[constr\_1330] Custom service identifier shall not overlap with standardized service identifiers** [The value of the attribute `customServiceId` shall not be set to any of the values reserved for standardized service identifiers as defined by the ISO 14229-1, see [4].

]()

**[constr\_1331] Existence of `DiagnosticEcuReset.customSubFunctionNumber`** [The attribute `DiagnosticEcuReset.customSubFunctionNumber` shall only exist if the value of `DiagnosticEcuReset.category` is outside the standardized set of values as defined by [TPS\_DEXT\_01056].

]()

**[constr\_1332] Value range for `DiagnosticEcuReset.customSubFunctionNumber`** [The allowed value for `DiagnosticEcuReset.customSubFunctionNumber` shall always be within the closed interval **0x40 .. 0x7E**.

]()

**[constr\_1333] Existence of `DiagnosticMemoryIdentifier.memoryLowAddress` and `DiagnosticMemoryIdentifier.memoryHighAddress`** [The attributes `DiagnosticMemoryIdentifier.memoryLowAddress` as well as `DiagnosticMemoryIdentifier.memoryHighAddress` shall not exist if the `DiagnosticMemoryIdentifier` referenced in the role `memoryRange` is referenced by a `DiagnosticRequestDownload` or a `DiagnosticRequestUpload`.

]()

**[constr\_1334] Existence of `DiagnosticComControl.customSubFunctionNumber`** [The attribute `DiagnosticComControl.customSubFunctionNumber` shall

only exist if the value of `DiagnosticComControl.category` is outside the standardized set of values as defined by [TPS\_DEXT\_01057].

]()

**[constr\_1335] Possible values for `DiagnosticComControl.customSubFunctionNumber`** [Given the fulfillment of [constr\_1334], the value of a given `DiagnosticComControl.customSubFunctionNumber` shall always be within the closed interval `0x40 .. 0x5F` (for manufacturer-specific sub-functions) or the closed interval `0x60 .. 0x7E` (for supplier-specific sub-functions).

]()

**[constr\_1336] Applicable value range for `DiagnosticComControlSpecificChannel.subnetNumber`** [The value of attribute `DiagnosticComControlSpecificChannel.subnetNumber` shall be within the closed interval `1 .. 14`.

]()

**[constr\_1337] Allowed value range for attribute `DiagnosticComControlSubNodeChannel.subNodeNumber`** [The value of attribute `DiagnosticComControlSubNodeChannel.subNodeNumber` shall not exceed the closed interval `0 .. 65535`.

]()

**[constr\_1338] Maximum number of aggregated `DiagnosticReadDataByPeriodicIDClass.periodicRate`** [The number of aggregated `periodicRate` within the context of one `DiagnosticReadDataByPeriodicIDClass` shall be within the closed interval `1..3`.

]()

**[constr\_1339] Existence of `DiagnosticRoutine.start`** [In a complete `DiagnosticExtract`, the attribute `DiagnosticRoutine.start` shall always exist for any given `DiagnosticRoutine`.

]()

**[constr\_1340] Consistency of `DiagnosticServiceSwMapping` with respect to synchronously called `DiagnosticRoutines`** [Each `DiagnosticServiceSwMapping` that references a `DiagnosticRoutineControl` that only aggregates a `DiagnosticStartRoutine` in the role `start` shall only reference a `SwcServiceDependency` or `BswServiceDependency` that in turn aggregates a `DiagnosticRoutineNeeds` with attribute `diagRoutineType` set to `DiagnosticRoutineTypeEnum.synchronous`.

]()

**[constr\_1341] Consistency of `DiagnosticServiceSwMapping` with respect to asynchronously called `DiagnosticRoutines`** [Each `DiagnosticServiceSwMapping` that references a `DiagnosticRoutineControl` that aggregates a `DiagnosticStopRoutine` and/or `DiagnosticRequestRoutineResults` in the

role `stop` or `requestResult` shall only reference a `SwcServiceDependency` or `BswServiceDependency` that in turn aggregates a `DiagnosticRoutineNeeds` with attribute `diagRoutineType` set to `DiagnosticRoutineTypeEnum.asynchronous`.

]()

**[constr\_1342] Possible values for `DiagnosticSecurityAccess.requestSeedId`** [The value of the attribute `DiagnosticSecurityAccess.requestSeedId` shall only be set to an odd number<sup>4</sup>.

The supported value range consists of the following list:

- all odd numbers in the closed interval **0x01 .. 0x41**
- **0x5F** (this corresponds to the case of *end-of-life activation of on-board pyrotechnic devices according to ISO 26021-2 [5]*)
- all odd numbers in the closed interval **0x61 .. 0x7E**

]()

**[constr\_1343] Simultaneous existence of the attributes `DiagnosticServiceDataMapping.diagnosticDataElement` and `DiagnosticDataByIdentifier.dataIdentifier`** [A `DiagnosticServiceDataMapping.diagnosticDataElement` shall also be aggregated by a `DiagnosticDataByIdentifier` in the role `dataIdentifier.dataElement.dataElement`.

]()

**[constr\_1344] Condition for the identification of data types of attributes `DiagnosticServiceDataMapping.mappedDataElement`** [`DiagnosticServiceDataMapping.mappedDataElement` shall be typed by either:

- `ApplicationPrimitiveDataType` where the value of attribute `category` is set to `VALUE`.
- `ApplicationArrayDataType` where the value of attribute `element.category` is set to `VALUE`.

]()

**[constr\_1345] `DiagnosticDataElement` shall not (finally) be aggregated by a `DiagnosticRoutine`** [A `DiagnosticDataElement` that is referenced by a `DiagnosticServiceDataMapping` shall not (finally) be aggregated by a `DiagnosticRoutine`.

]()

<sup>4</sup>The even numbers are reserved for the identification of the corresponding `sendKey` sub-function, as explained by [TPS\_DEXT\_01036].

**[constr\_1346] Allowed values of `DiagnosticServiceSwMapping.serviceInstance`** [The applicability of the `DiagnosticServiceSwMapping` is limited to pre-defined set of diagnostic services.

By regulation of the AUTOSAR standard, `DiagnosticServiceSwMapping.serviceInstance` shall only point to the following sub-classes of `DiagnosticServiceInstance`:

- `DiagnosticRoutine`
- `DiagnosticSecurityAccess`
- `DiagnosticReadDataByIdentifier`
- `DiagnosticWriteDataByIdentifier`
- `DiagnosticIOControl`

]()

**[constr\_1347] Existence of attributes of `DiagnosticServiceSwMapping`** [For any given `DiagnosticServiceSwMapping`, **one and only one** of the following references shall exist:

- `DiagnosticServiceSwMapping.mappedFlatSwcServiceDependency`
- `DiagnosticServiceSwMapping.mappedSwcServiceDependencyInSystem`
- `DiagnosticServiceSwMapping.mappedBswServiceDependency`

]()

**[constr\_1349] Value of `udsDtcValue` shall be unique** [The value of `DiagnosticTroubleCodeUds.udsDtcValue` shall be unique for all `DiagnosticTroubleCodeUds` that refer to the same `DiagnosticMemoryDestination` via the reference `DiagnosticTroubleCodeUds.dtcProps.diagnosticMemory`.

]()

**[constr\_1350] Value of `DiagnosticTroubleCodeGroup.groupNumber` shall be unique** [The value of `DiagnosticTroubleCodeGroup.groupNumber` shall be unique to any other DTC and DTC group value.

]()

**[constr\_1351] Value of `DiagnosticTroubleCodeGroup.groupNumber`** [To be compliant to ISO, the value of `DiagnosticTroubleCodeGroup.groupNumber` shall be set as defined in ISO 14229-1 [4].

]()

**[constr\_1352] Existence of `maxNumberFreezeFrameRecords` vs. `freezeFrame`** [If the attribute `DiagnosticTroubleCodeProps.maxNumberFreezeFrameRe-`



`cords` exists than the attribute `DiagnosticTroubleCodeProps.freezeFrame` shall not exist or vice versa.

]()

**[constr\_1353] Applicability of [1352]** [[`constr_1352`] shall apply in the identical way (either one or the other attribute shall exist) for all `DiagnosticTroubleCodeProps` within the context of all `DiagnosticContributionSets` of category `DIAGNOSTIC_ECU_EXTRACT` that refer to the same `EcuInstance`.

]()

**[constr\_1354] Existence of attribute `DiagnosticTroubleCodeProps.snapshotRecordContent`** [If one of the attributes `DiagnosticTroubleCodeProps.maxNumberFreezeFrameRecords` or `DiagnosticTroubleCodeProps.freezeFrame` exists then the attribute `DiagnosticTroubleCodeProps.snapshotRecordContent` shall exist.

]()

**[constr\_1355] Value of `extendedDataRecord.recordNumber`** [To be compliant to ISO, the value of `extendedDataRecord.recordNumber` shall be set in the interval as defined in ISO 14229-1 [4].

]()

**[constr\_1357] Value of `freezeFrame.recordNumber`** [To be compliant to ISO, the value of `freezeFrame.recordNumber` shall be set in the interval as defined in ISO 14229-1 [4].

]()

**[constr\_1359] Condition for the existence of attribute `DiagnosticDebounceAlgorithmProps.debounceCounterStorage`** [Attribute `debounceCounterStorage` of meta-class `DiagnosticDebounceAlgorithmProps` shall only exist if the aggregation of attribute `debounceAlgorithm` at `DiagnosticDebounceAlgorithmProps` actually aggregates a `DiagEventDebounceCounterBased`

]()

**[constr\_1361] Number of `DiagnosticEventToEnableConditionGroupMapping` elements per `DiagnosticEvent`** [The mapping element `DiagnosticEventToEnableConditionGroupMapping` shall be created no more than once per `DiagnosticEvent`.

If several `DiagnosticEventToEnableConditionGroupMapping` elements referring to the same `DiagnosticEvent` are defined, then the `Enable Condition Group` mapping shall be regarded as defective.

]()



**[constr\_1362] Number of `DiagnosticEventToStorageConditionGroupMapping` elements per `DiagnosticEvent`** [The mapping element `DiagnosticEventToStorageConditionGroupMapping` shall be created no more than once or once per `DiagnosticEvent`.

If several `DiagnosticEventToStorageConditionGroupMapping` elements referring to the same `DiagnosticEvent` are defined, then the Storage Condition Group mapping shall be regarded as defective.

]()

**[constr\_1378] Value of `DiagnosticMemoryDestinationUserDefined.memoryId`** [Within the scope of one `DiagnosticContributionSet`, no two (or more) `DiagnosticMemoryDestinationUserDefineds` shall exist that share the same value for attribute `DiagnosticMemoryDestinationUserDefined.memoryId`

]()

**[constr\_1379] Existence of `DiagnosticMemoryDestinationPrimary`** [Within the scope of one `DiagnosticContributionSet` only one `DiagnosticMemoryDestinationPrimary` shall exist.

]()

**[constr\_1394] Value of `DiagnosticDataElement.maxNumberOfElements` depending on its existence** [If the attribute `DiagnosticDataElement.maxNumberOfElements` exists then its value shall be greater than 0.

]()

**[constr\_1405] Value of `DiagnosticProtocol.serviceTable` vs. `DiagnosticServiceTable.protocolKind`** [If the reference `DiagnosticProtocol.serviceTable` exists then the value of `DiagnosticProtocol.protocolKind` shall be identical to the value of `DiagnosticServiceTable.protocolKind`.

]()

**[constr\_1406] `DiagnosticServiceTable.diagnosticConnection` vs. `DiagnosticProtocol.diagnosticConnection`** [If a `DiagnosticServiceTable` exists that fulfills the following conditions:

- reference `DiagnosticServiceTable.diagnosticConnection` exists
- the `DiagnosticServiceTable` is referenced by means of `DiagnosticProtocol.serviceTable`

then all of the `DiagnosticConnections` referenced by means of `DiagnosticServiceTable.diagnosticConnection` shall also be referenced in the role `diagnosticConnection` from a `DiagnosticProtocol` that in turn references the respective `DiagnosticServiceTable` in the role `DiagnosticProtocol.serviceTable`.

]()

**[constr\_1411] Existence of `DiagnosticMemoryIdentifier.memoryHighAddressLabel` vs. `DiagnosticMemoryIdentifier.memoryHighAddress`** [At most **one** of the attributes in the following list shall exist:

- `DiagnosticMemoryIdentifier.memoryHighAddressLabel`
- `DiagnosticMemoryIdentifier.memoryHighAddress`

]()

**[constr\_1412] Existence of `DiagnosticMemoryIdentifier.memoryLowAddressLabel` vs. `DiagnosticMemoryIdentifier.memoryLowAddress`** [At most **one** of the attributes in the following list shall exist:

- `DiagnosticMemoryIdentifier.memoryLowAddressLabel`
- `DiagnosticMemoryIdentifier.memoryLowAddress`

]()

**[constr\_1419] Value of `DiagnosticSecurityLevel.accessDataRecordSize`** [If the attribute `DiagnosticSecurityLevel.accessDataRecordSize` exists then its value shall be greater than zero.

]()

**[constr\_1421] Consistency of `DiagnosticDynamicallyDefineDataIdentifierClass.subfunction`** [The values of `DiagnosticDynamicallyDefineDataIdentifierClass.subfunction` shall not repeat, i.e. every value of `DiagnosticDynamicallyDefineDataIdentifierSubfunctionEnum` shall at most appear once in the `subfunction` attribute.

]()

**[constr\_1435] Debouncing in the presence of a `DiagnosticEventPortMapping`** [If a `DiagnosticEventPortMapping` exists and the enclosed `DiagnosticEventPortMapping.diagnosticEvent` is also referenced by a `DiagnosticEventToDebounceAlgorithmMapping` then the concrete subclass of the respective `DiagnosticEventToDebounceAlgorithmMapping.debounceAlgorithm` shall be identical to the `DiagnosticEventPortMapping.swcServiceDependencyInSystem/swcFlatServiceDependency.serviceNeeds.diagEventDebounceAlgorithm`.

It is assumed that the target of reference `DiagnosticEventPortMapping.swcServiceDependencyInSystem` resp. `swcFlatServiceDependency` aggregates a `DiagnosticEventNeeds`.

]()

**[constr\_1447] Restrictions for the value of `DiagnosticParameterIdentifier.id`** [The values 0x00, 0x20, 0x40, 0x60, 0x80, 0xA0, 0xC0, and 0xE0 are not allowed to appear in the value of `DiagnosticParameterIdentifier.id`.

]()

**[constr\_1448] Interval of `DiagnosticParameterIdentifier.id`** [The allowed interval for values of `DiagnosticParameterIdentifier.id` shall not exceed [0..255].

]()

**[constr\_1449] PID shall only carry a fixed-length collection of data** [The value of `DiagnosticParameterIdentifier.dataElement.dataElement.arraySizeSemantics` shall not be set to `variableSize`.

]()

**[constr\_1450] Service mapping for ODB mode 0x01 for `DiagnosticParameterIdentifier`** [if a `DiagnosticServiceSwMapping` or `DiagnosticServiceDataMapping` refers to a `DiagnosticRequestCurrentPowertrainData` and a `DiagnosticDataElement` that is aggregated by a `DiagnosticParameterIdentifier` then then one of two alternative model configurations shall exist:

- `SwcServiceDependency` referenced by the same `DiagnosticServiceSwMapping` or `DiagnosticServiceDataMapping` shall aggregate an `ObdPidServiceNeeds` in the role `serviceNeeds`.
- The `BswServiceDependencyIdent` referenced by the same `DiagnosticServiceSwMapping` shall aggregate an `ObdPidServiceNeeds` in the role `serviceNeeds`.

]()

**[constr\_1451] Service mapping for OBD mode 0x09 for `DiagnosticInfoType`** [if a `DiagnosticServiceSwMapping` refers to `DiagnosticRequestVehicleInfo` and a `DiagnosticDataElement` that is aggregated by a `DiagnosticInfoType` then one of two alternative model configurations shall exist:

- The `SwcServiceDependency` referenced by the same `DiagnosticServiceSwMapping` shall aggregate a `ObdInfoServiceNeeds` in the role `serviceNeeds`.
- The `BswServiceDependencyIdent` referenced by the same `DiagnosticServiceSwMapping` shall aggregate an `ObdInfoServiceNeeds` in the role `serviceNeeds`.

]()

**[constr\_1452] Service mapping for OBD mode 0x08 for `DiagnosticInfoType`** [if a `DiagnosticServiceSwMapping` refers to a `DiagnosticRequestControlOnBoardDevice` then the `SwcServiceDependency` referenced by the same `DiagnosticServiceSwMapping` shall aggregate an `ObdControlServiceNeeds` in the role `serviceNeeds`.

]()

**[constr\_1453] References from `DiagnosticFunctionInhibitSource`** [Each `DiagnosticFunctionInhibitSource` may either reference one of the following meta-classes in their respective roles:

- `DiagnosticFimAliasEventMapping` in the role `event`
- `DiagnosticFimAliasEventGroupMapping` in the role `eventGroup`

]()

**[constr\_1454] `DiagnosticFimFunctionMapping` shall only reference a `SwcServiceDependency` that aggregates `FunctionInhibitionNeeds`** [A `DiagnosticFimFunctionMapping` shall only reference a `SwcServiceDependency` that aggregates `FunctionInhibitionNeeds` in the role `serviceNeeds`.

]()

**[constr\_1455] Relation of `DiagnosticJ1939Node` to `J1939NmNode`** [Each `J1939NmNode` shall only be referenced in the role `nmNode` by a single `DiagnosticJ1939Node`.

]()

**[constr\_1456] Valid interval for attribute `DiagnosticTroubleCodeJ1939.fmi`** [The value of the attribute `DiagnosticTroubleCodeJ1939.fmi` shall be in the interval 0..31.

]()

**[constr\_1457] Service-only DTCs shall refer to a common memory section** [All `DiagnosticTroubleCodeJ1939` with attribute `kind` set to the value `serviceOnly` that reference the same `DiagnosticJ1939Node` shall also reference the same `DiagnosticTroubleCodeProps.diagnosticMemory`.

]()

**[constr\_1458] Reference to `DiagnosticMemoryDestination`** [A `DiagnosticMemoryDestination` that is referenced by a `DiagnosticTroubleCodeJ1939.dtcProps.diagnosticMemory` where the value of attribute `DiagnosticTroubleCodeJ1939.kind` is set to `serviceOnly` shall **not be referenced by any other** `DiagnosticTroubleCodeJ1939` where attribute `kind` is set to any other value than `serviceOnly`.

]()

**[constr\_1459] Existence of attributes of `DiagnosticTroubleCodeProps`** [The following list of attributes of meta-class `DiagnosticTroubleCodeProps` are not required and therefore shall be ignored if the `DiagnosticTroubleCodeProps` is referenced in the role `dtcProps` from a `DiagnosticTroubleCodeObd`:

- `freezeFrame`
- `snapshotRecordContent`

- `diagnosticMemory`
- `extendedDataRecord`
- `aging`

}]()

**[constr\_1460] Restrictions for the value of `DiagnosticInfoType.id`** [The values 0x00, 0x20, 0x40, 0x60, 0x80, 0xA0, 0xC0, and 0xE0 are not allowed to appear in the value of `DiagnosticInfoType.id`.

}]()

**[constr\_1461] Restrictions for the value of `DiagnosticTestRoutineIdentifier.id`** [The values 0x00, 0x20, 0x40, 0x60, 0x80, 0xA0, 0xC0, and 0xE0 are not allowed to appear in the value of `DiagnosticTestRoutineIdentifier.id`.

}]()

**[constr\_1462] Restrictions for the value of `DiagnosticTestResult.testIdentifier.id`** [The values 0x00, 0x20, 0x40, 0x60, 0x80, 0xA0, 0xC0, and 0xE0 are not allowed to appear in the value of `DiagnosticTestResult.testIdentifier.id`.

}]()

**[constr\_1464] Allowed value range of `DiagnosticEnvConditionFormula.nrcValue`** [The value of attribute `DiagnosticEnvConditionFormula.nrcValue` shall be limited to the interval [1..255].

}]()

**[constr\_1465] Allowed values of `compareType` in the context of a `DiagnosticEnvDataCondition`** [Within the context of a `DiagnosticEnvDataCondition` all values of `DiagnosticCompareTypeEnum` are supported for the inherited attribute `compareType`.

}]()

**[constr\_1466] Allowed values of `compareType` in the context of a `DiagnosticEnvModeCondition`** [Within the context of a `DiagnosticEnvDataCondition` only a subset of the values of `DiagnosticCompareTypeEnum` is supported for the inherited attribute `compareType`, namely:

- `DiagnosticCompareTypeEnum.isEqual`
- `DiagnosticCompareTypeEnum.isNotEqual`

}]()

**[constr\_1467] References in `DiagnosticEnvModeCondition`** [In a `DiagnosticEnvModeCondition` the reference `modeElement` shall only point to a `DiagnosticEnvModeElement` that is aggregated inside the same `DiagnosticEnvironmentalCondition` as the `DiagnosticEnvModeCondition` itself.

|()

**[constr\_1470] Value of `DiagnosticParameter.bitOffset`** [The value of `DiagnosticParameter.bitOffset` shall only be set to a multiple of 8.

|()

**[constr\_1472] Existence of `DiagnosticDataIdentifier.supportInfoByte`** [The attribute `DiagnosticDataIdentifier.supportInfoByte` shall not exist if the value of `DiagnosticDataIdentifier.id` is **outside the range 0xF400-0xF4FF**.

|()

**[constr\_1509] `extendedDataRecord.recordNumber` shall be unique within primary fault memory** [For all `DiagnosticTroubleCodeProps` that refer to `DiagnosticMemoryDestinationPrimary` in the role `diagnosticMemory` there shall be no two `extendedDataRecord.recordNumber` with the same value.

|()

**[constr\_1511] `extendedDataRecord.recordNumber` shall be unique within user-defined fault memory** [For all `DiagnosticTroubleCodeProps` that refer to `DiagnosticMemoryDestinationUserDefined` in the role `diagnosticMemory` there shall be no two `extendedDataRecord.recordNumber` with the same value for any `DiagnosticMemoryDestinationUserDefined` referenced as `DiagnosticTroubleCodeProps.diagnosticMemory` with a given value of `memoryId`.

|()

**[constr\_1512] `freezeFrame.recordNumber` shall be unique within primary fault memory** [For all `DiagnosticTroubleCodeProps` that refer to `DiagnosticMemoryDestinationPrimary` in the role `diagnosticMemory` there shall be no two `freezeFrame.recordNumber` with the same value.

|()

**[constr\_1514] `freezeFrame.recordNumber` shall be unique within user-defined fault memory** [For all `DiagnosticTroubleCodeProps` that refer to `DiagnosticMemoryDestinationUserDefined` in the role `diagnosticMemory` there shall be no two `freezeFrame.recordNumber` with the same value for any `DiagnosticMemoryDestinationUserDefined` referenced as `DiagnosticTroubleCodeProps.diagnosticMemory` with a given value of `memoryId`.

|()

**[constr\_1552] `DiagnosticDataIdentifier` referenced by `DiagnosticDataIdentifierSet`** [If a `DiagnosticDataIdentifier` is referenced by `DiagnosticDataIdentifierSet` then the `DiagnosticDataIdentifier` shall not have gaps in between individual elements (as indicated by `DiagnosticParameter.bitOffset` and the length of the aggregated `DiagnosticDataElement`)

or at the end of the `DiagnosticDataIdentifier` (as indicated by attribute `DiagnosticDataIdentifier.didSize`).

]()

**[constr\_1584] `DiagnosticDataElement` shall not be used more than once in I/O Control instance** [A given `DiagnosticDataElement` shall not be used by more than one `DiagnosticServiceDataMapping` that in turn refers to a `DataPrototype` defined in the context of a `DataInterface` that is used to type a `PortPrototype` that in turn is referenced by a `RoleBasedPortAssignment` where attribute `role` is set to the value `IOControlRequest`.

]()

**[constr\_1590] `DiagnosticEvent` referenced in the role `masterEvent` or `slaveEvent`** [Any given `DiagnosticEvent` shall at most once be referenced from a `DiagnosticMasterToSlaveEventMapping`.

]()

**[constr\_1591] `DiagnosticEvent` referenced as `slaveEvent` shall not be reported by diagnostic monitor** [A `DiagnosticEvent` referenced in the role `DiagnosticMasterToSlaveEventMapping.slaveEvent` shall not be referenced in the role `DiagnosticEventPortMapping.diagnosticEvent` and vice versa.

]()

**[constr\_1612] Reference from `DiagnosticRoutineControl` to `DiagnosticAccessPermission` has no meaning** [The reference from `DiagnosticRoutineControl` (via its abstract base class `DiagnosticServiceInstance`) in the role `accessPermission` to meta-class `DiagnosticAccessPermission` shall not be used.

]()

**[constr\_1616] Existence of attribute `DiagnosticExtendedDataRecord.customTrigger`** [The attribute `DiagnosticExtendedDataRecord.customTrigger` shall only exist if the attribute `DiagnosticExtendedDataRecord.trigger` is set to the value `DiagnosticRecordTriggerEnum.custom`.

]()

**[constr\_1617] Existence of attribute `DiagnosticFreezeFrame.customTrigger`** [The attribute `DiagnosticFreezeFrame.customTrigger` shall only exist if the attribute `DiagnosticFreezeFrame.trigger` is set to the value `DiagnosticRecordTriggerEnum.custom`.

]()

**[constr\_1623] Restriction on `DiagnosticReadScalingDataByIdentifier.dataIdentifier`** [The reference `DiagnosticReadScalingDataByIdentifier.dataIdentifier` shall only refer to a `DiagnosticDataIdentifier`.



]()

**[constr\_1624] Existence of `DiagnosticDataElement.scalingInfoSize`** [The attribute `DiagnosticDataElement.scalingInfoSize` shall only exist if the enclosing `DiagnosticParameter` is aggregated by a `DiagnosticDataIdentifier` that is referenced by a `DiagnosticReadScalingDataByIdentifier` in the role `DiagnosticReadScalingDataByIdentifier.dataIdentifier`.

]()

**[constr\_1721] `DiagnosticControlEnableMaskBit.bitNumber` shall be unique** [Within the context of the enclosing `DiagnosticIOControl` the value of attribute `DiagnosticIOControl.controlEnableMaskBit.bitNumber` shall be unique.

]()

**[constr\_1722] Relation between reference `DiagnosticIOControl.dataIdentifier` and attribute `DiagnosticIOControl.controlEnableMaskBit`** [Any `DiagnosticDataElement` referenced in the role `DiagnosticIOControl.controlEnableMaskBit.controlledDataElement` shall be defined in the scope of the `DiagnosticDataIdentifier` that is referenced in the role `DiagnosticIOControl.dataIdentifier`.

]()

**[constr\_1745] Indirect reference to `DiagnosticCommonElement`** [If a `DiagnosticCommonElement` is referenced from within the context of another `DiagnosticCommonElement` and the referencing `DiagnosticCommonElement` is in turn referenced by a `DiagnosticContributionSet` in the role `element` then the referenced `DiagnosticCommonElement` shall also be referenced by the same `DiagnosticContributionSet`.

]()

**[constr\_1749] Existence of `DiagnosticInfoType.dataElement`** [For each `DiagnosticInfoType`, at least one aggregation of `DiagnosticParameter` in the role `dataElement` shall exist at the time when the DEXT is complete.

]()

**[constr\_1750] Existence of attribute `DiagnosticParameterIdentifier.pidSize`** [Attribute `DiagnosticParameterIdentifier.pidSize` is only relevant if a gap exists at the end of the `DiagnosticParameterIdentifier`. If this gap does not exist, the size of the `DiagnosticParameterIdentifier` can be computed.

]()

**[constr\_1752] Existence of references owned by `DiagnosticEnableConditionPortMapping`** [For each `DiagnosticEnableConditionPortMapping`, only one of the following references

- to `SwcServiceDependency` in the role `swcFlatServiceDependency`



- to `SwcServiceDependency` in the role `swcServiceDependencyInSystem`

may exist **at the time when the DEXT is complete**.

]()

**[constr\_1753] Existence of references owned by `DiagnosticStorageConditionPortMapping`** [For each `DiagnosticStorageConditionPortMapping`, only one of the following references

- to `SwcServiceDependency` in the role `swcFlatServiceDependency`
- to `SwcServiceDependency` in the role `swcServiceDependencyInSystem`

may exist **at the time when the DEXT is complete**.

]()

**[constr\_1756] Existence of attributes `DiagnosticExtendedDataRecord.trigger` and `update`** [For each `DiagnosticExtendedDataRecord`, attributes `trigger` and `update` shall only exist **at the time when the DEXT is complete** if at least one `DiagnosticDataElement` is aggregated by a `DiagnosticExtendedDataRecord.recordElement` in the role `dataElement` to which no reference in the role `DiagnosticDemProvidedDataMapping.dataElement` exists.

]()

**[constr\_1757] Existence of attribute `DiagnosticTroubleCodeUds.udsDtcValue`** [For each `DiagnosticTroubleCodeUds`, attribute `udsDtcValue` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1758] Existence of attribute `DiagnosticTroubleCodeObd.obdDTCValue`** [For each `DiagnosticTroubleCodeObd`, attribute `obdDTCValue` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1759] Existence of references owned by `DiagnosticOperationCyclePortMapping`** [For each `DiagnosticOperationCyclePortMapping`, only one of the following references

- to `SwcServiceDependency` in the role `swcFlatServiceDependency`
- to `SwcServiceDependency` in the role `swcServiceDependencyInSystem`

shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1760] Existence of `DiagnosticExtendedDataRecord.recordElement`** [For each `DiagnosticExtendedDataRecord`, at least one aggregation of `DiagnosticParameter` in the role `recordElement` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1761] Existence of attribute `DiagnosticConnectedIndicator.healingCycle`** [Attribute `DiagnosticConnectedIndicator.healingCycle` shall **only exist** if the value of `DiagnosticConnectedIndicator.healingCycleCounterThreshold` is **not equal to 0**.

]()

**[constr\_1762] Existence of references owned by `DiagnosticEventPortMapping`** [For each `DiagnosticEventPortMapping`, only one of the references

- to `BswServiceDependency` in the role `bswServiceDependency`
- to `SwcServiceDependency` in the role `swcFlatServiceDependency`
- to `SwcServiceDependency` in the role `swcServiceDependencyInSystem`

shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1763] Existence of attribute `DiagnosticPeriodicRate.periodicRateCategory`** [For each `DiagnosticPeriodicRate`, the attribute `periodicRateCategory` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1766] Existence of `DiagEventDebounceCounterBased.counterJumpDownValue`** [For each `DiagEventDebounceCounterBased`, attribute `counterJumpDownValue` shall only exist **at the time when the DEXT is complete** if attribute `counterJumpDown` exists and is set to `True`.

]()

**[constr\_1767] Existence of `DiagEventDebounceCounterBased.counterJumpUpValue`** [For each `DiagEventDebounceCounterBased`, attribute `counterJumpUpValue` shall only exist **at the time when the DEXT is complete** if attribute `counterJumpUp` exists and is set to `True`.

]()

**[constr\_1768] Existence of attribute `DiagnosticEvent.associatedEventIdentification`** [Attribute `DiagnosticEvent.associatedEventIdentification` shall exist if the respective `DiagnosticEvent` is mapped to a `DiagnosticTroubleCodeUds` and one of the following conditions is fulfilled:

- The reference `DiagnosticTroubleCodeUds.dtcProps.snapshotRecordContent` exists and the referenced `DiagnosticDataIdentifierSet` references at least one `dataIdentifier.dataElement.dataElement` that is also referenced by a `DiagnosticDemProvidedDataMapping` that has attribute `dataProvider` set to the value `DEM_EVENT_ASSOCIATED_IDENTIFICATION`.

- The reference `DiagnosticTroubleCodeUds.dtcProps.extendedDataRecord` exists and the referenced `DiagnosticExtendedDataRecord` aggregates at least one `recordElement.dataElement` that is also referenced by a `DiagnosticDemProvidedDataMapping` that has attribute `dataProvider` set to the value `DEM_EVENT_ASSOCIATED_IDENTIFICATION`.

]()

**[constr\_1772] Unique `DiagnosticSession` and `DiagnosticSecurityLevel` for diagnostic routines that have the same identifier** [All `DiagnosticAccessPermissions` referenced from `DiagnosticRoutines` where attribute `DiagnosticRoutine.id` has the identical value shall refer to the identical set of `DiagnosticSession` and `DiagnosticSecurityLevel`.

]()

**[constr\_1780] Existence of attribute `DiagnosticTroubleCodeJ1939.fmi`** [For each `DiagnosticTroubleCodeJ1939`, attribute `fmi` shall exist at the time when the DEXT is complete.

]()

**[constr\_1781] Existence of attribute `DiagnosticTroubleCodeJ1939.spn`** [For each `DiagnosticTroubleCodeJ1939`, attribute `spn` shall exist at the time when the DEXT is complete.

]()

**[constr\_1782] Usage of internal data elements only for extended data records** [A `DiagnosticDemProvidedDataMapping` shall **only** refer to a `DiagnosticDataElement` that is aggregated by a `DiagnosticExtendedDataRecord` in the role `recordElement.dataElement`.

]()

**[constr\_1790] Existence of attribute `DiagnosticParameter.bitOffset`** [For each `DiagnosticParameter`, attribute `bitOffset` shall exist at the time when the DEXT is complete.

]()

**[constr\_1791] Existence of attribute `DiagnosticParameter.dataElement`** [For each `DiagnosticParameter`, attribute `dataElement` shall exist at the time when the DEXT is complete.

]()

**[constr\_1792] Existence of `DiagnosticDataIdentifier.dataElement`** [For each `DiagnosticDataIdentifier`, the aggregation of `DiagnosticParameter` in the role `dataElement` shall exist at least once at the time when the DEXT is complete.

]()

**[constr\_1793] Existence of attribute `DiagnosticAbstractDataIdentifier.id`** [For each `DiagnosticAbstractDataIdentifier`, attribute `id` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1794] Existence of attribute `DiagnosticProtocol.priority`** [For each `DiagnosticProtocol`, attribute `priority` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1795] Existence of attribute `DiagnosticProtocol.protocolKind`** [For each `DiagnosticProtocol`, attribute `protocolKind` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1796] Existence of attribute `DiagnosticServiceTable.serviceInstance`** [For each `DiagnosticServiceTable`, attribute `serviceInstance` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1797] Existence of attribute `DiagnosticServiceTable.protocolKind`** [For each `DiagnosticServiceTable`, attribute `protocolKind` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1798] Existence of `DiagnosticServiceInstance.serviceClass`** [For each subclass of `DiagnosticServiceInstance`, a reference with the abstract role `serviceClass` shall exist **at the time when the DEXT is complete** to a matching subclass of `DiagnosticServiceClass`.

This rule applies unless a rule for a specific combination of matching sub-classes of `DiagnosticServiceInstance` and `DiagnosticServiceClass` exists.

]()

**[constr\_1799] Existence of `DiagnosticEnvironmentalCondition.formula`** [For each `DiagnosticEnvironmentalCondition`, the aggregation of `DiagnosticEnvConditionFormula` in the role `formula` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1800] Existence of `DiagnosticEnvConditionFormula.op`** [For each `DiagnosticEnvConditionFormula`, that attribute `op` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1801] Existence of `DiagnosticEnvCompareCondition.compareType`**  
[For each `DiagnosticEnvCompareCondition`, that attribute `compareType` shall exist **at the time when the DEXT is complete.**

]()

**[constr\_1802] Existence of `DiagnosticEnvDataCondition.compareValue`**  
[For each `DiagnosticEnvDataCondition`, that attribute `compareValue` shall exist **at the time when the DEXT is complete.**

]()

**[constr\_1803] Existence of `DiagnosticEnvDataCondition.dataElement`** [For each `DiagnosticEnvDataCondition`, that attribute `dataElement` shall exist **at the time when the DEXT is complete.**

]()

**[constr\_1804] Existence of `DiagnosticEnvModeCondition.modeElement`** [For each `DiagnosticEnvModeCondition`, that attribute `modeElement` shall exist **at the time when the DEXT is complete.**

]()

**[constr\_1805] Existence of `DiagnosticEnvSwcModeElement.mode`** [For each `DiagnosticEnvSwcModeElement`, that attribute `mode` shall exist **at the time when the DEXT is complete.**

]()

**[constr\_1806] Existence of `DiagnosticEnvBswModeElement.mode`** [For each `DiagnosticEnvBswModeElement`, that attribute `mode` shall exist **at the time when the DEXT is complete.**

]()

**[constr\_1807] Existence of reference `DiagnosticDataByIdentifier.dataIdentifier`** [For each `DiagnosticDataByIdentifier`, the reference `dataIdentifier` shall exist **at the time when the DEXT is complete.**

]()

**[constr\_1808] Existence of reference `DiagnosticDynamicallyDefineDataIdentifier.dataIdentifier`** [For each `DiagnosticDynamicallyDefineDataIdentifier`, the reference to `DiagnosticDynamicDataIdentifier` in the role `dataIdentifier` shall exist **at the time when the DEXT is complete.**

]()

**[constr\_1810] Existence of aggregation `DiagnosticReadDataByPeriodicIDClass.periodicRate`** [For each `DiagnosticReadDataByPeriodicIDClass`, the aggregation of `DiagnosticPeriodicRate` in the role `periodicRate` shall exist **at least once at the time when the DEXT is complete.**

]()

**[constr\_1811] Existence of attribute `DiagnosticReadDataByPeriodicID-Class.maxPeriodicDidToRead`** [For each `DiagnosticReadDataByPeriodicIDClass`, the attribute `maxPeriodicDidToRead` shall exist at least once **at the time when the DEXT is complete.**

]()

**[constr\_1812] Existence of attribute `DiagnosticReadDataByPeriodicID-Class.schedulerMaxNumber`** [For each `DiagnosticReadDataByPeriodicIDClass`, the attribute `schedulerMaxNumber` shall exist at least once **at the time when the DEXT is complete.**

]()

**[constr\_1815] Existence of attribute `DiagnosticRoutine.id`** [For each `DiagnosticRoutine`, the attribute `id` shall exist at least once **at the time when the DEXT is complete.**

]()

**[constr\_1816] Existence of attribute `DiagnosticSecurityAccess.requestSeedId`** [For each `DiagnosticSecurityAccess`, the attribute `requestSeedId` shall exist at least once **at the time when the DEXT is complete.**

]()

**[constr\_1817] Existence of attribute `DiagnosticSecurityAccess.securityLevel`** [For each `DiagnosticSecurityAccess`, the attribute `securityLevel` shall exist at least once **at the time when the DEXT is complete.**

]()

**[constr\_1818] Existence of reference `DiagnosticSessionControl.diagnosticSession`** [For each `DiagnosticSessionControl`, the reference to `DiagnosticSession` in the role `diagnosticSession` shall exist **at the time when the DEXT is complete.**

]()

**[constr\_1819] Existence of attribute `DiagnosticParameterIdentifier.id`** [For each `DiagnosticParameterIdentifier`, attribute `id` shall exist **at the time when the derivation to Ecuc starts.**

]()

**[constr\_1820] Existence of reference `DiagnosticRequestCurrentPowertrainData.pid`** [For each `DiagnosticRequestCurrentPowertrainData`, the reference to `DiagnosticParameterIdentifier` in the role `pid` shall exist **at the time when the derivation to Ecuc starts.**

]()

**[constr\_1821] Existence of reference `DiagnosticRequestPowertrainFreezeFrameData.freezeFrame`** [For each `DiagnosticRequestPowertrainFreezeFrameData`, the reference to `DiagnosticParameterIdentifier` in the role `freezeFrame` shall exist **at the time when the derivation to Ecuc starts**.

]()

**[constr\_1822] Existence of reference `DiagnosticRequestControlOfOnBoardDevice.testId`** [For each `DiagnosticRequestControlOfOnBoardDevice`, the reference to `DiagnosticParameterIdentifier` in the role `testId` shall exist **at the time when the derivation to Ecuc starts**.

]()

**[constr\_1823] Existence of attribute `DiagnosticTestRoutineIdentifier.id`** [For each `DiagnosticTestRoutineIdentifier`, attribute `id` shall exist **at the time when the derivation to Ecuc starts**.

]()

**[constr\_1824] Existence of attribute `DiagnosticTestRoutineIdentifier.requestDataSize`** [For each `DiagnosticTestRoutineIdentifier`, attribute `requestDataSize` shall exist **at the time when the derivation to Ecuc starts**.

]()

**[constr\_1825] Existence of attribute `DiagnosticTestRoutineIdentifier.responseDataSize`** [For each `DiagnosticTestRoutineIdentifier`, attribute `responseDataSize` shall exist **at the time when the derivation to Ecuc starts**.

]()

**[constr\_1826] Existence of reference `DiagnosticRequestVehicleInfo.infoType`** [For each `DiagnosticRequestVehicleInfo`, the reference to `DiagnosticParameterIdentifier` in the role `infoType` shall exist **at the time when the derivation to Ecuc starts**.

]()

**[constr\_1827] Existence of attribute `DiagnosticInfoType.id`** [For each `DiagnosticInfoType`, attribute `id` shall exist **at the time when the derivation to Ecuc starts**.

]()

**[constr\_1828] Existence of referenced from `DiagnosticServiceDataMapping`** [For each `DiagnosticServiceDataMapping`, the following references shall exist **at the time when the DEXT is complete**:

- Reference to `DiagnosticDataElement` in the role `diagnosticDataElement`
- Reference to `DataPrototype` in the role `mappedDataElement`



]()

**[constr\_1829] Existence of reference `DiagnosticConnectedIndicator.indicator`** [For each `DiagnosticConnectedIndicator`, the reference to `DiagnosticIndicator` in the role `indicator` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1830] Existence of `DiagnosticTroubleCodeGroup.groupNumber`** [For each `DiagnosticTroubleCodeGroup`, attribute `groupNumber` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1831] Existence of `DiagnosticTroubleCodeProps.priority`** [For each `DiagnosticTroubleCodeProps`, attribute `priority` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1832] Existence of `DiagnosticExtendedDataRecord.recordNumber`** [For each `DiagnosticExtendedDataRecord`, attribute `recordNumber` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1833] Existence of `DiagnosticFreezeFrame.trigger`** [For each `DiagnosticFreezeFrame`, attribute `trigger` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1834] Existence of `DiagnosticCondition.initValue`** [For each `DiagnosticCondition`, attribute `initValue` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1835] Existence of `DiagEventDebounceCounterBased.counterDecrementStepSize`** [For each `DiagEventDebounceCounterBased`, attribute `counterDecrementStepSize` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1836] Existence of `DiagEventDebounceCounterBased.counterIncrementStepSize`** [For each `DiagEventDebounceCounterBased`, attribute `counterIncrementStepSize` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1837] Existence of `DiagEventDebounceCounterBased.counterFailedThreshold`** [For each `DiagEventDebounceCounterBased`, attribute `counterFailedThreshold` shall exist **at the time when the DEXT is complete**.



]()

**[constr\_1838] Existence of `DiagEventDebounceCounterBased.counterPassedThreshold`** [For each `DiagEventDebounceCounterBased`, attribute `counterPassedThreshold` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1839] Existence of attribute `DiagEventDebounceTimeBased.timeFailedThreshold`** [For each `DiagEventDebounceTimeBased`, attribute `timeFailedThreshold` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1840] Existence of attribute `DiagEventDebounceTimeBased.timePassedThreshold`** [For each `DiagEventDebounceTimeBased`, attribute `timePassedThreshold` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1841] Existence of `DiagnosticEnableConditionGroup.enableCondition`** [For each `DiagnosticEnableConditionGroup`, attribute `enableCondition` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1842] Existence of `DiagnosticStorageConditionGroup.storageCondition`** [For each `DiagnosticStorageConditionGroup`, attribute `storageCondition` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1843] Existence of reference `DiagnosticEventPortMapping.diagnosticEvent`** [For each `DiagnosticEventPortMapping`, the reference to `DiagnosticEvent` in the role `diagnosticEvent` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1844] Existence of reference `DiagnosticOperationCyclePortMapping.operationCycle`** [For each `DiagnosticOperationCyclePortMapping`, the reference to `DiagnosticOperationCycle` in the role `operationCycle` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1845] Existence of reference `DiagnosticEnableConditionPortMapping.enableCondition`** [For each `DiagnosticEnableConditionPortMapping`, the reference to `DiagnosticEnableCondition` in the role `enableCondition` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1846] Existence of reference `DiagnosticStorageConditionPortMapping.diagnosticStorageCondition`** [For each `DiagnosticStorageConditionPortMapping`, the reference to `DiagnosticStorageCondition` in the role `diagnosticStorageCondition` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1847] Existence of reference `DiagnosticDemProvidedDataMapping.dataElement`** [For each `DiagnosticDemProvidedDataMapping`, the reference to `DiagnosticDataElement` in the role `dataElement` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1848] Existence of attribute `DiagnosticAging.agingCycle`** [For each `DiagnosticAging`, attribute `agingCycle` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1849] Existence of attribute `DiagnosticAging.threshold`** [For each `DiagnosticAging`, attribute `threshold` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1850] Existence of aggregation `DiagnosticTestResult.testIdentifier`** [For each `DiagnosticTestResult`, the aggregation of meta-class `DiagnosticTestIdentifier` in the role `testIdentifier` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1851] Existence of reference `DiagnosticTestResult.monitoredIdentifier`** [For each `DiagnosticTestResult`, the reference to meta-class `DiagnosticTestIdentifier` in the role `monitoredIdentifier` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1852] Existence of attribute `DiagnosticEcuInstanceProps.obdSupport`** [For each `DiagnosticEcuInstanceProps`, attribute `obdSupport` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1853] Existence of attribute `DiagnosticIumprGroup.iumprGroupIdentifier`** [For each `DiagnosticIumprGroup`, attribute `iumprGroupIdentifier` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1854] Existence of attribute `DiagnosticIumprGroupIdentifier.groupId`** [For each `DiagnosticIumprGroupIdentifier`, attribute `groupId` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1855] Existence of attribute `DiagnosticFunctionIdentifierInhibit.inhibitionMask`** [For each `DiagnosticFunctionIdentifierInhibit`, attribute `inhibitionMask` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1856] Existence of attribute `DiagnosticJ1939Spn.spn`** [For each `DiagnosticJ1939Spn`, attribute `spn` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1857] Existence of the reference `DiagnosticEventToTroubleCodeJ1939Mapping.diagnosticEvent`** [For each `DiagnosticEventToTroubleCodeJ1939Mapping`, reference `diagnosticEvent` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1858] Existence of the attribute `DiagnosticEventToTroubleCodeJ1939Mapping.troubleCodeJ1939`** [For each `DiagnosticEventToTroubleCodeJ1939Mapping`, attribute `troubleCodeJ1939` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_1859] Usage of `DiagnosticRecordTriggerEnum.testFailedThisOperationCycle`** [The enumeration value `DiagnosticRecordTriggerEnum.testFailedThisOperationCycle` shall only be used in the context of meta-class `DiagnosticFreezeFrame`.

]()

**[constr\_10024]{DRAFT} Existence of reference in the role `DiagnosticSecurityEventReportingModeMapping.dataElement`** [For each `DiagnosticSecurityEventReportingModeMapping`, the reference to `DiagnosticDataElement` in the role `dataElement` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_10025]{DRAFT} Existence of reference in the role `DiagnosticSecurityEventReportingModeMapping.securityEvent`** [For each `DiagnosticSecurityEventReportingModeMapping`, the reference to `SecurityEventContextProps` in the role `securityEvent` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_10026]{DRAFT} Existence of reference in the role `DiagnosticEventToSecurityEventMapping.diagnosticEvent`** [For each `DiagnosticEventToSecurityEventMapping`, the reference to `DiagnosticEvent` in the role `diagnosticEvent` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_10027]{DRAFT} Existence of reference in the role `DiagnosticEventToSecurityEventMapping.securityEventProps`** [For each `DiagnosticEventToSecurityEventMapping`, the reference to `SecurityEventContextProps` in the role `securityEventProps` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_10038] Restriction for the usage of `DiagnosticAccessPermission.authenticationRole`** [Attribute `DiagnosticAccessPermission.authenticationRole` shall not exist if the `DiagnosticAccessPermission` is referenced from

- `DiagnosticRequestCurrentPowertrainData`
- `DiagnosticRequestPowertrainFreezeFrameData`
- `DiagnosticRequestEmissionRelatedDTC`
- `DiagnosticClearResetEmissionRelatedInfo`
- `DiagnosticRequestOnBoardMonitoringTestResults`
- `DiagnosticRequestControlOfOnBoardDevice`
- `DiagnosticRequestVehicleInfo`
- `DiagnosticRequestEmissionRelatedDTCPermanentStatus`
- sub-classes of `DiagnosticAuthentication`

]()

**[constr\_10042] Existence of attribute `DiagnosticCommonProps.defaultEndianness`** [One of the following conditions shall be fulfilled **at the time when the DEXT is complete**:

- `DiagnosticCommonProps.defaultEndianness` exists.
- The attribute `DiagnosticParameter.dataElement.swDataDefProps.baseType.baseTypeDefinition.baseTypeEncoding` exist for **all** `DiagnosticParameters` defined in the context of the `DiagnosticContributionSet`.

]()

**[constr\_10043] Existence of attribute `DiagnosticCommonProps.resetConfirmedBitOnOverflow`** [Attribute `DiagnosticCommonProps.resetConfirmedBitOnOverflow` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_10044] Existence of attribute `DiagnosticCommonProps.occurrenceCounterProcessing`** [If, in the context of a `DiagnosticContributionSet`, a `DiagnosticDemProvidedDataMapping` exists where attribute `DiagnosticDemProvidedDataMapping.dataProvider` is set to the value `DEM_OCCCTR`, then attribute `DiagnosticCommonProps.occurrenceCounterProcessing` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_10045] Existence of attribute `DiagnosticSecurityAccessClass.securityDelayTimeOnBoot`** [Attribute `DiagnosticSecurityAccessClass.securityDelayTimeOnBoot` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_10084] Existence of `DiagnosticIumprToFunctionIdentifierMapping.iumpr`** [For all `DiagnosticIumprToFunctionIdentifierMapping`, the reference in the role `iumpr` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_10085] Existence of `DiagnosticIumprToFunctionIdentifierMapping.functionIdentifier`** [For all `DiagnosticIumprToFunctionIdentifierMapping`, the reference in the role `functionIdentifier` shall exist **at the time when the DEXT is complete**.

]()

**[constr\_10088] Relation between event and DTC without event combination** [If attribute `DiagnosticCommonProps.typeOfEventCombinationSupported` is not configured, then all `DiagnosticTroubleCodeUds` that refer to a `DiagnosticTroubleCodeProps` in the role `dtrProps` that in turn refers to a `DiagnosticMemoryDestination` in the role `diagnosticMemory` shall only be referenced by at most one `DiagnosticEventToTroubleCodeUdsMapping`.

This rule shall be imposed **at the time when the DEXT is complete**.

]()

**[constr\_10089] Existence of attribute `DiagnosticCommonProps.eventCombinationReportingBehavior`** [Attribute `DiagnosticCommonProps.eventCombinationReportingBehavior` is always optional and shall be set to the value `DiagnosticEventCombinationReportingBehaviorEnum.reportingInChronologicalOrderOldestFirst` only if attribute `DiagnosticCommonProps.typeOfEventCombinationSupported` is set to the value `DiagnosticEventCombinationBehaviorEnum.eventCombinationOnRetrieval`.

If it is missing, then the reporting order is not specified. This rule shall be imposed **at the time when the DEXT is complete**.

]()

**[constr\_10091] Mandatory subfunction of diagnostic service Authentication**

[If the diagnostic service `Authentication` is supported, then the following subfunctions shall be configured:

- De-authentication, formalized by meta-class `DiagnosticDeAuthentication`.
- Proof of ownership, formalized by meta-class `DiagnosticProofOfOwnership`.
- Authentication configuration, formalized by meta-class `DiagnosticAuthenticationConfiguration`.
- One of
  - Verify certificate unidirectional, formalized by meta-class `DiagnosticVerifyCertificateUnidirectional`.
  - Verify certificate bidirectional, formalized by meta-class `DiagnosticVerifyCertificateBidirectional`.

]()

## 2.3 TPS\_ECUCConfiguration

**[constr\_3022] `EcucModuleDef` category restriction** [The category definition shall be restricted to exactly the two defined ones:

- `VENDOR_SPECIFIC_MODULE_DEFINITION`
- `STANDARDIZED_MODULE_DEFINITION`

]()

**[constr\_3023] Usage of `apiServicePrefix`** [The attribute `apiServicePrefix` is mandatory for VSMDs derived from the CDD StMD. The attribute shall not be provided for VSMDs derived from any other StMDs.

]()

**[constr\_3091] Multiplicity of `valueConfigClass`** [The multiplicity of the attribute `EcucCommonAttributes.valueConfigClass` shall not exceed 3.

]()

**[constr\_3092] Usage of `configVariant` and `configClass` attributes** [`configVariant` and `configClass` shall always exist as a pair for each existing `EcucAbstractConfigurationClass` (`EcucValueConfigurationClass` or `EcucMultiplicityConfigurationClass` depending on the context).

]()

**[constr\_3119] Necessary content of `EcucDestinationUriDefs` that are referenced by an `EcucContainerDef`** [The `EcucDestinationUriDef` that is referenced by the `EcucContainerDef` in the role `destinationUri` shall define at least the analogous set of `containers`, `parameters` and `references` defined by the `EcucDestinationUriPolicy` of the `EcucDestinationUriDef` that is referenced by the `EcucUriReferenceDef` that targets the `EcucContainerDef`.

]()

**[constr\_3120] Applicable attributes when `destinationUriNestingContract` is set to `targetContainer`** [If the `destinationUriNestingContract` is set to `targetContainer` the attributes `parameter` and `reference` shall not exist.

]()

**[constr\_3200] Restriction on values of `EcucDefinitionElement.relatedTraceItem` in the VSMD** [The value of `EcucDefinitionElement.relatedTraceItem` in the VSMD shall never start with 'ECUC\_'.

]()

**[constr\_3217] Symbolic name reference shall point only to containers with a symbolic name value defined** [If an `EcucReferenceValue` exists that refers in the role `definition` to an `EcucAbstractInternalReferenceDef` with the attribute `requiresSymbolicNameValue` set to true, then the `EcucContainerValue` that is the target of the reference shall refer to an `EcucParamConfContainerDef` in the role `definition` that contains a definition of an `EcucParameterDef` where the attribute `symbolicNameValue` exists and is set to true. The `EcucContainerValue` shall define an `EcucParameterValue` that refers to an `EcucParameterDef` where the attribute `symbolicNameValue` exists and is set to true.

]()

**[constr\_3233] `EcucModuleDef` that relies on `EcucCommonAttributes` with `valueConfigClass` set to `Link/PostBuild` of another `EcucModuleDef`** [If one `EcucModuleDef` relies on the `EcucCommonAttributes` (parameters and references) with `valueConfigClass.configClass` set to `Link/PostBuild` of another `EcucModuleDef`, the values of these `EcucCommonAttributes` can only be changed at `Link/PostBuild` time if the corresponding `EcucModuleConfigurationValues` of the using `EcucModuleDef` has the `implementationConfigVariant` set to `VariantLinkTime/VariantPostBuild`, respectively.

]()

**[constr\_3234] `EcucModuleDef` that relies on `EcucCommonAttributes` with `multiplicityConfigClass` set to `Link/PostBuild` of another `EcucModuleDef`** [If one `EcucModuleDef` relies on the `EcucCommonAttributes` (parameters and references) with `multiplicityConfigClass.configClass` set to `Link/PostBuild` of another `EcucModuleDef`, the number of instances of these `EcucCommonAttributes` can only be changed at `Link/PostBuild` time if the corresponding `EcucModuleConfigurationValues` of the using `EcucModuleDef` has the implemen-



`tationConfigVariant` set to `VariantLinkTime/VariantPostBuild`, respectively.

]()

**[constr\_3235] `EcucModuleDef` that relies on `EcucContainerDefs` with `multiplicityConfigClass` set to `Link/PostBuild` of another `EcucModuleDef`** [If one `EcucModuleDef` relies on the `EcucContainerDefs` with `multiplicityConfigClass.configClass` set to `Link/PostBuild` of another `EcucModuleDef`, the number of instances of these `EcucContainerDefs` can only be changed at `Link/PostBuild` time if the corresponding `EcucModuleConfigurationValues` of the using `EcucModuleDef` has the `implementationConfigVariant` set to `VariantLinkTime/VariantPostBuild`, respectively.

]()

**[constr\_3236] `EcucModuleDef` that relies on `EcucCommonAttributes` with `postBuildVariantValue` set to true of another `EcucModuleDef`** [If one `EcucModuleDef` relies on the `EcucCommonAttributes` (parameters and references) with `postBuildVariantValue` set to true of another `EcucModuleDef`, the values of these `EcucCommonAttributes` can only differ in different post-build variants if the implementation of the using `EcucModuleDef` supports post-build variations.

]()

**[constr\_3237] `EcucModuleDef` that relies on `EcucCommonAttributes` with `postBuildVariantMultiplicity` set to true of another `EcucModuleDef`** [If one `EcucModuleDef` relies on the `EcucCommonAttributes` (parameters and references) with `postBuildVariantMultiplicity` set to true of another `EcucModuleDef`, the number of instances of these `EcucCommonAttributes` can only differ in different post-build variants if the implementation of the using `EcucModuleDef` supports post-build variations.

]()

**[constr\_3238] `EcucModuleDef` that relies on `EcucContainerDef` with `postBuildVariantMultiplicity` set to true of another `EcucModuleDef`** [If one `EcucModuleDef` relies on the `EcucContainerDefs` with `postBuildVariantMultiplicity` set to true of another `EcucModuleDef`, the number of instances of these `EcucContainerDefs` can only differ in different post-build variants if the implementation of the using `EcucModuleDef` supports post-build variations.

]()

**[constr\_3307] ShortNames of `PredefinedVariants` referenced by `EcucPostBuildVariantRefs`** [All `PredefinedVariants` that are referenced by `EcucPostBuildVariantRefs` shall have different `shortNames`.

]()



**[constr\_3449] Impact of `postBuildVariantUsed` value set to FALSE** [If the value of the `EcucModuleConfigurationValues.postBuildVariantUsed` is set to FALSE or if it is not defined, it is not possible to add a post-build variant at post-build configuration time.

]()

**[constr\_3450] `postBuildVariantUsed` value in case of post build `VariationPoints`** [If the configuration values of a BSW module contain at least one post build `VariationPoint`, the value of the `postBuildVariantUsed` for the `EcucModuleConfigurationValues` shall be set to TRUE.

]()

**[constr\_3451] `EcucModuleConfigurationValues.postBuildVariantUsed` value setting restriction in case `postBuildVariantSupport` is set to TRUE** [If `EcucModuleDef.postBuildVariantSupport` is set to TRUE, then `EcucModuleConfigurationValues.postBuildVariantUsed` can be either TRUE or FALSE.

]()

**[constr\_3452] `EcucModuleConfigurationValues.postBuildVariantUsed` value setting restriction in case `postBuildVariantSupport` is set to FALSE** [If `EcucModuleDef.postBuildVariantSupport` is set to FALSE, then `EcucModuleConfigurationValues.postBuildVariantUsed` shall be FALSE.

]()

**[constr\_3509] Applicability of `scope` attribute** [The usage of the attribute `scope` is prohibited for `EcucModuleDef` and for sub-classes of `EcucContainerDef` (i.e. `EcucChoiceContainerDef` and `EcucParamConfContainerDef`).

]()

**[constr\_3570] `EcucDefinitionElement.lowerMultiplicity` always required** [The attribute `EcucDefinitionElement.lowerMultiplicity` shall always be defined when the ECU Configuration Parameter definition is complete.

]()

**[constr\_3571] `EcucCommonAttributes.origin` always required** [The attribute `EcucCommonAttributes.origin` shall always be defined when the ECU Configuration Parameter definition is complete.

]()

**[constr\_3572] `EcucParameterDef.symbolicNameValue` always required** [The attribute `EcucParameterDef.symbolicNameValue` shall always be defined when the ECU Configuration Parameter definition is complete.

]()

**[constr\_3573] [EcucAbstractConfigurationClass.configClass](#) always required** [The attribute [EcucAbstractConfigurationClass.configClass](#) shall always be defined **when the ECU Configuration Parameter definition is complete.**

]()

**[constr\_3574] [EcucAbstractConfigurationClass.configVariant](#) always required** [The attribute [EcucAbstractConfigurationClass.configVariant](#) shall always be defined **when the ECU Configuration Parameter definition is complete.**

]()

**[constr\_3575] [EcucEnumerationLiteralDef.origin](#) always required** [The attribute [EcucEnumerationLiteralDef.origin](#) shall always be defined **when the ECU Configuration Parameter definition is complete.**

]()

**[constr\_3576] [EcucInstanceReferenceDef.destinationContext](#) always required** [The attribute [EcucInstanceReferenceDef.destinationContext](#) shall always be defined **when the ECU Configuration Parameter definition is complete.**

]()

**[constr\_3577] [EcucInstanceReferenceDef.destinationType](#) always required** [The attribute [EcucInstanceReferenceDef.destinationType](#) shall always be defined **when the ECU Configuration Parameter definition is complete.**

]()

**[constr\_3578] [EcucForeignReferenceDef.destinationType](#) always required** [The attribute [EcucForeignReferenceDef.destinationType](#) shall always be defined **when the ECU Configuration Parameter definition is complete.**

]()

**[constr\_3579] [EcucReferenceDef.destination](#) always required** [The attribute [EcucReferenceDef.destination](#) shall always be defined **when the ECU Configuration Parameter definition is complete.**

]()

**[constr\_3580] [EcucUriReferenceDef.destinationUri](#) always required** [The attribute [EcucUriReferenceDef.destinationUri](#) shall always be defined **when the ECU Configuration Parameter definition is complete.**

]()

**[constr\_3581] [EcucDestinationUriDefSet.destinationUriDef](#) always required** [The attribute [EcucDestinationUriDefSet.destinationUriDef](#) shall always be defined **when the ECU Configuration Parameter definition is complete.**

]()

[constr\_3582] **EcucDestinationUriDef.destinationUriPolicy** always required [The attribute `EcucDestinationUriDef.destinationUriPolicy` shall always be defined **when the ECU Configuration Parameter definition is complete**.

]()

[constr\_3583] **EcucDestinationUriPolicy.destinationUriNestingContract** always required [The attribute `EcucDestinationUriPolicy.destinationUriNestingContract` shall always be defined **when the ECU Configuration Parameter definition is complete**.

]()

[constr\_3584] **EcucQuery.ecucQueryExpression** always required [The attribute `EcucQuery.ecucQueryExpression` shall always be defined **when the ECU Configuration Parameter definition is complete**.

]()

[constr\_3585] **EcucConditionFormula.ecucQuery** always required [The attribute `EcucConditionFormula.ecucQuery` shall always be defined **when the ECU Configuration Parameter definition is complete**.

]()

[constr\_3586] **EcucConditionFormula.ecucQueryString** always required [The attribute `EcucConditionFormula.ecucQueryString` shall always be defined **when the ECU Configuration Parameter definition is complete**.

]()

[constr\_3587] **EcucValidationCondition.validationFormula** always required [The attribute `EcucValidationCondition.validationFormula` shall always be defined **when the ECU Configuration Parameter definition is complete**.

]()

[constr\_3588] **EcucValueCollection.ecuExtract** always required [The attribute `EcucValueCollection.ecuExtract` shall always be defined **at code generation time**.

]()

[constr\_3589] **EcucModuleConfigurationValues.ecucDefEdition** always required [The attribute `EcucModuleConfigurationValues.ecucDefEdition` shall always be defined **at code generation time**.

]()

[constr\_3590] **EcucModuleConfigurationValues.implementationConfigVariant** always required [The attribute `EcucModuleConfigurationValues.implementationConfigVariant` shall always be defined **at code generation time**.

}|()

**[constr\_3591] `EcucModuleConfigurationValues.definition` always required** [The attribute `EcucModuleConfigurationValues.definition` shall always be defined **at code generation time**.

}|()

**[constr\_3592] `EcucContainerValue.definition` always required** [The attribute `EcucContainerValue.definition` shall always be defined **at code generation time**.

}|()

**[constr\_3593] `EcucParameterValue.definition` always required** [The attribute `EcucParameterValue.definition` shall always be defined **at code generation time**.

}|()

**[constr\_3594] `EcucNumericalParamValue.value` always required** [The attribute `EcucNumericalParamValue.value` shall always be defined **at code generation time**.

}|()

**[constr\_3595] `EcucTextualParamValue.value` always required** [The attribute `EcucTextualParamValue.value` shall always be defined **at code generation time**.

}|()

**[constr\_3596] `EcucAddInfoParamValue.value` always required** [The attribute `EcucAddInfoParamValue.value` shall always be defined **at code generation time**.

}|()

**[constr\_3597] `EcucAbstractReferenceValue.definition` always required** [The attribute `EcucAbstractReferenceValue.definition` shall always be defined **at code generation time**.

}|()

**[constr\_3598] `EcucInstanceReferenceValue.value` always required** [The attribute `EcucInstanceReferenceValue.value` shall always be defined **at code generation time**.

}|()

**[constr\_3599] `EcucReferenceValue.value` always required** [The attribute `EcucReferenceValue.value` shall always be defined **at code generation time**.

}|()

**[constr\_5015] Multiplicity of `multiplicityConfigClass`** [The multiplicity of the attribute `EcucCommonAttributes.multiplicityConfigClass` shall not exceed 3.

]()

**[constr\_5059] Ordering of `MetaDataItems` of a `MetaDataType`** [The `Meta-DataItems` of a `MetaDataType` shall be ordered according to their `MetaDataItemLength`. `MetaDataItems` with greater `MetaDataItemLength` going first.

]()

**[constr\_5108] `CddModuleId` range restriction** [The range of `CddModuleId` is restricted to the value 255 and to the range of values 2048..4095.

]()

**[constr\_5500] Applicability of the `multiplicityConfigClass` attribute** [The `multiplicityConfigClass` attribute is applicable only to `EcucContainerDefs` which have `upperMultiplicity` greater than `lowerMultiplicity`.

]()

**[constr\_5502] Introduction of new `EcucParameterValues` of type `EcucFunctionNameDef` at post-build time** [In case a new `EcucParameterValues` of type `EcucFunctionNameDef` (see [TPS\_ECUC\_02033]) is introduced at post-build time, it's value shall be one of the existing function names (e.g. callouts). This means that it is not allowed to introduce new functions at post-build time.

]()

**[constr\_5504] Removing an instance of the `EcucContainerDef` at post-build time** [Only instances of `EcucContainerDefs` with `multiplicityConfigClass.configClass` set to `PostBuild` in the `multiplicityConfigClass.configVariant VariantPostBuild` which are not referenced or are exclusively referenced by `EcucAbstractReferenceDefs` with `valueConfigClass.configClass` set to `PostBuild` in the `valueConfigClass.configVariant VariantPostBuild` and have been introduced at post-build time (not part of the initial configuration before post-build updates) can be removed at post-build time.

]()

**[constr\_5505] Configuration class of the elements of the `EcucQueryExpression`** [The elements of the `EcucQueryExpression` involved in one calculation formula shall have lower or equal configuration class (where `PreCompile` configuration class is considered to be the lowest and `PostBuild` the highest) with respect to the context element in which the calculation is performed (e.g. a `Link` configuration parameter can not calculate its value based on a `PostBuild` parameters value).

]()

**[constr\_5506] Applicability of `postBuildVariantMultiplicity` attribute** [The `postBuildVariantMultiplicity` attribute of `EcucContainerDef` is applicable only to `EcucContainerDefs` which have `upperMultiplicity` greater than `lowerMultiplicity`.

]()

**[constr\_5507] Value of `EcucContainerDef.postBuildVariantMultiplicity` if `postBuildVariantSupport` is set to false** [If `postBuildVariantSupport` is set to false, every `EcucContainerDef` in this `EcucModuleDef` with `upperMultiplicity` greater than `lowerMultiplicity` shall have its `postBuildVariantMultiplicity` attribute set to false.

]()

**[constr\_5508] Applicability of `postBuildVariantMultiplicity` attribute** [The `postBuildVariantMultiplicity` attribute is applicable only to `EcucCommonAttributes` which have `upperMultiplicity` greater than `lowerMultiplicity`.

]()

**[constr\_5509] Value of `postBuildVariantMultiplicity` if `postBuildVariantSupport` is set to false** [If `postBuildVariantSupport` is set to false, every `EcucCommonAttributes` in this `EcucModuleDef` with `upperMultiplicity` greater than `lowerMultiplicity` shall have its `postBuildVariantMultiplicity` attribute set to false.

]()

**[constr\_5510] Value of `postBuildVariantValue` if `postBuildVariantSupport` is set to false** [If `postBuildVariantSupport` is set to false, every `EcucCommonAttributes` in this `EcucModuleDef` shall have its `postBuildVariantValue` attribute set to false.

]()

**[constr\_5512] `postBuildVariantValue` attribute of `symbolicNameValue` parameters** [The values of `EcucParameterDefs` with `symbolicNameValue` attribute set to true shall have their `postBuildVariantValue` set to false.

]()

**[constr\_5514] Applicability of the `multiplicityConfigClass` attribute** [The `multiplicityConfigClass` attribute is applicable only to `EcucCommonAttributes` which have `upperMultiplicity` greater than `lowerMultiplicity`.

]()

**[constr\_5520] `valueConfigClass` attribute of `symbolicNameValue` parameters** [The values of `EcucParameterDefs` with `symbolicNameValue` attribute set to true shall have their `valueConfigClass.configClass` set to `PreCompile` or `PublishedInformation` for all `valueConfigClass.configVariants`.

]()

**[constr\_5521] `multiplicityConfigClass` attribute of `symbolicNameValue` parameters** [The values of `EcucParameterDefs` with `symbolicNameValue` attribute set to `true` shall have their `multiplicityConfigClass.configClass` set to `PreCompile` for all `multiplicityConfigClass.configVariants`.

]()

**[constr\_5522] `postBuildVariantMultiplicity` attribute of `symbolicNameValue` parameters** [The values of `EcucParameterDefs` with `symbolicNameValue` attribute set to `true` shall have their `postBuildVariantMultiplicity` set to `false`.

]()

**[constr\_5523] Allowed `configClasses` for paired `configVariants`** [PublishedInformation `configClass` is supported by all `configVariants` where [TPS\_ECUC\_02071] applies. Additionally, `VariantPreCompile` `configVariant` supports `PreCompile` `configClass`, `VariantLinkTime` `configVariant` supports `PreCompile` and `Link` `configClasses`, and `VariantPostBuild` `configVariant` supports `PreCompile`, `Link` and `PostBuild` `configClasses`.

]()

## 2.4 TPS\_ECUResourceTemplate

**[constr\_3500] `category` of `HwAttributeDef` shall not be extended** [In contrast to the general rule that `category` can be extended by user-specific values it is **not allowed** to extend the meaning of the attribute `category` of meta-class `HwAttributeDef`

]()

**[constr\_3511] `HwType` shall not have a reference to another `HwType`** [A `HwType` (being a `HwDescriptionEntity`) shall not have a reference to another `HwType` in the role `hwType`. The definition of `HwTypes` is not hierarchical.

]()

**[constr\_3512] No support of multiple instantiation** [An essential constraint is that each `HwElement` can only be target of one `nestedElement` reference. This means that there is no concept of multiple instantiation of hardware elements. If the same hardware element shall be used several times (using the `nestedElement` reference) each occurrence has to have its own description. This is also true for nested elements of the referenced nested element.

]()



**[constr\_3513] Scope of connections** [Each hardware connection shall only connect features which both are in the hierarchical scope of the hardware element. The hierarchical scope encloses

- all features belonging to the hardware element containing the connection
- all features belonging to hardware elements which are referenced directly and indirectly in the `nestedElement` relation from the hardware element containing connection.

]()

**[constr\_11001] Multiplicity of `HwAttributeValue.hwAttributeDef`** [For each `HwAttributeValue` the reference in the role `hwAttributeDef` shall exist.

]()

**[constr\_11002] Multiplicity of `HwElementConnector.hwElement`** [For each `HwElementConnector` there shall exist exactly 2 references in the role `hwElement`.

]()

**[constr\_11003] Multiplicity of `HwPinGroupConnector.hwPinGroup`** [For each `HwPinGroupConnector` there shall exist exactly 2 references in the role `hwPinGroup`.

]()

**[constr\_11004] Multiplicity of `HwPinConnector.hwPin`** [For each `HwPinConnector` there shall exist exactly 2 references in the role `hwPin`.

]()

**[constr\_11005] Multiplicity of `HwAttributeDef.isRequired`** [For each `HwAttributeDef` the attribute `isRequired` shall exist.

]()

## 2.5 TPS\_GenericStructureTemplate

**[constr\_2501] Blueprint of blueprints are not supported** [Note that objects modeled particularly as a “blueprint” (e.g. `PortPrototypeBlueprint`) also live in a package of category `BLUEPRINT`. Strictly speaking this means that they can be “blueprints” of “blueprints”. This indirection is not intended and not supported.

]()

**[constr\_2502] Merged model shall be compliant to the meta-model** [A model merged from `<<atpSplitable>>` elements shall adhere to the consistency rules of the *meta-model*. Note that the required lower multiplicities depend on the process



phase therefore the AUTOSAR schema sets them mainly to 0. This also applies to the bound model.

]()

**[constr\_2503] Bound model shall be compliant to the pure meta-model** [The *completely bound M1 model*<sup>5</sup> shall adhere to the *pure meta-model* with respect to consistency rules and semantic constraints defined in the related template specifications. Especially, the multiplicities in the bound model shall conform to the multiplicities and the constraints of the *pure meta-model*.

]()

**[constr\_2504] Constraint to `bindingTime`** [The tag `vh.latestBindingTime` *constraints* the value of the attribute `bindingTime` from [TPS\_GST\_00190]. Hence, it defines the latest point in methodology which is allowed as value for `bindingTime` of this particular application of `<<atpVariation>>`.

]()

**[constr\_2505] Multiplicity after binding** [if  $\text{Phase} \geq \{\text{partRole}\}.\text{BindingTime}$  then number of `\{\text{partRole}\}`'s =  $n$

]()

**[constr\_2507] `EvaluatedVariantSet` shall not refer to itself** [An `EvaluatedVariantSet` shall not refer to itself directly or via other `EvaluatedVariantSet`.

]()

**[constr\_2508] The `shortName` shall be unique in its name space** [The content of `shortName` needs to be unique (case insensitive) within a the parent given name space. Note that the check for uniqueness of `shortName` shall be performed case insensitively. This supports the good practice that names should not differ in upper / lower case only which would cause a lot of confusion.

The term “case insensitive” indicates that the characters in the sets

```
{a b c d e f g h i j k l m n o p q r s t u v w x y z}
{A B C D E F G H I J K L M N O P Q R S T U V W X Y Z}
```

are respectively considered to be the same. In other words case-insensitive check for uniqueness of `shortNames` results in the fact that e.g. elements with `shortName` "X" and "x" are considered the same and shall not exist in the same name space.

]()

**[constr\_2509] Uniqueness of `ReferenceBase.shortLabel` in the scope of an `ARPackage`** [The `shortLabel` of any given `ReferenceBase` defined in the scope of an `ARPackage` shall be unique within the scope of the enclosing `ARPackage`.

<sup>5</sup>Completely bound includes post build!

]()

**[constr\_2510] only one default ReferenceBase** [Only one ReferenceBase per level can be marked as default (default="true").

]()

**[constr\_2511] Named reference bases shall be available** [If there is a relative references, then one of the containing packages shall have a referenceBase with a shortLabel equal to the base of the reference.

]()

**[constr\_2512] shortName uniqueness constraint for variants** [shortName + shortLabel of a variant element shall be unique within the name space established by the surrounding Identifiable.

]()

**[constr\_2514] shortLabel in VariationPoint shall be unique** [The combination of shortName and shortLabel shall be unique within the next enclosing Identifiable {WholeClass}. In case the shortName does not exist on the {PartClass} the shortLabel is unnecessary. In case the shortName of the {PartClass} is unique in the context of the {WholeClass} the shortLabel is unnecessary.

]()

**[constr\_2515] Categories of packages shall not conflict** [If a non empty category is defined for a package, then all sub packages shall have empty category or the same category. See table 2.5. Additionally, the "Rules for references between elements in packages with specific categories" shall apply. See table ??.

]()

	child + category (also indirect children)						
parent category	empty	BLUEPRINT	STANDARD	EXAMPLE	ICS	custom1	custom2
empty	ok	ok	ok	ok	ok	ok	ok
BLUEPRINT	ok	ok	conflict	conflict	conflict	conflict	conflict
STANDARD	ok	conflict	ok	conflict	conflict	conflict	conflict
EXAMPLE	ok	conflict	conflict	ok	conflict	conflict	conflict
ICS	ok	conflict	conflict	conflict	ok	conflict	conflict
custom1	ok	conflict	conflict	conflict	conflict	ok	conflict
custom2	ok	conflict	conflict	conflict	conflict	conflict	ok

**Table 2.4: Rules for categories of sub packages**

	target package category (if category is empty, then the parent category applies)						
category of package that contains reference source element (if category is empty, then the parent category applies)	empty	BLUEPRINT	STANDARD	EXAMPLE	ICS	cus-tom1	cus-tom2
empty	ok	ok	ok	ok	ok	ok	ok
BLUEPRINT	ok	ok	ok	conflict	ok	conflict	conflict
STANDARD	ok	conflict	ok	conflict	conflict	conflict	conflict
EXAMPLE	ok	ok	ok	ok	ok	conflict	conflict
ICS	ok	conflict	ok	conflict <sup>6</sup>	ok	conflict	conflict
custom1	ok	ok	ok	ok	ok	ok	ok
custom2	ok	ok	ok	ok	ok	ok	ok

**Table 2.5: Rules for references between elements in packages with specific categories**

**[constr\_2516] Return type of an [AttributeValueVariationPoint](#)** [When such a formula is evaluated by a software tool, and the return value of the formula is shall be compatible to the type of the attribute in the pure meta-model.

]()

**[constr\_2517] [postBuildVariantCondition](#) only for PostBuild** [Aggregation of [PostBuildVariantCondition](#) in [VariationPoint](#) is only allowed if the annotated model states `vh.latestBindingTime` to PostBuild.

]()

**[constr\_2518] Binding time is constrained** [Note that this binding time is again constrained by the value of the tag `vh.latestBindingTime`.

]()

**[constr\_2519] [PredefinedVariants](#) need to be consistent** [If a [PredefinedVariant](#) plus its [includedVariants](#) references more than one [SwSystemconstantValueSet](#) all [value](#) attributes in [SwSystemconstValues](#) for a particular [SwSystemconst](#) shall be identical.

]()

<sup>6</sup>see [\[constr\\_2573\]](#) for details

**[constr\_2520] Nesting of lists shall be limited** [The nesting of lists shall be limited to a reasonable depth such that it can safely be rendered on A4 pages. A reasonable approach is not to nest more than three levels.

]()

**[constr\_2521] The `shortLabel` in `AttributeValueVariationPoint` shall be unique** [The `shortLabel` shall be unique (case insensitive) within the next enclosing `Identifiable` and is used to individually address variation points in the *variant-rich M1 model*.

Note that the check for uniqueness of `shortLabel` shall be performed case insensitively. This supports the good practice that `shortLabels` should not differ in upper / lower case only which would cause a lot of confusion.

The term 'case insensitive' indicates that the characters in the sets

```
{a b c d e f g h i j k l m n o p q r s t u v w x y z}
{A B C D E F G H I J K L M N O P Q R S T U V W X Y Z}
```

are respectively considered to be the same. In other words case-insensitive check for uniqueness of `shortLabel` results in the fact that e.g. elements with `shortLabel` 'X' and 'x' are considered the same and shall not exist in the same context.

]()

**[constr\_2522] Notes should not be nested** [Note even if it is possible to nest notes it is not recommended to do so, since it might lead to problems with the rendering of the note icon.

]()

**[constr\_2523] Used languages need to be consistent** [The used languages of an AUTOSAR file are specified in the top level `adminData`. All other elements shall be provided in the languages specified for the document.

]()

**[constr\_2524] Non splittable elements in one file** [If the *aggregation/attribute* is **not** `<<atpSplittable>>`, then all aggregated element(s) shall be described in the same physical file as the aggregating element.

]()

**[constr\_2525] Non splittable elements shall not be repeated** [Properties (namely aggregations, references and primitive attributes) which are not marked as `<<atpSplittable>>` shall be placed in one physical file. They shall not be repeated in the split files unless they are an attribute which is used as a part of the split key. Another special case is handling of `<<atpStructuredComment>>`, see [TPS\_GST\_00382].

]()

**[constr\_2533] Documentation context is either a feature or an identifiable** [One particular `DocumentationContext` shall be either a feature or an identifiable but not both at the same time. If this is desired, one should create multiple `DocumentationContext`.

]()

**[constr\_2534] Limits of unlimited Integer** [Practically `UnlimitedInteger` shall be limited such that it fits into 64 bit.

If a signed value is represented the min value can be down to -9223372036854775808 (0x800000000000000014) and the max value can be up to 9223372036854775807 (0x7fffffffffffffffffff).

If an unsigned value is represented the min value can be down to 0 and the max value can be up to 18446744073709551615 (0xffffffffffffffff).

]()

**[constr\_2537] Variation of `PackageableElement` is limited to components resp. modules** [Variation of `ARElement` in `ARPackage` shall be applied only to elements on a kind of component level. In particular this is `BswModuleDescription`, `Documentation`, `Implementation`, `SwComponentType`, `TimingExtension`. This constraint only applies if the `PackageableElement` is not a blueprint.

]()

**[constr\_2538] Global reference is limited to certain elements** [The ability to perform a global reference is limited to `Chapter`, `Topic1`, `Caption`, `Traceable`, `Xref-Target`, `Std`, `Xdoc`, `Xfile`

]()

**[constr\_2547] Ordered collections cannot be split into different partial models** [Ordered collections cannot be split. In other words: Contrary to the semantics of unordered collections - which can be distributed between partial models - ordered collections can only be placed as a whole in one of the partial models. Otherwise the merge approach would influence the semantics of the collections.

]()

**[constr\_2557] No `VariationPoints` where `vh.latestBindingTime` set to `BlueprintDerivationTime` in system configurations** [Blueprints are **not** part of a system configuration. In consequence of this, in a system configuration there shall be no `VariationPoint` where `vh.latestBindingTime` is restricted to `BlueprintDerivationTime` by the meta-model.

]()

**[constr\_2558] If `vh.latestBindingTime` is `BlueprintDerivationTime` then there shall only be `blueprintCondition` or `formalBlueprintGenerator` respectively `blueprintValue`** [`VariationPoints` with `vh.latestBindingTime`

restricted to `BlueprintDerivation` shall not have `swSyscond` nor `postBuild-VariantCondition`.

]()

**[constr\_2559] No nested `VariationPoint`** [As `blueprintCondition` is a `DocumentationBlock` it could again contain `VariationPoints` and therefore would allow nesting of `VariationPoints`. This is not intended and shall not be used.

]()

**[constr\_2567] Undefined Value in Attribute Value Blueprints** [If a `blueprint-Value` is specified, then the `value` defined by the `AttributeValueVariation-Point` is not used and should therefore at least contain one term `undefined` which is to be refined when deriving objects from this blueprint.

]()

**[constr\_2572] Unique Control of Document Languages** [The settings for multiple languages are specified in the top-Level `AdminData` only

]()

**[constr\_2573] ICS shall not reference examples** [ICS is like a productive Model and therefore shall not reference to an `EXAMPLE`. Such a reference would be useless since the target needs to be ignored in the ICS.

]()

**[constr\_2574] `globalInPackage` for global elements only** [`ReferenceBase.globalInPackage` is allowed only if `isGlobal` is set to true.

]()

**[constr\_2575] `blueprintValue` in blueprints only** [`blueprintValue` is only allowed in blueprints and may not be present in a system description.

]()

**[constr\_2577] Binding Time in Aggregation Pattern** [Within `VariationPoint`, the class `ConditionByFormula` has an attribute `bindingTime` which defines the *latest* binding time for this variation point. This binding time is further constrained by the UML tag `vh.latestBindingTime` that is attached to the aggregation see [TPS\_GST\_00190], [TPS\_GST\_00220], [TPS\_GST\_00221]):

`ConditionByFormula.bindingTime` ≤ *aggregation.vh.latestBindingTime*

]()

**[constr\_2578] Binding Time in Association Pattern** [Within `VariationPoint`, the class `ConditionByFormula` has an attribute `bindingTime` which defines the *latest* binding time for this variation point. This binding time is further constrained by the UML tag `vh.latestBindingTime` that is attached to the association (see [TPS\_GST\_00190], [TPS\_GST\_00220], [TPS\_GST\_00221]):

```
ConditionByFormula.bindingTime ≤ association.vh.latestBindingTime
```

```
]()
```

**[constr\_2579] Binding Time in Attribute Value Pattern** [The meta-class `AttributeValueVariationPoint` has an attribute `bindingTime` which defines the *latest* binding time for this variation point. This binding time is further constrained by the UML tag `vh.latestBindingTime` that is attached to the attribute (see [TPS\_GST\_00190], [TPS\_GST\_00220], [TPS\_GST\_00221]):

```
AttributeValueVariationPoint.bindingTime ≤ attribute.vh.latestBindingTime
```

```
]()
```

**[constr\_2580] Binding Time in Property Set Pattern** [The meta-class `VariationPoint` has an attribute `bindingTime` which defines the *latest* binding time for this variation point. This binding time is further constrained by the UML tag `vh.latestBindingTime` that is attached to the meta-class which is marked as `«atpVariation»` (see [TPS\_GST\_00190], [TPS\_GST\_00220], [TPS\_GST\_00221]):

```
VariationPoint.bindingTime ≤ meta class.vh.latestBindingTime
```

```
]()
```

**[constr\_2581] Default life cycle state shall be defined properly** [`defaultLcState` in `LifeCycleInfoSet` shall reference to a `lcState` defined in the `LifeCycleStateDefinitionGroup` referenced by `usedLifeCycleStateDefinitionGroup`.

```
]()
```

**[constr\_2583] Used life cycle state shall be defined properly** [`defaultLcState` in `LifeCycleInfo` shall reference to a `lcState` defined in the `LifeCycleStateDefinitionGroup` referenced by `usedLifeCycleStateDefinitionGroup` of the containing `LifeCycleInfoSet`.

```
]()
```

**[constr\_2585] LifeCycleInfo shall be unambiguous** [Within one particular `LifeCycleInfoSet` `lifeCycleInfo.lcObject` shall be unique. This ensures that the association of a `LifeCycleState` to a `Referrable` is unambiguous.

This constraint applies for a particular point in time under consideration of the period of viability according to [TPS\_GST\_00244].

```
]()
```

**[constr\_2586] Constraints on LifeCyclePeriod** [The attributes `date`, `arReleaseVersion`, `productRelease` in `LifeCyclePeriod` are mutually exclusive.

```
]()
```



**[constr\_2587] No `System` in `AnyInstanceRef`** [In consequence of [TPS\_GST\_-00387] `System` shall not be `contextElement` nor `target` of an `AnyInstanceRef`. Otherwise `atpBase` would not be determined.

]()

**[constr\_2594] Cyclic value assignments to `SwSystemconst` is not allowed** [It is explicitly forbidden to assign values to `SwSystemconst` which in turn depend directly or indirectly on this value assignment.

]()

**[constr\_2595] Footnotes should not be nested** [Note that even if supported by the meta-model, footnotes shall not be nested. Nested footnotes might lead to problems with the processing of the footnote link. In other words `LParagraph` shall not be aggregated with role `ft` within a `LParagraph` which already has the role `ft`.

]()

**[constr\_2596] Used colors of attributes `color` and `bgcolor`** [The used colors of the attributes `color` and `bgcolor` shall base on the 6 digits RGB hex-code following

```
|#([a-fA-F0-9]{6})|
```

.

]()

**[constr\_2599] Maximum one `VariationPoints` in `<<atpMixed>>`** [In case an `<<atpMixed>>` meta-class is aggregated as `<<atpVariation>>` there shall not be more than one `VariationPoint` and the `VariationPoint` shall be the last aggregated element.

]()

**[constr\_2601] Value of `AbstractEnumerationValueVariationPoint`** [The formula of an `AbstractEnumerationValueVariationPoint` shall evaluate to a value for which a mapping is defined in the `EnumerationMappingTable` which is referenced by the attributes `base` and `enumTable`.

]()

**[constr\_2602] Completeness of `AnyInstanceRef` referencing `ImplementationDataTypeElement`** [If the `target` references an `ImplementationDataTypeElement` the `AnyInstanceRef` shall define a `contextElement` reference for

1. each leaf `ImplementationDataTypeElement` in a chain of referencing `ImplementationDataTypes` which is not the `target`
2. and each `ImplementationDataTypeElement` of category `ARRAY` in a chain of referencing `ImplementationDataTypes`



Thereby the contexts are created according [TPS\_GST\_00162] from the root to the leaf `ImplementationDataTypeElement` which is either typed (directly or indirectly via `ImplementationDataType` of category TYPE\_REFERENCE) or owns the `target`.

]()

**[constr\_2606] Existence of `upperMultiplicityInfinite` and `upperMultiplicity` of `AbstractMultiplicityRestriction` is mutually exclusive** [The existence of the elements `upperMultiplicityInfinite` and `upperMultiplicity` of `AbstractMultiplicityRestriction` shall be mutually exclusive.

]()

**[constr\_2607] `lowerMultiplicity` of `AbstractMultiplicityRestriction` shall be smaller or equal to `upperMultiplicity`** [`lowerMultiplicity` of `AbstractMultiplicityRestriction` shall be smaller or equal to `upperMultiplicity`.

]()

**[constr\_2626] `atpTarget` of `InstanceRefs` shall be consistent** [The `atpTarget` of an instance ref shall either

- be an `atpFeature` owned by the `atpType` of the last `atpContextElement` or
- be an `atpFeature` owned by an `AtpStructureElement` owned by the `atpType` of the last `atpContextElement`.

]()

**[constr\_2627] No reassigning of the same name within one LET Block** [Within one LET block one name shall be assigned to an value at most once.

]()

**[constr\_2628] Representation of `xml.xsd.type=double` data types** [All data types with `xml.xsd.type=double` shall comply with IEEE 754 and are limited to what can be expressed by a 64 bit binary representation.

]()

**[constr\_2629] Defined identity up to the root** [If an element in the M1 model aggregates splittable elements on deeper levels, it shall have a defined identity, i.e. the identifying attributes (e.g. `shortName` or `shortLabel`); see [TPS\_GST\_00047]; shall be set in the M1 model.

]()

**[constr\_2630] M1 elements with same identity but different type are not allowed** [Splittable M1 elements with the same identity but different type shall not exist.

]()

**[constr\_2631] Usage of value ANY for `AnyServiceInstanceId`** [The value of a given `AnyServiceInstanceId` shall not be set to ANY.

]()

**[constr\_2632] No postbuild variation for attribute values** [The tag `vh.latestBindingTime` is limited to `preCompileTime` and earlier binding times, i.e. (`blueprintDerivationTime`, `systemDesignTime` and `codeGenerationTime`) in the Attribute Value pattern.

]()

**[constr\_2633] Existence of reference decorated with stereotype `<<isOfType>>`** [If a subclass of `AtpPrototype` defines a reference decorated with stereotype `<<isOfType>>` to a subclass of `AtpType`, then this reference shall always exist.

]()

**[constr\_2634] Conditionals with ordered collections** [Ordered collections shall not be split over different conditionals.

]()

**[constr\_2635] No custom values for `Collection.category`** [It is not allowed to define any custom or project-specific value of the attribute `Collection.category`.

]()

**[constr\_2636] No custom values for `Collection.elementRole`** [It is not allowed to define any custom or project-specific value of the attribute `Collection.elementRole`.

]()

**[constr\_4055] ICS may not contain blueprints** [Since an Implementation Conformance Statement always describes a set of one or more fully configured software modules, a package with category `ICS` it is not allowed to contain sub-packages at any level which have the category `BLUEPRINT`.

]()

## 2.6 TPS\_SafetyExtensions

**[constr\_6200] Safety goals have no decomposed ASIL** [If a safety requirement is of type `SAFETY_GOAL` the valid values of the `ASIL` attribute are restricted to: `QM`, `A`, `B`, `C`, or `D`.

]()

**[constr\_6201] Consistency of ASIL values** [The ASIL of AUTOSAR elements and allocated safety requirements should be *consistent*. An ASIL is consistent if the value

at an element is the same or higher of the maximum ASIL of allocated safety requirements.

]()

**[constr\_6202] Decomposition into two safety requirements** [A decomposition as specified by [TPS\_SAFEX\_00302] shall be specified at exactly two decomposing safety requirements (not more) for each decomposed requirement.

]()

**[constr\_6203] Decomposing only one safety requirement** [Each decomposing requirement specified according to [TPS\_SAFEX\_00302] shall decompose maximum one other requirement.

]()

## 2.7 TPS\_SoftwareComponentTemplate

**[constr\_1000] End-to-end protection is limited to sender/receive communication** [end-to-end protection applies for sender/receiver communication only.

]()

**[constr\_1004] Mapping of [ApplicationDataTypes](#) in the scope of single [AtomicSwComponentTypes](#)** [In the scope of [AtomicSwComponentType.internalBehavior.dataTypeMapping](#), each [ApplicationDataType](#) shall be mapped to exactly one [ImplementationDataType](#) at the time when the contract phase generation is executed.

]()

**[constr\_1005] Compatibility of [ImplementationDataTypes](#) mapped to the same [ApplicationDataType](#)** [It is required that [ImplementationDataTypes](#) which are taken for connecting corresponding elements of [PortInterfaces](#) and thus refer to compatible [ApplicationDataTypes](#) are also compatible among each other (so that RTE is able to cope with possible connections by converting the data accordingly) at the time when the contract phase generation is executed.

]()

**[constr\_1006] applicable data categories** [Table [2.6](#) defines the **only** applicable [category](#)s depending on specific model elements related to data definition properties at any time in the workflow.

]()

Category	Applicable to ...											Use Case	Description
	ApplicationArrayDataType	ApplicationRecordDataType	ApplicationPrimitiveDataType	ApplicationRecordElement	ApplicationArrayElement	ApplicationValueSpecification	ApplicationRuleBasedValueSpecification	ImplementationDataType	ImplementationDataTypeElement	SwServiceArg	SwSystemConst	McDataInstance	Calibration Measurement Communication Port Interfaces RTE + BSW
VALUE			x	x	x	x		x	x	x <sup>7</sup>	x	x	Contains a single value.
VAL_BLK			x	x	x	x						x	A value block defines values stored together within one calibration parameter object. It is similar to an value array but it stores the values by means of an axis instead (only important for calibration data handling).
DATA_REFERENCE								x	x	x			Contains an address of another <a href="#">DataPrototype</a> (whose type is given via <a href="#">SwDataDefProps.swPointerTargetProps</a> ).
FUNCTION_REFERENCE								x	x	x			Contains an address of a function prototype (whose signature is given via <a href="#">SwDataDefProps.swPointerTargetProps.functionPointerSignature</a> ).
TYPE_REFERENCE								x	x	x			The element is defined via reference to another data type (via <a href="#">SwDataDefProps.implementationDataType</a> ).
STRUCTURE	x			x	x			x	x			x	Holds one or several further elements which can have different <a href="#">AutosarDataTypes</a> . The underlying elements are defined in the same manner as normal data except for the association to <a href="#">SwAddrMethod</a> : This has to be the same for all underlying elements. Corresponds to a Record if used in the application domain.
UNION								x	x			x	Can hold values of different data types. It is similar to <a href="#">STRUCTURE</a> except that all of its members start at the same location in memory. A <a href="#">UNION</a> data prototype can contain only one of its elements at a time. The size of the <a href="#">UNION</a> is at least the size of the largest member. Please find more information in [TPS_SWCT_01700].
ARRAY	x			x	x		x	x	x			x	An array of sub-elements which are of the same type.
BIT												x	One or several bits within a host variable, which are treated as an own data object.



<sup>7</sup>This option has **very few** valid use cases, e.g. for defining a function pointer in native C notation, for example: `int (*SwCluC_BManif_VoidFncPtrType)(void);`

<sup>8</sup>[[constr\\_1295](#)] applies!



Category	Applicable to ...											Use Case	Description
	ApplicationArrayDataType	ApplicationRecordDataType	ApplicationPrimitiveDataType	ApplicationRecordElement	ApplicationArrayElement	ApplicationValueSpecification	ApplicationRuleBasedValueSpecification	ImplementationDataType	ImplementationDataTypeElement	SwServiceArg	SwSystemconst	McDataInstance	Calibration Measurement Communication Port Interfaces RTE + BSW
HOST											x	x x	A <b>HOST</b> data type is like a simple <b>VALUE</b> , but it is used for packed bit definition. That means it can host several <b>BIT</b> variables which have their own description and measurement access.
STRING			x	x	x	x					x	x x x	Contains a single value interpreted as a text string (note that it appears as a single value for the application domain; the internal representation can be an array).
BOOLEAN			x	x	x	x					x	x x x	Contains one boolean state. Depending on the CPU direct addressing of single bits may not be available. So a byte or a word can be used to store only one logical state.
COM_AXIS			x	x	x	x	x				x	x x	An axis definition as separate calibration parameter which can be referenced by any <b>CURVE</b> , <b>MAP</b> , <b>CUBOID</b> , <b>CUBE_4</b> , and <b>CUBE_5</b> . The benefits by using a common axis is that it saves memory space; because it is stored only one time and can be used in multiple <b>CURVES</b> , <b>MAPs</b> , <b>CUBOIDS</b> , <b>CUBE_4s</b> , and <b>CUBE_5s</b> .
RES_AXIS			x	x	x	x	x				x	x x	A <b>RES_AXIS</b> (rescale axis) is also a shared axis like <b>COM_AXIS</b> , the difference is that this kind of axis can be used for rescaling. Note that the <b>RES_AXIS</b> is by nature a <b>CURVE</b> which is used to implement a non linear scaling (rescale) of the axis. In addition to saving memory space via the shared usage like a <b>COM_AXIS</b> , it can compress a huge range to a non-linear distributed axis points thus retaining the required accuracy.
CURVE			x	x	x	x	x				x	x x	Calibration parameter with one input value and one output value. That means output values can be defined depending on the input value. The granularity of implemented functionality can be changed by using different number of axis points. A <b>CURVE</b> has always one input axis and one output axis. The output axis is a characteristic of the curve and every time present but the input axis can be defined within the curve definition or separately.





Category	Applicable to ...											Use Case	Description
	ApplicationArrayDataType	ApplicationRecordDataType	ApplicationPrimitiveDataType	ApplicationRecordElement	ApplicationArrayElement	ApplicationValueSpecification	ApplicationRuleBasedValueSpecification	ImplementationDataType	ImplementationDataTypeElement	SwServiceArg	SwSystemConst	McDataInstance	Calibration Measurement Communication Port Interfaces RTE + BSW
MAP			x	x	x	x	x					x	Calibration Measurement Communication Port Interfaces RTE + BSW
			x	x	x	x	x					x	Calibration Measurement Communication Port Interfaces RTE + BSW
CUBOID			x	x	x	x	x					x	Calibration Measurement Communication Port Interfaces RTE + BSW
			x	x	x	x	x					x	Calibration Measurement Communication Port Interfaces RTE + BSW
CUBE_4			x	x	x	x	x					x	Calibration Measurement Communication Port Interfaces RTE + BSW
			x	x	x	x	x					x	Calibration Measurement Communication Port Interfaces RTE + BSW
CUBE_5			x	x	x	x	x					x	Calibration Measurement Communication Port Interfaces RTE + BSW
			x	x	x	x	x					x	Calibration Measurement Communication Port Interfaces RTE + BSW
MACRO										x			x

Table 2.6: Usage of **category** for Data Types

**[constr\_1007] Allowed attributes of SwDataDefProps for Application-DataTypes** [The allowed attributes of SwDataDefProps for Application-DataTypes and their allowed multiplicities at any time in the workflow are listed as an overview in table 2.7.

]()

Attributes of SwDataDefProps	Root Elem.			Attribute Existence per Category												
	ApplicationDataType	ApplicationRecordElement	ApplicationArrayElement	VALUE	VAL_BLK	STRUCTURE	ARRAY	STRING	BOOLEAN	COM_AXIS	RES_AXIS	CURVE	MAP	CUBOID	CUBE_4	CUBE_5
additionalNativeTypeQualifier																
annotation	x	x	x	*	*	*	*	*	*	*	*	*	*	*	*	*
baseType																
compuMethod	x			0..1	0..1				0..1			0..1	0..1	0..1	0..1	0..1
dataConstr.dataConstrRule.physConstrs	x	x	x	0..1	0..1		0..1		0..1			0..1	0..1	0..1	0..1	0..1
dataConstr.dataConstrRule.internalConstrs	x	x	x	d/c <sup>9</sup>	d/c		d/c		d/c			d/c	d/c	d/c	d/c	d/c
displayFormat	x	x	x	0..1	0..1		0..1	0..1	0..1			0..1	0..1	0..1	0..1	0..1
displayPresentation	x	x	x	0..1	0..1		0..1			0..1	0..1	0..1	0..1	0..1	0..1	0..1
implementationDataType																
invalidValue	x			0..1				0..1	0..1							
stepSize	x	x	x	0..1	0..1		0..1			0..1	0..1	0..1	0..1	0..1	0..1	0..1
swAddrMethod	x			0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
swAlignment																
swBitRepresentation																
swCalibrationAccess	x	x		0..1	0..1	0..1	0..1	0..1	0..1	1	1	1	1	1	1	1
swCalprmAxisSet	x									1	1	1	1	1	1	1
swComparisonVariable																
swDataDependency																
swHostVariable																
swImplPolicy	x			0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
swIntendedResolution	x	x	x	0..1												
swInterpolationMethod	x			0..1						0..1	0..1	0..1	0..1	0..1	0..1	0..1
swIsVirtual																
swPointerTargetProps																
swRecordLayout	x			0..1	0..1 <sup>10</sup>			0..1		1	1	1	1	1	1	1
swRefreshTiming	x			0..1	0..1			0..1	0..1							
swTextProps	x							1								
swValueBlockSize	x				1											



<sup>9</sup>don't care

<sup>10</sup>This is required by [TPS\_SWCT\_01179].





swValueBlockSizeMult	x				1											
unit	x			0..1	0..1			0..1	0..1			0..1	0..1	0..1	0..1	0..1
valueAxisDataType	x				0..1					0..1	0..1	0..1	0..1	0..1	0..1	0..1
Other Attributes below the Root Element																
element: ApplicationRecordElement	x	x	x			1..*										
element: ApplicationArrayElement	x	x	x				1									
ApplicationArrayElement.array- SizeSemantics	x						0..1									
ApplicationArrayElement. maxNumberOfElements	x						1									

Table 2.7: Allowed Attributes vs. **category** for **ApplicationDataTypes**

[constr\_1009] **SwDataDefProps** applicable to **ImplementationDataTypes** [A  
complete list of the **SwDataDefProps** and other attributes and their multiplicities which  
are allowed for a given **category** is shown in table 2.8.

This rule shall be applied **at any time in the workflow**.

]()

Attributes of SwDataDefProps	Root Element				Attribute Existence per Category						
	ImplementationDataType	ImplementationDataTypeElement	SwPointerTargetProps	SwServiceArg	VALUE	DATA_REFERENCE	FUNCTION_REFERENCE	TYPE_REFERENCE	STRUCTURE	UNION	ARRAY
additionalNativeTypeQualifier	x	x	x	x	0..1	0..1	0..1	0..1	0..1	0..1	0..1
annotation	x	x	x	x	*	*	*	*	*	*	*
baseType	x	x	x	x	1						
compuMethod	x	x	x	x	0..1			0..1			
dataConstr.dataConstrRule.physConstrs	x	x	x	x	d/ c <sup>11</sup>			d/c			d/c
dataConstr.dataConstrRule.internalConstrs	x	x	x	x	0..1			0..1			0..1
displayFormat	x	x			0..1				0..1	0..1	0..1
displayPresentation	x	x			0..1						0..1
implementationDataType	x	x	x	x				1			



<sup>11</sup>don't care



Attributes of SwDataDefProps	Root Element				Attribute Existence per Category						
	ImplementationDataType	ImplementationDataTypeElement	SwPointerTargetProps	SwServiceArg	VALUE	DATA_REFERENCE	FUNCTION_REFERENCE	TYPE_REFERENCE	STRUCTURE	UNION	ARRAY
invalidValue	x	x	x		0..1			0..1	0..1 <sup>12</sup>		0..1 <sup>13</sup>
stepSize	x	x			0..1						
swAddrMethod	x	x	x		0..1	0..1	0..1	0..1	0..1	0..1	0..1
swAlignment	x				0..1	0..1	0..1		0..1	0..1	0..1
swBitRepresentation											
swCalibrationAccess	x	x			0..1			0..1	0..1	0..1	0..1
swCalprmAxisSet											
swComparisonVariable											
swDataDependency											
swHostVariable											
swImplPolicy	x		x	x	0..1	0..1	0..1	0..1	0..1	0..1	0..1
swIntendedResolution											
swInterpolationMethod											
swIsVirtual											
swPointerTargetProps	x	x	x	x		1	1				
swPointerTargetProps .swDataDefProps	x	x	x	x		1					
swPointerTargetProps .functionPointerSignature	x	x	x	x			1				
swRecordLayout											
swRefreshTiming	x	x	x	x	0..1				0..1	0..1	0..1
swTextProps											
swValueBlockSize											
swValueBlockSizeMult											
unit											
valueAxisDataType											
Other Attributes											
subElement: ImplementationDataTypeElement	x	x							1..*	1..*	1
subElement.arraySizeSemantics	x	x									0..1
subElement.arraySize	x	x									1

Table 2.8: Allowed Attributes vs. category for ImplementationDataType

<sup>12</sup>There is a use case for the definition of an `invalidValue` for category `ARRAY` and therefore category `STRUCTURE` is also supported for the sake of symmetry.

<sup>13</sup>This represents an exception such that it would make sense to use an entire `ArrayValueSpecification` as the `invalidValue` because a string semantically is more than just a bunch of characters in a row.

**[constr\_1010] If `nativeDeclaration` does not exist** [If `nativeDeclaration` does not exist in the `SwBaseType`, it is required that the `shortName` (e.g. "uint8") of the corresponding `ImplementationDataType` is equal to a name of one of the Platform or Standard Types predefined in AUTOSAR code.

This rule shall be imposed **at the time when the contract phase generation is executed.**

]()

**[constr\_1011] `category` of `SwBaseType`** [For the attribute `SwBaseType.category` only the values `FIXED_LENGTH` and `VOID` are supported **at the time when the contract phase generation is executed.**

]()

**[constr\_1012] Value of `category` is `FIXED_LENGTH`** [If the value of the attribute `SwBaseType.category` is set to `FIXED_LENGTH` then the attribute `baseTypeSize` shall be filled with content **at the time when the contract phase generation is executed.**

]()

**[constr\_1014] Supported value encodings for `SwBaseType`** [The supported values for attribute `BaseTypeDirectDefinition.baseTypeEncoding` are:

- 1C: One's complement
- 2C: Two's complement
- BCD-P: Packed Binary Coded Decimals
- BCD-UP: Unpacked Binary Coded Decimals
- DSP-FRACTIONAL: Digital Signal Processor
- SM: Sign Magnitude
- IEEE754: floating-point numbers
- ISO-8859-1: single-byte coded character
- ISO-8859-2: single-byte coded character
- WINDOWS-1252: single-byte coded character
- UTF-8: UCS Transformation Format 8
- UTF-16: Character encoding for Unicode *code points* based on 16 bit *code units* [6]
- UCS-2: Universal Character Set 2
- NONE: Unsigned Integer
- VOID: corresponds to a void in C. The encoding is not formally specified here.

- **BOOLEAN:** This represents an unsigned integer to be interpreted as boolean. The value shall be interpreted as `true` if the value of the unsigned integer is 1 and it shall be interpreted as `false` if the value of the unsigned integer is 0.

A `CompuMethod` shall be referenced by the corresponding `AutosarDataType` that implements the common sense behind the boolean concept, i.e. define a `TEXTTABLE` with two `CompuScales`: e.g. `true` → 1, `false` → 0.

This rule shall be imposed at any time in the workflow.

]()

**[constr\_1015] Prioritization of `SwDataDefProps`** [The prioritization and usage of attributes of meta-class `SwDataDefProps` shall follow the restrictions given in table 2.9 at the time when the contract phase generation is executed.

]()

Attributes of <code>SwDataDefProps</code>	Usage For			Place of Setting										
	RTE	A2L	Other Usage	ApplicationDataType	ImplementationDataType	DataPrototype	InstantiationDataDefProps	ParameterAccess	ComSpec	SwServiceArg	FlatInstanceDescriptor	McDataInstance	SwSystemconst	PerInstanceMemory
<code>additionalNativeTypeQualifier</code>	x		x	NA	D	I	NA	NA	NA	D	NA	S	NA	NA
<code>annotation</code>			x	D	A	A	A	A	A	D	NA	A	D	NA
<code>baseType</code>	x	x	x	NA	D	I	I	I	R	D	NA	S	M	NA
<code>compuMethod</code>	x	x	x	D	AI	I	I	NA	R	I	AI	S	D	NA
<code>dataConstr</code>	x	x	x	D	C	R	R	I	NA	R	NA	S	D	NA
<code>displayFormat</code>		x		D	A	R	R	I	NA	R	NA	S	D	NA
<code>displayPresentation</code>	x	x	x	D	A	R	R	NA	NA	NA	NA	S	NA	NA
<code>implementationDataType</code>	x		x	NA	D	I	I	I	NA	D	NA	NA	NA	NA
<code>invalidValue</code>	x	x		D	A	I	I	NA	D	NA	NA	S	NA	NA
<code>stepSize</code>		x		D	A	A	A	A	NA	NA	A	S	NA	NA
<code>swAddrMethod</code>	x	x	x	D	R	R	R	NA	NA	NA	R	NA	NA	D
<code>swAlignment</code>	x		x	NA	D	R	R	NA	NA	NA	NA	NA	NA	NA
<code>swBitRepresentation</code>		x	x	NA	NA	NA	NA	NA	NA	NA	NA	D	NA	NA
<code>swCalibrationAccess</code>	x	x		D	R	R	R	NA	NA	R	R	S	D	NA
<code>swCalprmAxisSet</code>	x	x		D	NA	I	I	I	NA	NA	NA	S	NA	NA
<code>swCalprmAxisSet.swCalprmAxis</code> <code>/SwAxisGrouped.swCalprmRef</code>		x		NA	NA	NA	D	R	NA	NA	NA	S	NA	NA
<code>swCalprmAxisSet.swCalprmAxis</code> <code>/SwAxisIndividual.swVariableRef</code>		x		NA	NA	NA	D	R	NA	NA	NA	S	NA	NA
<code>swCalprmAxisSet.swCalprmAxis</code> <code>/SwAxisGrouped.sharedAxisType</code>		x		D	NA	NA	NA	NA	NA	NA	NA	S	NA	NA
<code>swCalprmAxisSet.swCalprmAxis</code> <code>/SwAxisIndividual.inputVariableType</code>		x		D	NA	NA	NA	NA	NA	NA	NA	S	NA	NA





Attributes of SwDataDefProps	Usage For			Place of Setting										
	RTE	A2L	Other Usage	ApplicationDataType	ImplementationDataType	DataPrototype	InstantiationDataDefProps	ParameterAccess	ComSpec	SwServiceArg	FlatInstanceDescriptor	McDataInstance	SwSystemconst	PerInstanceMemory
swCalprmAxisSet/SwAxisIndividual.unit		opt.		D	NA	I	I	I	NA	I	NA	S	NA	NA
swComparisonVariable		x		NA	NA	NA	NA	D	NA	NA	NA	S	NA	NA
swDataDependency		x	x	NA	NA	D	R	NA	NA	NA	NA	S	NA	NA
swHostVariable		x	x	NA	NA	NA	NA	NA	NA	NA	NA	D	NA	NA
swImplPolicy	x		x	D	A	A	NA	NA	NA	D	NA	NA	NA	NA
swIntendedResolution			x	D <sup>14</sup>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
swInterpolationMethod			x	D	I	R	R	R	NA	NA	NA	S	NA	NA
swIsVirtual		x		NA	NA	D	R	NA	NA	NA	NA	S	NA	NA
swPointerTargetProps			x	NA	D	I	NA	NA	NA	D	NA	NA	NA	NA
swRecordLayout	x	x	x	D	NA	I	I	I	NA	NA	NA	S	NA	NA
swRefreshTiming		x		D	R	R	R	NA	NA	R	R	R	NA	NA
swTextProps		x	x	D	I	I	I	I	NA	NA	NA	S	NA	NA
swValueBlockSize		x	x	D	I	I	I	I	NA	NA	NA	S	NA	NA
swValueBlockSizeMult		x	x	D	I	I	I	I	NA	NA	NA	S	NA	NA
unit		x	x	D	I	I	I	NA	NA	I	NA	S	D	NA
valueAxisDataType		x	x	D	I	I	I	I	NA	NA	NA	S	NA	NA

**Table 2.9: Usage of Attributes of SwDataDefProps**

Please note that this table is (by reference) a part of [constr\_1015]

[constr\_1016] Restriction of **invalidValue** for **ImplementationDataType** and **ImplementationDataTypeElement** [invalidValue for ImplementationDataType and ImplementationDataTypeElement is restricted to be either a compatible **NumericalValueSpecification**, **TextValueSpecification** (caution, [constr\_1284] applies) or a **ConstantReference** that in turn points to a compatible **ValueSpecification**.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

[constr\_1017] Supported combinations of **swImplPolicy** and **swCalibrationAccess** [The table 2.10 defines the supported combinations at the

<sup>14</sup>swIntendedResolution is used only in an early phase of the definition of data types, namely in the context of the definition of so-called blueprints. To that extent, swIntendedResolution represents a non-binding requirement that shall later be considered for the definition of an appropriate CompuMethod.

time when the contract phase generation is executed of `swImplPolicy` and `swCalibrationAccess` attribute setting.

]()

<code>swImplPolicy</code>	<code>swCalibrationAccess</code>		
	<code>notAccessible</code>	<code>readOnly</code>	<code>readWrite</code>
<code>fixed</code>	yes	not supported	not supported
<code>const</code>	yes	yes	not supported
<code>standard</code>	yes	yes	yes
<code>queued</code>	yes	not supported	not supported
<code>measurementPoint</code>	not supported	yes	not supported

**Table 2.10: Supported combinations of `swImplPolicy` and `swCalibrationAccess`**

[constr\_1018] `measurementPoint` shall not be referenced by a `VariableAccess` aggregated by `RunnableEntity` in the role `dataReadAccess` [Due to the nature of `dataElements` characterized by setting the `swImplPolicy` to `measurementPoint`, such `dataElements` shall not be referenced by a `VariableAccess` aggregated by `RunnableEntity` in the role `dataReadAccess` at the time when the contract phase generation is executed.

]()

[constr\_1020] `ParameterDataPrototype` needs to be of compatible data type as referenced in `sharedAxisType` [Finally, the `ParameterDataPrototype` assigned in `swCalprmRef` shall be typed by data type compatible to `sharedAxisType` at the time when the contract phase generation is executed.

]()

[constr\_1022] Limits shall be defined for each direction of `CompuMethod` [In case that both domains are specified in the `CompuMethod` both shall have explicitly defined limits at the time when the contract phase generation is executed.

]()

[constr\_1024] Stepwise definition of `CompuMethods` [In a bound model, the intervals (i.e. determined by attributes `CompuScale.lowerLimit` and `CompuScale.upperLimit`) defined by `CompuScales` used in the context of a given `CompuMethod` of all values of `category` except `BITFIELD_TEXTTABLE` shall **not** overlap.

For `CompuMethods` of `category` `BITFIELD_TEXTTABLE`, the combination of the interval created by attributes `CompuScale.upperLimit`, `CompuScale.lowerLimit` and `CompuScale.mask` shall be unique in the context of the enclosing `CompuMethod`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1025] Avoid division by zero in rational formula** [The rational formula shall not yield any division by zero at any time in the workflow.

]()

**[constr\_1026] Compatibility of Units** [For data types or prototypes, units should be referenced from within the associated `CompuMethod`. But if it is referenced from within `SwDataDefProps` and/or `PhysConstrs` (for exceptional use cases) it shall be compatible (for more details please refer to [constr\_1052]) to the ones referenced from the referred `CompuMethod`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1029] ConstantSpecificationMapping and ConstantSpecification** [It is required that one `ConstantSpecification` referenced from a `ConstantSpecificationMapping` needs to be defined in the application domain (`applConstant`) and the other referenced `ConstantSpecification` needs to be defined in the implementation domain (`implConstant`).

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1033] Communication scenarios for sender/receiver communication** [For sender/receiver communication, it is not allowed to create a communication scenario where n sender are connected to m receivers where m and n are both greater than 1 at any time in the workflow.

]()

**[constr\_1035] Recursive definition of CompositionSwComponentType** [The recursive definition of a `CompositionSwComponentType` that eventually contains a `SwComponentPrototype` typed by the same `CompositionSwComponentType` shall not be feasible at any time in the workflow.

]()

**[constr\_1036] Connect kinds of PortInterfaces** [It shall not be possible to connect `PortPrototypes` typed by `PortInterfaces` of different kinds at the time when the RTE is generated.

Subclasses of `DataInterface` make an exception to this rule and can be used for creating connections to each other.

]()

**[constr\_1037] Client shall not be connected to multiple servers** [A client shall not be connected to multiple servers such that an operation call would be handled by more than one server at the time when the RTE is generated.



]()

**[constr\_1038] Reference to [ApplicationError](#)** [A [possibleError](#) referenced by a [ClientServerOperation](#) shall be owned by the [PortInterface](#) that also owns the [ClientServerOperation](#) at any time in the workflow.

]()

**[constr\_1039] Relevance of [swImplPolicy](#)** [It is not possible to define a mapping between an element where the [swImplPolicy](#) is set to [queued](#) and another element where the [swImplPolicy](#) is set differently. This rule shall be imposed at any time in the workflow.

]()

**[constr\_1040] Conversion of [SenderReceiverInterfaces](#)** [The conversion of elements of [SenderReceiverInterfaces](#) is possible if one of the following conditions applies at the time when the RTE is generated:

- The [AutosarDataTypes](#) of the referred [DataPrototypes](#) are compatible.
- A conversion of the data is available.
- A [DataPrototypeMapping.firstToSecondDataTransformation](#) is defined.

]()

**[constr\_1041] Conversion of [ClientServerInterfaces](#)** [Either the [AutosarDataTypes](#) of the referred [ArgumentDataPrototypes](#) are compatible or a conversion of the data is available at the time when the RTE is generated.

]()

**[constr\_1043] [PortInterface](#) vs. [ComSpec](#)** [The allowed combinations at any time in the workflow of a specific kind of [PortInterface](#) and a kind of [ComSpec](#) are documented in Table 2.11.

]()

<a href="#">PortInterface</a>	<a href="#">ComSpec</a>
<a href="#">SenderReceiverInterface</a>	<a href="#">SenderComSpec</a> , <a href="#">ReceiverComSpec</a>
<a href="#">ClientServerInterface</a>	<a href="#">ClientComSpec</a> , <a href="#">ServerComSpec</a>
<a href="#">ModeSwitchInterface</a>	<a href="#">ModeSwitchSenderComSpec</a> , <a href="#">ModeSwitchReceiverComSpec</a>
<a href="#">ParameterInterface</a>	<a href="#">ParameterProvideComSpec</a> , <a href="#">ParameterRequireComSpec</a>
<a href="#">NvDataInterface</a>	<a href="#">NvRequireComSpec</a> , <a href="#">NvProvideComSpec</a>

Table 2.11: [PortInterface](#) vs. [ComSpec](#)

**[constr\_1044] Applicability of [DataFilter](#)** [According to the origin of [DataFilter](#), i.e. ISO 17356-4 specification [7], [DataFilters](#) can only be applied to values with an integer base type at any time in the workflow.

]()

**[constr\_1045] Supported value encodings for `SwBaseType` in the context of `PortInterfaces`** [The supported value encodings for the usage within a `PortInterface` are:

- 2C: Two's complement
- IEEE754: floating-point numbers
- ISO-8859-1: single-byte coded character
- ISO-8859-2: single-byte coded character
- WINDOWS-1252: single-byte coded character
- UTF-8: UCS Transformation Format 8
- UTF-16: Character encoding for Unicode *code points* based on 16 bit *code units* [6]
- UCS-2: Universal Character Set 2
- NONE: Unsigned Integer
- BOOLEAN: This represents an integer to be interpreted as boolean.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1046] Applicability of [constr\_1045]** [[constr\_1045] applies at the time when the contract phase generation is executed **only** if the value of the attribute `isService` is set to `false`.

]()

**[constr\_1047] Compatibility of `ApplicationPrimitiveDataTypes`** [Instances of `ApplicationPrimitiveDataType` are compatible at the time when the RTE is generated if and only if one of the following conditions applies:

1. All the following sub conditions apply:
  - (a) They have the same `category`.
  - (b) The `swDataDefProps` attached to the M1 data types are compatible.
2. In the context of using the `ApplicationPrimitiveDataType`, a `DataPrototypeMapping` exists that refers to a `DataPrototype` typed by one of the `ApplicationPrimitiveDataTypes` in the role `firstDataPrototype` and to another `DataPrototype` typed by the other `ApplicationPrimitiveDataType` in the role `secondDataPrototype`.
3. In the context of using the `ApplicationPrimitiveDataType`, a `DataPrototypeMapping` exists that refers to a `DataPrototype` typed by the Appli-

`cationPrimitiveDataType` in the role `secondDataPrototype` and to another `DataPrototype` typed by an `ApplicationCompositeDataType` in the role `firstDataPrototype` and additionally for the side of the `ApplicationCompositeDataType` a corresponding `ApplicationCompositeDataTypeSubElementRef` exists in the role `firstElement` that in turn references an `ApplicationCompositeElementDataPrototype`.

]()

**[constr\_1048] Compatibility of `ApplicationRecordDataTypes`** [Instances of `ApplicationRecordDataTypes` are compatible at the time when the RTE is generated if and only if one of the following conditions applies:

1. All `elements` at the same record position are of compatible `AutosarDataTypes` (either `ApplicationCompositeDataTypes` or `ApplicationPrimitiveDataTypes`).
2. For each `ApplicationRecordDataType.element`, the attribute `isOptional` shall either
  - not exist on both sides or
  - be set to the value `False` if it only exists on one side or
  - have the identical value on both sides.
3. In the context of a `DataPrototypeMapping`, for each `ApplicationRecordElement` of the required `ApplicationRecordDataType` a `SubElementMapping` exists such that a `ApplicationCompositeDataTypeSubElementRef` in the role `firstElement` or `secondElement` exists that references the required `ApplicationRecordElement` **and** a corresponding `ApplicationCompositeDataTypeSubElementRef` exists in the **other** role (i.e. `secondElement` or `firstElement`) that in turn references an `ApplicationRecordElement` of the provided `ApplicationRecordDataType`.

]()

**[constr\_1049] Compatibility of `ApplicationArrayDataTypes`** [Instances of `ApplicationArrayDataType` are compatible at the time when the RTE is generated if and only if one of the following conditions applies:

1. All the following sub conditions apply:
  - (a) Their `elements` are of a compatible `AutosarDataTypes` (either `ApplicationCompositeDataTypes` or `ApplicationPrimitiveDataTypes`).
  - (b) The attributes `maxNumberOfElements` and `arraySizeSemantics` (given the existence) have identical values.
2. In the context of a `DataPrototypeMapping`, for the `ApplicationArrayElement` of the required `ApplicationArrayDataType` a `SubElementMapping`

exists such that a `ApplicationCompositeDataTypeSubElementRef` in the role `firstElement` or `secondElement` exists that references the required `ApplicationArrayElement` **and** a corresponding `ApplicationCompositeDataTypeSubElementRef` exists in the **other** role (i.e. `secondElement` or `firstElement`) that in turn references an `ApplicationArrayElement` of the provided `ApplicationArrayDataType`.

]()

**[constr\_1050] Compatibility of `ImplementationDataTypes`** [Instances of `ImplementationDataType` are compatible at the time when the RTE is generated if and only if after all type-references are resolved one of the following rules apply:

1. All the following sub conditions apply:
  - (a) They have the same `category`.
  - (b) They have the identical structure (this refers to `ImplementationDataTypeElement` and their `subElements`).
  - (c) The attributes `arraySize` and `arraySizeSemantics` have (given the existence) identical values.
  - (d) For each `ImplementationDataType.subElement`, the attribute `isOptional` shall either
    - not exist on both sides or
    - be set to the value `False` if it only exists on one side or
    - have the identical value on both sides.
  - (e) The `swDataDefProps` attached to the M1 data types are compatible.
2. In the context of using the `ImplementationDataType`, a `DataPrototypeMapping` exists that refers to a `DataPrototype` typed by one of the `ImplementationDataTypes` in the role `firstDataPrototype` and to another `DataPrototype` typed by the other `ImplementationDataType` in the role `secondDataPrototype`.
3. In the context of using the `ImplementationDataType`, a `DataPrototypeMapping` exists that refers to a `DataPrototype` typed by the `ImplementationDataTypes` in the role `secondDataPrototype` and to another `DataPrototype` typed by an `ImplementationDataType` with a `subElement` in the role `firstDataPrototype` and additionally for the side of the `ImplementationDataType` with a `subElement` a corresponding `ImplementationDataTypeSubElementRef` exists in the role `firstElement` that in turn references an `ImplementationDataTypeElement`.

]()

**[constr\_1051] Compatibility of `SwDataDefProps`** [`SwDataDefProps` are compatible at the time when the RTE is generated if and only if:

1. They refer to compatible `Unit` definitions, or neither of them has an associated `Unit`.
2. They refer to compatible conversion methods or neither of them associates such a method.
3. They both aggregate a `ValueSpecification` in the role `invalidValue` or neither of them aggregates a `ValueSpecification` in the role `invalidValue`.
4. If existent (see previous condition), one of the following conditions apply to `ValueSpecifications` aggregated in the role `invalidValue` for being considered compatible (after following and resolving indirections created by `ConstantReference`):
  - (a) both are `ApplicationValueSpecifications` and the values are compatible according to [TPS\_GST\_02501].
  - (b) both are `NumericalValueSpecifications` and the values are compatible according to [TPS\_GST\_02501].
  - (c) both are `TextValueSpecifications` and the values are identical.
  - (d) both are `ArrayValueSpecifications` and the values are effectively identical, e.g. if one `ArrayValueSpecification` specifies all values explicitly and the other `ArrayValueSpecification` specifies values based on a rule then the yield of both `ArrayValueSpecifications` (i.e. element for element) shall be identical.
  - (e) both are `RecordValueSpecifications` and the values are identical.
  - (f) if one is a `NumericalValueSpecification` and the other one is an `ApplicationValueSpecification` then the check for compatibility shall apply the `CompuMethod` on the physical value such that a comparison on the implementation level becomes possible. [TPS\_GST\_02501] applies<sup>15</sup>.
5. They refer to compatible data constraints `dataConstr`.
6. They refer to compatible `swRecordLayouts`

All other attributes (e.g. `swCalibrationAccess` do not affect compatibility).

]()

**[constr\_1052] Compatibility of `Units`** [Two `Unit` definitions are compatible at the time when the RTE is generated if and only if:

<sup>15</sup>if one is a `NumericalValueSpecification` and the other one is an `ApplicationValueSpecification` and the application of the `CompuMethod` on the side of the `ApplicationValueSpecification` does not yield a valid number a comparison is not possible.

1. They have compatible (see [TPS\_GST\_02501]) values of attributes `factorSiToUnit` and `offsetSiToUnit`.
2. They either refer to identical definitions of `PhysicalDimension` or neither of them associates a `PhysicalDimension`.

]()

**[constr\_1053] Compatibility of `PhysicalDimensions`** [Two `PhysicalDimension` definitions are compatible if and only if the values of

- `lengthExp`
- `massExp`
- `timeExp`
- `currentExp`
- `temperatureExp`
- `molarAmountExp`
- `luminousIntensityExp`

are identical and **either** the `shortNames` are identical **or** a `PhysicalDimensionMapping` exists that maps one of the `PhysicalDimensions` in the role `firstPhysicalDimension` and the other `PhysicalDimension` in the role `secondPhysicalDimension`.

The imposition time of this constraint depends on the context:

- If the compatibility of `PhysicalDimensions` is evaluated in the context of the creation of a `SwConnector`, then the rule shall be imposed **at the time when the RTE is generated**.
- If the context is the creation of an `ApplicationValueSpecification`, then the rule shall be imposed **at the time when the contract phase generation is executed**.

]()

**[constr\_1054] No `DataConstr` available at the provider** [If the provider defines no constraints, it is only compatible with a receiver which also defines no constraints at all **at the time when the RTE is generated**.

]()

**[constr\_1055] `ImplementationDataType` has `category VALUE`** [The attributes `baseType` shall refer to a compatible `SwBaseType` **at the time when the contract phase generation is executed**.

]()

**[constr\_1056] ImplementationDataType has category TYPE\_REFERENCE** [The `ImplementationDataTypes` referenced by the attributes `SwDataDefProps.implementationDataType` shall be compatible at the time when the contract phase generation is executed.

]()

**[constr\_1057] ImplementationDataType has category DATA\_REFERENCE** [The attributes `SwDataDefProps.swPointerTargetProps` shall have identical `targetCategory` and shall refer to `SwDataDefProps` where all attributes are identical at the time when the contract phase generation is executed.

]()

**[constr\_1058] ImplementationDataType has category FUNCTION\_REFERENCE** [The attributes `SwDataDefProps.swPointerTargetProps.functionPointerSignature` shall refer to `BswModuleEntry`s which each resolve to the same function signature at the time when the contract phase generation is executed.

]()

**[constr\_1059] Compatibility of data types with category VALUE** [An `ApplicationDataType` of category `VALUE` shall (after all indirections created by `ImplementationDataTypes` of category `TYPE_REFERENCE` are resolved) only be mapped/connected to an `ImplementationDataType` which also has category `VALUE`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1060] Compatibility of data types with category ARRAY, VAL\_BLK** [An `ApplicationDataType` of category `ARRAY`, `VAL_BLK` shall (after all indirections created by `ImplementationDataTypes` of category `TYPE_REFERENCE` are resolved) only be mapped/connected to

- an `ImplementationDataType` of category `ARRAY` or
- an `ImplementationDataType` that represents a Variable-Size Array Data Type (see [TPS\_SWCT\_01610]).

The specific rules are documented in Table 2.12. This constraint shall be imposed at the time when the contract phase generation is executed.

]()



	Array of uint8	Array of other
ApplicationArrayType, arraySizeSemantics = fixedSize	ImplementationDataType of category ARRAY, with ImplementationDataTypeElement with arraySizeSemantics = fixedSize	ImplementationDataType of category ARRAY, with ImplementationDataTypeElement with arraySizeSemantics = fixedSize
ApplicationArrayType, arraySizeSemantics = variableSize	ImplementationDataType of category ARRAY, with ImplementationDataTypeElement with arraySizeSemantics = variableSize or Variable-Size Array Data Type	Variable-Size Array Data Type

**Table 2.12: Rules for compatibility of old and new world variable-size arrays**

**[constr\_1061] Compatibility of data types with category STRUCTURE** [An ApplicationDataType of category STRUCTURE shall (after all indirections created by ImplementationDataTypes of category TYPE\_REFERENCE are resolved) only be mapped/connected to an ImplementationDataType of category STRUCTURE.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1063] Compatibility of data types with category BOOLEAN** [An ApplicationDataType of category BOOLEAN shall (after all indirections created by ImplementationDataTypes of category TYPE\_REFERENCE are resolved) only be mapped/connected to an ImplementationDataType of category VALUE.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1064] Compatibility of data types with category COM\_AXIS, RES\_AXIS, CURVE, MAP, CUBOID, CUBE\_4, or CUBE\_5** [An ApplicationDataType of category

- COM\_AXIS,
- RES\_AXIS,
- CURVE,
- MAP,
- CUBOID,
- CUBE\_4, or
- CUBE\_5

shall (after all indirections created by `ImplementationDataTypes` of category `TYPE_REFERENCE` are resolved) only be mapped/connected to an `ImplementationDataType` of category

- `STRUCTURE` or
- `ARRAY`.

This rule shall be imposed at the time when the contract phase generation is executed.

⌋()

**[constr\_1066] Forbidden mappings to `ImplementationDataType`** [An `ApplicationDataType` shall never be mapped to

- an `ImplementationDataType` of category
  - `UNION`,
  - `DATA_REFERENCE`, or
  - `FUNCTION_REFERENCE`,
- or to an `ImplementationDataType` that contains `subElements` of category
  - `UNION`,
  - `DATA_REFERENCE`, or
  - `FUNCTION_REFERENCE`.

This rule shall be imposed at the time when the contract phase generation is executed.

⌋()

**[constr\_1068] Compatibility of `VariableDataPrototypes` or `ParameterDataPrototypes` typed by primitive data types** [Two `VariableDataPrototypes` or `ParameterDataPrototypes` of `ApplicationPrimitiveDataTypes` or `ImplementationDataTypes` of category `VALUE`, `BOOLEAN`, or `STRING` are compatible at the time when the RTE is generated if and only if one of the following conditions applies:

1. All the following subconditions apply:
  - (a) They are typed by (read “refer to”) compatible `AutosarDataTypes`
  - (b) The two `VariableDataPrototypes` or `ParameterDataPrototypes` have identical `shortNames`. This is required to map `VariableDataPrototypes` in unordered `SenderReceiverInterfaces`, `NvDataInterfaces` and `ParameterInterfaces`.
  - (c) The attribute `swImplPolicy` is either set to `queued` for both or none of the `VariableDataPrototypes`.

2. In the context of a `DataPrototypeMapping`, one of the applicable `VariableDataPrototypes` or `ParameterDataPrototypes` is referenced by the `DataPrototypeMapping` in the role `firstDataPrototype` and the other `VariableDataPrototypes` or `ParameterDataPrototypes` is referenced by the same `DataPrototypeMapping` in the role `secondDataPrototype`.

]()

**[constr\_1069] Compatibility of `PortPrototypes` of different `DataInterfaces` in the context of `AssemblySwConnectors`** [`PortPrototypes` of different `DataInterfaces` are compatible at the time when the RTE is generated if and only if

1. One of the following conditions applies:
  - (a) For each `VariableDataPrototype` or `ParameterDataPrototype` defined in the context of the `DataInterface` of the required `PortPrototype` a compatible (see [constr\_1068]) `VariableDataPrototype` or `ParameterDataPrototype` exists in the `DataInterface` of the provided `PortPrototype`.  
  
The `shortNames` of `VariableDataPrototypes` and `ParameterDataPrototypes` are used to identify the pair.
  - (b) A `VariableAndParameterInterfaceMapping.dataMapping` exists for which the following conditions apply:
    - i. It is referenced by the corresponding `SwConnector`.
    - ii. It references one of the two `VariableDataPrototypes` or `ParameterDataPrototypes` in the role `firstDataPrototype` and the other in the role `secondDataPrototype`.
2. For each such pair, the values of their `isService` attributes are identical.

]()

**[constr\_1070] Compatibility of `PortPrototypes` of different `DataInterfaces` in the context of `DelegationSwConnectors`** [`PortPrototypes` of different `DataInterfaces` are compatible at the time when the RTE is generated if and only if

1. One of the following conditions applies:
  - (a) For each `VariableDataPrototype` or `ParameterDataPrototype` defined in the context of the `DataInterface` of the required inner `PortPrototype` a compatible `VariableDataPrototype` or `ParameterDataPrototype` exists in the `DataInterface` of the required outer `PortPrototype`.  
  
The `shortName` of `VariableDataPrototypes` and `ParameterDataPrototypes` are used to identify the pair.

[constr\_1071] defines which `PortInterface` elements are compatible depending on the `PortInterface` type and the `swImplPolicy` attributes of the `PortInterface` elements.

- (b) A `VariableAndParameterInterfaceMapping.dataMapping` exists for which the following conditions apply:
  - i. It is referenced by the corresponding `SwConnector`.
  - ii. It references one of the two `VariableDataPrototypes` or `ParameterDataPrototypes` in the role `firstDataPrototype` and the other in the role `secondDataPrototype`.

2. One of the following conditions applies:

- (a) For at least one `VariableDataPrototype` or `ParameterDataPrototype` defined in the context of the `SenderReceiverInterface`, `NvDataInterface` or `ParameterInterface` of the provided inner `PortPrototype` a compatible `VariableDataPrototype` or `ParameterDataPrototype` exists in the `SenderReceiverInterface`, `NvDataInterface` or `ParameterInterface` of the provided outer `PortPrototype`.

The `shortNames` of `VariableDataPrototypes` and `ParameterDataPrototypes` are used to identify the pair.

[constr\_1071] defines which `PortInterface` elements are compatible depending on the `PortInterface` type and the `swImplPolicy` attributes of the `PortInterface` elements.

- (b) A `VariableAndParameterInterfaceMapping.dataMapping` exists for which the following conditions apply:
  - i. It is (if a corresponding `SwConnector` already exists) referenced by the corresponding `SwConnector`.
  - ii. It references one of the two `VariableDataPrototypes` or `ParameterDataPrototypes` in the role `firstDataPrototype` and the other in the role `secondDataPrototype`.

3. For each such pair, the values of their `isService` attributes are identical.

]()

**[constr\_1071] compatibility of `ParameterDataPrototype` and `VariableDataPrototype`** [Combinations of `ParameterDataPrototype` and `VariableDataPrototype` used in `PortPrototypes` typed by various kinds of `PortInterfaces` shall only be allowed at the time when the RTE is generated where Table 2.13 contains the value “yes”.

]()

Provided Port Required Outer Port Provided Inner Port Required Outer Port		Required Port / Required Inner Port / Provided Outer Port / Provided Outer Port						
PortInterface		Prm			S/R		NvD	
Interface Element		PDP			VDP		VDP	
SwImplPolicyEnum		fixed	const	standard	standard	queued	standard	
Prm	PDP	fixed	yes	yes	yes	yes	no	yes
		const	no	yes	yes	yes	no	yes
		standard	no	no	yes	yes	no	yes
S/R	VDP	standard	no	no	no	yes	no	yes
		queued	no	no	no	no	yes	no
NvD	VDP	standard	no	no	no	yes	no	yes

**Table 2.13: Overview of compatibility of `ParameterDataPrototype` and `VariableDataPrototype`**

**[constr\_1072] Compatibility of `ModeSwitchInterfaces` in the context of an `AssemblySwConnector`** [`PortPrototypes` of different `ModeSwitchInterfaces` are compatible at the time when the RTE is generated if and only if

1. One of the following conditions applies:
  - (a) For the `ModeDeclarationGroupPrototype` defined in the context of the `ModeSwitchInterface` of the required `PortPrototype` a compatible `ModeDeclarationGroupPrototype` exists in the `ModeSwitchInterface` of the provided `PortPrototype`.
  - (b) A `ModeInterfaceMapping.modeMapping` exists for which the following conditions apply:
    - i. It is referenced by the corresponding `SwConnector`.
    - ii. It references one of the two `ModeDeclarationGroupPrototypes` in the role `firstModeGroup` and the other in the role `secondModeGroup`.
2. For each such pair, the values of their `isService` attributes are identical.

]()

**[constr\_1073] Compatibility of `ModeSwitchInterfaces` in the context of an `DelegationSwConnector`** [`PortPrototypes` of different `ModeSwitchInterfaces` are compatible at the time when the RTE is generated if and only if

1. One of the following conditions applies:
  - (a) For the `ModeDeclarationGroupPrototype` defined in the context of the `ModeSwitchInterface` of the inner `PortPrototype` a compatible `ModeDeclarationGroupPrototype` exists in the `ModeSwitchInterface` of the outer `PortPrototype`.

- (b) A `ModeInterfaceMapping.modeMapping` exists for which the following conditions apply:
  - i. It is referenced by the corresponding `SwConnector`.
  - ii. It references one of the two `ModeDeclarationGroupPrototypes` in the role `firstModeGroup` and the other in the role `secondModeGroup`.
- 2. For each such pair, the values of their `isService` attributes are identical.

]()

**[constr\_1074] Compatibility of `ModeDeclarationGroupPrototypes`** [`ModeDeclarationGroupPrototypes` are compatible at the time when the RTE is generated if and only if one of the following conditions applies:

- 1. They are typed by (read “refer to”) compatible `ModeDeclarationGroups`.
- 2. A `ModeDeclarationGroupPrototypeMapping` exists that identifies the differently named `ModeDeclarationGroupPrototypes` that correlate with each other. [constr\_1210] applies.

]()

**[constr\_1075] Compatibility of `ModeDeclarationGroups`** [`ModeDeclarationGroups` are compatible at the time when the RTE is generated if and only if one of the following conditions applies:

- 1. All the following subconditions apply:
  - (a) They define an identical number of `ModeDeclarations`.
  - (b) Each `ModeDeclaration` on the required side corresponds to a `ModeDeclaration` on the provided side with an identical `shortName`.
  - (c) The `initialModes` on both sides refer to `ModeDeclarations` with identical `shortNames`.
  - (d) The attribute `ModeDeclarationGroup.modeUserErrorBehavior.errorReactionPolicy` has identical values on both sides.
  - (e) The attribute `ModeDeclarationGroup.modeManagerErrorBehavior.errorReactionPolicy` has identical values on both sides.
  - (f) The attribute `ModeDeclarationGroup.modeUserErrorBehavior.defaultMode` either does not exist on both sides or refers on both sides to `ModeDeclarations` with identical `shortNames`.
  - (g) The attribute `ModeDeclarationGroup.modeManagerErrorBehavior.defaultMode` either does not exist on both sides or refers on both sides to `ModeDeclarations` with identical `shortNames`.
- (h) one of the following subconditions applies:

- the attribute `category` has the value `ALPHABETIC_ORDER` on both sides.
- the attribute `category` has the value `EXPLICIT_ORDER` on both sides **and** the matching `ModeDeclarations` according to 1(b) have the identical values of the attributes `ModeDeclaration.value` **and** also the value of `ModeDeclarationGroup.onTransitionValue` matches on both sides.

2. A `ModeDeclarationMapping` is applied which identifies the corresponding `ModeDeclarations`.

In addition, the compatibility of corresponding `ModeTransitions` shall be checked, i.e. [\[constr\\_1194\]](#) and [\[constr\\_1245\]](#) apply.

]()

**[constr\_1076] Compatibility of `ArgumentDataPrototypes`** [Two `ArgumentDataPrototypes` are compatible at the time when the RTE is generated if and only if

1. They are typed by compatible `AutosarDataTypes` **or** a `ClientServerOperationMapping.argumentMapping` exists that references one `ArgumentDataPrototype` in the role `firstDataPrototype` and the other `ArgumentDataPrototype` in the role `secondDataPrototype`.
2. They have the same value of the argument `direction` (`in`, `out` or `inout`), i.e. [\[constr\\_1268\]](#) applies.

]()

**[constr\_1077] Compatibility of `ApplicationErrors`** [Two `ApplicationErrors` are compatible at the time when the RTE is generated if and only if one of the following conditions applies:

1. All the following subconditions apply:
  - (a) They have the same `shortName`.
  - (b) They have the same attributes. Especially the `errorCode` shall be identical in both `ApplicationErrors`.
2. A `ClientServerInterfaceMapping.errorMapping` exists that references one of the `ApplicationErrors` in the role `firstApplicationError` and the other `ApplicationErrors` in the role `secondApplicationError`.

]()

**[constr\_1078] Compatibility of `ClientServerOperations`** [Two `ClientServerOperations` are considered compatible at the time when the RTE is generated if their signatures match. In particular, they are compatible if and only if



1. They have the same number of `ArgumentDataPrototypes`.
2. The n-th arguments of both `ClientServerOperations` are compatible. This implies ordering of `ArgumentDataPrototypes`.
3. They have identical values of attribute `diagArgIntegrity` or the attribute `diagArgIntegrity` does not exist on both sides.
4. They have the same `shortName` (again allows for mapping in `PortInterfaces`).
5. The required `ClientServerOperation` specifies a compatible `ApplicationError` for each `ApplicationError` that is possibly raised by the provided `ClientServerOperation`, maybe more. Thereby, `ClientServerOperations` that refer to a `possibleError` that represents the value `E_OK` are compatible to `ClientServerOperations` that do refer to `possibleErrors` where none of them represents the value `E_OK`.

]()

**[constr\_1079] Compatibility of `ClientServerInterfaces` in the context of an `AssemblySwConnector`** [`ClientServerInterfaces` are compatible at the time when the RTE is generated if and only if

1. One of the following conditions applies:
  - (a) For each `ClientServerOperation` defined in the context of the `ClientServerInterface` of the required `PortPrototype` a compatible `ClientServerOperation` exists in the `ClientServerInterface` of the provided `PortPrototype`. The `shortNames` of `ClientServerOperations` are used to identify the pair.
  - (b) A `ClientServerInterfaceMapping.operationMapping` exists for which the following conditions apply:
    - i. It is referenced by the corresponding `SwConnector`.
    - ii. It references one of the two `ClientServerOperations` in the role `firstOperation` and the other in the role `secondOperation`.
2. For each such pair, the values of their `isService` attributes are identical.

]()

**[constr\_1080] Compatibility of `ClientServerInterfaces` in the context of an `DelegationSwConnector`** [`ClientServerInterfaces` are compatible at the time when the RTE is generated if and only if

1. One of the following conditions applies:
  - (a) For each `ClientServerOperation` defined in the context of the `ClientServerInterface` of the required inner `PortPrototype` a compatible `ClientServerOperation` exists in the `ClientServerInter-`

face of the required outer `PortPrototype`. The `shortNames` of `ClientServerOperations` are used to identify the pair.

- (b) A `ClientServerInterfaceMapping.operationMapping` exists for which the following conditions apply:
  - i. It is referenced by the corresponding `SwConnector`.
  - ii. It references one of the two `ClientServerOperations` in the role `firstOperation` and the other in the role `secondOperation`.

2. One of the following conditions applies:

- (a) For at least one `ClientServerOperation` defined in the context of the `ClientServerInterface` of the provided inner `PortPrototype` a compatible `ClientServerOperation` exists in the `ClientServerInterface` of the provided outer `PortPrototype`. The `shortNames` of `ClientServerOperations` are used to identify the pair.
- (b) A `ClientServerInterfaceMapping.operationMapping` exists for which the following conditions apply:
  - i. It is referenced by the corresponding `SwConnector`.
  - ii. It references one of the two `ClientServerOperations` in the role `firstOperation` and the other in the role `secondOperation`.

3. For each such pair, the values of their `isService` attributes are identical.

]()

**[constr\_1081] Compatibility of `TriggerInterfaces` in the context of an `AssemblySwConnector`** [`TriggerInterfaces` are compatible at the time when the RTE is generated if and only if

1. One of the following conditions applies:

- (a) For each `Trigger` defined in the context of the `TriggerInterface` of the required `PortPrototype` a compatible `Trigger` exists in the `TriggerInterface` of the provided `PortPrototype`. The `shortNames` of `Trigger` are used to identify the pair.
- (b) A `TriggerInterfaceMapping.triggerMapping` exists for which the following conditions apply:
  - i. It is referenced by the corresponding `SwConnector`.
  - ii. It references one of the two `Triggers` in the role `firstTrigger` and the other in the role `secondTrigger`.

2. For each such pair, the values of their `isService` attributes are identical.

]()

**[constr\_1082] Compatibility of `TriggerInterfaces` in the context of an `DelegationSwConnector`** [`TriggerInterfaces` are compatible at the time when the RTE is generated if and only if all the following conditions apply:

1. One of the following subconditions applies:
  - (a) For each `Trigger` defined in the context of the `TriggerInterface` of the **required** inner `PortPrototype` a compatible `Trigger` exists in the `TriggerInterface` of the **required** outer `PortPrototype`. The `shortNames` of `Trigger` are used to identify the pair.
  - (b) For at least one `Trigger` defined in the context of the `TriggerInterface` of the **provided** outer `PortPrototype` a compatible `Trigger` exists in the `TriggerInterface` of the **provided** inner `PortPrototype`. The `shortNames` of `Trigger` are used to identify the pair.
  - (c) A `TriggerInterfaceMapping.triggerMapping` exists for which all the following conditions apply:
    - i. It is referenced by the corresponding `SwConnector`.
    - ii. It references one of the two `Triggers` in the role `firstTrigger` and the other in the role `secondTrigger`.
2. For each such pair, the values of their `isService` attributes are identical.

]()

**[constr\_1083] Compatibility of `Triggers`** [`Triggers` are compatible at the time when the RTE is generated if they have an identical `shortName`.

]()

**[constr\_1084] delegation of a provided outer `PortPrototype`** [The delegation of a provided outer `PortPrototype` is properly defined if the following criteria are fulfilled:

1. For each `VariableDataPrototype` or `ParameterDataPrototype` present in the `SenderReceiverInterface`, `NvDataInterface`, or `ParameterInterface` of the provided outer `PortPrototype` at least one connection via `DelegationSwConnector` to a provided inner `PortPrototype` **or** `PassThroughSwConnector` to a required outer `PortPrototype` with a compatible `VariableDataPrototype` or `ParameterDataPrototype` in the `SenderReceiverInterface` `NvDataInterface` or `ParameterInterface` of the provided inner `PortPrototype` **or** required outer `PortPrototype` exists.

Either the `shortNames` of `VariableDataPrototypes` or `ParameterDataPrototypes` are used to identify the pair or a `PortInterfaceMapping` defines which differently named `PortInterface` elements correlate with each other.

2. For each `VariableDataPrototype` provided by a `PRPortPrototype` that is typed by a `SenderReceiverInterface` or `NvDataInterface` and that is referenced in the role `outerPort` by a `DelegationSwConnector` a corresponding `VariableDataPrototype` owned by an `innerPort` shall be provided by either a `PPortPrototype` or a `PRPortPrototype`.

Either the `shortNames` of `VariableDataPrototypes` are used to identify the pair or a `PortInterfaceMapping` defines which differently named `PortInterface` elements correlate with each other.

3. For the `ModeDeclarationGroupPrototype` present in the `ModeSwitchInterface` of the provided outer `PortPrototype` exactly one connection via `DelegationSwConnector` to a provided inner `PortPrototype` or `PassThroughSwConnector` to a required outer `PortPrototype` with a compatible `ModeDeclarationGroupPrototype` in the `ModeSwitchInterface` of the provided inner `PortPrototype` or required outer `PortPrototype` exists.

Either the `shortNames` of `ModeDeclarationGroupPrototypes` are used to identify the pair or a `PortInterfaceMapping` defines which differently named `PortInterface` elements correlate with each other.

4. For each `ClientServerOperation` present in the `ClientServerInterface` of the provided outer `PortPrototype` exactly one connection via `DelegationSwConnector` to a provided inner `PortPrototype` or `PassThroughSwConnector` to a required outer `PortPrototype` with a compatible `ClientServerOperation` in the `ClientServerInterface` of the provided inner `PortPrototype` or required outer `PortPrototype` exists.

Either the `shortNames` of `ClientServerOperations` are used to identify the pair or a `PortInterfaceMapping` defines which differently named `PortInterface` elements correlate with each other.

5. For each `Trigger` present in the `TriggerInterface` of the provided outer `PortPrototype` exactly one connection via `DelegationSwConnector` to a provided inner `PortPrototype` or `PassThroughSwConnector` to a required outer `PortPrototype` with a compatible `Trigger` in the `TriggerInterface` of the provided inner `PortPrototype` or required outer `PortPrototype` exists.

Either the `shortNames` of `Triggers` are used to identify the pair or a `PortInterfaceMapping` defines which differently named `PortInterface` elements correlate with each other.

This constraint is associated with two possible imposition times:

- at the time when the RTE is generated
- at the time when the creation of the `CompositionSwComponentType` is finished

]()

**[constr\_1085] Compatibility in the case of a flat ECU extract** [PortPrototypes of different `SenderReceiverInterfaces`, `NvDataInterfaces`, and `ParameterInterfaces` are compatible if and only if for at least one `VariableDataPrototype` or `ParameterDataPrototype` defined in the context of the `SenderReceiverInterface`, `NvDataInterface`, or `ParameterInterface` of the `RPortPrototype` a compatible `VariableDataPrototype` or `ParameterDataPrototype` exists in the `SenderReceiverInterface`, `NvDataInterface`, or `ParameterInterface` of the provided `PortPrototype`.

The compatibility of `PortInterface` elements depends on the kind of `PortInterface` and the `swImplPolicy` attributes of the `PortInterface` elements.

Either the `shortNames` of `VariableDataPrototypes` and `ParameterDataPrototypes` are used to identify the pair or a `PortInterfaceMapping` defines which differently named `PortInterface` elements correlate with each other.

]()

**[constr\_1086] SwConnector between two specific PortPrototypes** [Each pair of `PortPrototypes` can only be connected by one and only one `SwConnector` at the time when the RTE is generated.

]()

**[constr\_1087] AssemblySwConnector inside CompositionSwComponentType** [An `AssemblySwConnector` can only connect `PortPrototypes` of `SwComponentPrototypes` that are owned by the same `CompositionSwComponentType` at any time in the workflow.

]()

**[constr\_1088] DelegationSwConnector inside CompositionSwComponentType** [A `DelegationSwConnector` can only connect a `PortPrototype` of a `SwComponentPrototype` that is owned by the same `CompositionSwComponentType` that also owns the connected delegation `PortPrototype` at any time in the workflow.

]()

**[constr\_1090] WaitPoint and RunnableEntity** [A single `RunnableEntity` can actually wait only at a single `WaitPoint` provided that the `RunnableEntity` can only be scheduled a single time<sup>16</sup>.

]()

**[constr\_1091] RTEEvents that can unblock a WaitPoint** [The only `RTEEvents` that are qualified for unblocking a `WaitPoint` are:

---

<sup>16</sup>This constraint is valid at least in the ISO 17356-3 [8] standard where an extended task (that can have wait points) can only exist a single time in the context of the scheduler.

- `DataReceivedEvent`
- `DataSendCompletedEvent`
- `ModeSwitchedAckEvent`
- `AsynchronousServerCallReturnsEvent`

]()

**[constr\_1092] `ParameterSwComponentType`** [A `ParameterSwComponentType` shall never aggregate a `SwcInternalBehavior` and also owns exclusively `PPortPrototypes` of type `ParameterInterface`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1093] Definition of textual strings** [An `ApplicationPrimitiveDataType` of category `STRING` shall have a `swTextProps` which determines the `arraySizeSemantics` and `swMaxTextSize`.

This rule shall be imposed at the time when the contract phase generation is executed

]()

**[constr\_1095] Values of `nDataSets` vs. `reliability`** [If the value of `nDataSets` is greater than 0, the value of `reliability` shall not be set to `errorCorrection` at the time when the RTE is generated.

]()

**[constr\_1096] `SwcModeSwitchEvent` and `WaitPoint`** [A `RunnableEntity` that has a `WaitPoint` shall not be referenced by a `SwcModeSwitchEvent` at the time when the contract phase generation is executed.

]()

**[constr\_1097] `RunnableEntity` that has a `WaitPoint`** [A `RunnableEntity` that has a `WaitPoint` shall not be referenced by an `RTEEvent` that has a reference in the role `disabledMode` at the time when the RTE is generated.

]()

**[constr\_1098] Mode switch and mode disabling** [A `SwcModeSwitchEvent` shall not simultaneously reference to the same `ModeDeclaration` in both the roles `mode` and `disabledMode` at the time when the RTE is generated.

]()

**[constr\_1100] Unconnected `RPortPrototype` typed by a `DataInterface`** [For any element in an unconnected `RPortPrototype` typed by a `DataInterface`, there

shall be a `requiredComSpec` that defines an `initValue` at the time when the RTE is generated.

]()

**[constr\_1101] Mode-related communication** [An `RPortPrototype` typed by `ModeSwitchInterface` shall not be referenced by more than one `SwConnector` at the time when the RTE is generated.

]()

**[constr\_1102] `ApplicationError` in the scope of one `SwComponentType`** [If a `SwComponentType` has `PortPrototypes` typed by different `ClientServerInterfaces` with equal `shortName` and `ApplicationErrors` defined then the following condition applies: `ApplicationErrors` with the same `shortName` shall have identical values of `errorCodes`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1103] `NonqueuedReceiverComSpec` and `enableUpdate`** [A `NonqueuedReceiverComSpec` that has the value of attribute `enableUpdate` set to `true` at the time when the contract phase generation is executed may not reference a `dataElement` that in turn is referenced by a `VariableAccess` in the role `dataReadAccess`.

]()

**[constr\_1104] Trigger sink and trigger source** [An `RPortPrototype` typed by a `TriggerInterface` shall not be referenced by more than one `SwConnectors` that are in turn referencing `PPortPrototypes` typed by `TriggerInterfaces` that contain `Triggers` with the same `shortName` at the time when the RTE is generated.

]()

**[constr\_1105] Value of `arraySize`** [The value of the attribute `arraySize` of an `ImplementationDataTypeElement` owned by an `ImplementationDataType` or `ImplementationDataTypeElement` of category `ARRAY` shall be greater than 0 unless attribute `ImplementationDataTypeElement.arraySizeHandling` exists and is set to the value `inheritedFromArrayElementTypeSize`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1106] Structure shall have at least one element** [An `ImplementationDataType` or `ImplementationDataTypeElement` of category `STRUCTURE` shall



own at least one `ImplementationDataTypeElement` at the time when the contract phase generation is executed.

]()

**[constr\_1107] Union shall have at least one element** [An `ImplementationDataType` or `ImplementationDataTypeElement` of category `UNION` shall own at least one `ImplementationDataTypeElement` at the time when the contract phase generation is executed.

]()

**[constr\_1108] Value of `ApplicationError.errorCode`** [The value of `ApplicationError.errorCode` shall not exceed the closed interval 1 .. 63. The following exception applies: **only** in case `possibleError` is supposed to represent `E_OK` the value 0 shall be allowed.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1109] Mapping of `SwComponentPrototypes` typed by a `SensorActuatorSwComponentType`** [A `SwComponentPrototype` typed by a `SensorActuatorSwComponentType` needs to be mapped and run on exactly that ECU that contains the `HwElement` corresponding to the `HwType` that its `SensorActuatorSwComponentType` refers to in case it accesses the hardware via the I/O hardware abstraction layer.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1110] Value of `category` in `EndToEndDescription`** [The attribute `category` of `EndToEndDescription` can have the following values:

- `NONE`
- `PROFILE_01`
- `PROFILE_02`

]()

**[constr\_1111] Constraints of `dataId` in `PROFILE_01`** [In `PROFILE_01`, there shall be only one element in the set and the applicable range of values is [0 .. 65535].

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1112] Constraints of `dataIdMode` in `PROFILE_01`** [In `PROFILE_01`, the applicable range of values for `dataIdMode` is [0 .. 3].



This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1113] Existence of attributes in PROFILE\_01** [In PROFILE\_01, the following attributes shall exist:

- `dataLength`
- `dataId`

at the time when the contract phase generation is executed.

]()

**[constr\_1114] Constraints of `crcOffset` in PROFILE\_01** [In PROFILE\_01, the applicable range of values for `crcOffset` is [0 .. 65535]. For the value of this attribute the constraint *value mod 4 = 0* applies.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1115] Constraints of `counterOffset` in PROFILE\_01** [In PROFILE\_01, the applicable range of values for `counterOffset` is [0 .. 65535]. For the value of this attribute the constraint *value mod 4 = 0* applies.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1116] Constraints of `dataLength` in PROFILE\_01** [In PROFILE\_01, the applicable range of values for `dataLength` is [0 .. 240]. For the value of this attribute the constraint *value mod 8 = 0* applies.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1117] Constraints of `maxDeltaCounterInit` in PROFILE\_01** [In PROFILE\_01, the applicable range of values for `EndToEndDescription.maxDeltaCounterInit` and `ReceiverComSpec.maxDeltaCounterInit` is [0 .. 14].

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1118] Existence of attributes in PROFILE\_02** [In PROFILE\_02, only the following attributes shall exist:

- `dataLength`
- `dataId`

at the time when the contract phase generation is executed

]()

**[constr\_1119] Constraints of `dataLength` in PROFILE\_02** [In PROFILE\_02, the applicable range of values for `dataLength` is [0 .. 65535]. For the value of this attribute the constraint *value mod 8 = 0* applies.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1120] Constraints of `dataId` in PROFILE\_02** [In PROFILE\_02, there shall be exactly ordered 16 elements in the set and the applicable range of values is [0 .. 255].

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1121] Constraints of `maxDeltaCounterInit` in PROFILE\_02** [In PROFILE\_02, the applicable range of values for `EndToEndDescription.maxDeltaCounterInit` and `ReceiverComSpec.maxDeltaCounterInit` is [0 .. 15].

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1126] Compatibility of `DataConstrs`** [The `DataConstr` (e.g. the limits) defined by the type of the providing data element shall be within the constraints defined by the type of the requiring data element.

For client-server communication, the following rules apply:

- For `arguments` with attribute `direction` set to the value `in`, the client shall take the role of the *provider* and the server shall take the role of the *requiring side*.
- For `arguments` with attribute `direction` set to the value `inout` the `DataConstr` shall be equal on both sides.
- For `arguments` with attribute `direction` set to the value `out`, the server shall take the role of the *provider* and the client shall take the role of the *requiring side*.

This rule shall be applied at the time when the RTE is generated.

]()

**[constr\_1128] Queue length of `ClientServerOperations` associated with the same `RunnableEntity`** [If two or more `OperationInvokedEvents` reference a single `RunnableEntity` the value of the `ServerComSpec` attribute `queueLength` shall be **identical** for all `ServerComSpecs` owned by `PPortPrototypes` of the enclosing `SwComponentType` that reference one of the `ClientServerOperations` that are also referenced by the `OperationInvokedEvents`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1129] `swImplPolicy` and `NonqueuedReceiverComSpec`** [The attribute `swImplPolicy` of a `dataElement` referenced by a `NonqueuedReceiverComSpec` shall not be set to the value `queued` at the time when the contract phase generation is executed.

]()

**[constr\_1130] `swImplPolicy` and `QueuedReceiverComSpec`** [The attribute `swImplPolicy` of a `dataElement` referenced by a `QueuedReceiverComSpec` shall be set to the value `queued` at the time when the contract phase generation is executed.

]()

**[constr\_1131] `swImplPolicy` and `NonqueuedSenderComSpec`** [The attribute `swImplPolicy` of a `dataElement` referenced by a `NonqueuedSenderComSpec` shall not be set to the value `queued` at the time when the contract phase generation is executed.

]()

**[constr\_1132] `swImplPolicy` and `QueuedSenderComSpec`** [The attribute `swImplPolicy` of a `dataElement` referenced by a `QueuedSenderComSpec` shall be set to the value `queued` at the time when the contract phase generation is executed.

]()

**[constr\_1134] Allowed structure of `TEXTTABLE`** [The existence of `physConstrs` is not allowed and `compuInternalToPhys` shall exist with `compuScales` consisting of `upperLimit` and `lowerLimit` at any time in the workflow.

]()

**[constr\_1135] Limit of `vt` in `BITFIELD_TEXTTABLE`** [The separator for splitting the string representing the value is “|” and is therefore forbidden to appear in `vt` at any time in the workflow.

]()

**[constr\_1137] Applicability of `ParameterInterface`** [A `PPortPrototype` typed by a `ParameterInterface` can **only** be owned by a `ParameterSwComponentType` or a `CompositionSwComponentType` at any time in the workflow.

]()

**[constr\_1138] `assignedPort` and `DiagEventDebounceMonitorInternal`** [The existence of an `assignedPort` in combination with a `DiagEventDebounceAlgorithm` shall only be respected for the concrete subclass `DiagEventDebounceMonitorInternal`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1139] `assignedPort` of `DiagEventDebounceMonitorInternal` shall refer to an `RPortPrototype`** [Concerning the debouncing, the software-component acts as a client and thus the `assignedPort` defined with respect to a `DiagEventDebounceMonitorInternal` may only refer to an `RPortPrototype`. The standardized value of the `role` identifier of the `assignedPort` shall be `CallbackGetFaultDetectCounter`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1140] Combination of `invalidValue` with the attribute `handleInvalid`** [The combination of setting the attribute `handleInvalid` of the meta-class `InvalidationPolicy` owned by `SenderReceiverInterface` to value `replace` and of setting the value of the attribute `initValue` owned by a corresponding `NonqueuedReceiverComSpec` effectively to the value of the `invalidValue` (owned by a corresponding `SwDataDefProps`) is not supported at the time when the contract phase generation is executed.

]()

**[constr\_1141] Applicability of the `scope` attribute** [The attribute `scope` of meta-class `VariableAccess` shall **only** be applied with respect to the aggregation of `VariableAccess` in the following roles:

- `dataReadAccess`
- `dataWriteAccess`
- `dataSendPoint`
- `dataReceivePointByValue`
- `dataReceivePointByArgument`

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1142] category of CompuMethod shall not be extended** [In contrast to the general rule that `category` can be extended by user-specific values it is **not allowed** to extend the meaning of the attribute `category` of meta-class `CompuMethod` at any time in the workflow.

]()

**[constr\_1144] SensorActuatorSwComponentType, EcuAbstractionSwComponentType, and ComplexDeviceDriverSwComponentType may only reference a HwType** [The attribute `sensorActuator` of `SensorActuatorSwComponentType`, the attribute `hardwareElement` of `EcuAbstractionSwComponentType`, and the attribute `hardwareElement` of `ComplexDeviceDriverSwComponentType` may **only** reference a `HwType`. References to other subclasses of `HwDescriptionEntity` are not allowed at the time when the RTE is generated.

]()

**[constr\_1146] Applicability of a symbol for a CompuScale in C code** [The `symbol` attribute shall only be provided for `CompuScales` where the `category` of the enclosing `CompuMethod` is one of the following:

- TEXTTABLE
- SCALE\_LINEAR\_AND\_TEXTTABLE
- SCALE\_RATIONAL\_AND\_TEXTTABLE
- BITFIELD\_TEXTTABLE

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1147] Standardized values for the attribute category of meta-class PortGroup** [The following values of the attribute `category` of meta-class `PortGroup` are reserved by the AUTOSAR standard:

- MODE\_MANAGEMENT: This represents the usage of the `PortGroup` for the purpose of mode management
- PARTIAL\_NETWORKING: This represents the usage of the `PortGroup` for the purpose of partial networking

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1148] PortInterfaces of PortPrototypes used to connect to NvBlockSwComponentTypes** [PortInterfaces of PortPrototypes used to connect to `NvBlockSwComponentTypes` as well as the `PortInterfaces` used in the

context of `NvBlockSwComponentTypes` shall **always** set the value of the attribute `isService` to `false` **at the time when the RTE is generated**.

]()

**[constr\_1149] PortPrototypes used for NV data management** [A `PortPrototype` typed by a `ClientServerInterface` used for NV data management, i.e. the interaction of `ApplicationSwComponentTypes` with `NvBlockSwComponentTypes`, shall be typed by `ClientServerInterfaces` that are compatible to the particular `ClientServerInterfaces` derived from `MOD_GeneralBlueprints` [9]. **[constr\_1148]** applies.

This rule shall be imposed **at the time when the RTE is generated**.

]()

**[constr\_1150] Usage of valueType for PortDefinedArgumentValue** [The `valueType` (typically this boils down to integer values used to specify an “id”) associated with `PortDefinedArgumentValue` shall be of `category` `VALUE` or `TYPE_REFERENCE`. The latter case is only supported if the value of `category` of the target data type is set to `VALUE`.

This rule shall be imposed **at the time when the RTE is generated**.

]()

**[constr\_1151] Applicability of PortInterfaceMapping** [A `PortInterfaceMapping` is only applicable and valid for a `SwConnector` if the two `PortPrototypes` which are referenced by the `SwConnector` are typed by the same two `PortInterfaces` which are mapped by the `PortInterfaceMapping`. This rule shall be imposed **at the time when the RTE is generated**.

]()

**[constr\_1152] category of ApplicationArrayElement and AutosarDataType referenced in the role type shall be kept in sync** [The value of `category` of an `ApplicationArrayElement` shall always be identical to the value of `category` of the `AutosarDataType` referenced by the `ApplicationArrayElement`.

]()

**[constr\_1153] Applicability of compatibility requirements for CompuScales** [Compatibility requirements for `CompuScales` shall only apply for `CompuScales` where the `category` of the enclosing `CompuMethod` is one of the following:

- `TEXTTABLE`
- `SCALE_LINEAR_AND_TEXTTABLE`
- `SCALE_RATIONAL_AND_TEXTTABLE`
- `TAB_NOINTP`
- `BITFIELD_TEXTTABLE`

- LINEAR
- RAT\_FUNC
- IDENTICAL

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1154] Compatibility of [CompuScales](#) for sender-receiver communication and similar use cases** [For sender-receiver communication and similar use cases, it is required that the set of [CompuScales](#) defined in the [CompuMethod](#) of the provider of the communication (i.e. on the side of the [PPortPrototype](#)) shall be a subset of the set of [CompuScales](#) defined in the [CompuMethod](#) on the required side (i.e. on the side of the [RPortPrototype](#)) at the time when the RTE is generated.

]()

**[constr\_1155] Compatibility of [CompuScales](#) for client-server communication** [For client-server communication, the following rules apply at the time when the RTE is generated:

For [arguments](#) of direction IN the [CompuScales](#) defined in the [CompuMethod](#) of the client (i.e. on the side of the [RPortPrototype](#)) shall be a subset of the set of [CompuScales](#) defined in the [CompuMethod](#) supported at the server (i.e. on the side of the [PPortPrototype](#)).

For [arguments](#) of the direction OUT the set of [CompuScales](#) defined in the [CompuMethod](#) of the server (i.e. on the side of the [PPortPrototype](#)) shall be a subset of the set of [CompuScales](#) defined in the [CompuMethod](#) supported at the client (i.e. on the side of the [RPortPrototype](#)).

For [arguments](#) of direction INOUT the set of [CompuScales](#) defined in the [CompuMethod](#) of server and client shall be identical.

]()

**[constr\_1156] Relevance of “names” of [CompuScales](#)** [[CompuScales](#) which contribute to tabular conversion by having a [compuConst](#) are compatible if and only if the “names” of the [compuScales](#), (namely [shortLabel](#), [vt](#) and [symbol](#), according to the priority rules communicated in [TPS\_SWCT\_01431]) are equal.

If the scale has no [compuConst](#), “names” of [CompuScales](#) are not relevant for compatibility.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1158] Applicable [categorys](#) for attribute [ImplementationDataType.swDataDefProps.compuMethod](#)** [The definition of the reference [ImplementationDataType.swDataDefProps.compuMethod](#) is restricted to a [CompuMethod](#) of

either `category` `BITFIELD_TEXTTABLE` or `category` `TEXTTABLE` (these might be seen as implementation specific in certain cases).

This rule shall be imposed **at the time when the contract phase generation is executed.**

]()

**[constr\_1159] Consistency of `VariableAndParameterInterfaceMapping` with respect to the referenced `DataInterfaces`** [Within one `VariableAndParameterInterfaceMapping` all `firstDataPrototypes` shall belong to one and only one `DataInterface` and all `secondDataPrototypes` shall belong to one other and only one other `DataInterface` **at any time in the workflow.**

]()

**[constr\_1161] Applicability of the attribute `Ref.index`** [The usage of attribute `Ref.index` is limited to references to the following meta-classes:

- `ApplicationArrayElement`
- Sub-classes of `AbstractImplementationDataTypeElement`.

This rule shall be imposed **at any time in the workflow.**

]()

**[constr\_1162] Compatibility of `SwRecordLayouts`** [Two `SwRecordLayout` definitions are compatible **at the time when the RTE is generated** if and only if all attributes **except**

- `shortName`
- `desc`
- `introduction`
- `longName`
- `adminData`
- `annotation`

are **identical.**

]()

**[constr\_1163] Compatibility of `CompuMethods`** [Two `CompuMethod` definitions are compatible **at the time when the RTE is generated** if and only if all attributes **except**

- `shortName`
- `desc`
- `introduction`



- `longName`
- `adminData`
- `annotation`
- `displayFormat`

are **identical and** the `compuScales` and `units` are compatible.

]()

**[constr\_1164] Number of `arguments` owned by a `RunnableEntity`** [If a given `RunnableEntity` owns `RunnableEntityArguments` in the role `argument`, then the number of these `RunnableEntityArguments` shall be identical to the number of applicable `portArgValues` of the `PortAPIOption` that references the `Port-Prototype` that in turn is referenced by the `OperationInvokedEvent` that references the `RunnableEntity` **plus** the number of `ArgumentDataPrototypes` aggregated in the role `argument` by the `ClientServerOperation` referenced by said `OperationInvokedEvent` **at the time when the contract phase generation is executed.**

]()

**[constr\_1165] Applicability of `RunnableEntityArgument`** [The existence of a `RunnableEntityArgument` is limited to `RunnableEntity`s triggered by a `ClientServerOperation`.

This rule shall be imposed **at the time when the contract phase generation is executed.**

]()

**[constr\_1166] Restrictions of `ModeRequestTypeMap`** [For every `ModeDeclarationGroup` referenced by a `ModeDeclarationGroupPrototype` used in a `Port-Prototype` typed by a `ModeSwitchInterface` a `ModeRequestTypeMap` shall exist that points to the `ModeDeclarationGroup` and also to an eligible `ImplementationDataType`.

The `ModeRequestTypeMap` shall be aggregated by a `DataTypeMappingSet` which is referenced from the `SwcInternalBehavior` that is owned by the `Application-SwComponentType` that also owns the `PortPrototype`.

This rule shall be imposed **at the time when the contract phase generation is executed.**

]()

**[constr\_1167] `ImplementationDataTypes` used as `ModeRequestTypeMap.implementationDataType`** [The `ImplementationDataType` referenced by a `ModeRequestTypeMap` shall **either** be of category `VALUE` **or** of category `TYPE_REFERENCE` that in turn references an `ImplementationDataType` of category `VALUE`.

The `baseType` referenced by the `ImplementationDataType` shall have set the value of the attribute `BaseTypeDirectDefinition.baseTypeEncoding` to `NONE`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1168] Compatibility of `ImplementationDataTypes` used in the `ModeRequestTypeMap`** [Both `ImplementationDataTypes` shall fulfill [constr\_1167].

In addition to that, the possible numbers used for representing `ModeDeclarations` on the side of the mode manager shall match the supported range of the `ImplementationDataType` used for representing `ModeDeclarations` on the side of the mode user (see [constr\_1075]).

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1169] Allowed values for `Trigger.swImplPolicy`** [The only allowed values for the attribute `Trigger.swImplPolicy` are either `STANDARD` (in which case the `Trigger` processing does not use a queue) or `QUEUED` (in which case the processing of `Triggers` positively uses a queue).

at the time when the contract phase generation is executed.

]()

**[constr\_1170] Interpretation of attribute `maxDeltaCounterInit` owned by `EndToEndDescription`** [If `EndToEndProtection.endToEndProtectionVariablePrototype.receiver` is identical to the `RPortPrototype.requiredComSpec.dataElement` and `RPortPrototype.requiredComSpec.maxDeltaCounterInit` is defined then the value of `RPortPrototype.requiredComSpec.maxDeltaCounterInit` shall be preferred over the value of `EndToEndProtection.endToEndProfile.maxDeltaCounterInit`.

If the value of `category` of `EndToEndDescription` is set to `PROFILE_01` and either the described correspondence rule concerning the referenced `VariableDataPrototype` is not fulfilled or `RPortPrototype.requiredComSpec.maxDeltaCounterInit` is not defined then `EndToEndProtection.endToEndProfile.maxDeltaCounterInit` shall exist.

]()

**[constr\_1171] Interpretation of attribute `maxDeltaCounterInit` of `EndToEndDescription`** [If `EndToEndProtection.endToEndProtectionVariablePrototype.receiver` is identical to the `RPortPrototype.requiredComSpec.dataElement` and `RPortPrototype.requiredComSpec.maxDeltaCounterInit` is defined then the value of `RPortPrototype.requiredComSpec.maxDeltaCounterInit` shall be preferred over the value of `EndToEndProtection.endToEndProfile.maxDeltaCounterInit`.

If the value of `category` of `EndToEndDescription` is set to `PROFILE_02` **and either** the described correspondence rule concerning the referenced `VariableDataPrototype` is not fulfilled **or** `RPortPrototype.requiredComSpec.maxDeltaCounterInit` is not defined **then** `EndToEndProtection.endToEndProfile.maxDeltaCounterInit` **shall exist**.

]()

**[constr\_1172] Allowed values of `SwCalibrationAccessEnum` for `ModeDeclarationGroupPrototype`** [The only allowed values of `swCalibrationAccess` aggregated by `ModeDeclarationGroupPrototype` are `notAccessible` and `readOnly`.

This rule shall be imposed **at any time in the workflow**.

]()

**[constr\_1173] Applicability of `AutosarParameterRef` referencing a `VariableDataPrototype`** [A reference from `AutosarParameterRef` to `VariableDataPrototype` is **only** applicable if the `AutosarParameterRef` is used in the context of `SwAxisGrouped` **at the time when the contract phase generation is executed**.

]()

**[constr\_1174] `PortInterfaces` used in the context of `CompositionSwComponentTypes` cannot refer to AUTOSAR services** [`CompositionSwComponentTypes` shall not own `PortPrototypes` typed by `PortInterfaces` where the attribute `isService` is set to `true` **at any time in the workflow**.

]()

**[constr\_1175] Depending on its `category`, `CompuMethod` shall refer to a `unit`** [As a `CompuMethod` specifies the conversion between the physical world and the numerical values, it shall refer to a `unit` unless the `CompuMethod`'s `category` is one of `TEXTTABLE`, `BITFIELD_TEXTTABLE`, or `IDENTICAL`.

This rule shall be imposed **at the time when the contract phase generation is executed**.

]()

**[constr\_1176] Compatibility of `CompuScales` of `category` `LINEAR` and `RAT_FUNC`** [`CompuScales` of `category` `LINEAR` and `RAT_FUNC` are considered compatible **at the time when the RTE is generated** if they yield the same conversion.

]()

**[constr\_1177] Allowed `targetCategory` for `SwPointerTargetProps`** [The value of `targetCategory` for `SwPointerTargetProps` can only be one of `TYPE_REFERENCE` or `FUNCTION_REFERENCE`.

The only exception to this rule applies if the `swDataDefProps` owned by the `SwPointerTargetProps` refers to a `SwBaseType` with native type declaration `void`, in this case `VALUE` is also permitted.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1178] Existence of attributes of `SwDataDefProps` in the context of `ImplementationDataType`** [For the sake of removing possible sources of ambiguity, `SwDataDefProps` used in the context of `ImplementationDataType` can only have one of

- `baseType`
- `swPointerTargetProps`
- `implementationDataType`

at the time when the contract phase generation is executed.

]()

**[constr\_1181] Numerical values used in `ModeDeclaration.value` and `ModeDeclarationGroup.onTransitionValue`** [The numerical values used to define the `value` attributes and the `onTransitionValue` attribute of a `ModeDeclarationGroup` shall not overlap at the time when the contract phase generation is executed.

]()

**[constr\_1182] Allowed values for `InternalTriggeringPoint.swImplPolicy`** [The only allowed values for the attribute `swImplPolicy` of meta-class `InternalTriggeringPoint` are either `STANDARD` (in which case the processing of the internal triggering does not use a queue) or `QUEUED` (in which case the processing of internal triggering positively uses a queue).

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1183] `EndToEndProtectionVariablePrototypes` aggregated by `EndToEndProtection`** [All `EndToEndProtectionVariablePrototypes` aggregated by the same `EndToEndProtection` shall refer to the identical `sender` at the time when the contract phase generation is executed.

]()

**[constr\_1184] Consistency of `rootDataPrototype` and `base` in the context of `ApplicationCompositeElementInPortInterfaceInstanceRef`** [The `rootDataPrototype` referenced by `ApplicationCompositeElementInPortInter-`

`faceInstanceRef` shall be owned by the applicable subclass of `DataInterface` referenced in the role `base`.

This implies that the `rootDataPrototype` shall be a `ParameterDataPrototype` if the `base` is a `ParameterInterface`. Otherwise, the `rootDataPrototype` shall be a `VariableDataPrototype`.

This rule shall be applied at **any time in the workflow**.

]()

**[constr\_1185] Consistency of data types in the context of `ApplicationCompositeElementInPortInterfaceInstanceRef`** [The definition of attributes `contextDataPrototype` and `targetDataPrototype` shall (via the type-prototype pattern) be enclosed in the context of the definition of the data type used to type `rootDataPrototype` at **any time in the workflow**.

]()

**[constr\_1186] Consistency of data types in the context of `ArVariableInImplementationDataInstanceRef`** [The definition of attributes `contextDataPrototype` and `targetDataPrototype` shall be enclosed in the context of the definition of the data type used to type `rootVariableDataPrototype` at **any time in the workflow**.

]()

**[constr\_1187] Compatibility of `VariableDataPrototypes` or `ParameterDataPrototypes` typed by composite data types** [DataPrototypes of `ApplicationCompositeDataTypes` or `ImplementationDataTypes` of category `STRUCTURE` or `ARRAY` are compatible at the time when the RTE is generated if one of the following conditions evaluates to true:

1. The underlying `ApplicationCompositeDataTypes` or `ImplementationDataTypes` of category `STRUCTURE` or `ARRAY` are identical
2. The underlying `ApplicationCompositeDataTypes` or `ImplementationDataTypes` of category `STRUCTURE` or `ARRAY` fulfill the following condition:
  - They consist of the same number of elements **and**
  - They are composed of compatible `AutosarDataTypes` (either `ApplicationCompositeDataTypes` or `ImplementationDataTypes` of category `STRUCTURE` or `ARRAY` **OR** `ApplicationPrimitiveDataTypes` or `ImplementationDataTypes` of category `VALUE`, `BOOLEAN`, or `STRING`) **in the same order and**
  - All attributes match exactly, except for the `shortName` of the M1 `AutosarDataType`.
3. In the context of a `DataPrototypeMapping`, for each `ApplicationCompositeElementDataPrototype` of the required `DataPrototype` a `SubEle-`

mentMapping exists such that a ApplicationCompositeDataType-SubElementRef in the role firstElement or secondElement exists that references the required ApplicationCompositeElementDataPrototype **and** a corresponding ApplicationCompositeDataTypeSubElementRef exists in the **other** role (i.e. secondElement or firstElement) that in turn references an ApplicationCompositeElementDataPrototype of the provided ApplicationCompositeDataType.

4. If and only if the DataPrototype is **not** typed by an ApplicationDataType but by an ImplementationDataType: in the context of a DataPrototypeMapping, for each ImplementationDataTypeElement of the required DataPrototype a SubElementMapping exists such that a ImplementationDataTypeSubElementRef in the role firstElement or secondElement exists that references the required ImplementationDataTypeElement **and** a corresponding ImplementationDataTypeSubElementRef exists in the **other** role (i.e. secondElement or firstElement) that in turn references an ImplementationDataTypeElement of the provided ImplementationDataType.

]()

**[constr\_1188] Existence of ReceiverComSpec.replaceWith** [The aggregation of VariableAccess in the role ReceiverComSpec.replaceWith shall exist **if and only if at least one of the following conditions is fulfilled**:

- Attribute ReceiverComSpec.handleOutOfRange is set to the value externalReplacement.
- Attribute SenderReceiverInterface.invalidationPolicy.handleInvalid is set to the value externalReplacement.

This rule shall be applied **at the time when the contract phase generation is executed**.

]()

**[constr\_1190] Only one mapping for composite to primitive use case** [In the case described by [TPS\_SWCT\_01195] only one subElementMapping shall exist at the enclosing DataPrototypeMapping **at the time when the RTE is generated**.

]()

**[constr\_1191] Value of Limit shall yield a numerical value** [After all variability is bound, the content obtained from a limit shall yield a numerical value **at any time in the workflow**.

]()

**[constr\_1192] Compatibility of “IDENTICAL” to “RAT\_FUNC” or “LINEAR”** [Similar to [constr\_1176], a CompuScale where the category of the enclosing CompuMethod

is set to IDENTICAL is – at the time when the RTE is generated – considered compatible to a CompuScale where the category of the enclosing CompuMethod is set to RAT\_FUNC or LINEAR if the following rule applies:

$$int = \frac{N_0 + N_1 * phys + N_i * phys^i}{D_0 + D_1 * phys + D_i * phys^i} = phys$$

]()

**[constr\_1193] ModeDeclaration** shall be referenced by at least one **ModeTransition** in the role **enteredMode** [For each ModeDeclaration at least one ModeTransition shall reference the ModeDeclaration in the role enteredMode.

This constraint shall apply at the time when the RTE is generated only if there is at least one ModeTransition defined in the context of the enclosing ModeDeclarationGroup and it shall not apply to the initialMode.

]()

**[constr\_1194] Identical ModeTransitions** [Two ModeDeclarationGroups contain identical modeTransitions at the time when the RTE is generated if and only if

1. For each ModeTransition defined in the context of the mode provider one ModeTransition with the same shortName is defined in the context of the mode user.
2. Each pair of ModeTransitions in both ModeDeclarationGroups identified by their respective shortName have identical targets (in terms of the shortName of the referenced ModeDeclaration) of the references enteredMode and exitedMode.

]()

**[constr\_1195] SwcModeSwitchEvent and the definition of ModeTransition** [For each pair of ModeDeclarations referenced by a SwcModeSwitchEvent with attribute activation set to onTransition a ModeTransition shall be defined in the corresponding direction (i.e. from exitedMode to enteredMode). This constraint shall only apply at the time when the RTE is generated if the respective ModeDeclarationGroup defines at least one modeTransition.

]()

**[constr\_1196] Existence of networkRepresentation vs. compositeNetworkRepresentation** [If a ReceiverComSpec or SenderComSpec aggregates networkRepresentation it shall not aggregate compositeNetworkRepresentation (and vice versa) at the time when the contract phase generation is executed.

]()

**[constr\_1197] Existence of compositeNetworkRepresentation shall be comprehensive** [If at least one compositeNetworkRepresentation exists then for



each leaf `ApplicationCompositeElementDataPrototype` of the affected `ApplicationCompositeDataType` exactly one `compositeNetworkRepresentation` shall be defined at the time when the contract phase generation is executed.

For each such `compositeNetworkRepresentation`, attributes `leafElement` and `networkRepresentation` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1200] Queued communication is not applicable for `dataElements` owned by `PRPortPrototype`** [The `swImplPolicy` shall not be set to `queued` for any `dataElement` owned by a `PRPortPrototype` at any time in the workflow.

]()

**[constr\_1202] Supported connections by `AssemblySwConnector` for `PortPrototypes` typed by a `SenderReceiverInterface` or `NvDataInterface`** [For the modeling of `AssemblySwConnectors` between `PortPrototypes` typed by a `SenderReceiverInterface` or `NvDataInterface`, **only** the connections documented in Table 2.14 are supported by AUTOSAR at any time in the workflow.

]()

	<code>RPortPrototype</code>	<code>PPortPrototype</code>	<code>PRPortPrototype</code>
<code>RPortPrototype</code>	No	Yes	Yes
<code>PPortPrototype</code>	Yes	No	Yes
<code>PRPortPrototype</code>	Yes	Yes	Yes

**Table 2.14: Supported connections by `AssemblySwConnector` for `PortPrototypes` typed by a `SenderReceiverInterface` or `NvDataInterface`**

**[constr\_1203] Supported connections by `DelegationSwConnector` for `PortPrototypes` typed by a `SenderReceiverInterface` or `NvDataInterface`** [For the modeling of `DelegationSwConnectors` between `PortPrototypes` typed by a `SenderReceiverInterface` or `NvDataInterface`, **only** the connections documented in Table 2.15 are supported by AUTOSAR at any time in the workflow.

]()

<code>innerPort</code>	<code>outerPort</code>		
	<code>RPortPrototype</code>	<code>PPortPrototype</code>	<code>PRPortPrototype</code>
<code>RPortPrototype</code>	Yes	No	Yes
<code>PPortPrototype</code>	No	Yes	Yes







PRPortPrototype	Yes	Yes	Yes
-----------------	-----	-----	-----

**Table 2.15: Supported connections by `DelegationSwConnector` for `PortPrototypes` typed by a `SenderReceiverInterface` or `NvDataInterface`**

**[constr\_1204] Supported connections by `AssemblySwConnector` for `PortPrototypes` typed by a `ClientServerInterface`, `ModeSwitchInterface`, or `TriggerInterface`** [For the modeling of `AssemblySwConnectors` between `PortPrototypes` typed by a `ClientServerInterface`, `ModeSwitchInterface`, or `TriggerInterface`, **only** the connections documented in Table 2.16 are supported by AUTOSAR at any time in the workflow.

]()

	RPortPrototype	PPortPrototype	PRPortPrototype
RPortPrototype	No	Yes	Yes
PPortPrototype	Yes	No	No
PRPortPrototype	Yes	No	No

**Table 2.16: Supported connections by `AssemblySwConnector` for `PortPrototypes` typed by a `ClientServerInterface`, `ModeSwitchInterface`, or `TriggerInterface`**

**[constr\_1205] Supported connections by `DelegationSwConnector` for `PortPrototypes` typed by a `ClientServerInterface`, `ModeSwitchInterface`, or `TriggerInterface`** [For the modeling of `DelegationSwConnectors` between `PortPrototypes` typed by a `ClientServerInterface`, `ModeSwitchInterface`, or `TriggerInterface`, **only** the connections documented in Table 2.17 are supported by AUTOSAR at any time in the workflow.

]()

innerPort	outerPort		
	RPortPrototype	PPortPrototype	PRPortPrototype
RPortPrototype	Yes	No	No
PPortPrototype	No	Yes	No
PRPortPrototype	No	Yes	No

**Table 2.17: Supported connections by `DelegationSwConnector` for `PortPrototypes` typed by a `ClientServerInterface`, `ModeSwitchInterface`, or `TriggerInterface`**

**[constr\_1209] Mapping of `ModeDeclarations` of mode user to `ModeDeclaration` of mode manager** [A configuration that maps **several** `ModeDeclarations` representing modes of a mode user to **one** `ModeDeclaration` representing a mode of a mode manager shall be rejected at any time in the workflow.

]()

**[constr\_1210] Mapping of ModeDeclarations of mode user to all ModeDeclarations of mode manager** [If a `ModeDeclarationMapping` exists that references a `ModeDeclaration` representing a mode of the mode manager, then `ModeDeclarationMappings` shall exist that map all modes of the mode manager to modes of the mode user at the time when the RTE is generated.

]()

**[constr\_1211] Constraints of `maxNoNewOrRepeatedData` in PROFILE\_01** [In PROFILE\_01, the applicable range of values for `EndToEndDescription.maxNoNewOrRepeatedData` and `ReceiverComSpec.maxNoNewOrRepeatedData` is [0 .. 14].

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1212] Constraints of `syncCounterInit` in PROFILE\_01** [In PROFILE\_01, the applicable range of values for `EndToEndDescription.syncCounterInit` and `ReceiverComSpec.syncCounterInit` is [0 .. 14].

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1213] Constraints of `maxNoNewOrRepeatedData` in PROFILE\_02** [In PROFILE\_02, the applicable range of values for `EndToEndDescription.maxNoNewOrRepeatedData` and `ReceiverComSpec.maxNoNewOrRepeatedData` is [0 .. 15].

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1214] Constraints of `syncCounterInit` in PROFILE\_02** [In PROFILE\_02, the applicable range of values for `EndToEndDescription.syncCounterInit` and `ReceiverComSpec.syncCounterInit` is [0 .. 15].

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1215] Interpretation of attribute `maxNoNewOrRepeatedData` owned by `EndToEndDescription` in PROFILE\_01** [If `EndToEndProtection.endToEndProtectionVariablePrototype.receiver` is identical to the `RPortPrototype.requiredComSpec.dataElement` and `RPortPrototype.requiredComSpec.maxNoNewOrRepeatedData` is defined then the value of `RPortPrototype`.

`requiredComSpec.maxNoNewOrRepeatedData` **shall be preferred** over the value of `EndToEndProtection.endToEndProfile.maxNoNewOrRepeatedData`.

If the value of `category` of `EndToEndDescription` is set to `PROFILE_01` **and either** the described correspondence rule concerning the referenced `VariableDataPrototype` is not fulfilled **or** `RPortPrototype.requiredComSpec.maxNoNewOrRepeatedData` is not defined **then** `EndToEndProtection.endToEndProfile.maxNoNewOrRepeatedData` **shall exist**.

]()

**[constr\_1216]** Interpretation of attribute `syncCounterInit` owned by `EndToEndDescription` in `PROFILE_01` [If `EndToEndProtection.endToEndProtectionVariablePrototype.receiver` is identical to the `RPortPrototype.requiredComSpec.dataElement` **and** `RPortPrototype.requiredComSpec.syncCounterInit` is defined **then** the value of `RPortPrototype.requiredComSpec.syncCounterInit` **shall be preferred** over the value of `EndToEndProtection.endToEndProfile.syncCounterInit`.

If the value of `category` of `EndToEndDescription` is set to `PROFILE_01` **and either** the described correspondence rule concerning the referenced `VariableDataPrototype` is not fulfilled **or** `RPortPrototype.requiredComSpec.syncCounterInit` is not defined **then** `EndToEndProtection.endToEndProfile.syncCounterInit` **shall exist**.

]()

**[constr\_1217]** Interpretation of attribute `maxNoNewOrRepeatedData` owned by `EndToEndDescription` in `PROFILE_02` [If `EndToEndProtection.endToEndProtectionVariablePrototype.receiver` is identical to the `RPortPrototype.requiredComSpec.dataElement` **and** `RPortPrototype.requiredComSpec.maxNoNewOrRepeatedData` is defined **then** the value of `RPortPrototype.requiredComSpec.maxNoNewOrRepeatedData` **shall be preferred** over the value of `EndToEndProtection.endToEndProfile.maxNoNewOrRepeatedData`.

If the value of `category` of `EndToEndDescription` is set to `PROFILE_02` **and either** the described correspondence rule concerning the referenced `VariableDataPrototype` is not fulfilled **or** `RPortPrototype.requiredComSpec.maxNoNewOrRepeatedData` is not defined **then** `EndToEndProtection.endToEndProfile.maxNoNewOrRepeatedData` **shall exist**.

]()

**[constr\_1218]** Interpretation of attribute `syncCounterInit` owned by `EndToEndDescription` in `PROFILE_02` [If `EndToEndProtection.endToEndProtectionVariablePrototype.receiver` is identical to the `RPortPrototype.requiredComSpec.dataElement` **and** `RPortPrototype.requiredComSpec.syncCounterInit` is defined **then** the value of `RPortPrototype.requiredComSpec`.

`syncCounterInit` **shall be preferred** over the value of `EndToEndProtection.endToEndProfile.syncCounterInit`.

If the value of `category` of `EndToEndDescription` is set to `PROFILE_02` **and either** the described correspondence rule concerning the referenced `VariableDataPrototype` is not fulfilled **or** `RPortPrototype.requiredComSpec.syncCounterInit` is not defined **then** `EndToEndProtection.endToEndProfile.syncCounterInit` **shall exist**.

]()

**[constr\_1219] Invalidation depends on the value of `swImplPolicy`** [Invalidation of `dataElements` is only supported for `dataElements` where the value of `swImplPolicy` is **not** set to `queued` at the time when the contract phase generation is executed.

]()

**[constr\_1220] Compatibility of `SwBaseType`** [Two `SwBaseTypes` are compatible at the time when the RTE is generated if and only if attributes

- `baseTypeSize` respectively
- `byteOrder`,
- `memAlignment`,
- `baseTypeEncoding`, and
- `nativeDeclaration`

have identical values at the time when the RTE is generated.

]()

**[constr\_1221] `DataPrototype` is typed by an `ApplicationPrimitiveDataType`** [If a `DataPrototype` is typed by an `ApplicationPrimitiveDataType`, its `initValue` shall be provided by an `ApplicationValueSpecification`.

If the underlying `ApplicationPrimitiveDataType` represents an enumeration, the value provided shall match to one of the applicable text values (`vt`, `shortLabel`, `symbol`) defined by the applicable `CompuScales`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1222] `category` of an `AutosarDataType` used to type a `DataPrototype` is set to `STRING`** [If the `category` of an `AutosarDataType` used to type a `DataPrototype` is set to `STRING`, the `ApplicationValueSpecification` used to initialize the `DataPrototype` shall be of `category STRING`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1223] DataPrototype is typed by an ApplicationRecordDataType** [If a `DataPrototype` is typed by an `ApplicationRecordDataType`, the corresponding `initValue` shall be provided by a `RecordValueSpecification`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1224] DataPrototype is typed by an ApplicationArrayDataType** [If a `DataPrototype` is typed by an `ApplicationArrayDataType`, the corresponding `initValue` shall be provided by an `ArrayValueSpecification` (that may contain an `ApplicationRuleBasedValueSpecification`).

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1225] DataPrototype is typed by an ImplementationDataType that references a CompuMethod of category TEXTTABLE or BITFIELD\_TEXTTABLE** [If a `DataPrototype` is typed by an `ImplementationDataType` that references a `CompuMethod` of category `TEXTTABLE` or `BITFIELD_TEXTTABLE` the applicable `ValueSpecification` shall be a `TextValueSpecification`.

In this case the value provided shall match to one of the applicable text values (`vt`, `shortLabel`, `symbol`) defined by the applicable `CompuScales`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1226] Applicable range for ExecutableEntityActivationReason.bitPosition** [The value of attribute `ExecutableEntityActivationReason.bitPosition` shall be in the range of 0 .. 31 at the time when the contract phase generation is executed.

]()

**[constr\_1227] Value of attribute ExecutableEntityActivationReason.bitPosition shall be unique** [The value of attributes `ExecutableEntityActivationReason.bitPosition` and `ExecutableEntityActivationReason.symbol` shall be unique in the context of the enclosing `RunnableEntity` at the time when the contract phase generation is executed.

]()

[constr\_1228] **RTEEvent** that is referenced by a **WaitPoint** in the role **trigger** shall not reference **ExecutableEntityActivationReason** [An **RTEEvent** that is referenced by a **WaitPoint** in the role **trigger** shall not reference **ExecutableEntityActivationReason** in the role **activationReasonRepresentation** at the time when the **RTE** is generated.

]()

[constr\_1229] **category** of **ImplementationDataType** boils down to **VALUE** [An **ImplementationDataType** qualifies as an Integral Primitive Type if and only if either

- its **category** is **VALUE** or **TYPE\_REFERENCE** that eventually boils down to **VALUE** or
- its **category** is **ARRAY** and it has only one **subElement** and one of the following conditions applies:
  - **subElement.category** is set to **VALUE** or **TYPE\_REFERENCE** that eventually boils down to **VALUE** and the **subElement** refers to a **SwBaseType** where **baseTypeSize** is set to the value 8 and the **baseTypeEncoding** is set to **NONE**.
  - **subElement.category** is set to **TYPE\_REFERENCE** and the **swDataDefProps.implementationDataType** literally represents the Platform Data Type named “uint8”.
  - **subElement.category** is set to **TYPE\_REFERENCE** and the attribute **swDataDefProps.implementationDataType.shortName** is set to “uint8” and **swDataDefProps.baseType.baseTypeDefinition.nativeDeclaration** does not exist.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

[constr\_1230] **ApplicationDataType** that qualifies for Integral Primitive Type [An **ApplicationDataType** qualifies as an Integral Primitive Type if and only if all the following conditions apply:

- **ApplicationDataType.category** is set to **BOOLEAN**, **VALUE**, **STRING**, or **ARRAY**
- in the applicable scope a **DataTypeMap** is available that refers to the given **ApplicationDataType**
- the found **DataTypeMap** refers to an **ImplementationDataType** that fulfills the requirements of [constr\_1229]

This rule shall be imposed at the time when the contract phase generation is executed.

|()

**[constr\_1231] ConsistencyNeeds aggregated by CompositionSwComponentType** [If **ConsistencyNeeds** are aggregated by a **CompositionSwComponentType** the associations stereotyped `<<instanceRef>>` may only refer to context and target elements within the context of this **CompositionSwComponentType**.

This rule shall be imposed at the time when the creation of the **CompositionSwComponentType** is finished.

|()

**[constr\_1232] ConsistencyNeeds aggregated by AtomicSwComponentType** [If **ConsistencyNeeds** are aggregated by a **AtomicSwComponentType** the associations stereotyped `<<instanceRef>>` may only refer to context and target elements within the context of this **AtomicSwComponentType** at the time when the contract phase generation is executed.

|()

**[constr\_1233] InstantiationTimingEventProps shall only reference TimingEvent** [at any time in the workflow, an **InstantiationTimingEventProps** shall only reference **TimingEvent** in the role **refinedEvent**. A reference to other kinds of **RTEEvents** is not supported.

|()

**[constr\_1234] Value of RunnableEntity.symbol** [The value of a **RunnableEntity.symbol** owned by an **NvBlockSwComponentType** that is triggered by an **OperationInvokedEvent** shall only be taken from the set of API names associated with the **NvM**.

This rule shall be imposed at the time when the **RTE** is generated.

|()

**[constr\_1237] Scope of mapped ClientServerOperations in the context of a ClientServerOperationMapping** [All **ClientServerOperations** referenced by a **ClientServerOperationMapping** in the role **firstOperation** shall belong to exactly one **ClientServerInterface**.

All **ClientServerOperations** referenced by a **ClientServerOperationMapping** in the role **secondOperation** shall belong to exactly one other **ClientServerInterface**.

This rule shall be imposed at any time in the workflow.

|()

**[constr\_1238] Scope of mapped ApplicationErrors in the context of a ClientServerOperationMapping** [All **ApplicationErrors** referenced by a **ClientServerApplicationErrorMapping** in the role **firstApplicationError** shall belong to exactly one **ClientServerInterface**.



All `ApplicationErrors` referenced by a `ClientServerApplicationErrorMapping` in the role `secondApplicationError` shall belong to exactly one other `ClientServerInterface`.

This rule shall be imposed at any time in the workflow.

]()

**[constr\_1240] Consistency of `ArgumentDataPrototypes` within the context of a `ClientServerOperationMapping`** [Unless a `ClientServerOperationMapping.firstToSecondDataTransformation` exists, for each `argument` owned by

- a `ClientServerOperationMapping.firstOperation` and
- `ClientServerOperationMapping.secondOperation`,

a reference in the role

- `ClientServerOperationMapping.argumentMapping.firstDataPrototype` or
- `ClientServerOperationMapping.argumentMapping.secondDataPrototype`

shall exist at any time in the workflow, originated by one of the `ClientServerOperationMapping.argumentMappings` owned by the mentioned `ClientServerOperationMapping`.

]()

**[constr\_1241] Compound Primitive Data Types and `invalidValue`** [Compound Primitive Data Types that have set the value of `category` other than `STRING` shall not define `invalidValue` at the time when the contract phase generation is executed.

]()

**[constr\_1242] Restriction of `invalidValue` for `ApplicationPrimitiveDataType` of `category STRING`** [`invalidValue` for `ApplicationPrimitiveDataType` of `category STRING` ([constr\_1241] applies) is restricted to be either a compatible `ApplicationValueSpecification` or a `ConstantReference` that in turn points to a compatible `ApplicationValueSpecification` at the time when the contract phase generation is executed.

]()

**[constr\_1243] `NumericalOrText` shall either define `vf` or `vt`** [Within the context of one `NumericalOrText`, either the attribute `vf` or the attribute `vt` shall be defined. The existence of both attributes at the same time is not permitted.

This rule shall be imposed at the time when the contract phase generation is executed.

]()



**[constr\_1244] DataPrototypes used in application software shall not be typed by C enums** [A `ImplementationDataType` that is used to type a `DataPrototype` owned by an `AtomicSwComponentType` shall not set `swDataDefProps.additionalNativeTypeQualifier` to `enum` at the time when the contract phase generation is executed.

]()

**[constr\_1245] Consideration of ModeTransitions for the compatibility of ModeDeclarationGroups** [One of the following conditions for the consideration of `ModeTransitions` for the compatibility of `ModeDeclarationGroups` shall apply at the time when the RTE is generated:

- Either the mode provider or the mode user define `ModeTransitions`.
- The `ModeTransitions` defined in the context of the mode provider are **identical** to the `ModeTransitions` defined in the context of the mode user or a `ModeDeclarationMapping` mapping is applied.

]()

**[constr\_1246] Consistency of firstMode and secondMode in the scope of one ModeDeclarationMappingSet** [Within the scope of one `ModeDeclarationMappingSet`,

- all `firstModes` shall belong to one and only one `ModeDeclarationGroup` and
- all `secondModes` shall belong to one and only one **other** `ModeDeclarationGroup`

at any time in the workflow.

]()

**[constr\_1247] Consistency of ModeDeclarationMappingSet with respect to the referenced firstModeGroup and secondModeGroup** [If a `ModeDeclarationGroupPrototypeMapping.modeDeclarationMappingSet` exists, then

- the `ModeDeclarationGroup` owning the `modeDeclarations` referenced in the role `firstMode` shall be the `type` of the `ModeDeclarationGroupPrototypeMapping.firstModeGroup` and
- the `ModeDeclarationGroup` owning the `modeDeclarations` referenced in the role `secondMode` shall be the `type` of the `ModeDeclarationGroupPrototypeMapping.secondModeGroup`.

This rule shall be imposed at any time in the workflow.

]()

**[constr\_1248] Compatibility of PortPrototypes of different DataInterfaces in the context of a PassThroughSwConnector** [PortPrototypes of different

`DataInterfaces` are considered compatible **at the time when the RTE is generated** if and only if

1. For **at least one** `VariableDataPrototype` or `ParameterDataPrototype` defined in the context of the `DataInterface` of the required outer `PortPrototype` a compatible `VariableDataPrototype` or `ParameterDataPrototype` exists in the `DataInterface` of the provided outer `PortPrototype`.

**Either** the `shortName` of `VariableDataPrototypes` and `ParameterDataPrototypes` are used to identify the pair **or** a `PortInterfaceMapping` exists that defines which differently named elements of `PortInterfaces` correlate with each other.

2. For each such pair, the values of the `PortInterface.isService` attributes are identical.

]()

**[constr\_1249] Compatibility of `ModeSwitchInterfaces` in the context of a `PassThroughSwConnector`** [`PortPrototypes` of different `ModeSwitchInterfaces` are considered compatible **at the time when the RTE is generated** if and only if

1. For the `ModeDeclarationGroupPrototype` defined in the context of the `ModeSwitchInterface` of the required outer `PortPrototype` a compatible `ModeDeclarationGroupPrototype` exists in the `ModeSwitchInterface` of the provided outer `PortPrototype`.

**Either** the `shortNames` of the `ModeDeclarationGroupPrototypes` are used to identify the pair **or** a `ModeInterfaceMapping` exists that maps the corresponding `ModeDeclarationGroupPrototypes`.

2. For each such pair, the values of the `PortInterface.isService` attributes are identical.

]()

**[constr\_1250] Compatibility of `ClientServerInterfaces` in the context of a `PassThroughSwConnector`** [`PortPrototypes` of different `ClientServerInterfaces` are considered compatible **at the time when the RTE is generated** if and only if

1. For **at least one** `ClientServerOperation` defined in the context of the `ClientServerInterface` of the provided outer `PortPrototype` a compatible `ClientServerOperation` exists in the `ClientServerInterface` of the required outer `PortPrototype`.

**Either** the `shortNames` of the `ClientServerOperations` are used to identify the pair **or** a `ClientServerInterfaceMapping` exists that maps the corresponding `ClientServerOperations`.

2. For each such pair, the values of the `PortInterface.isService` attributes are identical.

]()

**[constr\_1251] Compatibility of `PortPrototypes` of `TriggerInterfaces` in the context of a `PassThroughSwConnector`** [`PortPrototypes` of different `TriggerInterfaces` are considered compatible at the time when the RTE is generated if and only if

1. For **at least one** `Trigger` defined in the context of the `TriggerInterface` of the required outer `PortPrototype` a compatible `Trigger` exists in the `TriggerInterface` of the provided outer `PortPrototype`.

**Either** the `shortName` of `Triggers` are used to identify the pair **or** a `TriggerInterfaceMapping` exists that refers to one of the `Triggers` in the role `firstTrigger` and to the other in the role `secondTrigger`.

2. For each such pair, the values of the `PortInterface.isService` attributes are identical.

]()

**[constr\_1252] Creation of a loop involving a `PassThroughSwConnector` is not allowed** [**at any time in the workflow**, a `PassThroughSwConnector` is not allowed if the required outer `PortPrototype` is directly or indirectly connected to the provided outer `PortPrototype` without the placement of a `SwComponentPrototype` typed by an `AtomicSwComponentType` in the chain of `SwConnectors`.

]()

**[constr\_1253] Supported usage of `VariationPointProxy`** [The allowed multiplicities for attributes of `VariationPointProxy` depending on the applicable binding time and the value of `VariationPointProxy.category` are documented in Table 2.19.

For clarification, the multiplicities of attributes of meta-class `VariationPointProxy` that are **not** explicitly mentioned in a given row of table ?? shall be interpreted as [0].

This rule shall be applied **at the time when the contract phase generation is executed**.

]()

BindingTime	category	Allowed Attribute Multiplicity
PreBuild	VALUE	<code>valueAccess</code> [1]
	CONDITION	<code>conditionAccess</code> [1]
PostBuild	VALUE	<code>postBuildValueAccess</code> [1], <code>implementationDataType</code> [1]
	CONDITION	<code>postBuildVariantCondition</code> [1..*], <code>conditionAccess</code> [0..1]

**Table 2.18: Supported usage of `VariationPointProxy`**

BindingTime	category	Allowed Attribute Multiplicity
PreBuild	VALUE	valueAccess [1]
	CONDITION	conditionAccess [1]
PostBuild	VALUE	postBuildValueAccess [1], implementationDataType [1]
	CONDITION	postBuildVariantCondition [1..*], conditionAccess [0..1]

Table 2.19: Supported usage of **VariationPointProxy**

**[constr\_1254] Definition of a pointer to a pointer** [AUTOSAR does **not** support the definition of a pointer to a pointer by defining an `ImplementationDataType` of category `DATA_REFERENCE` that aggregates `SwDataDefProps` in the role `swDataDefProps` that in turn aggregate `SwPointerTargetProps` in the role `swPointerTargetProps` with attribute `targetCategory` set to `DATA_REFERENCE` that in turn aggregates `SwDataDefProps` in the role `swDataDefProps` that aggregates `SwPointerTargetProps` in the role `swPointerTargetProps` that references an `ImplementationDataType` of category e.g. `VALUE`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1255] ApplicationPrimitiveDataTypes of category BOOLEAN and STRING** [If a `Unit` is referenced from within `SwDataDefProps` and/or `PhysConstrs` owned by an `ApplicationPrimitiveDataTypes` of category `BOOLEAN` and `STRING` it is required that this `Unit` represents a meaningless unit, i.e. the referenced `physicalDimension` shall not define any exponent value other than 0 at any time in the workflow.

]()

**[constr\_1256] Acknowledgement feedback in n:1 writer case** [Within the scope of one `SwcInternalBehavior`, it is **not** allowed that two or more aggregated `RunnableEntities` own either `dataSendPoints` or `dataWriteAccesses` that in turn point to the identical `accessedVariable.autosarVariable.targetDataPrototype` if the attribute `transmissionAcknowledge` exists in the context of the `SenderComSpec` owned by the `dataSendPoint.accessedVariable.autosarVariable.portPrototype` (or the respective construct for `dataWriteAccess`) that also refers to said `dataElement`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1257] No WaitPoints allowed** [A `RunnableEntity` referenced by an `InitEvent` in the role `startOnEvent` shall not aggregate a `WaitPoint` at the time when the RTE is generated.

]()

**[constr\_1258] Value of `minimumStartInterval` for `RunnableEntity`s triggered by an `InitEvent`** [The value of the attribute `ExecutableEntity.minimumStartInterval` for a `RunnableEntity`s that is triggered by an `InitEvent` shall always be set to 0 at the time when the RTE is generated.

]()

**[constr\_1259] Aggregation of `AsynchronousServerCallPoint` and `AsynchronousServerCallResultPoint`** [A `RunnableEntity` referenced by an `InitEvent` in the role `startOnEvent` may aggregate an `AsynchronousServerCallPoint` but it shall not aggregate an `AsynchronousServerCallResultPoint` at the time when the RTE is generated.

]()

**[constr\_1260] No mode disabling for `InitEvents`** [An `InitEvent` shall not have a reference to a `ModeDeclaration` in the role `disabledMode` at the time when the RTE is generated.

]()

**[constr\_1261] Applicability for `EndToEndDescription.dataIdNibbleOffset`** [ `EndToEndDescription.dataIdNibbleOffset` shall be used **only** if `EndToEndDescription.dataIdMode` is set to the value 3 **and** at the same time `EndToEndDescription.category` is set to `PROFILE_01`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1263] Existence of `ModeErrorBehavior.defaultMode`** [The optional attribute `ModeErrorBehavior.defaultMode` shall **exist** if the value of the attribute `ModeErrorBehavior.errorReactionPolicy` is set to `defaultMode`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1264] Iteration along output axis is only supported for `VALUE` and `VAL_BLK`** [ `swRecordLayoutVIndex` in `SwRecordLayoutV` cannot be 0 for any value of `SwRecordLayoutV.category` other than `VALUE` and `VAL_BLK`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1268] `ArgumentDataPrototype.direction` shall be preserved in a `ClientServerOperationMapping`** [Within the context of a `ClientServerOperationMapping`, the value of the argument `ArgumentDataPrototype.direction` of two mapped `ArgumentDataPrototype` shall be identical at any time in the workflow.

|()

**[constr\_1269] Number of arguments shall be preserved in a ClientServerOperationMapping** [Within the context of a ClientServerOperationMapping, the number of arguments of firstOperation and secondOperation shall be identical at any time in the workflow.

|()

**[constr\_1270] ArgumentDataPrototype shall be mapped only once in a ClientServerOperationMapping** [Within the context of a ClientServerOperationMapping, each argument shall only be referenced once in the role firstDataPrototype or secondDataPrototype at any time in the workflow.

|()

**[constr\_1271] RecordValueSpecification.fields shall be identical to the number of ApplicationRecordDataType.elements** [The initialization of an DataPrototype typed by an ApplicationRecordDataType by means of a RecordValueSpecification shall exactly match the structure of the ApplicationRecordDataType.

For this means, it is required that the number of RecordValueSpecification.fields shall be identical to the number of ApplicationRecordDataType.elements.

This rule shall be imposed at the time when the contract phase generation is executed.

|()

**[constr\_1272] RecordValueSpecification.fields shall be identical to the number of subElements of ImplementationDataType of category STRUCTURE** [The initialization of an DataPrototype typed by an ImplementationDataType of category STRUCTURE by means of a RecordValueSpecification shall exactly match the structure of the ImplementationDataType of category STRUCTURE.

For this means, it is required that the number of RecordValueSpecification.fields shall be identical to the number of ImplementationDataType.subElements.

This rule shall be imposed at the time when the contract phase generation is executed.

|()

**[constr\_1273] Rules for the initialization of ApplicationArrayDataType by means of ArrayValueSpecification** [The following rules apply for the initialization of a DataPrototype typed by an ApplicationArrayDataType by means of an ArrayValueSpecification:

- If the attribute `ApplicationArrayDataType.element.arraySizeSemantics` is set to **fixedSize** then the `ArrayValueSpecification` shall exactly match the structure of the `ApplicationArrayDataType`.

This means that the number of `ArrayValueSpecification.elements` shall be identical to the value of `ApplicationArrayDataType.element.maxNumberOfElements`.

- If the attribute `ApplicationArrayDataType.element.arraySizeSemantics` is set to **variableSize** and the `ArrayValueSpecification` **does not define** attribute `intendedPartialInitializationCount` then `ArrayValueSpecification` shall **exactly** match the structure of the `ApplicationArrayDataType`.

This means that the number of `ArrayValueSpecification.elements` shall be identical to the value of `ApplicationArrayDataType.element.maxNumberOfElements`.

- If the attribute `ApplicationArrayDataType.element.arraySizeSemantics` is set to **variableSize** and the `ArrayValueSpecification` specifies a value for attribute `intendedPartialInitializationCount` then `ArrayValueSpecification` shall contain **exactly** `intendedPartialInitializationCount` elements.

This includes the case that the value of `intendedPartialInitializationCount` is set to 0 (i.e. "empty" initialization) and the case that the `intendedPartialInitializationCount` is set to the value of the respective `ApplicationArrayElement.maxNumberOfElements` (i.e. "full" initialization).

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1274] Rules for the initialization of array-shaped `ImplementationDataType` with a fixed size by means of `ArrayValueSpecification`** [The following rule applies for the initialization of a `DataPrototype` typed by an `ImplementationDataType` of category `ARRAY` where attribute `ImplementationDataType.subElement.arraySizeSemantics` is set to **fixedSize** by means of an `ArrayValueSpecification`: the `ArrayValueSpecification` shall exactly match the structure of the `ImplementationDataType`.

This means that the number of `ArrayValueSpecification.elements` shall be identical to the value of `ImplementationDataType.subElement.arraySize`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1277] `SwDataDefProps.swImplPolicy` of a `VariableDataPrototype` referenced by a `VariableAccess` aggregated in the role `dataReceivePoint`**



**ByValue** [The `SwDataDefProps.swImplPolicy` of a `VariableDataPrototype` referenced by a `VariableAccess` aggregated in the role `dataReceivePoint-ByValue` shall not be set to `queued` at the time when the contract phase generation is executed.

]()

**[constr\_1278] PhysConstrs references a Unit** [DataConstrs are only compatible if the `DataConstr.dataConstrRule.physConstrs.unit` are compatible or neither `DataConstr.dataConstrRule.physConstrs.unit` exist at the time when the RTE is generated.

]()

**[constr\_1279] Unmapped elements of ApplicationCompositeDataTypes or ImplementationDataTypes and the attribute swImplPolicy** [If the attribute `swImplPolicy` is set to `queued`, then it is not allowed to have unmapped elements of `ApplicationCompositeDataTypes` or `ImplementationDataTypes` of category `STRUCTURE` or `ARRAY` on the “target” end at the time when the RTE is generated.

]()

**[constr\_1280] Unmapped dataElement on the “target” end shall have an init-Value** [If elements of `ApplicationCompositeDataTypes` or `ImplementationDataTypes` of category `STRUCTURE` or `ARRAY` are not considered in a `SubElementMapping` and the `NonqueuedReceiverComSpec` is aggregated by an `AbstractRequiredPortPrototype` referenced by the “target” end, then the enclosing `dataElement` shall have an `initValue`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1282] Restriction concerning the usage of RuleBasedValueSpecification or a ReferenceValueSpecification for the specification of an invalidValue** [The aggregation of a `RuleBasedValueSpecification` or a `ReferenceValueSpecification` for the definition of a `ApplicationPrimitiveDataType.swDataDefProps.invalidValue` is not supported at the time when the contract phase generation is executed.

]()

**[constr\_1284] Limitation of the use of TextValueSpecification** [TextValueSpecification shall only be used in the context of an `AutosarDataType` that references a `CompuMethod` in the role `ImplementationDataType.swDataDefProps.compuMethod` of category `TEXTTABLE` and `BITFIELD_TEXTTABLE`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1285] Applicability of roles vs. [PortPrototypes](#)** [The aggregation of [AutosarVariableRef](#) aggregated by [NvBlockDataMapping](#) in the roles [writtenNvData](#), [writtenReadNvData](#), or [readNvData](#) is subject to limitation at the time when the RTE is generated, depending on the applicable subclass of [PortPrototype](#):

- The role [writtenNvData](#) shall only be used if the corresponding [PortPrototype](#) is a [RPortPrototype](#)
- The role [writtenReadNvData](#) shall only be used if the corresponding [PortPrototype](#) is a [PRPortPrototype](#)
- The role [readNvData](#) shall only be used if the corresponding [PortPrototype](#) is a [PPortPrototype](#)

]()

**[constr\_1286] [serverArgumentImplPolicy](#) and [ArgumentDataPrototype](#) typed by primitive data types** [The value of the attribute [ArgumentDataPrototype.serverArgumentImplPolicy](#) shall not be set to [useVoid](#) for an [ArgumentDataPrototype](#) of [direction in](#) that is typed by an [AutosarDataType](#) that boils down to a primitive C data type (see [TPS\_SWCT\_01565]).

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1287] Compatibility of [SenderReceiverInterfaces](#) with respect to [invalidationPolicy](#)** [[VariableDataPrototypes](#) defined in the context of the [SenderReceiverInterface](#) are only compatible if the [invalidationPolicys](#) have the same value.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1288] Allowed Attributes vs. [category](#) for [DataPrototypes](#) typed by [ImplementationDataTypes](#)** [The allowed values per [category](#) for [DataPrototypes](#) typed by [ImplementationDataTypes](#) are documented in table 2.20.

This rule shall be imposed at any time in the workflow.

]()

Attributes of SwDataDefProps	Root Element			Attribute Existence per Category						
	DataPrototype	InstantiationDataDefProps	ParameterAccess	VALUE	DATA_REFERENCE	FUNCTION_REFERENCE	TYPE_REFERENCE	STRUCTURE	UNION	ARRAY
additionalNativeTypeQualifier										
annotation	x	x	*	*	*	*	*	*	*	*
baseType										
compuMethod										
dataConstr.dataConstrRule.physConstrs	x	x		d/ C <sup>17</sup>			d/c			d/c
dataConstr.dataConstrRule.internalConstrs	x	x		0..1			0..1			0..1
displayFormat	x	x		0..1			0..1	0..1	0..1	0..1
displayPresentation	x	x		0..1			0..1			0..1
implementationDataType										
invalidValue										
stepSize	x	x		0..1						0..1
swAddrMethod	x	x		0..1	0..1	0..1	0..1	0..1	0..1	0..1
swAlignment	x	x		0..1	0..1	0..1	0..1	0..1	0..1	0..1
swBitRepresentation										
swCalibrationAccess	x	x		0..1			0..1	0..1	0..1	0..1
swCalprmAxisSet										
swComparisonVariable										
swDataDependency										
swHostVariable										
swImplPolicy	x			0..1	0..1	0..1	0..1	0..1	0..1	0..1
swIntendedResolution										
swInterpolationMethod										
swIsVirtual										
swPointerTargetProps										
swPointerTargetProps.swDataDefProps										
swPointerTargetProps.functionPointerSignature										
swRecordLayout										
swRefreshTiming	x	x		0..1			0..1	0..1	0..1	0..1
swTextProps										
swValueBlockSize										
swValueBlockSizeMult										
unit										
valueAxisDataType										

Table 2.20: Allowed Attributes vs. category for DataPrototypes typed by ImplementationDataTypes

<sup>17</sup>don't care

[constr\_1289] Allowed Attributes vs. **category** for **DataPrototypes** typed by **ApplicationDataTypes** [The allowed values of Attributes per **category** for **DataPrototypes** typed by **ApplicationDataTypes** are documented in table 2.21.

This rule shall be imposed at any time in the workflow.

]()

Attributes of SwDataDefProps	Root EI.			Attribute Existence per Category												
	DataPrototype	InstantiationDataDefProps	ParameterAccess	VALUE	VAL_BLK	STRUCTURE	ARRAY	STRING	BOOLEAN	COM_AXIS	RES_AXIS	CURVE	MAP	CUBOID	CUBE_4	CUBE_5
additionalNativeTypeQualifier				*	*	*	*	*	*	*	*	*	*	*	*	*
annotation	x	x	x	*	*	*	*	*	*	*	*	*	*	*	*	*
baseType																
compuMethod																
dataConstr.dataConstrRule.physConstrs	x	x		0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
dataConstr.dataConstrRule.internalConstrs	x	x		d/c <sup>18</sup>	d/c	d/c	d/c	d/c	d/c	d/c	d/c	d/c	d/c	d/c	d/c	d/c
displayFormat	x	x		0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
displayPresentation	x	x		0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
implementationDataType																
invalidValue																
stepSize	x	x	x	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
swAddrMethod	x	x		0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
swAlignment	x	x		0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
swBitRepresentation																
swCalibrationAccess	x	x		0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
swCalprmAxisSet																
swCalprmAxisSet.swCalprmAxis/SwAxis-Grouped.swCalprmRef		x	x			0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
swCalprmAxisSet.swCalprmAxis/SwAxis-Individual.swVariableRef		x	x			0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
swCalprmAxisSet.swCalprmAxis/SwAxis-Grouped.sharedAxisType																
swCalprmAxisSet.swCalprmAxis/SwAxis-Individual.inputVariableType																
swCalprmAxisSet.swCalprmAxis/SwAxis-Individual.unit																
swComparisonVariable			x									0..1	0..1	0..1	0..1	0..1
swDataDependency	x	x		0..1								0..1	0..1	0..1	0..1	0..1
swHostVariable																



<sup>18</sup>don't care



Attributes of SwDataDefProps	Root EI.			Attribute Existence per Category												
	DataPrototype	InstantiationDataDefProps	ParameterAccess	VALUE	VAL_BLK	STRUCTURE	ARRAY	STRING	BOOLEAN	COM_AXIS	RES_AXIS	CURVE	MAP	CUBOID	CUBE_4	CUBE_5
	swImplPolicy	x			0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1
	swIntendedResolution															
	swInterpolationMethod	x	x	x	0..1					0..1	0..1	0..1	0..1	0..1	0..1	0..1
	swIsVirtual	x	x		0..1				0..1			0..1	0..1	0..1	0..1	0..1
	swPointerTargetProps															
	swRecordLayout															
	swRefreshTiming	x	x		0..1	0..1			0..1	0..1						
	swTextProps															
	swValueBlockSize															
	swValueBlockSizeMult															
	unit															
	valueAxisDataType															

Table 2.21: Allowed Attributes vs. **category** for **DataPrototypes** typed by Application Data Types

**[constr\_1290] Limitation on the number of PPortComSpecs in the context of one PPortPrototype** [Within the context of one PPortPrototype, there can only be one PPortComSpec that references a given dataElement or operation at the time when the contract phase generation is executed.

]()

**[constr\_1291] Limitation on the number of RPortComSpecs in the context of one PPortPrototype** [Within the context of one RPortPrototype, there can only be one RPortComSpec that references a given dataElement or operation at the time when the contract phase generation is executed.

]()

**[constr\_1292] Limitation on the number of RPortComSpecs/PPortComSpecs in the context of one PRPortPrototype** [Within the context of one PRPortPrototype, there can only be one RPortComSpec and one PPortComSpec that references a given dataElement or operation at the time when the contract phase generation is executed.

]()

**[constr\_1295] PortInterfaces and category DATA\_REFERENCE** [A DataPrototype defined in the context of a PortInterface used by an Application-

`SwComponentType` or `SensorActuatorSwComponentType` that is (after potential indirections via `TYPE_REFERENCE` are resolved) either typed by or mapped to an `ImplementationDataType` of category `DATA_REFERENCE` shall only be used if either the provider or the requester of the information represents a `ServiceSwComponentType`, a `ComplexDeviceDriverSwComponentType`, a `ParameterSwComponentType`, or an `NvBlockSwComponentType`, or the `EcuAbstractionSwComponentType`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1296] DataPrototypes used as `explicitInterRunnableVariable` or `implicitInterRunnableVariable` and category `DATA_REFERENCE`** [A `VariableDataPrototype` shall not be aggregated by `SwcInternalBehavior` in either the role:

- `explicitInterRunnableVariable`, or
- `implicitInterRunnableVariable`

if the `VariableDataPrototype` (after potential indirections via `TYPE_REFERENCE` are resolved) is either typed by, or mapped to, an:

- `ImplementationDataType` of category `DATA_REFERENCE`, or
- `ImplementationDataType` that contains `subElements` that (after potential indirections via `TYPE_REFERENCE` are resolved) are of category `DATA_REFERENCE`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1298] Existence of attributes if category of a `ModeDeclarationGroup` is set to `EXPLICIT_ORDER`** [The attributes `ModeDeclarationGroup.onTransitionValue` and `ModeDeclaration.value` (for each `ModeDeclaration`) shall be set if the category of a `ModeDeclarationGroup` is set to `EXPLICIT_ORDER`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1299] Existence of attributes if category of a `ModeDeclarationGroup` is set to other than `EXPLICIT_ORDER`** [The attributes `ModeDeclarationGroup.onTransitionValue` or `ModeDeclaration.value` (for any `ModeDeclaration`) shall not be set if the category of a `ModeDeclarationGroup` is set to any value other than `EXPLICIT_ORDER` at the time when the contract phase generation is executed.

]()

**[constr\_1300] Primitive `DataPrototype` on the “source” end shall not be mapped to element of a composite data type on the “target” end of the `SwConnector`** [The usage of `DataPrototypeMapping` or `SubElementMapping` does not support the following configuration:

- The `AutosarDataPrototype` contained in the `PortPrototype` on the “source” end of an `SwConnector` is typed by an `ApplicationPrimitiveDataType` of category `VALUE` or `ImplementationDataType` of category `VALUE` or category `TYPE_REFERENCE` that eventually resolves to category `VALUE`.
- The `DataPrototypeMapping` aggregates a `subElementMapping` that refers to a `ImplementationDataTypeElement` or `ApplicationCompositeElementDataPrototype` contained in the `PortPrototype` on the “target” end.

This rule shall be imposed at any time in the workflow.

]()

**[constr\_1301] Existence of `RoleBasedDataTypeAssignment.role` vs. `RoleBasedDataAssignment.role`** [The usage of a `RoleBasedDataTypeAssignment` with attribute `role` set to the value `temporaryRamBlock` is only allowed if no `RoleBasedDataAssignment` defined with attribute `role` set to value `defaultValue` exists in the owning `SwcServiceDependency`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1302] Restriction of data invalidation** [Data invalidation is only applicable for one of the following cases applicable on the **receiving** side:

1. `VariableDataPrototypes` typed by either an `ApplicationPrimitiveDataType` or an `ImplementationDataType` of category `VALUE` or `TYPE_REFERENCE` that boils down to category `VALUE` that have defined an `invalidValue`.
2. `VariableDataPrototypes` typed by either an `ApplicationCompositeDataType` or an `ImplementationDataType` of category `STRUCTURE`, or `ARRAY` or of category `TYPE_REFERENCE` that boils down to category `STRUCTURE`, or `ARRAY` that have **at least one** primitive element with an `invalidValue`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1303] Applicability of `TextTableMapping` depending on the value of `CompuMethod.category`** [If – at the time when the RTE is generated – a



`DataPrototypeMapping` aggregates a `TextTableMapping` then only certain combinations of the value of the applicable `CompuMethod.category` are supported:

- `category` of `firstDataPrototype`: `TEXTTABLE`,  
  `category` of `secondDataPrototype`: `TEXTTABLE`
- `category` of `firstDataPrototype`: `SCALE_LINEAR_AND_TEXTTABLE`,  
  `category` of `secondDataPrototype`: `TEXTTABLE`
- `category` of `firstDataPrototype`: `TEXTTABLE`,  
  `category` of `secondDataPrototype`: `SCALE_LINEAR_AND_TEXTTABLE`
- `category` of `firstDataPrototype`: `BITFIELD_TEXTTABLE`,  
  `category` of `secondDataPrototype`: `TEXTTABLE`
- `category` of `firstDataPrototype`: `TEXTTABLE`,  
  `category` of `secondDataPrototype`: `BITFIELD_TEXTTABLE`
- `category` of `firstDataPrototype`: `BITFIELD_TEXTTABLE`,  
  `category` of `secondDataPrototype`: `BITFIELD_TEXTTABLE`

]()

**[constr\_1304] Existence of attribute `bitfieldTextTableMaskFirst`** [The attribute `bitfieldTextTableMaskFirst` shall be defined **only if** the `firstDataPrototype` of a `DataPrototypeMapping` refers to a `CompuMethod` that has the value of `category` set to `BITFIELD_TEXTTABLE`.

This rule shall be imposed **at the time when the RTE is generated**.

]()

**[constr\_1305] Existence of attribute `bitfieldTextTableMaskSecond`** [The attribute `bitfieldTextTableMaskSecond` shall be defined **only if** the `secondDataPrototype` of a `DataPrototypeMapping` refers to a `CompuMethod` that has the value of `category` set to `BITFIELD_TEXTTABLE`.

This rule shall be imposed **at the time when the RTE is generated**.

]()

**[constr\_1306] Limitation of `TextTableMapping` for `CompuMethods` that have the value of `category` set to `BITFIELD_TEXTTABLE`** [For any `TextTableMapping` where both `firstDataPrototype` and `secondDataPrototype` refer to `CompuMethods` that have the value of `category` set to `BITFIELD_TEXTTABLE` **and** where the attribute `TextTableMapping.valuePair` exists the value of attribute `TextTableMapping.identicalMapping` shall be set to false.

This rule shall be imposed **at the time when the RTE is generated**.

]()

**[constr\_1307] Consistency of values and masks in `TextTableMapping`** [If a `TextTableMapping` element defines bit masks as `bitfieldTextTableMask-`

First or `bitfieldTextTableMaskSecond` then all contained `TextTableMapping.valuePair.firstValues` as well as all `TextTableMapping.valuePair.secondValues` shall **not** specify a value that would be ruled out when - depending on the given value of `TextTableMapping.mappingDirection` - the relevant bit mask is applied.

This rule shall be imposed **at the time when the RTE is generated.**

]()

**[constr\_1308] Existence of `NvBlockNeeds.cyclicWritingPeriod`** [The attribute `NvBlockNeeds.cyclicWritingPeriod` shall exist if and only if the attribute `NvBlockNeeds.storeCyclic` exists and its value is set to `true`.

This rule shall be imposed **at the time when the RTE is generated**

]()

**[constr\_1309] Existence of `NvBlockDescriptor.timingEvent`** [The attribute `NvBlockDescriptor.timingEvent` shall exist **at the time when the RTE is generated** if and only if the `NvBlockDescriptor.nvBlockNeeds.storeCyclic` exists and is set to the value `true`.

]()

**[constr\_1310] Existence of attributes of meta-class `NvBlockNeeds`** [If in the context of an `ApplicationSwComponentType` the attribute `SwcServiceDependency.serviceNeeds` is implemented by an `NvBlockNeeds` then the following attributes

- `NvBlockNeeds.storeCyclic`
- `NvBlockNeeds.cyclicWritingPeriod`
- `NvBlockNeeds.storeEmergency`
- `NvBlockNeeds.storeImmediate`
- `NvBlockNeeds.storeOnChange`

shall only exist if in the context of the same `SwcServiceDependency` a `SwcServiceDependency.assignedPort` exists that has the attribute `role` set to the value `NvDataPort`.

This rule shall be imposed **at the time when the RTE is generated.**

]()

**[constr\_1311] Appearance of safety-related possible values of `MemorySection.option` or `SwAddrMethod.option`** [Any given collection of values stored in the attributes `MemorySection.option` or `SwAddrMethod.option` according to [TPS\_SWCT\_01456] shall at most include a single value out of the following list **at the time when the RTE is generated:**

- **safetyQM**
- **safetyAsilA**
- **safetyAsilB**
- **safetyAsilC**
- **safetyAsilD**

]()

**[constr\_1312] PortPrototypes typed by a ParameterInterface** [PortPrototypes typed by a ParameterInterface can either be PPortPrototypes or RPortPrototypes. The usage of PPortPrototypes that are typed by a ParameterInterface is not supported at any time in the workflow.

]()

**[constr\_1313] Completeness of TextTableMapping for the values of a given bit mask on the sender side** [If a DataPrototypeMapping contains one or more TextTableMapping(s) where the DataPrototype on the **sender side** refers to a CompuMethod of category BITFIELD\_TEXTTABLE then all DataPrototypeMapping.textTableMapping shall aggregate a collection of TextTableMapping.valuePair where each possible value of the **sender bit mask**<sup>19</sup> is represented by exactly one TextTableValuePair.firstValue ([TPS\_SWCT\_01163]) or TextTableValuePair.secondValue ([TPS\_SWCT\_01164]).

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1314] Profile VSA\_LINEAR for ApplicationArrayDataType** [If the dynamicArraySizeProfile of ApplicationArrayDataType is set to VSA\_LINEAR, the contained ApplicationArrayElement shall fulfill all the following conditions at the time when the contract phase generation is executed:

- The attribute ApplicationArrayElement.arraySizeSemantics shall set to the value variableSize.
- The attribute ApplicationArrayElement.maxNumberOfElements shall be defined.
- The attribute ApplicationArrayElement.arraySizeHandling shall be set to the value allIndicesSameArraySize.
- The ApplicationArrayElement shall be typed by an ApplicationDataType that is not an ApplicationArrayDataType where the attribute dynamicArraySizeProfile exists.

<sup>19</sup>Depending on the applicable case this means either bitfieldTextTableMaskFirst (applies if [TPS\_SWCT\_01163] is in place) or bitfieldTextTableMaskSecond for the case of [TPS\_SWCT\_01164].

]()

**[constr\_1315] Profile VSA\_SQUARE for ApplicationArrayDataType** [If the `dynamicArraySizeProfile` of `ApplicationArrayDataType` is set to `VSA_SQUARE`, the contained `ApplicationArrayElement` shall fulfill **all** the following conditions :

- The attribute `ApplicationArrayElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ApplicationArrayElement.maxNumberOfElements` shall not be defined.
- The attribute `ApplicationArrayElement.arraySizeHandling` shall be set to the value `inheritedFromArrayElementTypeSize`.
- The `ApplicationArrayElement` shall be typed by an `ApplicationArrayDataType`.

The referred `ApplicationArrayDataType` shall refer over a chain (under consideration of the number of dimensions of the “root” `ApplicationArrayDataType`) of nested `ApplicationArrayDataTypes` with `ApplicationArrayElements` to an `ApplicationDataType` that is **not** an `ApplicationArrayDataType` where the attribute `dynamicArraySizeProfile` exists.

The last `ApplicationArrayDataType` in that chain shall have an `ApplicationArrayElement` that fulfills **all** the following conditions:

- The attribute `ApplicationArrayElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ApplicationArrayElement.maxNumberOfElements` shall be defined.
- The attribute `ApplicationArrayElement.arraySizeHandling` set to the value `allIndicesSameArraySize`.

All `ApplicationArrayDataTypes` before shall have an `ApplicationArrayElement` that fulfills **all** the following conditions:

- The attribute `ApplicationArrayElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ApplicationArrayElement.maxNumberOfElements` shall not be defined.
- The attribute `ApplicationArrayElement.arraySizeHandling` shall be set to the value `inheritedFromArrayElementTypeSize`.
- The `ApplicationArrayElement` shall be typed by an `ApplicationArrayDataType`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1316] Profile VSA\_RECTANGULAR for `ApplicationArrayDataType`** [If the `dynamicArraySizeProfile` of `ApplicationArrayDataType` is set to `VSA_RECTANGULAR` the contained `ApplicationArrayElement` shall fulfill **all** the following conditions :

- The attribute `ApplicationArrayElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ApplicationArrayElement.maxNumberOfElements` shall be defined.
- The attribute `ApplicationArrayElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.
- The `ApplicationArrayElement` shall be typed by an `ApplicationArrayDataType`.

The referred `ApplicationArrayDataType` shall refer over a chain (under consideration of the number of dimensions of the “root” `ApplicationArrayDataType`) of nested `ApplicationArrayDataTypes` with `ApplicationArrayElements` to an `ApplicationDataType` that is **not** an `ApplicationArrayDataType` where the attribute `dynamicArraySizeProfile` exists.

The last `ApplicationArrayDataType` in that chain shall have an `ApplicationArrayElement` that fulfills **all** the following conditions:

- The attribute `ApplicationArrayElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ApplicationArrayElement.maxNumberOfElements` shall be defined.
- The attribute `ApplicationArrayElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.

All `ApplicationArrayDataTypes` before shall have an `ApplicationArrayElement` that fulfills **all** the following conditions:

- The attribute `ApplicationArrayElement.arraySizeSemantics` shall set to the value `variableSize`
- The attribute `ApplicationArrayElement.maxNumberOfElements` shall be defined.
- The attribute `ApplicationArrayElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.

- The `ApplicationArrayElement` shall be typed by an `ApplicationArrayDataType`.

This rule shall be imposed **at the time when the contract phase generation is executed.**

]()

**[constr\_1317] Profile VSA\_FULLY\_FLEXIBLE for `ApplicationArrayDataType`**

[If the `dynamicArraySizeProfile` of `ApplicationArrayDataType` is set to `VSA_FULLY_FLEXIBLE`, the contained `ApplicationArrayElement` shall fulfill **all** the following conditions:

- The attribute `ApplicationArrayElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ApplicationArrayElement.maxNumberOfElements` shall be defined.
- The attribute `ApplicationArrayElement.arraySizeHandling` shall be set to the value `allIndicesDifferentArraySize`.
- The `ApplicationArrayElement` shall be typed by an `ApplicationArrayDataType`.

The referred `ApplicationArrayDataType` shall refer over a chain (under consideration of the number of dimensions of the “root” `ApplicationArrayDataType`) of nested `ApplicationArrayDataTypes` with `ApplicationArrayElements` to an `ApplicationDataType` that is **not** an `ApplicationArrayDataType` where the attribute `dynamicArraySizeProfile` exist.

The last `ApplicationArrayDataType` in that chain shall have an `ApplicationArrayElement` that fulfills **all** the following conditions:

- The attribute `ApplicationArrayElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ApplicationArrayElement.maxNumberOfElements` shall be defined.
- The attribute `ApplicationArrayElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.

All `ApplicationArrayDataTypes` before shall have an `ApplicationArrayElement` that fulfills **all** the following conditions:

- The attribute `ApplicationArrayElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ApplicationArrayElement.maxNumberOfElements` shall be defined.

- The attribute `ApplicationArrayElement.arraySizeHandling` shall be set to the value `allIndicesDifferentArraySize`.
- The `ApplicationArrayElement` shall be typed by an `ApplicationArrayDataType`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1318] Profile VSA\_LINEAR for `ImplementationDataType`** [If the value of attribute `ImplementationDataType.dynamicArraySizeProfile` is set to `VSA_LINEAR`, the `ImplementationDataType` shall aggregate a VSA Payload `ImplementationDataTypeElement` that fulfills all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall not be defined.
- The attribute `ImplementationDataTypeElement.category` shall be set to `ARRAY`.
- The attribute `ImplementationDataTypeElement.arraySize` shall not be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall not be defined.

The VSA Payload `ImplementationDataTypeElement` shall immediately aggregate another `ImplementationDataTypeElement` that shall fulfill all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ImplementationDataTypeElement.arraySize` shall be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1319] Profile VSA\_SQUARE for `ImplementationDataType`** [If the value of attribute `ImplementationDataType.dynamicArraySizeProfile` is set to `VSA_SQUARE`, the `ImplementationDataType` shall aggregate a VSA Payload `ImplementationDataTypeElement` that fulfills all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall not be defined.



- The attribute `ImplementationDataTypeElement.category` shall be set to the value `ARRAY`.
- The attribute `ImplementationDataTypeElement.arraySize` shall not be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall not be defined.

The VSA Payload `ImplementationDataTypeElement` shall immediately aggregate another `ImplementationDataTypeElement` (representing the first dimension) that shall fulfill all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ImplementationDataTypeElement.category` shall be set to the value `ARRAY`.
- The attribute `ImplementationDataTypeElement.arraySize` shall not be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `inheritedFromArrayElementTypeSize`.

All **intermediate** `ImplementationDataTypeElements` in the aggregation chain that do not terminate the chain shall fulfill all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ImplementationDataTypeElement.category` shall be set to the value `ARRAY`.
- The attribute `ImplementationDataTypeElement.arraySize` shall not be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `inheritedFromArrayElementTypeSize`.

The **terminating** `ImplementationDataTypeElement` in the aggregation chain shall fulfill all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ImplementationDataTypeElement.arraySize` shall be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.

This rule shall be imposed **at the time when the contract phase generation is executed**.

]()

**[constr\_1320] Profile VSA\_RECTANGULAR for ImplementationDataType** [If the value of attribute `ImplementationDataType.dynamicArraySizeProfile` is set to `VSA_RECTANGULAR`, the `ImplementationDataType` shall aggregate a VSA Payload `ImplementationDataTypeElement` that fulfills all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall not be defined.
- The attribute `ImplementationDataTypeElement.category` shall be set to the value `ARRAY`.
- The attribute `ImplementationDataTypeElement.arraySize` shall not be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall not be defined.

The VSA Payload `ImplementationDataTypeElement` shall immediately aggregate another `ImplementationDataTypeElement` (representing the first dimension) that shall fulfill all the following conditions:

- The attribute `ImplementationDataTypeElement.category` shall be set to the value `ARRAY`.
- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ImplementationDataTypeElement.arraySize` shall be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.

All **intermediate** `ImplementationDataTypeElements` in the aggregation chain that do not terminate the chain shall fulfill all the following conditions:

- The attribute `ImplementationDataTypeElement.category` shall be set to the value `ARRAY`.
- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ImplementationDataTypeElement.arraySize` shall be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.

The **terminating** `ImplementationDataTypeElement` in the aggregation chain shall fulfill all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ImplementationDataTypeElement.arraySize` shall be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1321] Profile VSA\_FULLY\_FLEXIBLE for `ImplementationDataType`** [If the value of attribute `ImplementationDataType.dynamicArraySizeProfile` is set to the value `VSA_FULLY_FLEXIBLE`, the `ImplementationDataType` shall aggregate a VSA Payload `ImplementationDataTypeElement` that fulfills all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall not be defined.
- The attribute `ImplementationDataTypeElement.category` shall be set to the value `ARRAY`.
- The attribute `ImplementationDataTypeElement.arraySize` shall not be defined
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall not be defined.

The VSA Payload `ImplementationDataTypeElement` shall immediately aggregate another `ImplementationDataTypeElement` (representing the first dimension) that shall fulfill all the following conditions:

- The attribute `ImplementationDataTypeElement.category` shall be set to `STRUCTURE`
- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ImplementationDataTypeElement.arraySize` shall be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `allIndicesDifferentArraySize`.

The `ImplementationDataTypeElement` shall aggregate another `ImplementationDataTypeElement` that fulfills the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall not be defined.

- The attribute `ImplementationDataTypeElement.category` shall be set to the value `ARRAY`.
- The attribute `ImplementationDataTypeElement.arraySize` shall not be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall not be defined.

The **aggregation chain is continued** by a (possible empty) sequence of a pair of `ImplementationDataTypeElements` with the following characteristics:

- The first `ImplementationDataTypeElement` in the pair shall fulfill all the following conditions:
  - The attribute `ImplementationDataTypeElement.category` shall be set to `STRUCTURE`.
  - The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
  - The attribute `ImplementationDataTypeElement.arraySize` shall be defined.
  - The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `allIndicesDifferentArraySize`.
- The second `ImplementationDataTypeElement` in the pair shall fulfill all the following conditions:
  - The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall not be defined.
  - The attribute `ImplementationDataTypeElement.category` shall be set to the value `ARRAY`.
  - The attribute `ImplementationDataTypeElement.arraySize` shall not be defined.
  - The attribute `ImplementationDataTypeElement.arraySizeHandling` shall not be defined.

The **terminating** `ImplementationDataTypeElement` in the aggregation chain shall fulfill all the following conditions:

- The attribute `ImplementationDataTypeElement.arraySizeSemantics` shall be set to the value `variableSize`.
- The attribute `ImplementationDataTypeElement.arraySize` shall be defined.
- The attribute `ImplementationDataTypeElement.arraySizeHandling` shall be set to the value `allIndicesSameArraySize`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1322] Size Indicator for undefined `dynamicArraySizeProfile`** [If the `ImplementationDataType.dynamicArraySizeProfile` does not exist but the `ImplementationDataType` is mapped to an `ApplicationArrayDataType` where the attribute `ApplicationArrayDataType.dynamicArraySizeProfile` exists, then the `ImplementationDataType` shall have the category `STRUCTURE`, representing a Variable-Size Array Data Type with Size Indicator enabled at the time when the contract phase generation is executed.

]()

**[constr\_1363] Existence of attributes of `DiagnosticValueNeeds`** [if `DiagnosticValueNeeds` is aggregated by a `SwcServiceDependency` in the role `serviceNeeds` then the attributes

- `DiagnosticValueNeeds.diagnosticValueAccess`
- `DiagnosticValueNeeds.dataLength`

shall **not** exist at any time in the workflow.

]()

**[constr\_1364] Existence of attributes of `DiagnosticIoControlNeeds`** [if `DiagnosticIoControlNeeds` is aggregated by a `SwcServiceDependency` in the role `serviceNeeds` then the attributes

- `DiagnosticIoControlNeeds.freezeCurrentStateSupported`
- `DiagnosticIoControlNeeds.shortTermAdjustmentSupported`

shall **not** exist at any time in the workflow.

]()

**[constr\_1375] Existence of attributes of `CompuMethod` and related meta-classes** [The existence of attributes of `CompuMethod` and related meta-classes depending on the value of the `category` shall follow the restrictions documented in Table 2.22.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

	Attribute Existence per Category									
	IDENTICAL	LINEAR	SCALE_LINEAR	RAT_FUNC	SCALE_RAT_FUNC	TEXTTABLE	BITFIELD_TEXTTABLE	SCALE_LINEAR_AND_TEXTTABLE	SCALE_RATIONAL_AND_TEXTTABLE	TAB_NOINTP
<b>Attributes of CompuMethod</b>										
compuInternalToPhys	N/A	D(1)	D(1)	D(2)	D(2)	D	D	D(8)	D(2)	D
compuPhysToInternal	N/A	D(1)	D(1)	D(2)	D(2)	N/A	N/A	N/A	D(2,3)	N/A
<b>Attributes of meta-classes related to CompuMethod</b>										
compuDefaultValue	N/A	O(6)	O(6)	O(6)	O(6)	O(6)	O(6)	O(6)	O(6)	O(6)
CompuScale	N/A	D/ 1..1	D/ 1..n	D/ 1..1	D/ 1..n	D/ 1..n	D/ 1..n	D/ 1..n	D/ 1..n	D/1..n
CompuScale.compuInverseValue	N/A	N/A	N/A	O(2)	O(2)	O(5)	N/A	O(2,5)	O(2,5)	O(5)
CompuScale.lowerLimit	N/A	O	D	D(4)	D(4)	D	D	D	D(4)	D
CompuScale.mask	N/A	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A	N/A
CompuScale.shortLabel	N/A	N/A	N/A	N/A	N/A	O(7)	O(7)	O(7)	O(7)	N/A
CompuScale.symbol	N/A	N/A	N/A	N/A	N/A	O(7)	O(7)	O(7)	O(7)	N/A
CompuScale.upperLimit	N/A	O	D	D(4)	D(4)	D	D	D	D(4)	D
CompuConst	N/A	N/A	N/A	N/A	N/A	D/vt	D/vt	D/vt	D/vt	D/vt or vf
CompuRationalCoeffs	N/A	D	D	D	D	N/A	N/A	D	D	N/A
CompuRationalCoeffs.compuDenominator	N/A	D/1v	D/1v	D	D	N/A	N/A	D/1v	D	N/A
CompuRationalCoeffs.compuNumerator	N/A	D/2v	D/2v	D	D	N/A	N/A	D/2v	D	N/A

Table 2.22: Allowed Attributes vs. category for CompuMethods

[constr\_1381] Appearance of core-related possible values of **MemorySection.option** or **SwAddrMethod.option** [Any given collection of values stored in the attributes **MemorySection.option** or **SwAddrMethod.option** according to [TPS\_SWCT\_01456] shall at most include a single value out of the following list at the time when the RTE is generated:

- coreGlobal
- coreLocal

]()

[constr\_1382] Mutually exclusive existence of attributes **SwVariableRefProxy.autosarVariable** vs. **SwVariableRefProxy.mcDataInstanceVar** [In any given AUTOSAR model, the aggregations **SwVariableRefProxy.autosarVariable** and **SwVariableRefProxy.mcDataInstanceVar** shall never exist at the same time at any time in the workflow.

]()

**[constr\_1383] Existence of CompuMethod and DataConstr for ImplementationDataTypes of category TYPE\_REFERENCE** [The existence of `ImplementationDataType.swDataDefProps.compuMethod` and `ImplementationDataType.swDataDefProps.dataConstr` for `ImplementationDataTypes` of category `TYPE_REFERENCE` is only allowed, if the respective `ImplementationDataType`, after all type references are resolved, ends up in an `ImplementationDataType` of category `VALUE`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1384] Definition of invalidValue for DataPrototype typed by ApplicationPrimitiveDataType of category CURVE, MAP, CUBOID, CUBE\_4, CUBE\_5, COM\_AXIS, RES\_AXIS, and VAL\_BLK** [An `invalidValue` shall not be specified for a `DataPrototype` typed by `ApplicationPrimitiveDataType` of category `CURVE`, `MAP`, `CUBOID`, `CUBE_4`, `CUBE_5`, `COM_AXIS`, `RES_AXIS`, and `VAL_BLK` at any time in the workflow.

]()

**[constr\_1385] DataPrototype is typed by an ImplementationDataType** [If a `DataPrototype` is typed by an `ImplementationDataType`, its `initValue` shall not be provided by an `ApplicationValueSpecification`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1386] PortDefinedArgumentValue shall only be defined for AbstractProvidedPortPrototype** [A `PortAPIOption` which aggregates at least one `PortDefinedArgumentValue` in the role `portArgValue` shall reference an `AbstractProvidedPortPrototype` typed by a `ClientServerInterface` in the role `port` at the time when the RTE is generated.

]()

**[constr\_1388] VariationPointProxy of category VALUE shall not mix “pre-build” and “post-build” use-cases** [If the value of `category` of the `VariationPointProxy` is set to `VALUE` then there can only be one value yield from the evaluation of a `VariationPointProxy`. In other words, a `VariationPointProxy` of category `VALUE` shall not mix the “pre-build” and “post-build” use-cases.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1389] Restriction regarding the value of category of VariationPointProxy.implementationDataType** [`VariationPointProxy.implementation-`



`DataType` shall **not** be of category `STRUCTURE`, `ARRAY`, `UNION`, `FUNCTION_REFERENCE`, and `DATA_REFERENCE`.

The `VariationPointProxy.implementationDataType` shall be of category `VALUE` or `TYPE_REFERENCE` that, after all references are resolved, yields an `ImplementationDataType` of category `VALUE`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1390] Restriction to the value of `SenderReceiverInterface.invalidationPolicy.handleInvalid`** [If the value of `SenderReceiverInterface.invalidationPolicy.handleInvalid` is set to any value other than `HandleInvalidEnum.dontInvalidate` then the `invalidValue` shall not be within the interval defined by the `CompuMethod` of the applicable `dataElement` at the time when the contract phase generation is executed.

]()

**[constr\_1391] Compatibility of `Units` in the context of assignment using an `ApplicationValueSpecification`** [If an `ApplicationValueSpecification` is used in the context of an assignment to an `AutosarDataPrototype`, then the `ApplicationValueSpecification.swValueCont.unit` shall be compatible to the `Unit` used in the definition of the given `AutosarDataPrototype`, i.e. `AutosarDataType.swDataDefProps.unit`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1392] Compatibility of `Units` in the context of assignment using an `ApplicationRuleBasedValueSpecification`** [If an `ApplicationRuleBasedValueSpecification` is used in the context of an assignment to an `AutosarDataPrototype` then the `ApplicationRuleBasedValueSpecification.swValueCont.unit` shall be compatible to the `Unit` used in the definition of the given `AutosarDataPrototype`, i.e. `AutosarDataType.swDataDefProps.unit`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1393] Existence of `RuleBasedValueCont.unit`** [For every `RuleBasedValueCont`, the reference `unit` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1395] `NvBlockDataMapping` shall be complete** [If an `NvBlockDataMapping` refers to *sub-elements* or *leaf* elements of the `NvDataInterface.nvData` in the context of a particular `PortPrototype`, then **all remaining *sub-elements* or *leaf* elements shall effectively be mapped** according to [TPS\_SWCT\_01659] by means of a collection of `NvBlockDataMappings` at the time when the RTE is generated.

]()

**[constr\_1396] Restriction for the value of attribute `category` for non-terminating `ImplementationDataTypeElements` taken to model a Variable-Size Array Data Type** [The value of attribute `category` for non-terminating `ImplementationDataTypeElements` taken to model a Variable-Size Array Data Type shall **not** be set to `TYPE_REFERENCE` at the time when the contract phase generation is executed.

]()

**[constr\_1397] Existence of attributes of `TransformerHardErrorEvent`** [For any given `TransformerHardErrorEvent`, **either** the attribute `TransformerHardErrorEvent.operation` **or** `TransformerHardErrorEvent.requiredTrigger` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1398] Existence of attributes of `BaseTypeDirectDefinition`** [If the value of attribute `BaseTypeDirectDefinition.baseTypeEncoding` is set to `UTF-16` then the attribute `BaseTypeDirectDefinition.byteOrder` shall exist.

The only allowed values of `BaseTypeDirectDefinition.byteOrder` in this case are `mostSignificantByteFirst` and `mostSignificantByteLast`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1399] Standardized values of `ModeDeclarationGroup.category`** [The AUTOSAR standard defines the following values of the attribute `ModeDeclarationGroup.category` with a standardized meaning:

- `EXPLICIT_ORDER`
- `ALPHABETIC_ORDER`

[TPS\_SWCT\_01010] defines the meaning of these values.

It is **not allowed** to define any custom or project-specific value of the attribute `ModeDeclarationGroup.category`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1400] Reference to a specific `DataTransformation`** [A specific `DataTransformation` shall only be referenced by either

- a `DataPrototypeMapping` in the role `firstToSecondDataTransformation` (and potentially `secondToFirstDataTransformation`) **or**
- an `ISignal` in the role `dataTransformation` **or**
- an `ISignalGroup` in the role `comBasedSignalGroupTransformation` **or**
- a `ClientServerOperationMapping` in the role `firstToSecondDataTransformation`

This rule shall be imposed **at the time when the RTE is generated.**

]()

**[constr\_1401] Restrictions on the relation between `DataPrototypeMapping` and `DataTransformation`** [A `VariableDataPrototype` in the context of a `PortPrototype` shall—at the time when the RTE is generated—not be referenced by a `DataPrototypeMapping` that references a `DataTransformation` while a `DataMapping` exists that points to this `VariableDataPrototype` (via the `SystemSignal`) that also refers to an `ISignal` that in turn references a `DataTransformation`.

]()

**[constr\_1402] Applicability of core-related possible values of `MemorySection.option` or `SwAddrMethod.option` related to `SwAddrMethod.sectionInitializationPolicy`** [If the attribute `SwAddrMethod.option` or `MemorySection.option` is set to `coreLocal` then the attribute `SwAddrMethod.sectionInitializationPolicy` of the same `SwAddrMethod` respectively the `MemorySection.swAddrMethod` shall be either set to `INIT` or `CLEARED` **at the time when the RTE is generated.**

]()

**[constr\_1403] `NvBlockDataMappings` to a given `nvData` shall be unambiguous** [If an `NvBlockDataMapping` exists that **directly** and **completely** maps a specific `NvDataInterface.nvData` in the context of a particular `PortPrototype`, then **no** other `NvBlockDataMapping` which maps sub-elements of the `NvDataInterface.nvData` shall exist **at the time when the RTE is generated.**

]()

**[constr\_1404] All `NvDataInterface.nvData` of `PortPrototypes` in the context of a specific `SwcServiceDependency` shall be mapped to the same `NvBlockDescriptor`** [In the context of a given `SwcServiceDependency` (which, in turn, is owned by an `AtomicSwComponentType`), **all** `NvDataInterface.nvData` of `PortPrototypes` referenced by a `RoleBasedPortAssignment` with attribute `Role-`

`BasedPortAssignment.role` set to `NvDataPort` shall be connected (either directly or via the definition of suitable `PortInterfaceMappings`) to `NvDataInterface.nvData` (on the side of the `NvBlockSwComponentType`) that are **completely mapped** (via `NvBlockDataMappings`) to the identical `NvBlockDescriptor.ramBlock`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1407] Definition of `SwDataDefProps.dataConstr` depending on the capabilities of the data type** [The definition of a `SwDataDefProps.dataConstr` according to [constr\_1288] and [constr\_1289] is only supported for a `DataPrototype` of category `ARRAY` if the corresponding `ApplicationArrayDataType` or `ImplementationDataType` of category `ARRAY` also supports the specification of a `SwDataDefProps.dataConstr`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1408] Definition of `SwDataDefProps.displayFormat` depending on the capabilities of the data type** [The definition of a `SwDataDefProps.displayFormat` according to [constr\_1288] and [constr\_1289] is only supported for a `DataPrototype` of category `ARRAY` if the corresponding `ApplicationArrayDataType` or `ImplementationDataType` of category `ARRAY` also supports the specification of a `SwDataDefProps.displayFormat`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1409] Definition of `SwDataDefProps.dataConstr` depending on the capabilities of the element data type** [The definition of a `SwDataDefProps.dataConstr` according to [constr\_1007] and [constr\_1009] is only supported for an `ApplicationArrayDataType` or an `ImplementationDataType` of category `ARRAY` if the aggregated `ApplicationArrayDataType.element` or `ImplementationDataType.subElement` also supports the specification of a `SwDataDefProps.dataConstr`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1410] Definition of `SwDataDefProps.displayFormat` depending on the capabilities of the element data type** [The definition of a `SwDataDefProps.displayFormat` according to [constr\_1007] and [constr\_1009] is only supported for an `ApplicationArrayDataType` or an `ImplementationDataType` of category

ARRAY if the aggregated `ApplicationArrayDataType.element` or `ImplementationDataType.subElement` also supports the specification of a `SwDataDefProps.displayFormat`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1413] Definition of `SwDataDefProps.stepSize` depending on the capabilities of the data type** [The definition of a `SwDataDefProps.stepSize` according to [constr\_1288] and [constr\_1289] is only supported for a `DataPrototype` of category ARRAY if the corresponding `ApplicationArrayDataType` or `ImplementationDataType` of category ARRAY also supports the specification of a `SwDataDefProps.stepSize`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1414] Definition of `SwDataDefProps.stepSize` depending on the capabilities of the element data type** [The definition of a `SwDataDefProps.stepSize` according to [constr\_1007] and [constr\_1009] is only supported for an `ApplicationArrayDataType` or an `ImplementationDataType` of category ARRAY if the aggregated `ApplicationArrayDataType.element` or `ImplementationDataType.subElement` also supports the specification of a `SwDataDefProps.stepSize`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1415] Supported values of `ModeSwitchEventTriggeredActivity.role`** [The only supported value of `ModeSwitchEventTriggeredActivity.role` at the time when the RTE is generated is `WriteBlock`.

]()

**[constr\_1416] Existence of `ApplicationArrayElement.maxNumberOfElements`** [The attribute `ApplicationArrayElement.maxNumberOfElements` shall exist at the time when the contract phase generation is executed for all `ApplicationArrayElements` defined in the scope of an `ApplicationArrayDataType` where the attribute `ApplicationArrayDataType.dynamicArraySizeProfile` does not exist.

]()

**[constr\_1417] Invalid connection between `NvBlockSwComponentType` and other `AtomicSwComponentType` (I)** [A configuration where an `RPortPrototype` owned by an `AtomicSwComponentType` is simultaneously and directly connected to `Ab-`

`structProvidedPortPrototypes` of a collection of `AtomicSwComponentTypes` where at least one in the collection is an `NvBlockSwComponentType` for a matching set of `dataElements` in all these `PortPrototypes` shall be considered invalid at the time when the RTE is generated.

]()

**[constr\_1418] Invalid connection between `NvBlockSwComponentType` and other `AtomicSwComponentType` (II)** [A configuration where a `PRPortPrototype` owned by an `AtomicSwComponentType` is connected to a `PPortPrototype` owned by an `NvBlockSwComponentType` for a matching set of `dataElements` in all these `PortPrototypes` shall be considered invalid at the time when the RTE is generated.

]()

**[constr\_1420] Existence of `SwAxisIndividual.inputVariableType`** [If the reference `SwAxisIndividual.inputVariableType` does not exist then either:

- `SwAxisIndividual.dataConstr`
- `SwAxisIndividual.unit`

or

- `SwAxisIndividual.dataConstr`
- `SwAxisIndividual.compuMethod.unit`

shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1422] Value of `category` is `VOID`** [If the value of the attribute `SwBaseType.category` is set to `VOID` then the attribute `baseTypeSize` and `baseTypeEncoding` shall not exist at the time when the contract phase generation is executed.

]()

**[constr\_1423] Completeness of references `ArVariableInImplementationDataInstanceRef.contextDataPrototype`** [The reference `ArVariableInImplementationDataInstanceRef.contextDataPrototype` shall be defined for

- each *leaf* (i.e. the end of a chain of aggregating elements) `ImplementationDataTypeElement` of category `TYPE_REFERENCE` in a chain of referencing `ImplementationDataTypes` which is not the `targetDataPrototype`
- and each `ImplementationDataTypeElement` owned by an `ImplementationDataType` or `ImplementationDataTypeElement` of category `ARRAY` in a chain of referencing `ImplementationDataTypes`

starting from the `ImplementationDataTypes` of the `rootVariableDataPrototype` down to the leaf `ImplementationDataTypeElement` which is typed (directly or indirectly via `ImplementationDataType` of category `TYPE_REFERENCE`) by the `ImplementationDataType` of the `targetDataPrototype`.

This rule shall be imposed at the time when the contract phase generation is executed.

}]()

**[constr\_1424] Existence of `ArVariableInImplementationDataInstanceRef.contextDataPrototype`** [The attribute `ArVariableInImplementationDataInstanceRef.contextDataPrototype` shall only exist at any time in the workflow for an `ImplementationDataTypeElement` category `TYPE_REFERENCE` or `ARRAY`.

}]()

**[constr\_1425] Definition of `swCalprmAxisSet.swCalprmAxis` / `SwAxisIndividual.swVariableRef`** depending on the capabilities of the data type [The definition of a `swCalprmAxisSet.swCalprmAxis` / `SwAxisIndividual.swVariableRef` in the context of an `InstantiationDataDefProps` or a `ParameterAccess` is only supported for a `DataPrototype` of category `ARRAY` if the data type of the `ApplicationArrayElement` also supports the specification of a `swCalprmAxisSet.swCalprmAxis` / `SwAxisIndividual.swVariableRef` according to [constr\_1289].

Thereby, multiple `ApplicationArrayDataTypes` might be nested to express multiple array dimensions. This rule shall be imposed at the time when the contract phase generation is executed.

}]()

**[constr\_1426] Consistency of array sizes for axes and input variable array** [The number of array dimension defined by `ApplicationArrayDataTypes` and the values of the `maxNumberOfElements` attributes for the array of elements of category `CURVE`, `MAP`, `CUBOID`, `CUBE_4`, `CUBE_5`, `COM_AXIS`, or `RES_AXIS` shall be **identical** to the number of array dimension and according value of the `maxNumberOfElements` of the `VariableDataPrototype` referenced by `SwAxisIndividual.swVariableRef.autosarVariable`.

This rule shall be imposed at the time when the contract phase generation is executed.

}]()

**[constr\_1427] Definition of `swCalprmAxisSet.swCalprmAxis` / `SwAxisGrouped.swCalprmRef`** depending on the capabilities of the data type [The definition of a `swCalprmAxisSet.swCalprmAxis` / `SwAxisGrouped.swCalprmRef` in the context of an `InstantiationDataDefProps` or a `ParameterAccess` is only supported for a `DataPrototype` of category `ARRAY` if the data type of the `Ap-`



`ApplicationArrayElement` also supports the specification of a `swCalprmAxisSet.swCalprmAxis/SwAxisGrouped.swCalprmRef` according to [constr\_1289].

Thereby, multiple `ApplicationArrayDataTypes` might be nested to express multiple array dimensions. This rule shall be imposed **at the time when the contract phase generation is executed**.

⌋()

**[constr\_1428] Consistency of array sizes for arrays of elements of `category CURVE, MAP, CUBOID, CUBE_4, or CUBE_5` arrays and used group axes arrays** [The number of array dimension defined by `ApplicationArrayDataTypes` and the values of attribute `maxNumberOfElements` attributes for the array of elements of `category CURVE, MAP, CUBOID, CUBE_4, or CUBE_5` needs to be identical to the number of array dimension and according value of the `maxNumberOfElements` of the `DataPrototype` referenced by `SwAxisGrouped.swCalprmRef.arParameter` **at the time when the contract phase generation is executed**.

⌋()

**[constr\_1429] Access to data within `PortPrototypes` from within `RunnableEntities`** [For a `VariableAccess` that is aggregated in the roles

- `RunnableEntity.dataWriteAccess`
- `RunnableEntity.dataReadAccess`
- `RunnableEntity.dataSendPoint`
- `RunnableEntity.dataReceivePointByArgument`
- `RunnableEntity.dataReceivePointByValue`

the existence of the following attributes is not allowed:

- `VariableAccess.accessedVariable.autosarVariable.contextDataPrototype`
- `VariableAccess.accessedVariable.autosarVariable.rootVariableDataPrototype`
- `VariableAccess.accessedVariable.autosarVariableInImplDatatype`
- `VariableAccess.accessedVariable.localVariable`

In other words: in this case, only the references

- `VariableAccess.accessedVariable.autosarVariable.portPrototype` and
- `VariableAccess.accessedVariable.autosarVariable.targetDataPrototype`



shall exist and the latter shall **exclusively** refer to a `VariableDataPrototype` that is aggregated as either

- `SenderReceiverInterface.dataElement` or
- `NvDataInterface.nvData`.

This rule shall be imposed **at the time when the contract phase generation is executed**.

]()

**[constr\_1430] Access to local data from within `RunnableEntity`s** [For `VariableAccess` that is aggregated in the roles

- `RunnableEntity.writtenLocalVariable`
- `RunnableEntity.readLocalVariable`

the existence of the following attributes is not allowed:

- `VariableAccess.accessedVariable.autosarVariableInImpl-Datatype`
- `VariableAccess.accessedVariable.autosarVariable`

In other words, **only** the reference `VariableAccess.accessedVariable.localVariable` shall be used in this case.

This rule shall be imposed **at the time when the contract phase generation is executed**.

]()

**[constr\_1431] Access to parameters from within `RunnableEntity`s** [For a `ParameterAccess` that is aggregated in the role `RunnableEntity.parameterAccess` the existence of the following attributes is not allowed:

- `ParameterAccess.accessedParameter.autosarParameter.contextDataPrototype`
- `ParameterAccess.accessedParameter.autosarParameter.rootParameterDataPrototype`

In other words: in this case, **one** of the following alternatives is allowed to exist:

- a combination of
  - `ParameterAccess.accessedParameter.autosarParameter.portPrototype` and
  - `ParameterAccess.accessedParameter.autosarParameter.targetDataPrototype` that **exclusively** refers to a `ParameterDataPrototype` aggregated by a `ParameterInterface` in the role `parameter`.

- `ParameterAccess.accessedParameter.localParameter` that refers to a `ParameterDataPrototype` that is either aggregated as
  - `InternalBehavior.constantMemory` or
  - `SwcInternalBehavior.perInstanceParameter` or
  - `SwcInternalBehavior.sharedParameter`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1432] Multiplicity of `CommunicationBufferLocking`** [In a concrete aggregated set of `PortAPIOption.supportedFeature`, `CommunicationBufferLocking` shall exist at most once at the time when the RTE is generated.

]()

**[constr\_1433] Transient faults are not applicable to software-components** [An `ErrorTracerNeeds` aggregated in the context of a `SwcInternalBehavior` is - at the time when the RTE is generated - not allowed to own a `TransientFault` in the role `ErrorTracerNeeds.tracedFailure`.

]()

**[constr\_1434] `CompuScales` shall not have identical `CompuScale Value Symbolic Names`** [In a `CompuMethod` that is subject to [constr\_1146], no two `CompuScales` shall have identical `CompuScale Value Symbolic Names` (according to [TPS\_SWCT\_01696]) at the time when the contract phase generation is executed.

]()

**[constr\_1438] `ApplicationArrayElement.indexDataType` needs to refer to a `CompuMethod` of category `TEXTTABLE`** [The reference `ApplicationArrayElement.indexDataType` shall only point to an `ApplicationPrimitiveDataType` that in turn refers to a `CompuMethod` of category `TEXTTABLE`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1439] Requirements on `ApplicationArrayElement` if attribute `indexDataType` exists** [If `ApplicationArrayElement.indexDataType` exists then the attribute `ApplicationArrayElement.arraySizeSemantics` shall be set to the value `fixedSize` and attribute `arraySizeHandling` shall not exist at the time when the contract phase generation is executed.

]()

**[constr\_1440] Size of the `CompuMethod` of `category` `TEXTTABLE` referenced by `ApplicationArrayElement.indexDataType`** [The interval defined by the `CompuScales` contained in the `CompuMethod` referenced by `ApplicationArrayElement.indexDataType` shall start at 0 and include all integer values until `ApplicationArrayElement.maxNumberOfElements` - 1.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1442] `category` `TYPE_REFERENCE` shall not be used for modeling the “payload” of a `Wrapped Union Data Type`** [For the modeling of the “payload” part of a `Wrapped Union Data Type` it shall not be possible at any time in the workflow to use an `ImplementationDataTypeElement` of `category` `TYPE_REFERENCE` that finally (i.e. after all possible indirections are resolved) boils down to `category` `UNION`.

]()

**[constr\_1444] Limited applicability of `Wrapped Union Data Type`** [There is no support at any time in the workflow for the usage of `Wrapped Union Data Type` in `PortInterfaceMappings`, and `Diagnostics`.

]()

**[constr\_1445] Initialization of the `Member Selector` of a `Wrapped Union Data Type`** [The `initValue` for the `Member Selector` shall never be set to any value other than 1.

This rule shall be imposed at any time in the workflow.

]()

**[constr\_1446] No definition of `invalidValue` for a `Wrapped Union Data Type`** [The definition of an `invalidValue` for a `DataPrototype` typed by a `Wrapped Union Data Type` is not supported at any time in the workflow.

]()

**[constr\_1468] Limitation on the number of `SwcExclusiveAreaPolicys`** [An `ExclusiveArea` shall only be referenced by at most one `SwcExclusiveAreaPolicy` at the time when the contract phase generation is executed.

]()

**[constr\_1469] Applicability of constraints depending on the existence of a data transformation** [[constr\_1269], [constr\_1270], [constr\_1268], and [constr\_1240] shall – at any time in the workflow – not apply under the following conditions:

- A reference from the respective `ClientServerOperationMapping` to a `DataTransformation` in the role `firstToSecondDataTransformation` exists.

- The value of the attribute `dataTransformationKind` of the referenced `DataTransformation` is set to `DataTransformationKindEnum.asymmetricFromByteArray` or `DataTransformationKindEnum.asymmetricToByteArray`.

]()

**[constr\_1516] Completeness of references `ArParameterInImplementationDataInstanceRef.contextDataPrototype`** [The reference `ArParameterInImplementationDataInstanceRef.contextDataPrototype` shall be defined for

- each *leaf* (i.e. the end of a chain of aggregating elements) `ImplementationDataTypeElement` of category `TYPE_REFERENCE` in a chain of referencing `ImplementationDataTypes` which is not the `targetDataPrototype`
- and each `ImplementationDataTypeElement` owned by an `ImplementationDataType` or `ImplementationDataTypeElement` of category `ARRAY` in a chain of referencing `ImplementationDataTypes`

starting from the `ImplementationDataTypes` of the `rootParameterDataPrototype` down to the leaf `ImplementationDataTypeElement` which is typed (directly or indirectly via `ImplementationDataType` of category `TYPE_REFERENCE`) by the `ImplementationDataType` of the `targetDataPrototype`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1517] Existence of `ArParameterInImplementationDataInstanceRef.contextDataPrototype`** [The attribute `ArParameterInImplementationDataInstanceRef.contextDataPrototype` shall only exist at any time in the workflow for an `ImplementationDataTypeElement` category `TYPE_REFERENCE` or `ARRAY`.

]()

**[constr\_1518] Consistency of data types in the context of `ArParameterInImplementationDataInstanceRef`** [The definition of attributes `contextDataPrototype` and `targetDataPrototype` shall be enclosed in the context of the definition of the data type used to type `rootParameterDataPrototype` at any time in the workflow.

]()

**[constr\_1519] Existence of attributes vs. category of `ApplicationValueSpecification`** [The existence of attributes of meta-class `ApplicationValueSpecification` vs. the value of `category` is regulated by Table 2.23.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

Attribute of <code>ApplicationValueSpecification</code>	Attribute Existence per Category									
	VALUE	STRING	BOOLEAN	COM_AXIS	RES_AXIS	CURVE	MAP	CUBOID	CUBE_4	CUBE_5
<code>swValueCont</code>	D	D	D	D	D	D	D	D	D	D
<code>swValueCont.unit</code>	O	O	O	O	O	O	O	O	O	O
<code>swValueCont.swValuesPhys</code>	D	D	D	D	D	D	D	D	D	D
<code>swValueCont.swArraysSize</code>	N/A	N/A	N/A	D	D	D	D	D	D	D
<code>swAxisCont</code>	N/A	N/A	N/A	N/A	D	D	D	D	D	D
<code>swAxisCont.unit</code>	N/A	N/A	N/A	N/A	O	O	O	O	O	O
<code>swAxisCont.category</code>	N/A	N/A	N/A	N/A	D	D	D	D	D	D
<code>swAxisCont.swAxisIndex</code>	N/A	N/A	N/A	N/A	D	D	D	D	D	D
<code>swAxisCont.swArraysSize</code>	N/A	N/A	N/A	N/A	D	D	D	D	D	D
<code>swAxisCont.swValuesPhys</code>	N/A	N/A	N/A	N/A	D	O(1)	O(1)	O(1)	O(1)	O(1)

Table 2.23: Allowed Attributes vs. `category` for `ApplicationValueSpecification`

**[constr\_1520] Semantics of `ObdRatioServiceNeeds.rateBasedMonitoredEvent`** [In the context of an `SwcServiceDependency`, each `DiagnosticEventNeeds` referenced in the role `rateBasedMonitoredEvent` shall only be referenced by at most a single `ObdRatioServiceNeeds` at the time when the RTE is generated.

]()

**[constr\_1521] Reference from `AsynchronousServerCallReturnsEvent` to `AsynchronousServerCallResultPoint`** [In the context of a `RunnableEntity`, a given `AsynchronousServerCallResultPoint` shall only be referenced by one `AsynchronousServerCallReturnsEvent` in the role `eventSource` at the time when the contract phase generation is executed.

]()

**[constr\_1523] No mode disabling for `OperationInvokedEvents`** [An `OperationInvokedEvent` shall not have a reference to a `ModeDeclaration` in the role `disabledMode` at the time when the RTE is generated.

]()

**[constr\_1538] Restriction for `ReceiverComSpec.dataElement`** [The reference `ReceiverComSpec.dataElement` shall not refer to an `ArgumentDataPrototype` or `ParameterDataPrototype` at any time in the workflow.

]()

**[constr\_1539] Restriction for `SenderComSpec.dataElement`** [The reference `SenderComSpec.dataElement` shall not refer to an `ArgumentDataPrototype` or `ParameterDataPrototype` at the time when the contract phase generation is executed.

]()

**[constr\_1540] Existence of [ClientComSpec.operation](#)** [The reference [ClientComSpec.operation](#) shall exist if the [AbstractRequiredPortPrototype](#) that owns the [ClientComSpec](#) is typed by a [ClientServerInterface](#). This rule shall be imposed at any time in the workflow.

]()

**[constr\_1541] Existence of [ServerComSpec.operation](#)** [The reference [ServerComSpec.operation](#) shall exist if the [AbstractProvidedPortPrototype](#) that owns the [ServerComSpec](#) is typed by a [ClientServerInterface](#).

This rule shall be imposed at any time in the workflow.

]()

**[constr\_1544] Modeling of [SwAxisGeneric](#) for the definition of a fix axis** [The standardized values and multiplicities within the model of an [SwAxisGeneric](#) according to [TPS\_SWCT\_01479] and [TPS\_SWCT\_01480] are documented in Table 2.24.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

category of <a href="#">swAxisType</a>	category of <a href="#">SwGenericAxis-ParamType</a>	Multiplicity of <a href="#">swGenericAxis-Param</a>	Multiplicity of <a href="#">vf</a>
FIX_AXIS_PAR	OFFSET	1	1
	SHIFT	1	1
FIX_AXIS_PAR_DIST	OFFSET	1	1
	DISTANCE	1	1
FIX_AXIS_PAR_LIST	LIST	1	1..*

Table 2.24: Modeling of [SwAxisGeneric](#)

**[constr\_1545] No initialization for fix axis** [An [ApplicationValueSpecification](#) taken to initialize an [ApplicationPrimitiveDataType](#) that contains a fix axis shall not contain initial values for the axis index of the fix axis inside the [ApplicationPrimitiveDataType](#) at any time in the workflow.

]()

**[constr\_1583] [PortInterfaceMapping](#) for [DataPrototype](#) typed by Compound Primitive Data Type** [There is one very limited use case to apply [PortInterfaceMapping](#) for a [DataPrototype](#) typed by a Compound Primitive Data Type: adjustment of the [shortName](#) of the [DataPrototype](#). Everything else is not supported. This rule shall be imposed at any time in the workflow.

]()

**[constr\_1592] Definition of [SwDataDefProps.displayPresentation](#) depending on the capabilities of the data type** [The definition of a [SwDataDefProps.displayPresentation](#)

`playPresentation` according to [constr\_1288] and [constr\_1289] shall only be applied for a `DataPrototype` of category `ARRAY` if the corresponding `ApplicationArrayDataType` or `ImplementationDataType` of category `ARRAY` supports the specification of a `SwDataDefProps.displayPresentation`.

This rule shall be imposed at any time in the workflow.

]()

**[constr\_1602] Definition of `SwDataDefProps.displayPresentation` depending on the capabilities of the element** [The definition of a `SwDataDefProps.displayPresentation` according to [constr\_1007] and [constr\_1009] is only supported for an `ApplicationArrayDataType` or an `ImplementationDataType` of category `ARRAY` if the aggregated `ApplicationArrayDataType.element` or `ImplementationDataType.subElement` also supports the specification of a `SwDataDefProps.displayPresentation`.

This rule shall be imposed at any time in the workflow.

]()

**[constr\_1607] Only Wrapped Union Data Types in `PortInterface`** [Within the scope of a `PortInterface` the usage of a Union data type is only supported

- for Wrapped Union Data Types.
- for a `PortInterface` that is used to type a `PortPrototype` that does not appear as a context in an `instanceRef` owned by a `DataMapping`. See also [constr\_1441].

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1608] Existence of `rootParameterDataPrototype`** [The reference `rootParameterDataPrototype` shall exist at any time in the workflow if and only if

- `AutosarDataType` of the `autosarParameter` is a composite data type and
- `targetDataPrototype` refers to a `DataPrototype` inside the `rootParameterDataPrototype`.

]()

**[constr\_1609] Existence of `rootVariableDataPrototype`** [The reference `rootVariableDataPrototype` shall exist at any time in the workflow if and only if

- the `AutosarDataType` of the `autosarVariable` is a composite data type and



- the `targetDataPrototype` refers to a `DataPrototype` inside the `root-VariableDataPrototype`.

]()

**[constr\_1610] Existence of `SwDataDefProps.swValueBlockSize` and `SwDataDefProps.swValueBlockSizeMult`** [Attributes `SwDataDefProps.swValueBlockSize` and `SwDataDefProps.swValueBlockSizeMult` shall not exist at the same time in the context of a given `SwDataDefProps`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1611] Existence of `ImplementationDataTypeSubElementRef.implementationDataTypeElement` as opposed to `ImplementationDataTypeSubElementRef.parameterImplementationDataTypeElement`** [For any given `ImplementationDataTypeSubElementRef`, either the aggregation

- `ImplementationDataTypeSubElementRef.implementationDataTypeElement` or
- `ImplementationDataTypeSubElementRef.parameterImplementationDataTypeElement`

shall exist at any time in the workflow.

]()

**[constr\_1622] Value of `TimingEvent.offset` vs. `TimingEvent.period`** [If a value is defined for attribute `TimingEvent.offset` then this value shall be greater than 0 and less or equal than the value of attribute `TimingEvent.period` of the respective `TimingEvent` at the time when the RTE is generated.

]()

**[constr\_1631] Applicability of `DataPrototypeMapping.secondToFirstDataTransformation`** [The reference to `DataTransformation` in the role `DataPrototypeMapping.secondToFirstDataTransformation` shall only exist if reference `DataPrototypeMapping.firstToSecondDataTransformation` exists and refers to a `DataTransformation` where attribute `dataTransformationKind` exists and is **not** set to the value `symmetric`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1632] Restriction for `firstToSecondDataTransformation` and `secondToFirstDataTransformation`** [If – at the time when the RTE is generated – both the reference `firstToSecondDataTransformation` and the reference `secondToFirstDataTransformation` exist in the context of the same `DataPrototypeMapping` then

- the `firstToSecondDataTransformation` shall refer to a `DataTransformation` with attribute `dataTransformationKind` set to `asymmetricToByteArray` and
- the `secondToFirstDataTransformation` shall refer to a `DataTransformation` with attribute `dataTransformationKind` set to `asymmetricFromByteArray`.

]()

**[constr\_1634] Allowed combinations of `ApplicationDataType.category` vs. `CompuMethod.category`** [The allowed combinations of `ApplicationDataType.category` vs. `CompuMethod.category` at the time when the contract phase generation is executed are described by Table 2.25.

]()

	IDENTICAL	LINEAR	SCALE_LINEAR	SCALE_LINEAR_AND_TEXTTABLE	RAT_FUNC	SCALE_RATIONAL_AND_TEXTTABLE	TEXTTABLE	TAB_NOINTP	BITFIELD_TEXTTABLE
VALUE	x	x	x	x	x	x	x	x	x
VAL_BLK	x	x	x	x	x	x	x	x	x
BOOLEAN	n/a	n/a	n/a	n/a	n/a	n/a	x	n/a	n/a
CURVE	x	x	x	x	x	x	x	x	x
MAP	x	x	x	x	x	x	x	x	x
CUBOID	x	x	x	x	x	x	x	x	x
CUBE_4	x	x	x	x	x	x	x	x	x
CUBE_5	x	x	x	x	x	x	x	x	x

**Table 2.25: `ApplicationDataType.category` vs. `CompuMethod.category`**

**[constr\_1635] Relevance of attribute `isOptional`** [If a `SubElementMapping` is defined for the elements of a structured data type then the attribute `isOptional`<sup>20</sup> shall either not exist for the `firstElement` and `secondElement` or it shall have the identical value for the `firstElement` and `secondElement`. This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1636] Mapping of data types that represent an Optional Element Structure** [An `ApplicationRecordDataType` with at least one `element` where attribute `isOptional` is set to `True` shall only be mapped to an `Implementa-`

<sup>20</sup>this is valid for both `ApplicationRecordElement` and `ImplementationDataTypeElement`

`tionDataType` that fulfills the structural requirements to represent an Optional Element Structure (see [TPS\_SWCT\_01774]) **at the time when the contract phase generation is executed.**

]()

**[constr\_1637] Existence of `ImplementationDataTypeElement.isOptional` vs. `ImplementationDataType.isStructWithOptionalElement`** [If one `ImplementationDataType.subElement` sets attribute `isOptional` to the value `True` then the enclosing `ImplementationDataType` shall also set attribute `isStructWithOptionalElement` to `True`.

This rule shall be imposed **at the time when the contract phase generation is executed.**

]()

**[constr\_1638] First `ImplementationDataTypeElement` of `ImplementationDataType` that represents an Optional Element Structure** [The first `ImplementationDataTypeElement` of `ImplementationDataType` that represents an Optional Element Structure, i.e. the `availabilityBitfield` according to [TPS\_SWCT\_01774], shall not set attribute `isOptional` to `True` **at the time when the contract phase generation is executed.**

]()

**[constr\_1639] `ImplementationDataTypeElement` with attribute `isOptional` set to `True`** [`ImplementationDataTypeElement` with attribute `isOptional` set to `True` shall **not** be of category `STRUCTURE` **at the time when the contract phase generation is executed.**

]()

**[constr\_1640] No use of Optional Element Structure for interaction with the diagnostic stack** [An `SwcServiceDependency` that aggregates a diagnostic-related subclass of `ServiceNeeds` shall not refer to any `PortPrototype` by means of either a `RoleBasedPortAssignment` or `RoleBasedDataAssignment` where the respective `PortInterface` contains any `DataPrototype` typed by an Optional Element Structure.

This rule shall be imposed **at the time when the RTE is generated.**

]()

**[constr\_1662] Compatibility of `ApplicationRecordDataType` and `ImplementationDataType` that both represent an Optional Element Structure** [An `ApplicationRecordDataType` that represents an Optional Element Structure shall (after all indirections created by `ImplementationDataTypes` of category `TYPE_REFERENCE` are resolved) only be mapped/connected to an `ImplementationDataType` of category `STRUCTURE` that represents an Optional El-

ement Structure if corresponding pairs of elements have the same value of the attribute `isOptional`.

This rule shall be imposed at the time when the contract phase generation is executed.

}]()

**[constr\_1679] Existence of attribute `RoleBasedDataAssignment.usedDataElement.localVariable` for `RoleBasedDataAssignment.role = signalBasedDiagnostics`** [If the attribute `RoleBasedDataAssignment.role` is set to the value `signalBasedDiagnostics` then the reference `RoleBasedDataAssignment.usedDataElement.localVariable` shall not exist at the time when the RTE is generated.

}]()

**[constr\_1680] Existence of attribute `RoleBasedDataAssignment.usedDataElement.localVariable` for `RoleBasedDataAssignment.role = AppModeRequestInterface`** [If the attribute `RoleBasedDataAssignment.role` is set to the value `AppModeRequestInterface` then the reference `RoleBasedDataAssignment.usedDataElement.localVariable` shall not exist at the time when the RTE is generated.

}]()

**[constr\_1681] Existence of attribute `RoleBasedDataAssignment.usedDataElement.localVariable` for `RoleBasedDataAssignment.role = VerificationStatus`** [If the attribute `RoleBasedDataAssignment.role` is set to the value `VerificationStatus` then the reference `RoleBasedDataAssignment.usedDataElement.localVariable` shall not exist at the time when the RTE is generated.

}]()

**[constr\_1682] Existence of attribute `RoleBasedDataAssignment.usedDataElement.localVariable` for `RoleBasedDataAssignment.role = V2xFacVdp`** [If the attribute `RoleBasedDataAssignment.role` is set to the value `V2xFacVdp` then the reference `RoleBasedDataAssignment.usedDataElement.localVariable` shall not exist at the time when the RTE is generated.

}]()

**[constr\_1683] Existence of attribute `RoleBasedDataAssignment.usedDataElement.localVariable` for `RoleBasedDataAssignment.role = V2xApplRxIndicationCam`** [If the attribute `RoleBasedDataAssignment.role` is set to the value `V2xApplRxIndicationCam` then the reference `RoleBasedDataAssignment.usedDataElement.localVariable` shall not exist at the time when the RTE is generated.

}]()

**[constr\_1684] Existence of attribute `RoleBasedDataAssignment.usedDataElement.localVariable` for `RoleBasedDataAssignment.role = V2xApplRxIndicationMapem`** [If the attribute `RoleBasedDataAssignment.role` is set to the value `V2xApplRxIndicationMapem` then the reference `RoleBasedDataAssignment.usedDataElement.localVariable` shall not exist at the time when the RTE is generated.

]()

**[constr\_1685] Existence of attribute `RoleBasedDataAssignment.usedDataElement.localVariable` for `RoleBasedDataAssignment.role = V2xApplRxIndicationIvim`** [If the attribute `RoleBasedDataAssignment.role` is set to the value `V2xApplRxIndicationIvim` then the reference `RoleBasedDataAssignment.usedDataElement.localVariable` shall not exist at the time when the RTE is generated.

]()

**[constr\_1686] Existence of attribute `RoleBasedDataAssignment.usedDataElement.localVariable` for `RoleBasedDataAssignment.role = V2xApplRxIndicationSpatem`** [If the attribute `RoleBasedDataAssignment.role` is set to the value `V2xApplRxIndicationSpatem` then the reference `RoleBasedDataAssignment.usedDataElement.localVariable` shall not exist at the time when the RTE is generated.

]()

**[constr\_1694] Allowed target of `SwDataDefProps.implementationDataType`** [The reference `SwDataDefProps.implementationDataType` shall only refer to an `ImplementationDataType`. Any other subclass of `AbstractImplementationDataType` is not supported as a reference target.

This rule shall be applied at the time when the contract phase generation is executed.

]()

**[constr\_1706] Definition of initial value for data transmission** [Initial values for data transmission shall only be defined by means of `NonqueuedSenderComSpec.initValue` resp. `NonqueuedReceiverComSpec.initValue`. Any definition of an `initValue` defined in the context of `VariableDataPrototype` shall be ignored.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1712] Existence of attribute `ArrayValueSpecification.intendedPartialInitializationCount`** [An `ArrayValueSpecification` where attribute `intendedPartialInitializationCount` exists shall only be applied for the initialization of an `ApplicationArrayDataType` where attribute `arraySizeSemantics` is set to `variableSize`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1713]** **NvBlockDescriptor.writingStrategy.usedDataElement** shall refer to **AutosarDataPrototype** [The reference **NvBlockDescriptor.writingStrategy.usedDataElement** shall **only** refer to an **AutosarDataPrototype** at the time when the RTE is generated.

]()

**[constr\_1714]** **AutosarDataPrototype** shall only be referenced by a single **NvBlockDescriptor.writingStrategy** [If an **AutosarDataPrototype** in the context of a **PortPrototype** is referenced from a **NvBlockDescriptor.writingStrategy** then this **AutosarDataPrototype** shall not be referenced from any other **NvBlockDescriptor.writingStrategy**.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1715]** Possible values of attribute **NvBlockDescriptor.writingStrategy.role** [The attribute **NvBlockDescriptor.writingStrategy.role** shall only have one of the following values at the time when the RTE is generated (see [TPS\_SWCT\_01586]):

- **storeAtShutdown**
- **storeImmediate**
- **storeOnChange**

]()

**[constr\_1716]** Consistency of attribute **NvBlockDescriptor.writingStrategy.role** set to **storeAtShutdown** [The existence of **NvBlockDescriptor.writingStrategy** where attribute **role** is set to **storeAtShutdown** is only supported if **NvBlockDescriptor.nvBlockNeeds.storeAtShutdown** exists and is set to **True** at the time when the RTE is generated.

]()

**[constr\_1717]** Consistency of attribute **NvBlockDescriptor.writingStrategy.role** set to **storeImmediate** [The existence of **NvBlockDescriptor.writingStrategy** where attribute **role** is set to **storeImmediate** is only supported if **NvBlockDescriptor.nvBlockNeeds.storeImmediate** exists and is set to **True** at the time when the RTE is generated.

]()

**[constr\_1718]** Inheritance of **SwDataDefProps.dataConstr** from an array data type to the array elements [A **SwDataDefProps.dataConstr** specified for an **Ap-**

`ApplicationArrayDataType` or `ImplementationDataType` of category `ARRAY` applies to all array leaf elements represented by (potentially multiple levels of) `ApplicationArrayDataType.element` or `ImplementationDataType.subElement`.

In this case, the `ApplicationArrayDataType.element` or `ImplementationDataType.subElement` shall not have an own `SwDataDefProps.dataConstr`. This also applies for multi-dimensional array data types.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1719] Inheritance of `SwDataDefProps.displayFormat` from an array data type to the array elements** [A `SwDataDefProps.displayFormat` specified for an `ApplicationArrayDataType` or `ImplementationDataType` of category `ARRAY` applies to all array leaf elements represented by (potentially multiple levels of) `ApplicationArrayDataType.element` or `ImplementationDataType.subElement`.

In this case, the `ApplicationArrayDataType.element` or `ImplementationDataType.subElement` shall not have an own `SwDataDefProps.displayFormat`. This also applies for multi-dimensional array data types.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1720] Inheritance of `SwDataDefProps.stepSize` from an array data type to the array elements** [A `SwDataDefProps.stepSize` specified for an `ApplicationArrayDataType` or `ImplementationDataType` of category `ARRAY` applies to all array leaf elements represented by (potentially multiple levels of) `ApplicationArrayDataType.element` or `ImplementationDataType.subElement`.

In this case, the `ApplicationArrayDataType.element` or `ImplementationDataType.subElement` shall not have an own `SwDataDefProps.stepSize`. This also applies for multi-dimensional array data types.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1724] Usage of attribute `ClientServerOperation.diagArgIntegrity`** [With the exception of the context of a `ServiceSwComponentType`, the attribute `ClientServerOperation.diagArgIntegrity` shall only have the value `True` if the `ClientServerInterface` containing the respective `ClientServerOperation` is used to type a `PPortPrototype` that is referenced by a `RoleBasedPortAssignment` aggregated by a `SwcServiceDependency` that in turn aggregates `DiagnosticRoutineNeeds`.



This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1726] Ordering of `MetaDataItemSet.metaDataItem`** [The ordering of the elements of `MetaDataItemSet.metaDataItem` shall be done such that the `MetaDataItem` with the **largest value** of attribute `length` is **located in the first position** and the `MetaDataItem` with the **smallest value** of attribute `length` is **located in the last position**.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1735] Limitation of the aggregation of `AutosarVariableRef` in the context of an `NvBlockDataMapping` owned by a `BulkNvDataDescriptor`** [Any `NvBlockDataMapping` owned by a `BulkNvDataDescriptor` shall only aggregate an `AutosarVariableRef` in the role `readNvData` and `nvRamBlockElement` (that in turn refers to the `BulkNvDataDescriptor.bulkNvBlock`) at the time when the RTE is generated.

]()

**[constr\_1741] Restriction to explicit sending semantics for the usage of Data Services in the context of a `SwcServiceDependency` that aggregates `DiagnosticValueNeeds` that in turn is referenced by a `DiagnosticIoControlNeeds`** [A `dataElement`

- that is referenced by a `RoleBasedDataAssignment` (where the attribute `role` is set to `signalBasedDiagnostics`) owned by a `SwcServiceDependency` that aggregates `DiagnosticValueNeeds` that in turn is referenced by a `DiagnosticIoControlNeeds`
- **shall also be referenced** by a `VariableAccess` aggregated in the role `dataSendPoint` by a given `RunnableEntity` that in turn belongs to the enclosing `SwcInternalBehavior`.
- **shall not be referenced** by a `VariableAccess` aggregated in the role `dataWriteAccess` by a given `RunnableEntity` that in turn belongs to the enclosing `SwcInternalBehavior`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_1754] Aggregation of `NumericalRuleBasedValueSpecification`** [Each `ArrayValueSpecification` shall only aggregate at most one `NumericalRuleBasedValueSpecification` in the role element.

If one `NumericalRuleBasedValueSpecification` is aggregated then it shall be the only aggregated element, i.e. no further `ValueSpecification` shall exist in the

same aggregation where an [NumericalRuleBasedValueSpecification](#) is aggregated.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1755] Aggregation of [CompositeRuleBasedValueSpecification](#)**

[Each [ArrayValueSpecification](#) shall only aggregate at most one [CompositeRuleBasedValueSpecification](#) in the role element.

If one [CompositeRuleBasedValueSpecification](#) is aggregated then it shall be the only aggregated element, i.e. no further [ValueSpecification](#) shall exist in the same aggregation where an [CompositeRuleBasedValueSpecification](#) is aggregated.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1771] Existence of [SwValueCont.unit](#)** [For every [SwValueCont](#), the reference [unit](#) shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1773] Value of attribute [dataSendPoint.returnValueProvision](#)** [All [RunnableEntity.dataSendPoint](#) that refer to the same [accessedVariable](#) shall define the identical value for attribute [returnValueProvision](#) at the time when the contract phase generation is executed.

]()

**[constr\_1774] Value of attribute [dataReceivePointByArgument.returnValueProvision](#)** [All [RunnableEntity.dataReceivePointByArgument](#) that refer to the same [accessedVariable](#) shall define the identical value for attribute [returnValueProvision](#) at the time when the contract phase generation is executed.

]()

**[constr\_1775] Value of attribute [serverCallPoint.returnValueProvision](#)** [All [RunnableEntity.serverCallPoint](#) that refer to the same [operation](#) shall define the identical value of attribute [returnValueProvision](#) at the time when the contract phase generation is executed.

]()

**[constr\_1776] Value of attribute [asynchronousServerCallResultPoint.returnValueProvision](#)** [All [RunnableEntity.asynchronousServerCallResultPoint](#) that refer to the same [AsynchronousServerCallPoint.operation](#)

shall define the identical value of attribute `returnValueProvision` at the time when the contract phase generation is executed.

]()

**[constr\_1777] Value of attribute `externalTriggeringPoint.returnValueProvision`** [All `RunnableEntity.externalTriggeringPoint` that refer to the same `trigger` shall define the identical value of attribute `returnValueProvision` at the time when the contract phase generation is executed.

]()

**[constr\_1778] Value of attribute `modeSwitchPoint.returnValueProvision`** [All `RunnableEntity.modeSwitchPoint` that refer to the same `modeGroup` shall define the identical value of attribute `returnValueProvision` at the time when the contract phase generation is executed.

]()

**[constr\_1779] Scope of the definition of an `AbstractRuleBasedValueSpecification`** [An `AbstractRuleBasedValueSpecification` shall only be defined in the context of an `ArrayValueSpecification` or a `ConstantSpecification`. If the `AbstractRuleBasedValueSpecification` is defined in the context of a `ConstantSpecification` then a reference to this `ConstantSpecification` shall only be created in the context of an `ArrayValueSpecification`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_1783] Existence of attribute `ImplementationDataTypeElement.arrayImplPolicy`** [Attribute `ImplementationDataTypeElement.arrayImplPolicy` shall only exist at the time when the contract phase generation is executed if the enclosing `ImplementationDataType` or `ImplementationDataTypeElement` is of category `ARRAY`.

]()

**[constr\_1860] Multiplicity of `DelegationSwConnector.innerPort`** [For each `DelegationSwConnector`, the reference `DelegationSwConnector.innerPort` shall exist at the time when the creation of the `CompositionSwComponentType` is finished.

]()

**[constr\_1861] Multiplicity of `DelegationSwConnector.outerPort`** [For each `DelegationSwConnector`, the reference `DelegationSwConnector.outerPort` shall exist at the time when the creation of the `CompositionSwComponentType` is finished.

]()

**[constr\_1862] Multiplicity of `PassThroughSwConnector.requiredOuterPort`**  
[For each `PassThroughSwConnector`, the reference `PassThroughSwConnector.requiredOuterPort` shall exist at the time when the creation of the `CompositionSwComponentType` is finished.

]()

**[constr\_1863] Multiplicity of `PassThroughSwConnector.providedOuterPort`**  
[For each `PassThroughSwConnector`, the reference `PassThroughSwConnector.providedOuterPort` shall exist at the time when the creation of the `CompositionSwComponentType` is finished.

]()

**[constr\_1864] Multiplicity of `InstantiationRTEEventProps.refinedEvent`**  
[For each `InstantiationRTEEventProps`, the instance-reference `InstantiationRTEEventProps.refinedEvent` shall exist at the time when the RTE is generated.

]()

**[constr\_1865] Existence of `InvalidationPolicy.dataElement`** [For each `InvalidationPolicy`, the reference `InvalidationPolicy.dataElement` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1866] Existence of `MetaDataItem.length`** [For each `MetaDataItem`, attribute `length` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1867] Existence of `MetaDataItem.metaDataItemType`** [For each `MetaDataItem`, attribute `metaDataItemType` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1868] Existence of `MetaDataItemSet.dataElement`** [For each `MetaDataItemSet` that aggregates at least one `metaDataItem`, at least one reference to a `dataElement` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1869] Existence of attribute `ArgumentDataPrototype.direction`** [For each `ArgumentDataPrototype`, attribute `direction` shall be defined at the time when the contract phase generation is executed.

]()

**[constr\_1870] Existence of attribute `ApplicationError.errorCode`** [For each `ApplicationError`, attribute `errorCode` shall be defined at the time when the contract phase generation is executed.

]()

**[constr\_1871] Existence of attribute `ModeRequestTypeMap.implementationDataType`** [For each `ModeRequestTypeMap`, attribute `implementationDataType` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1872] Existence of attribute `ModeRequestTypeMap.modeGroup`** [For each `ModeRequestTypeMap`, attribute `modeGroup` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1873] Existence of `DataPrototypeMapping.firstDataPrototype`** [For each `DataPrototypeMapping`, the reference in the role `firstDataPrototype` shall exist at the time when the RTE is generated.

]()

**[constr\_1874] Existence of `DataPrototypeMapping.secondDataPrototype`** [For each `DataPrototypeMapping`, the reference in the role `secondDataPrototype` shall exist at the time when the RTE is generated.

]()

**[constr\_1875] Existence of reference `ClientServerOperationMapping.firstOperation`** [For each `ClientServerOperationMapping`, the reference in the role `firstOperation` shall exist at the time when the RTE is generated.

]()

**[constr\_1876] Existence of reference `ClientServerOperationMapping.secondOperation`** [For each `ClientServerOperationMapping`, the reference in the role `secondOperation` shall exist at the time when the RTE is generated.

]()

**[constr\_1877] Existence of reference `ModeDeclarationGroupPrototypeMapping.firstModeGroup`** [For each `ModeDeclarationGroupPrototypeMapping`, the reference in the role `firstModeGroup` shall exist at the time when the RTE is generated.

]()

**[constr\_1878] Existence of reference `ModeDeclarationGroupPrototypeMapping.secondModeGroup`** [For each `ModeDeclarationGroupPrototypeMapping`, the reference in the role `secondModeGroup` shall exist at the time when the RTE is generated.

]()

**[constr\_1879] Existence of reference `ModeDeclarationMapping.firstMode`** [For each `ModeDeclarationMapping`, at least one reference `firstMode` shall exist at the time when the RTE is generated.

]()

**[constr\_1880] Existence of reference `ModeDeclarationMapping.secondMode`** [For each `ModeDeclarationMapping`, the reference `secondMode` shall exist at the time when the RTE is generated.

]()

**[constr\_1881] Existence of reference `TriggerMapping.firstTrigger`** [For each `TriggerMapping`, the reference `firstTrigger` shall exist at the time when the RTE is generated.

]()

**[constr\_1882] Existence of reference `TriggerMapping.secondTrigger`** [For each `TriggerMapping`, the reference `secondTrigger` shall exist at the time when the RTE is generated.

]()

**[constr\_1883] Existence of `ApplicationCompositeDataTypeSubElementRef.applicationCompositeElement`** [For each `ApplicationCompositeDataTypeSubElementRef`, the reference `applicationCompositeElement` shall exist at the time when the RTE is generated.

]()

**[constr\_1884] Existence of attribute `TextTableMapping.identicalMapping`** [For each `TextTableMapping`, the attribute `identicalMapping` shall exist at the time when the RTE is generated.

]()

**[constr\_1885] Existence of attribute `TextTableMapping.mappingDirection`** [For each `TextTableMapping`, the attribute `mappingDirection` shall exist at the time when the RTE is generated.

]()

**[constr\_1886] Existence of attribute `TextTableValuePair.firstValue`** [For each `TextTableValuePair`, the attribute `firstValue` shall exist at the time when the RTE is generated.

]()

**[constr\_1887] Existence of attribute `TextTableValuePair.secondValue`** [For each `TextTableValuePair`, the attribute `secondValue` shall exist at the time when the RTE is generated.

]()

**[constr\_1888] Existence of attribute `DataTransformation.executeDespiteDataUnavailability`** [For each `DataTransformation`, the attribute `executeDespiteDataUnavailability` shall exist at the time when the RTE is generated.

]()

**[constr\_1889] Existence of attribute `QueuedReceiverComSpec.queueLength`** [For each `QueuedReceiverComSpec`, attribute `queueLength` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1890] Existence of attribute `DataFilter.dataFilterType`** [For each `DataFilter`, attribute `dataFilterType` shall exist at the time when the RTE is generated.

]()

**[constr\_1891] Existence of attribute `NonqueuedReceiverComSpec.initValue`** [For each `NonqueuedReceiverComSpec`, attribute `initValue` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1892] Existence of attribute `TransmissionAcknowledgementRequest.timeout`** [For each `TransmissionAcknowledgementRequest`, attribute `timeout` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1893] Existence of attribute `ServerComSpec.queueLength`** [For each `ServerComSpec`, attribute `queueLength` shall exist at the time when the RTE is generated.

]()

**[constr\_1894] Existence of attribute `ModeSwitchSenderComSpec.queueLength`** [For each `ModeSwitchSenderComSpec`, attribute `queueLength` shall exist at the time when the RTE is generated.

]()



**[constr\_1895] Existence of attribute [ModeSwitchSenderComSpec.modeGroup](#)**  
[For each [ModeSwitchSenderComSpec](#), attribute [modeGroup](#) shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1896] Existence of attribute [ModeSwitchReceiverComSpec.modeGroup](#)**  
[For each [ModeSwitchReceiverComSpec](#), attribute [modeGroup](#) shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1897] Existence of reference [ParameterProvideComSpec.parameter](#)**  
[For each [ParameterProvideComSpec](#), the reference [parameter](#) shall exist at the time when the contract phase generation is executed.

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**[constr\_1898] Existence of reference [ParameterRequireComSpec.parameter](#)**  
[For each [ParameterRequireComSpec](#), the reference [parameter](#) shall exist at the time when the contract phase generation is executed.

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**[constr\_1899] Existence of reference [NvRequireComSpec.variable](#)** [For each [NvRequireComSpec](#), the reference [variable](#) shall exist at the time when the contract phase generation is executed.

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**[constr\_1900] Existence of reference [NvProvideComSpec.variable](#)** [For each [NvProvideComSpec](#), the reference [variable](#) shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1901] Existence of attribute [EndToEndDescription.category](#)** [For each [EndToEndDescription](#), attribute [category](#) shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1902] Existence of attribute [EndToEndProtection.endToEndProfile](#)**  
[For each [EndToEndProtection](#), attribute [endToEndProfile](#) shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1903] Existence of reference [DataTypeMap.applicationDataType](#)** [For each [DataTypeMap](#), reference [applicationDataType](#) shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1904] Existence of reference `DataTypeMap.implementationDataType`**  
[For each `DataTypeMap`, reference `implementationDataType` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1905] Existence of attribute `SwTextProps.arraySizeSemantics`**  
[For each `SwTextProps`, attribute `arraySizeSemantics` shall exist at the time when the contract phase generation is executed.

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**[constr\_1906] Existence of attribute `SwTextProps.swMaxTextSize`**  
[For each `SwTextProps`, attribute `swMaxTextSize` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1907] Existence of attribute `ApplicationArrayDataType.element`**  
[For each `ApplicationArrayDataType`, the aggregation of `ApplicationArrayElement` in the role `element` shall exist at the time when the RTE is generated.

]()

**[constr\_1908] Existence of attribute `ApplicationRecordDataType.element`**  
[For each `ApplicationRecordDataType`, the aggregation of `ApplicationRecordElement` in the role `element` shall exist at the time when the RTE is generated.

]()

**[constr\_1909] Existence of attribute `ImplementationProps.symbol`**  
[For each `ImplementationProps`, the attribute `symbol` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1910] Existence of attribute `BaseType.baseTypeDefinition`**  
[For each `BaseType` (which will be utilized in the form of `SwBaseType`), the aggregation in the role `baseTypeDefinition` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1911] Existence of `ArVariableInImplementationDataInstanceRef.targetDataPrototype`**  
[For each `ArVariableInImplementationDataInstanceRef`, the reference `targetDataPrototype` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1912] Existence of reference `ArParameterInImplementationDataInstanceRef.targetDataPrototype`** [For each `ArParameterInImplementationDataInstanceRef`, the reference `targetDataPrototype` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1913] Existence of attribute `CompuRationalCoeffs.compuDenominator`** [For each `CompuRationalCoeffs`, the attribute `compuDenominator` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1914] Existence of attribute `CompuRationalCoeffs.compuNumerator`** [For each `CompuRationalCoeffs`, the attribute `compuNumerator` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1915] Existence of attribute `PhysicalDimensionMapping.firstPhysicalDimension`** [For each `PhysicalDimensionMapping`, attribute `firstPhysicalDimension` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1916] Existence of attribute `PhysicalDimensionMapping.secondPhysicalDimension`** [For each `PhysicalDimensionMapping`, attribute `secondPhysicalDimension` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1917] Existence of `ConstantSpecification.valueSpec`** [For each `ConstantSpecification`, the aggregation of `ValueSpecification` in the role `valueSpec` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1918] Existence of `RecordValueSpecification.field`** [For each `RecordValueSpecification`, the aggregation of `ValueSpecification` in the role `field` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1919] Existence of `TextValueSpecification.value`** [For each `TextValueSpecification`, attribute `value` shall exist at the time when the contract phase generation is executed.

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**[constr\_1920] Existence of `NumericalValueSpecification.value`** [For each `NumericalValueSpecification`, attribute `value` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1921] Existence of `ReferenceValueSpecification.referenceValue`** [For each `ReferenceValueSpecification`, attribute `referenceValue` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1922] Existence of `ApplicationRuleBasedValueSpecification.category`** [For each `ApplicationRuleBasedValueSpecification`, attribute `category` shall exist at the time when the RTE is generated.

]()

**[constr\_1923] Existence of `RuleBasedAxisCont.ruleBasedValues`** [For each `RuleBasedAxisCont`, attribute `ruleBasedValues` shall exist at the time when the contract phase generation is executed.

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**[constr\_1924] Existence of `RuleBasedValueCont.ruleBasedValues`** [For each `RuleBasedValueCont`, attribute `ruleBasedValues` shall exist at the time when the contract phase generation is executed.

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**[constr\_1925] Existence of `NumericalRuleBasedValueSpecification.ruleBasedValues`** [For each `NumericalRuleBasedValueSpecification`, attribute `ruleBasedValues` shall exist at the time when the contract phase generation is executed.

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**[constr\_1926] Existence of `RuleBasedValueSpecification.rule`** [For each `RuleBasedValueSpecification`, attribute `rule` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1927] Existence of `RuleBasedValueSpecification.arguments`** [For each `RuleBasedValueSpecification`, the aggregation of `RuleArguments` in the role `arguments` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1928] Existence of `CompositeRuleBasedValueSpecification.rule`** [For each `CompositeRuleBasedValueSpecification`, attribute `rule` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1929] Existence of `CompositeRuleBasedValueSpecification.argument`** [For each `CompositeRuleBasedValueSpecification`, the aggregation of `CompositeValueSpecification` in the role `argument` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1930] Existence of `ConstantReference.constant`** [For each `ConstantReference`, attribute `constant` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1931] Existence of `ConstantSpecificationMapping.applConstant`** [For each `ConstantSpecificationMapping`, the reference to meta-class `ConstantSpecification` in the role `applConstant` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1932] Existence of `ConstantSpecificationMapping.implConstant`** [For each `ConstantSpecificationMapping`, the reference to meta-class `ConstantSpecification` in the role `implConstant` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1933] Existence of `CalibrationParameterValue.initializedParameter`** [For each `CalibrationParameterValue`, the reference to meta-class `ConstantSpecification` in the role `initializedParameter` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1934] Existence of attribute `SwcInternalBehavior.handleTerminationAndRestart`** [For each `SwcInternalBehavior`, attribute `handleTerminationAndRestart` shall exist at the time when the RTE is generated.

]()

**[constr\_1935] Existence of attribute `SwcInternalBehavior.supportsMultipleInstantiation`** [For each `SwcInternalBehavior`, attribute `supportsMultipleInstantiation` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1936] Existence of attribute `RunnableEntity.symbol`** [For each `RunnableEntity`, attribute `symbol` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1937] Existence of attribute `TimingEvent.period`** [For each `TimingEvent`, attribute `period` shall exist at the time when the RTE is generated.

]()

**[constr\_1938] Existence of attribute `RunnableEntityArgument.symbol`** [For each `RunnableEntityArgument`, attribute `symbol` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1939] Existence of attribute `ExecutableEntityActivationReason.bitPosition`** [For each `ExecutableEntityActivationReason`, attribute `bitPosition` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1940] Existence of attribute `AsynchronousServerCallReturnsEvent.eventSource`** [For each `AsynchronousServerCallReturnsEvent`, attribute `eventSource` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1941] Existence of attribute `DataSendCompletedEvent.eventSource`** [For each `DataSendCompletedEvent`, attribute `eventSource` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1942] Existence of attribute `DataWriteCompletedEvent.eventSource`** [For each `DataWriteCompletedEvent`, attribute `eventSource` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1943] Existence of attribute `DataReceivedEvent.data`** [For each `DataReceivedEvent`, attribute `data` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1944] Existence of attribute `DataReceiveErrorEvent.data`** [For each `DataReceiveErrorEvent`, attribute `data` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1945] Existence of attribute `OperationInvokedEvent.operation`** [For each `OperationInvokedEvent`, attribute `operation` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1946] Existence of attribute `SwcModeSwitchEvent.activation`** [For each `SwcModeSwitchEvent`, attribute `activation` shall exist at the time when the RTE is generated.

]()

**[constr\_1947] Existence of reference `SwcModeSwitchEvent.mode`** [For each `SwcModeSwitchEvent`, the reference to `ModeDeclaration` in the role `mode` shall exist at the time when the RTE is generated.

]()

**[constr\_1948] Existence of attribute `ModeSwitchedAckEvent.eventSource`** [For each `ModeSwitchedAckEvent`, attribute `eventSource` shall exist at the time when the RTE is generated.

]()

**[constr\_1949] Existence of attribute `ExternalTriggerOccurredEvent.trigger`** [For each `ExternalTriggerOccurredEvent`, attribute `trigger` shall exist at the time when the RTE is generated.

]()

**[constr\_1950] Existence of attribute `InternalTriggerOccurredEvent.eventSource`** [For each `InternalTriggerOccurredEvent`, the attribute `eventSource` shall exist at the time when the RTE is generated.

]()

**[constr\_1951] Existence of attribute `WaitPoint.timeout`** [For each `WaitPoint`, attribute `timeout` shall exist at the time when the RTE is generated.

]()

**[constr\_1952] Existence of reference `WaitPoint.trigger`** [For each `WaitPoint`, the reference to `RTEEvent` in the role `trigger` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1953] Existence of attribute `SwcExclusiveAreaPolicy.apiPrinciple`** [For each `SwcExclusiveAreaPolicy` that refers to an `exclusiveArea`, attribute `apiPrinciple` shall exist at the time when the RTE is generated.

]()



**[constr\_1954] Existence of attribute `VariableAccess.accessedVariable`** [For each `VariableAccess`, attribute `accessedVariable` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1955] Existence of attribute `ServerCallPoint.operation`** [For each `ServerCallPoint`, attribute `operation` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1956] Existence of attribute `ServerCallPoint.timeout`** [For each `ServerCallPoint`, attribute `timeout` shall exist at the time when the RTE is generated.

]()

**[constr\_1957] Existence of attribute `AsynchronousServerCallResultPoint.asynchronousServerCallPoint`** [For each `AsynchronousServerCallResultPoint`, the reference to `AsynchronousServerCallPoint` in the role `asynchronousServerCallPoint` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1958] Existence of attribute `ParameterAccess.accessedParameter`** [For each `ParameterAccess`, attribute `accessedParameter` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1959] Existence of attribute `InstantiationDataDefProps.swDataDefProps`** [For each `InstantiationDataDefProps`, attribute `swDataDefProps` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1960] Existence of attribute `PortAPIOption.port`** [For each `PortAPIOption`, attribute `port` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1961] Existence of attribute `PortDefinedArgumentValue.value`** [For each `PortDefinedArgumentValue`, attribute `value` shall exist at the time when the RTE is generated.

]()

**[constr\_1962] Existence of attribute `PortDefinedArgumentValue.valueType`** [For each `PortDefinedArgumentValue`, attribute `valueType` shall exist at the time when the RTE is generated.

]()

**[constr\_1963] Existence of attribute `CommunicationBufferLocking.support-BufferLocking`** [For each `CommunicationBufferLocking`, attribute `support-BufferLocking` shall exist at the time when the RTE is generated.

]()

**[constr\_1964] Existence of attribute `PerInstanceMemory.type`** [For each `PerInstanceMemory`, attribute `type` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1965] Existence of attribute `PerInstanceMemory.typeDefinition`** [For each `PerInstanceMemory`, attribute `typeDefinition` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1966] Existence of attribute `Implementation.swVersion`** [For each `Implementation`, attribute `swVersion` shall exist at the time when the RTE is generated.

]()

**[constr\_1967] Existence of attribute `Implementation.vendorId`** [For each `Implementation`, attribute `vendorId` shall exist at the time when the RTE is generated.

]()

**[constr\_1968] Existence of attribute `Implementation.codeDescriptor`** [For each `Implementation`, at least one aggregation of `Code` in the role `codeDescriptor` shall exist at the time when the RTE is generated.

]()

**[constr\_1969] Existence of attribute `SwcImplementation.behavior`** [For each `SwcImplementation`, attribute `behavior` shall exist at the time when the RTE is generated.

]()

**[constr\_1970] Existence of attribute `PerInstanceMemorySize.alignment`** [For each `PerInstanceMemorySize`, attribute `alignment` shall exist at the time when the RTE is generated.

]()

**[constr\_1971] Existence of attribute `PerInstanceMemorySize.perInstanceMemory`** [For each `PerInstanceMemorySize`, the reference to `PerInstanceMemory` in the role `perInstanceMemory` shall exist at the time when the RTE is generated.

]()

**[constr\_1972] Existence of attribute `PerInstanceMemorySize.size`** [For each `PerInstanceMemorySize`, attribute `size` shall exist at the time when the RTE is generated.

]()

**[constr\_1973] Existence of attribute `ModeDeclarationGroup.initialMode`** [For each `ModeDeclarationGroup`, the reference to `ModeDeclaration` in the role `initialMode` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_1974] Existence of attribute `ModeDeclarationGroup.modeDeclaration`** [For each `ModeDeclarationGroup`, at least one `ModeDeclaration` shall be aggregated in the role `modeDeclaration` at the time when the contract phase generation is executed.

]()

**[constr\_1975] Existence of attribute `ModeTransition.enteredMode`** [For each `ModeTransition`, the reference to `ModeDeclaration` in the role `enteredMode` shall exist at the time when the RTE is generated.

]()

**[constr\_1976] Existence of attribute `ModeTransition.exitedMode`** [For each `ModeTransition`, the reference to `ModeDeclaration` in the role `exitedMode` shall exist at the time when the RTE is generated.

]()

**[constr\_1977] Existence of attribute `ModeErrorBehavior.errorReactionPolicy`** [For each `ModeErrorBehavior`, the attribute `errorReactionPolicy` shall exist at the time when the RTE is generated.

]()

**[constr\_1978] Existence of attribute `SwcModeManagerErrorEvent.modeGroup`** [For each `SwcModeManagerErrorEvent`, the instance reference to `ModeDeclaration` in the role `modeGroup` shall exist at the time when the RTE is generated.

]()

**[constr\_1979] Existence of the reference `SwcBswMapping.bswBehavior`** [For each `SwcBswMapping`, the reference to `BswInternalBehavior` in the role `bswBehavior` shall exist at the time when the RTE is generated.

]()

**[constr\_1980] Existence of the reference `SwcBswMapping.swcBehavior`** [For each `SwcBswMapping`, the reference to `BswInternalBehavior` in the role `swcBehavior` shall exist at the time when the RTE is generated.

]()

**[constr\_1981] Existence of attribute `NvBlockDescriptor.nvBlockNeeds`** [For each `NvBlockDescriptor`, attribute `nvBlockNeeds` shall exist at the time when the RTE is generated.

]()

**[constr\_1982] Existence of attribute `ModeSwitchEventTriggeredActivity.role`** [For each `ModeSwitchEventTriggeredActivity`, attribute `role` shall exist at the time when the RTE is generated.

]()

**[constr\_1983] Existence of attribute `ModeSwitchEventTriggeredActivity.swcModeSwitchEvent`** [For each `ModeSwitchEventTriggeredActivity`, attribute `swcModeSwitchEvent` shall exist at the time when the RTE is generated.

]()

**[constr\_1984] Existence of instance reference `NvBlockDataMapping.nvRamBlockElement`** [For each `NvBlockDataMapping`, the instance reference to `ModeDeclaration` in the role `nvRamBlockElement` shall exist at the time when the RTE is generated.

]()

**[constr\_1985] Existence of the reference `SupervisedEntityNeeds.toleratedFailedCycles`** [For each `SupervisedEntityNeeds`, the reference to `BswInternalBehavior` in the role `toleratedFailedCycles` shall exist at the time when the RTE is generated.

]()

**[constr\_1986] Existence of the reference `DiagnosticRoutineNeeds.diagRoutineType`** [For each `DiagnosticRoutineNeeds`, the reference to `BswInternalBehavior` in the role `diagRoutineType` shall exist at the time when the RTE is generated.

]()

**[constr\_1987] Existence of instance reference [RapidPrototypingScenario.hostSystem](#)** [For each [RapidPrototypingScenario](#), the instance reference to [ModeDeclaration](#) in the role [hostSystem](#) shall exist at the time when the RTE is generated.

]()

**[constr\_1988] Existence of attribute [RptProfile.maxServicePointId](#)** [For each [RptProfile](#), attribute [maxServicePointId](#) shall exist at the time when the RTE is generated.

]()

**[constr\_1989] Existence of attribute [RptProfile.minServicePointId](#)** [For each [RptProfile](#), attribute [minServicePointId](#) shall exist at the time when the RTE is generated.

]()

**[constr\_1990] Existence of attribute [RptProfile.servicePointSymbolPost](#)** [For each [RptProfile](#), attribute [servicePointSymbolPost](#) shall exist at the time when the RTE is generated.

]()

**[constr\_1991] Existence of attribute [RptProfile.servicePointSymbolPre](#)** [For each [RptProfile](#), attribute [servicePointSymbolPre](#) shall exist at the time when the RTE is generated.

]()

**[constr\_1992] Existence of attribute [RptProfile.stimEnabler](#)** [For each [RptProfile](#), attribute [stimEnabler](#) shall exist at the time when the RTE is generated.

]()

**[constr\_1993] Existence of attribute [RptImplPolicy.rptEnablerImplType](#)** [For each [RptImplPolicy](#), attribute [rptEnablerImplType](#) shall exist at the time when the RTE is generated.

]()

**[constr\_1994] Existence of attribute [RptImplPolicy.rptPreparationLevel](#)** [For each [RptImplPolicy](#), attribute [rptPreparationLevel](#) shall exist at the time when the RTE is generated.

]()

**[constr\_1995] Existence of attribute [RptSwPrototypingAccess.rptHookAccess](#)** [For each [RptSwPrototypingAccess](#), attribute [rptHookAccess](#) shall exist at the time when the RTE is generated.

]()

**[constr\_1996] Existence of attribute `RptSwPrototypingAccess.rptReadAccess`** [For each `RptSwPrototypingAccess`, attribute `rptReadAccess` shall exist at the time when the RTE is generated.

]()

**[constr\_1997] Existence of attribute `RptSwPrototypingAccess.rptWriteAccess`** [For each `RptSwPrototypingAccess`, attribute `rptWriteAccess` shall exist at the time when the RTE is generated.

]()

**[constr\_1998] Existence of attribute `RptExecutableEntityProperties.maxRptEventId`** [For each `RptExecutableEntityProperties`, attribute `maxRptEventId` shall exist at the time when the RTE is generated.

]()

**[constr\_1999] Existence of attribute `RptExecutableEntityProperties.minRptEventId`** [For each `RptExecutableEntityProperties`, attribute `minRptEventId` shall exist at the time when the RTE is generated.

]()

**[constr\_2000] Compatibility of `ClientServerOperations` triggering the same `RunnableEntity`** [The `ClientServerOperations` are considered compatible at the time when the contract phase generation is executed if

- the number of `arguments` (which can be `ArgumentDataPrototypes` or related `PortDefinedArgumentValues`) is equal and
- the corresponding `arguments` (i.e. first `argument` on both sides, second `argument` on both sides, etc.) are compatible or both are typed by "new-world" Variable-Size Array Data Types where the data types of the array elements are compatible (but the array sizes may differ).
- and the respective values of `PortAPIOption.errorHandling` are identical.

In particular, this means that:

- for combinations of `ArgumentDataPrototypes` and `ArgumentDataPrototypes` where the `serverArgumentImplPolicy` is set to `useArgumentType` the referred `ImplementationDataTypes` shall be compatible.

In case of data types of category `STRUCTURE` all by order matching `ImplementationDataTypes` shall be named equally.

- for combinations of `PortDefinedArgumentValues` and `ArgumentDataPrototypes` where the `serverArgumentImplPolicy` is set to `useArgumentType` the referred `ImplementationDataTypes` shall be compatible.

In case of `ImplementationDataTypeElements` of category `STRUCTURE` all by order matching `ImplementationDataTypeElements` of the structure shall be named equally.

- for `ArgumentDataPrototypes` where the `serverArgumentImplPolicy` is set to `useVoid` an arbitrary `ImplementationDataType` is referred to.

In addition, it is required that the **return value defined on both sides shall match** (in terms of `Std_ReturnType` vs. `void`) and also the `possibleErrors` are compatible.

]()

**[constr\_2002] Referenced `VariableDataPrototype` from `AutosarVariableRef` of `VariableAccess` in role `dataReadAccess`** [A `VariableAccess` in the role `dataReadAccess` shall refer to an `RPortPrototype` or `PRPortPrototype` that is typed by either a `SenderReceiverInterface` or a `NvDataInterface`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2003] Referenced `VariableDataPrototype` from `AutosarVariableRef` of `VariableAccess` in role `dataWriteAccess`** [A `VariableAccess` in the role `dataWriteAccess` shall refer to a `PPortPrototype` or `PRPortPrototype` that is typed by either a `SenderReceiverInterface` or a `NvDataInterface`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2004] Referenced `VariableDataPrototype` from `AutosarVariableRef` of `VariableAccess` in role `dataSendPoint`** [A `VariableAccess` in the role `dataSendPoint` shall refer to a `PPortPrototype` or `PRPortPrototype` that is typed by either a `SenderReceiverInterface` or a `NvDataInterface` at the time when the contract phase generation is executed.

]()

**[constr\_2005] Referenced `VariableDataPrototype` from `AutosarVariableRef` of `VariableAccess` in role `dataReceivePointByValue` or `dataReceivePointByArgument`** [A `VariableAccess` in the role `dataReceivePointByValue` or `dataReceivePointByArgument` shall refer to an `RPortPrototype` or `PRPortPrototype` that is typed by either a `SenderReceiverInterface` or an `NvDataInterface` at the time when the contract phase generation is executed.

]()

**[constr\_2006] Number of `AsynchronousServerCallResultPoint` referencing to one `AsynchronousServerCallPoint`** [The `AsynchronousServer-`



`CallPoint` may be referenced by at most one `AsynchronousServerCallResultPoint` at the time when the contract phase generation is executed.

If the reference exists, this means that only the `RunnableEntity` with this `AsynchronousServerCallResultPoint` can fetch the result of the asynchronous server invocation of this particular `AsynchronousServerCallPoint`.

]()

**[constr\_2007] Consistency of `typeDefinition` attribute** [All `PerInstanceMemorys` of the same `SwcInternalBehavior` with identical `type` attribute shall define an identical `typeDefinition` attribute as well.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2009] Supported kinds of `PortPrototypes` of a `NvBlockSwComponentType`** [With respect to external communication, `NvBlockSwComponentType` is limited to the definition of the following kinds of `PortPrototype`:

- `PortPrototypes` typed by either `NvDataInterfaces` or `ClientServerInterfaces`
- `RPortPrototypes` typed by `ModeSwitchInterfaces`

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_2010] Connections between `SwComponentPrototypes` of type `NvBlockSwComponentType`** [The existence of `SwConnectors` that refer to `PortPrototypes` belonging to `SwComponentPrototypes` where both are typed by `NvBlockSwComponentType` is not permitted at the time when the RTE is generated.

]()

**[constr\_2011] Connections between `SwComponentPrototypes` typed by `NvBlockSwComponentType` and `SwComponentPrototypes` typed by other `AtomicSwComponentTypes`** [The *nv data* `PortPrototypes` of the `SwComponentPrototype` typed by an `NvBlockSwComponentType` are either connected with `PortPrototypes` typed by `NvDataInterfaces` or `SenderReceiverInterfaces` of other `AtomicSwComponentType`.

]()

**[constr\_2012] Compatibility of `ImplementationDataTypes` used for `ramBlock` and `romBlock`** [The `ramBlock` and the `romBlock` shall have compatible `ImplementationDataTypes` to ensure at the time when the RTE is generated,

that the NVRAM Block default values in the ROM Block can be copied into the RAM Block.

]()

**[constr\_2013] Compatibility of ImplementationDataTypes for NvBlockDataMapping** [Unless both the attribute `bitfieldTextTableMaskNvBlockDescriptor` and attribute `bitfieldTextTableMaskPortPrototype` is defined in the context of a given `NvBlockDataMapping`, the `NvBlockDataMapping` is only valid if the `ImplementationDataType` of the referenced `VariableDataPrototype` or `ImplementationDataTypeElement` in the role `nvRamBlockElement` is compatible to the `ImplementationDataType` used to type the `DataPrototype` aggregated by `NvBlockDataMapping` in the role `writtenNvData`, `writtenReadNvData`, or `readNvData`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_2014] Limitation of RoleBasedPortAssignment.role in NvBlockDescriptors** [The `role` has to be set to a valid name of the *Standardized AUTOSAR Interface* used for the *NVRAM Manager* e.g. `NvMNotifyJobFinished` or `NvMNotifyInitBlock`.

]()

**[constr\_2015] Limitation of SwcInternalBehavior of a NvBlockSwComponentType** [The `SwcInternalBehavior` of a `NvBlockSwComponentType` is only permitted to define

- `OperationInvokedEvents`
- `RunnableEntitys` triggered by `OperationInvokedEvents` (server `RunnableEntitys`)
- `RunnableEntitys` which defines only the mandatory attributes `symbol` and `canBeInvokedConcurrently`
- `PortAPIOptions` defining `PortDefinedArgumentValues`
- `TimingEvents` (which may include references to `ModeDeclarations` in the role `disabledMode`)
- `DataReceivedEvents` (which may include references to `ModeDeclarations` in the role `disabledMode`)
- `SwcModeSwitchEvents`
- `RunnableEntitys` triggered by `TimingEvents`
- `RunnableEntitys` triggered by `DataReceivedEvents`
- `RunnableEntitys` triggered by `SwcModeSwitchEvents`

- [DataTypeMappingSet](#)

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_2016] Connections between [SwComponentPrototypes](#) of type [ServiceProxySwComponentType](#)** [A connection between [PortPrototypes](#) belonging to [SwComponentPrototypes](#) where both are typed by [ServiceProxySwComponentType](#) is not permitted at the time when the RTE is generated.

]()

**[constr\_2017] Ports of [ServiceProxySwComponentTypes](#)** [[ServiceProxySwComponentType](#) is only permitted to define

- [RPortPrototypes](#) that are typed by [SenderReceiverInterface](#) or
- [PortPrototypes](#) that are typed by a [PortInterface](#) where the [isService](#) attribute is set to true.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_2018] Supported remote communication of a [ServiceProxySwComponentType](#)** [For remote communication, [ServiceProxySwComponentType](#) can have only [RPortPrototypes](#) typed by [SenderReceiverInterfaces](#) in a 1:n communication scenario.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_2019] [ServiceSwComponentType](#) shall have service ports only** [In the case of [ServiceSwComponentType](#), all aggregated [PortPrototypes](#) need to have an <<isOfType>> relationship to a [PortInterface](#) which has its [isService](#) attribute set to true at the time when the RTE is generated.

The exceptions described in

- [TPS\_SWCT\_01572],
- [TPS\_SWCT\_01579],
- [TPS\_SWCT\_01831] and
- [TPS\_SWCT\_01580]

apply.

]()

**[constr\_2020] [dataReadAccess](#) can not be used for queued communication** [The [swImplPolicy](#) of the [VariableDataPrototype](#) referenced by a [Vari-](#)

`ableAccess` in role `dataReadAccess` shall **not** be set to `queued` at the time when the contract phase generation is executed.

]()

**[constr\_2021] `WaitPoint` referencing a `DataReceivedEvent` can not be used for non-queued communication** [A `WaitPoint` referencing a `DataReceivedEvent` is permitted **if and only if** the `swImplPolicy` of the `VariableDataPrototype` referenced by this `DataReceivedEvent` is set to `queued`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2022] Mutually exclusive use of `SynchronousServerCallPoints` and `AsynchronousServerCallPoints`** [A `ClientServerOperation` of a particular `RPortPrototype` shall be mutually exclusive referenced by either a `SynchronousServerCallPoints` or an `AsynchronousServerCallPoints` at the time when the contract phase generation is executed.

]()

**[constr\_2023] Consistency of `timeout` values** [The `timeout` values of all `ServerCallPoints` referencing the same instance of `ClientServerOperation` in a `RPortPrototype` shall be identical at the time when the RTE is generated.

]()

**[constr\_2024] `enableTakeAddress` is restricted to single instantiation** [The definition of a `PortAPIOption` with `enableTakeAddress` set to `true` is only permitted for software-components where the attribute `SwcInternalBehavior.supportsMultipleInstantiation` is set to `false` at the time when the contract phase generation is executed.

]()

**[constr\_2026] Referenced `VariableDataPrototype` from `AutosarVariableRef` of `VariableAccess` in role `writtenLocalVariable` and `readLocalVariable`** [A `VariableDataPrototype` in the `localVariable` reference needs to be owned by the same `SwcInternalBehavior` as this `RunnableEntity` belongs to, and the referenced `VariableDataPrototype` has to be defined in the role `implicitInterRunnableVariable` or `explicitInterRunnableVariable`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2027] `SwcServiceDependency` shall be defined for service ports only** [A `PortPrototype` that is referenced by a `SwcServiceDependency` via `assigned-`

Port or via `assignedData` shall be typed by a `PortInterface` that has `isService` set to `true` **at the time when the RTE is generated.**

This rule does **not** apply to `PortPrototypes` referenced by a `RoleBasedPortAssignment` where the attribute `role` is set to any of the following values:

- `NvMService`
- `NvMNotifyJobFinished`
- `NvMNotifyInitBlock`
- `NvMAdmin`
- `NvMMirror`
- `NvDataPort`

Furthermore, the rule does **not** apply to the case described in [TPS\_SWCT\_01579], [TPS\_SWCT\_01831], [TPS\_SWCT\_01580], and [TPS\_SWCT\_01572].

]()

**[constr\_2028] `staticMemory` is restricted to single instantiation** [The `staticMemory` is only supported if the attribute `supportsMultipleInstantiation` of the owning `SwcInternalBehavior` is set to `false` **at the time when the RTE is generated**

]()

**[constr\_2029] `shortName` of `constantMemory` and `staticMemory`** [The `shortName` of a `VariableDataPrototype` in role `staticMemory` or a `ParameterDataPrototype` in role `constantMemory` has to be equal with the 'C' identifier of the described variable or constant.

]()

**[constr\_2030] `AsynchronousServerCallResultPoint` combined with `WaitPoint` shall belong to the same `RunnableEntity`** [A `WaitPoint` referencing a `AsynchronousServerCallReturnsEvent` as well as a `AsynchronousServerCallResultPoint` referenced by said `AsynchronousServerCallReturnsEvent` shall be aggregated by the same `RunnableEntity` **at the time when the contract phase generation is executed.**

]()

**[constr\_2031] Period of `TimingEvent` shall be greater than 0** [The value of the attribute `period` of `TimingEvent` shall be greater than 0 **at the time when the RTE is generated.**

]()

**[constr\_2033] Timeout of `DataSendCompletedEvent`** [The `timeout` value of a `WaitPoint` associated with a `DataSendCompletedEvent` shall have the same value as the corresponding value of `TransmissionAcknowledgementRequest.timeout` at the time when the RTE is generated.

]()

**[constr\_2034] `SwAddrMethod` referenced by `RunnableEntitys`, `BswCalledEntitys`, or `BswSchedulableEntitys`** [`RunnableEntitys`, `BswCalledEntitys`, and `BswSchedulableEntitys` shall not reference a `SwAddrMethod` which attribute `memoryAllocationKeywordPolicy` is set to `addrMethodShortNameAndAlignment` at the time when the RTE is generated.

]()

**[constr\_2035] `swImplPolicy` for `VariableDataPrototype` in `SenderReceiverInterface`** [The overriding value of attribute `swImplPolicy` of a `VariableDataPrototype` owned by a `SenderReceiverInterface` shall be either `standard`, `queued`, or `measurementPoint`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2036] `swImplPolicy` for `VariableDataPrototype` in `NvDataInterface`** [The overriding value of attribute `swImplPolicy` of a `VariableDataPrototype` owned by a `NvDataInterface` shall be `standard`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2037] `swImplPolicy` for `VariableDataPrototype` in the role `ramBlock`** [The overriding value of attribute `swImplPolicy` of a `VariableDataPrototype` aggregated in the role `NvBlockDescriptor.ramBlock` shall be `standard`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2038] `swImplPolicy` for `VariableDataPrototype` in the role `implicitInterRunnableVariable`** [The overriding value of attribute `swImplPolicy` of a `VariableDataPrototype` aggregated in the role `SwcInternalBehavior.implicitInterRunnableVariable` shall be `standard`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2039] `swImplPolicy` for `VariableDataPrototype` in the role `explicitInterRunnableVariable`** [The overriding value of attribute `swImplPolicy` of a `VariableDataPrototype` aggregated in the role `SwcInternalBehavior.explicitInterRunnableVariable` shall be `standard`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2040] `swImplPolicy` for `VariableDataPrototype` in the role `arTypedPerInstanceMemory`** [The overriding value of attribute `swImplPolicy` of a `VariableDataPrototype` aggregated in the role `SwcInternalBehavior.arTypedPerInstanceMemory` shall be `standard` or `measurementPoint`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2041] `swImplPolicy` for `VariableDataPrototype` in the role `staticMemory`** [The overriding value of attribute `swImplPolicy` of a `VariableDataPrototype` aggregated in the role `InternalBehavior.staticMemory` shall be `standard` or `measurementPoint`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2042] `swImplPolicy` for `ParameterDataPrototype` in `ParameterInterface`** [The overriding value of attribute `swImplPolicy` of a `ParameterDataPrototype` owned by a `ParameterInterface` shall be either `standard`, `const`, or `fixed`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2043] `swImplPolicy` for `ParameterDataPrototype` in the role `romBlock`** [The overriding value of attribute `swImplPolicy` of a `ParameterDataPrototype` aggregated in the role `NvBlockDescriptor.romBlock` shall be `standard`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2044] `swImplPolicy` for `ParameterDataPrototype` in the role `sharedParameter`** [The overriding value of attribute `swImplPolicy` of a `ParameterDataPrototype` aggregated in the role `SwcInternalBehavior.sharedParameter` shall be `standard` or `const`.



This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2045] *swImplPolicy* for *ParameterDataPrototype* in the role *perInstanceParameter*** [The overriding value of attribute *swImplPolicy* of a *ParameterDataPrototype* in the role *SwcInternalBehavior.perInstanceParameter* shall be *standard* or *const*.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2046] *swImplPolicy* for *ParameterDataPrototype* in the role *constantMemory*** [The overriding value of attribute *swImplPolicy* of a *ParameterDataPrototype* aggregated in the role *InternalBehavior.constantMemory* shall be *standard*, *const*, or *fixed*.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2047] *swImplPolicy* for *ArgumentDataPrototype*** [The overriding value of attribute *swImplPolicy* of an *ArgumentDataPrototype* shall be *standard*.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2048] *swImplPolicy* for *SwServiceArg*** [The overriding value of attribute *swImplPolicy* of a *SwServiceArg* shall be *standard* or *const*.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2049] Different *ModeDeclarationGroups* shall have different *shortNames*.** [A software component is not allowed to type multiple *PortPrototypes* with *ModeSwitchInterfaces* where the contained *ModeDeclarationGroupPrototypes* are referencing *ModeDeclarationGroups* with identical *shortNames* but different *ModeDeclarations*.

at the time when the contract phase generation is executed

]()

**[constr\_2050] Mandatory information of a *SwAxisCont*** [If the attribute *swAxisCont* is defined for an *ApplicationValueSpecification* the *SwAxisCont* shall define one *swAxisIndex* value and one *swArraysize* value per dimension, even

in the case when the owning [ApplicationValueSpecification](#) defines only the content of a single dimensional object like a CURVE.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2051] Mandatory information of a [SwValueCont](#)** [If the attribute [swValueCont](#) is defined for an [ApplicationValueSpecification](#) the [SwValueCont](#) shall always define the attribute [swArraysize](#) if the [ApplicationValueSpecification](#) is of category CURVE, MAP, CUBOID, CUBE\_4, CUBE\_5, COM\_AXIS, RES\_AXIS, or VAL\_BLK.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2052] Values of [swArraysize](#) and the number of values provided by [swValuesPhys](#) shall be consistent.** [[swValuesPhys](#) shall define as many values as the attribute [swArraysize](#) (if this attribute exists) defines.

In other words, in the bound model the number of descendants ([v](#), or [vf](#), or [vt](#), or [vtf](#)) shall be identical to the number of elements of the related [DataPrototype](#) typed by an [ApplicationPrimitiveDataType](#).

If several [swArraysize](#) values are provided, the values have to be multiplied in order to get the total number of [swValuesPhys](#) values.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2053] Consistency between [role](#) IUMPRNumerator and [ObdRatioServiceNeeds.connectionType](#)** [If a [SwcServiceDependency](#) with a [ObdRatioServiceNeeds](#) is defined and the attribute [connectionType](#) of the contained [ObdRatioServiceNeeds](#) is set to [ObdRatioConnectionKindEnum.apiUse](#), a [RoleBasedPortAssignment](#) with the [role](#) value IUMPRNumerator shall be defined.

If the attribute [connectionType](#) of the contained [ObdRatioServiceNeeds](#) is set to [ObdRatioConnectionKindEnum.observer](#), the [role](#) value IUMPRNumerator is not applicable.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_2054] Valid targets of [rptSystem](#)** [The [System](#) referenced in the role [rptSystem](#) shall be of category RPT\_SYSTEM.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_2055] Valid targets of `byPassPoint` and `rptHook` reference** [Depending on the `category` value, the targets of `byPassPoint` and `rptHook` references are restricted according table 2.26.

This rule shall be imposed at the time when the RTE is generated.

]()

Category	Meaning	Specific properties
SW_COMPONENT_PROTOTYPE	Adds one <code>SwComponentPrototype</code> to an Rapid Prototyping Scenario.	The <code>byPassPoint</code> and <code>rptArHook</code> shall reference a <code>SwComponentPrototypes</code> .
DATA_PROTOTYPE	Adds one instance of a <code>DataPrototype</code> to an Rapid Prototyping Scenario.	The <code>byPassPoint</code> and <code>rptArHook</code> shall reference a <code>DataPrototype</code> instances in <code>Port-Prototypes</code> .
RUNNABLE_ENTITY	Adds one <code>RunnableEntity</code> to an Rapid Prototyping Scenario.	The <code>byPassPoint</code> and <code>rptArHook</code> shall reference a <code>RunnableEntity</code> instances.
ACCESS_POINTS	Adds one <code>VariableAccess</code> , <code>ParameterAccess</code> , <code>ServerCallPoint</code> , <code>AsynchronousServerCallResultPoint</code> , <code>InternalTriggeringPoint</code> , <code>ModeSwitchPoint</code> , <code>ModeAccessPoint</code> or <code>ExternalTriggeringPoint</code> to a Rapid Prototyping Scenario.	The <code>byPassPoint</code> and <code>rptArHook</code> shall reference a <code>VariableAccess</code> , <code>ParameterAccess</code> , <code>ServerCallPoint</code> , <code>AsynchronousServerCallResultPoint</code> , <code>InternalTriggeringPoint</code> , <code>ModeSwitchPoint</code> , <code>ModeAccessPoint</code> or <code>ExternalTriggeringPoint</code> instances.

Table 2.26: Category of RptContainers

**[constr\_2056] Consistency of `RapidPrototypingScenario` with respect to `rptSystem` and `rptArHook` references** [Within one `RapidPrototypingScenario` all `rptSystem` references shall point to instances in one and only one `System`, and if existent, all `rptArHook` shall point to instances in one other and only one other `System`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_2057] Mandatory information of a `RuleBasedAxisCont`** [If the attribute `swAxisCont` is defined for an `ApplicationRuleBasedValueSpecification` the `RuleBasedAxisCont` shall define one `swAxisIndex` value and one `swArraysize` value per dimension, even in the case when the owning `ApplicationRuleBasedValueSpecification` defines only the content of a single dimensional object like a `CURVE`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2058] Mandatory information of a `RuleBasedValueCont`** [If the attribute `swValueCont` is defined for an `ApplicationRuleBasedValueSpecification` the `RuleBasedValueCont` shall always define the attribute `swArraysize` if the

`ApplicationRuleBasedValueSpecification` is of category `CURVE`, `MAP`, `CUBOID`, `CUBE_4`, `CUBE_5`, `COM_AXIS`, `RES_AXIS`, or `VAL_BLK`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2535] Target of an `autosarParameter` in `AutosarParameterRef` shall refer to a parameter** [Except for the specifically described cases where [\[constr\\_1173\]](#), applies the target of `autosarParameter` (which in fact is an instance ref) in `AutosarParameterRef` shall either be or be nested in `ParameterDataPrototype`. This means that the target shall either be a `ParameterDataPrototype` or an `ApplicationCompositeElementDataPrototype` that in turn is owned by a `ParameterDataPrototype`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2536] Target of an `autosarVariable` in `AutosarVariableRef` shall refer to a variable** [The target of `autosarVariable` (which in fact is an instance ref) in `AutosarVariableRef` shall either be or be nested in `VariableDataPrototype`. This means that the target shall either be a `VariableDataPrototype` or an `ApplicationCompositeElementDataPrototype` that in turn is owned by a `VariableDataPrototype`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2544] Limits need to be consistent** [

- The limits of `ApplicationDataType` shall be inside the definition range of the `CompuMethod`

The `CompuMethod` needs to be applicable for limits of an `ApplicationDataType`. The reason is that the internal representation of the limits for the `ApplicationDataType` are calculated by applying the `CompuMethod`.

- The such defined internal limits of the `ApplicationDataType` shall be within or equal the `internalConstrs` of the mapped `ImplementationDataType`.
- The limits of the `ImplementationDataType` shall be within or equal to the limits defined by the size of the `BaseType`.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2545] `invalidValue` shall fit in the specified ranges** [The `invalidValue` shall be in the range of the `ImplementationDataType` at the time when the contract phase generation is executed.

]()

**[constr\_2548] Data constraint of value axis shall match** [The values compliant to `SwDataDefProps.dataConstr` shall also be compliant to `SwDataDefProps.valueAxisDataType.swDataDefProps.dataConstr`.

In other words `SwDataDefProps.dataConstr` win over but are not allowed to relax `SwDataDefProps.valueAxisDataType.swDataDefProps.dataConstr` but are not allowed.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2549] Units of input axis shall be consistent** [The units specified in the context of an input axis shall be compatible, even if there is a precedence rule.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2550] Units of value axis shall be consistent** [The units specified in the context of value axis shall be the same, even if there is a precedence rule.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_2561] Application of `DataConstrRule.constrLevel`** [`DataConstrRule.constrLevel` is limited to

**0:** This represents so called “hard limits”. They shall always be specified.

**1:** This represents so called “soft limits”. Soft limits may be violated after confirmation by the user of an MCD-System.

This rule applies at any time in the workflow. Other values may exist, but the semantics is outside the AUTOSAR scope.

]()

**[constr\_4002] Unambiguous mapping of modes to data types** [Within one `DataTypeMappingSet`, a `ModeDeclarationGroup` shall not be mapped to different `ImplementationDataTypes` at the time when the contract phase generation is executed.

]()

**[constr\_4003] Semantics of `SwcModeSwitchEvent`** [If the value of `SwcModeSwitchEvent.activation` is `onTransition`, then `SwcModeSwitchEvent` shall refer to two different `ModeDeclarations` belonging to the same instance of `ModeDeclarationGroup`.

Their order defines the direction of the transition from one mode into another. In all other cases `SwcModeSwitchEvent` shall refer to exactly one `ModeDeclaration`.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_4004] Context of `SenderReceiverAnnotation`** [A `SenderReceiverAnnotation` shall only be aggregated by a `PortPrototype` typed by a `SenderReceiverInterface` at any time in the workflow.

]()

**[constr\_4005] Context of `ClientServerAnnotation`** [A `ClientServerAnnotation` shall only be aggregated by a `PortPrototype` typed by a `ClientServerInterface` at any time in the workflow.

]()

**[constr\_4006] Context of `ParameterPortAnnotation`** [A `ParameterPortAnnotation` shall only be aggregated by a `PPortPrototype` owned by a `ParameterSwComponentType` at any time in the workflow.

]()

**[constr\_4007] Context of `ModePortAnnotation`** [A `ModePortAnnotation` shall only be aggregated by a `PortPrototype` typed by a `ModeSwitchInterface` at any time in the workflow.

]()

**[constr\_4008] Context of `TriggerPortAnnotation`** [A `TriggerPortAnnotation` shall only be aggregated by a `PortPrototype` typed by a `TriggerInterface` at any time in the workflow.

]()

**[constr\_4009] Context of `NvDataPortAnnotation`** [An `NvDataPortAnnotation` shall only be aggregated by a `PortPrototype` typed by an `NvDataInterface` at any time in the workflow.

]()

**[constr\_4010] Context of `DelegatedPortAnnotation`** [A `DelegatedPortAnnotation` shall only be aggregated by a `PortPrototype` aggregated by a `CompositionSwComponentType`.

]()

**[constr\_4012] Timeout of ModeSwitchedAckEvent** [The timeout value of a `WaitPoint` associated with a `ModeSwitchedAckEvent` shall be equal to the corresponding `ModeSwitchedAckRequest.timeout` at the time when the RTE is generated.

]()

**[constr\_4082] RunnableEntity.reentrancyLevel shall not be set.** [The optional attribute `reentrancyLevel` shall not be set for a `RunnableEntity`. This attribute would define more specific reentrancy features than the mandatory attribute `canBeInvokedConcurrently`. These features are currently only supported for Basic Software.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_5234] Existence of attribute E2EProfileCompatibilityProps.transitToInvalidExtended** is mandatory for each `EndToEndTransformationComSpecProps` [For each `EndToEndTransformationComSpecProps`, a reference in the role `e2eProfileCompatibilityProps` to meta-class `E2EProfileCompatibilityProps` shall exist and the referenced `E2EProfileCompatibilityProps` shall define a value for the attribute `transitToInvalidExtended` at the time when the RTE is generated.

]()

**[constr\_10000] Existence of attribute RptExecutableEntityProperties.rptExecutionControl** [For each `RptExecutableEntityProperties`, attribute `rptExecutionControl` shall exist at the time when the RTE is generated.

]()

**[constr\_10001] Existence of attribute RptExecutableEntityProperties.rptServicePoint** [For each `RptExecutableEntityProperties`, attribute `rptServicePoint` shall exist at the time when the RTE is generated.

]()

**[constr\_10005] Existence of attribute NotAvailableValueSpecification.defaultPattern** [For each `NotAvailableValueSpecification`, attribute `defaultPattern` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_10006] Valid interval of attribute NotAvailableValueSpecification.defaultPattern** [The valid interval for attribute `NotAvailableValueSpecification.defaultPattern` at the time when the contract phase generation is executed is 0..255.



]()

**[constr\_10009] Aggregation of `ApplicationRuleBasedValueSpecification`** [Each `ArrayValueSpecification` shall only aggregate at most one `ApplicationRuleBasedValueSpecification` in the role element.

If one `ApplicationRuleBasedValueSpecification` is aggregated then it shall be the only aggregated element, i.e. no further `ValueSpecification` shall exist in the same aggregation where an `ApplicationRuleBasedValueSpecification` is aggregated.

This rule shall be imposed at the time when the contract phase generation is executed.

]()

**[constr\_10016] Applicability of `OsTaskExecutionEvent`** [An `OsTaskExecutionEvent` is only applicable for a `SwcInternalBehavior` in the context of a `ComplexDeviceDriverSwComponentType`, `EcuAbstractionSwComponentType`, or `ServiceSwComponentType` at any time in the workflow.

]()

**[constr\_10017] Existence of attribute `SwAxisCont.category`** [For each `SwAxisCont`, attribute `category` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_10018] Existence of attribute `SwAxisCont.swAxisIndex`** [For each `SwAxisCont`, attribute `swAxisIndex` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_10019] Existence of attribute `SwAxisCont.swValuesPhys`** [For each `SwAxisCont`, attribute `swValuesPhys` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_10020] Existence of attribute `RoleBasedDataTypeAssignment.usedImplementationDataType`** [For each `RoleBasedDataTypeAssignment`, attribute `usedImplementationDataType` shall exist at the time when the RTE is generated.

]()

**[constr\_10028] Existence of reference stereotyped `<<isOfType>>`** [Any reference that is decorated with the stereotype `<<isOfType>>` shall exist at any time in the workflow.

]()

**[constr\_10032] Restrictions for the usage of `ServiceDependency.diagnosticRelevance`** [The attribute `ServiceDependency.diagnosticRelevance` shall only be used for a `SwcServiceDependency` that aggregates a `BswMgrNeeds` at the time when the RTE is generated.

]()

**[constr\_10033] Existence of `MemorySection.swAddrmethod`** [For each `MemorySection`, attribute `swAddrmethod` shall exist at the time when the contract phase generation is executed.

]()

**[constr\_10034] Existence of `MemorySection.alignment`** [For each `MemorySection`, attribute `alignment` shall exist at the time when the contract phase generation is executed if the attribute `MemorySection.swAddrmethod.memoryAllocationKeywordPolicy` is set to `MemoryAllocationKeywordPolicyType.addrMethodShortNameAndAlignment`.

]()

**[constr\_10040] Value of `ApplicationValueSpecification.swAxisCont.category`** [The value of attribute `ApplicationValueSpecification.swAxisCont.category` shall not be set to `fixAXIS` at the time when the contract phase generation is executed.

]()

**[constr\_10041] Value of `ApplicationRuleBasedValueSpecification.swAxisCont.category`** [The value of `ApplicationValueSpecification.swAxisCont.category` shall not be set to `fixAXIS`

]()

**[constr\_10067] Creation of `AssemblySwConnector` for service communication** [If an `AssemblySwConnector` is created between two `PortPrototypes` and the affected `PortInterfaces` set the attribute `isService` to the value `true`, then at least one of the `SwComponentPrototypes` shall be typed by a `ServiceSwComponentType`. This constraint shall be imposed at the time when the RTE is generated.

]()

**[constr\_10068] Standardized values for `SectionInitializationPolicyType`** [The following values for `SectionInitializationPolicyType` are reserved by the AUTOSAR standard:

**INIT** To be used for (explicitly or not explicitly) initialized variables.

**CLEARED** To be used for (explicitly or not explicitly) initialized variables.

**POWER-ON-CLEARED** To be used for variables that are not explicitly initialized (cleared) during normal start-up. Instead these are cleared only after power on reset.

This rule shall be imposed at the time when the RTE is generated.

]()

**[constr\_10071]** Allowed multiplicities of **SenderComSpec** attributes for communication between **ApplicationSwComponentType** and **NvBlockSwComponentType** [The allowed multiplicities for **SenderComSpec** attributes for a communication between **ApplicationSwComponentType** and **NvBlockSwComponentType** are documented in Table 2.27.

This rule shall be imposed at the time when the RTE is generated.

]()

Sender	<b>ApplicationSwComponentType</b>	
Receiver	<b>NvBlockSwComponentType</b>	
Queuing Configuration	non-queued	queued
<b>SenderComSpec.transmissionAcknowledge</b>	d/c	n/a
<b>SenderComSpec.dataElement</b>	1	n/a
<b>SenderComSpec.handleOutOfRange</b>	d/c	n/a
<b>SenderComSpec.usesEndToEndProtection</b>	d/c	n/a
<b>SenderComSpec.transmissionProps.dataUpdatePeriod</b>	0..1	n/a
<b>SenderComSpec.transmissionProps.minimumSendInterval</b>	0..1	n/a
<b>SenderComSpec.transmissionProps.transmissionMode</b>	0..1	n/a
<b>SenderComSpec.networkRepresentation</b>	d/c	n/a
<b>SenderComSpec.compositeNetworkRepresentation</b>	d/c	n/a
<b>NonqueuedSenderComSpec.dataFilter</b>	d/c	n/a
<b>NonqueuedSenderComSpec.initValue</b>	0..1	n/a

**Table 2.27:** Allowed multiplicities of **SenderComSpec** attributes for communication between **ApplicationSwComponentType** and **NvBlockSwComponentType**

**[constr\_10072]** Allowed multiplicities of **SenderComSpec** attributes for communication between **NvBlockSwComponentType** and **ApplicationSwComponentType** [The allowed multiplicities for **SenderComSpec** attributes for a communication between **NvBlockSwComponentType** and **ApplicationSwComponentType** are documented in Table 2.28.

This rule shall be imposed at the time when the RTE is generated.

]()

Sender	NvBlockSwComponentType	
Receiver	ApplicationSwComponentType	
Queuing Configuration	non-queued	queued
ReceiverComSpec.replaceWith	0	n/a
ReceiverComSpec.dataElement	1	n/a
ReceiverComSpec.receptionProps.dataUpdatePeriod	0	n/a
ReceiverComSpec.receptionProps.timeout	0	n/a
ReceiverComSpec.usesEndToEndProtection	0	n/a
ReceiverComSpec.maxDeltaCounterInit	0	n/a
ReceiverComSpec.handleOutOfRange	0	n/a
ReceiverComSpec.handleOutOfRangeStatus	0	n/a
ReceiverComSpec.maxNoNewOrRepeatedData	0	n/a
ReceiverComSpec.syncCounterInit	0	n/a
ReceiverComSpec.transformationComSpecProps	0	n/a
ReceiverComSpec.networkRepresentation	0	n/a
ReceiverComSpec.compositeNetworkRepresentation	0	n/a
QueuedReceiverComSpec.queueLength	n/a	n/a
NonqueuedReceiverComSpec.filter	0	n/a
NonqueuedReceiverComSpec.timeoutSubstitutionValue	0	n/a
NonqueuedReceiverComSpec.initValue	0..1	n/a
NonqueuedReceiverComSpec.aliveTimeout	0	n/a
NonqueuedReceiverComSpec.enableUpdate	0	n/a
NonqueuedReceiverComSpec.handleDataStatus	0	n/a
NonqueuedReceiverComSpec.handleNeverReceived	0..1	n/a
NonqueuedReceiverComSpec.handleTimeoutType	0	n/a

**Table 2.28: Allowed multiplicities of `ReceiverComSpec` attributes for communication between `NvBlockSwComponentType` and `ApplicationSwComponentType`**

**[constr\_10073] Existence of `DataReceiveErrorEvent`** [A `DataReceiveErrorEvent` shall only exist if it latest at the time when the contract phase generation is executed refers to a given `VariableDataPrototype` in the role `data` where either

- the `VariableDataPrototype` is referenced from a `NonqueuedReceiverComSpec` in the role `dataElement` and the attribute `aliveTimeout` of the `NonqueuedReceiverComSpec` exists and is set to a value  $> 0$  or
- the `VariableDataPrototype` is aggregated by a `SenderReceiverInterface` where attribute `invalidationPolicy.handleInvalid` exists and is set to the value `keep`.

]()

**[constr\_10074] Consistency of attribute `NvBlockDescriptor.writingStrategy.role` set to `storeOnChange`** [The existence of `NvBlockDescriptor.writingStrategy` where attribute `role` is set to `storeOnChange` is only supported if `NvBlockDescriptor.nvBlockNeeds.storeOnChange` exists and is set to `True` at the time when the RTE is generated.

]()

**[constr\_10075] Existence of `CompositeRuleBasedValueSpecification.argument` vs. `compoundPrimitiveArgument`** [For every `CompositeRuleBasedValueSpecification`, at most one of the aggregations

- `argument`
- `compoundPrimitiveArgument`

shall exist at the time when the contract phase generation is executed.

]()

**[constr\_10087] Restriction for the existence of a `SubElementMapping`** [The existence of a `DataPrototypeMapping.subElementMapping` is only supported if the `PortPrototypes` that are referenced by the respective `SwConnector` are typed by a `DataInterface` at the time when the RTE is generated.

]()

## 2.8 TPS\_StandardizationTemplate

**[constr\_2500] `PortInterfaces` shall be of same kind** [Both objects (`PortInterfaces`) referenced by a blueprint mapping for port interfaces (represented by `BlueprintMapping`) shall be of the same kind (e.g. both shall be `SenderReceiverInterfaces`). In other words both interfaces shall be instances of the same meta class.

]()

**[constr\_2526] `PortInterface` need to be compatible to the blueprints** [`PortInterface` shall be compatible to their respective blueprints according to the compatibility rules.

]()

**[constr\_2527] Blueprints shall live in package of a proper category** [As explained in detail in the [10], model artifacts (in this case `PortPrototypeBlueprint` and incompletely specified `PortInterfaces`) created for the purpose of becoming blueprints shall reside in an `ARPackage` of category `BLUEPRINT`.

]()

**[constr\_2528] `PortPrototypes` shall not refer to blueprints of a `PortInterface`** [A port `PortPrototype` shall not reference a `PortInterface` which lives in a package of category `BLUEPRINT`.

]()

**[constr\_2529] PortPrototypeBlueprints and derived PortPrototypes shall reference proper PortInterfaces** [A `PortPrototypeBlueprint` may reference a blueprint of `PortInterface`. According to [constr\_2570], a system description shall not contain blueprints. Therefore the reference to the `PortInterface` may need to be rewritten when a `PortPrototype` is derived from the blueprint.

In this case the `PortInterface` referenced by the derived `PortPrototype` shall be compatible to the `PortInterface` (which is a blueprint) referenced by the `PortPrototypeBlueprint`.

According to [constr\_2526] this can be ensured if the `PortInterface` referenced by the `PortPrototypeBlueprint` is the blueprint of the `PortInterface` referenced by the respective `PortPrototype`.

]()

**[constr\_2540] Tagged text category** [The `category` of `TraceableText` shall be one of

**ADVISORY\_ITEM** The text represents a particular advisory. Such an item is applicable primarily in template specifications. It is similar to a constraint item but represents the characteristic of a WARNING rather than an ERROR.

**CONSTRAINT\_ITEM** The text represents a particular constraint. Such an item is applicable primarily in template specifications. It is similar to a specification item but represents issues that may be validated automatically e.g. by a tool.

**IMPLEMENTATION\_ITEM** The text represents a short description of an implementation. It is applicable primarily within the `introduction` of a model element.

**REQUIREMENT\_ITEM** The text represents a particular requirement. Such an item is applicable primarily in requirement specifications.

**SAFETY\_\*** The text represents the type of safety requirements. The allowed values (\*) are defined in [TPS\_SAFEX\_00102] in [11].

**SPECIFICATION\_ITEM** The text represents a particular item in the specification. Such an item is a requirement for the implementation of the software specification.

**SRC** The text represents the source code content.

**TEST\_ITEM** The text represents a short description of a test. Such an item is applicable primarily in test specifications.

]()

**[constr\_2546] References in derived model elements** [Model elements derived from blueprints shall never refer to model elements that are blueprints.

]()

**[constr\_2553] `shortName` shall follow the pattern defined in the Blueprint** [The `shortName` respectively `symbol` of the derived objects shall follow the pattern defined in `namePattern` or `blueprintValue` of the blueprint according to [TPS\_STDT\_00086]

]()

**[constr\_2554] Derived objects shall match the blueprints** [Unless specified explicitly otherwise, the attributes of the blueprint shall appear in the derived objects. As an exception `namePattern` and `blueprintValue` may **not** be copied.

]()

**[constr\_2556] No Blueprint Motivated `VariationPoints` in AUTOSAR Descriptions** [AUTOSAR descriptions which are not blueprints shall not have `blueprintCondition`, `formalBlueprintGenerator` nor `blueprintValue`.

]()

**[constr\_2563] `BswModuleDescription` blueprints should not have a `BswInternalBehavior`** [A `BswModuleDescription` blueprint should not have a `BswInternalBehavior` since this is a matter of implementation and not subject to standardization. Exceptions might exist in vendor internal applications.

]()

**[constr\_2564] `VariationPoint` in Blueprints of `PackageableElement`** [To support standardization, constraint [constr\_2537] in [10] is relaxed for blueprints. This means in particular, that all `PackageableElements` which inherit from `AtpBlueprint` and live in a package of category BLUEPRINT may have a `VariationPoint`. In this case `vh.latestBindingTime` is considered as `blueprintDerivationTime` even if the meta model still states `systemDesignTime` for `PackageableElement`.

]()

**[constr\_2565] Trace shall not be nested** [Due to the intended atomicity of requirements respectively specification items, `Traceable` shall not be nested.

]()

**[constr\_2566] Blueprintmapping shall map appropriate elements** [`BlueprintMapping` shall map elements which represent a valid pair of blueprint / derived object. In most of the cases this means that `blueprint` and `derivedObject` shall refer to objects of the same meta-class.

]()

**[constr\_2568] `SwComponentTypes` shall be of same kind** [Both objects (`SwComponentTypes`) referenced by a blueprint mapping for port interfaces (represented by `BlueprintMapping`) shall be of the same kind (e.g. both shall be `AtomicSwCom`



ponentTypes). In other words both components shall be instances of the same meta class.

]()

**[constr\_2569] Purely Blueprint Motivated VariationPoints** [VariationPoints with `vh.latestBindingTime` set to `blueprintDerivationTime` shall have only `blueprintCondition` or `formalBlueprintGenerator` respectively `blueprintValue`.

]()

**[constr\_2570] No Blueprints in system descriptions** [There shall be no blueprints in system descriptions. In consequence of this blueprint elements shall be referenced only from blueprints and `AtpBlueprintMappings`. Due to `«atpUriDef»`, the references from `AtpBlueprintMapping` do not need to be resolved in system descriptions.

]()

**[constr\_2571] Outgoing references from Blueprints** [Note that outgoing references from Blueprints are basically not limited. Practically, references to objects living in a package of category EXAMPLE should not occur.

]()

**[constr\_2589] In VFB Timing Blueprint TDEventVfbPort shall reference Port-PrototypeBlueprint** [In a VFB Timing Blueprint `TDEventVfbPort` shall reference `PortPrototypeBlueprint`. In other words, a VFB Timing Description Event specified in a VFB Timing Blueprint shall always reference a Port Prototype Blueprint.

]()

**[constr\_2590] One BlueprintPolicy is allowed** [For each attribute of a blueprint, at most one `BlueprintPolicy` is allowed.

]()

**[constr\_2591] BlueprintPolicyNotModifiable** [If `BlueprintPolicyNotModifiable` is assigned to an attribute, then during blueprinting it is not allowed to modify the value of the attribute and all its contained content.

]()

**[constr\_2592] No BlueprintPolicy** [If no `BlueprintPolicy` is assigned to an attribute, then arbitrary modifications are allowed while deriving from the blueprint.

]()

**[constr\_2593] Expression for identifying the attribute a BlueprintPolicy relates to** [The expression language for identifying the related attribute of a `BlueprintPolicy` is a subset version of xpath, see [12]. For navigation over the model we use the names as they are used in XML.

]()

**[constr\_2597] ClientServerOperationBlueprintMapping constraints number of arguments** [The number of arguments of the `BswModuleEntry` referenced by a `bswModuleEntry` shall be identical to the number of `portDefinedArgumentBlueprints` of the owning `ClientServerInterfaceToBswModuleEntryBlueprintMapping` plus the number of `ArgumentDataPrototypes` aggregated in the role argument of the `clientServerOperation`

]()

**[constr\_2598] ClientServerOperationBlueprintMapping constraints the types of arguments** [The arguments in the ordered lists `bswModuleEntry` and the matching arguments in the set union of the ordered lists `portDefinedArgumentBlueprint` plus `clientServerOperation` shall result in the identical C data type definitions.

]()

**[constr\_2603] Use of "applies to" in context of the specification level** [On specification level 1 and 2 only the requirements table including the `appliesTo` attribute shall be used. On the specification levels 3 and 4 only the requirements table without the `appliesTo` attribute shall be used. Exception: Documents of the foundation which are handled on specification level 3.

]()

**[constr\_2604] Allowed uptraces in context of "applies to" values** [Traces to documents of upper specification levels shall be conform to the values assigned to `appliesTo`.

]()

**[constr\_2608] Custom extensions shall be part of the Documentation that is referenced by the Baseline** [If a `SpecElementReference` references a custom defined specification element, then this specification element shall be part of a `Documentation` that is referenced by the `Baseline` of this `Profile`.

]()

**[constr\_2609] Single revision per AUTOSAR standard** [The `standardRevision` may only contain a single revision per AUTOSAR standard. E.g. it is allowed to combine the AUTOSAR standards "Foundation" in revision 1.0.0 with the "Classic Platform" in revision 4.3.0. However, it is not allowed to reference the revisions 4.2.2 and 4.3.0 of the "Classic Platform" in the same `Baseline`.

]()

**[constr\_2610] No alternativeName if matching via shortName** [The `alternativeName` shall not be set if the referenced AUTOSAR Specification Element matches the rules of `Identifier`.

]()

**[constr\_2611] Referenced AUTOSAR Specification Elements shall be part of the AUTOSAR Specification Baseline** [If the `SpecElementReference` references an AUTOSAR specification element then the `shortName` or `alternativeName` shall match the name of the AUTOSAR specification element in a specification that is part of the revision of the standard that is specified in `Baseline`.

]()

**[constr\_2612] `shortName` of `ConcreteClassTailoring` shall match the name of an AUTOSAR specified concrete meta-class** [`shortName` of `ConcreteClassTailoring` shall match the name of an AUTOSAR specified concrete meta-class).

]()

**[constr\_2613] `shortName` of `AbstractClassTailoring` shall match the name of an AUTOSAR specified abstract meta-class** [`shortName` of `AbstractClassTailoring` shall match the name of an AUTOSAR specified abstract meta-class).

]()

**[constr\_2614] `PrimitiveAttributeCondition.attribute` shall reference invariant owned `PrimitiveAttributeTailoring`, only** [The following conditions need to evaluate to true for `PrimitiveAttributeCondition.attribute`:

- The referenced `PrimitiveAttributeTailoring` is owned by an `ClassContentConditional` that has no `condition` (invariant class content) **AND**
- The `ClassContentConditional` that owns the referenced `PrimitiveAttributeTailoring` and the `ClassContentConditional` that owns this `PrimitiveAttributeCondition` are owned by the same `ClassTailoring`.

]()

**[constr\_2615] `AggregationCondition.aggregation` shall reference invariant owned `AggregationTailoring`, only** [The following conditions need to evaluate to true for `AggregationCondition.aggregation`:

- The referenced `AggregationTailoring` is owned by an `ClassContentConditional` that has no `condition` (invariant class content) **AND**
- The `ClassContentConditional` that owns the referenced `AggregationTailoring` and the `ClassContentConditional` that owns this `AggregationCondition` are owned by the same `ClassTailoring`.

]()

**[constr\_2616] `ReferenceCondition.reference` shall reference invariant owned `ReferenceTailoring`, only** [The following conditions need to evaluate to true for `ReferenceCondition.reference`:

- The referenced [ReferenceTailoring](#) is owned by an [ClassContentConditional](#) that has no [condition](#) (invariant class content) **AND**
- The [ClassContentConditional](#) that owns the referenced [ReferenceTailoring](#) and the [ClassContentConditional](#) that owns this [ReferenceConditional](#) are owned by the same [ClassTailoring](#).

}|()

**[constr\_2617] [ClassTailoring.variationRestriction](#) only applicable for <<atpVariation>> classes** [If the tailored meta class is not marked with stereotype <<atpVariation>> then [ClassTailoring.variationRestriction](#) shall not be defined.

}|()

**[constr\_2618] ShortName of AttributeTailoring shall match owned or inherited attributes** [The [shortName](#) shall match the name of an attribute that is owned or inherited by the AUTOSAR meta-class which is identified by the [ClassTailoring](#) that owns this [AttributeTailoring](#).

}|()

**[constr\_2619] No [AttributeTailoring](#) for Derived or Abstract Attributes** [No [AttributeTailorings](#) are allowed for [Attributes](#) that are marked with stereotypes <<atpDerived>> or <<atpAbstract>>.

}|()

**[constr\_2620] [shortName](#) of [PrimitiveAttributeTailoring](#) shall be a primitive attribute in the referenced Baseline** [The [shortName](#) of [PrimitiveAttributeTailoring](#) shall match the name of an AUTOSAR specified primitive attribute of the Meta-Class in the referenced Baseline.

}|()

**[constr\_2621] The [shortName](#) of [AggregationTailoring](#) shall match the name of an AUTOSAR specified aggregation of the meta-class** [The [shortName](#) of [AggregationTailoring](#) shall match the name of an AUTOSAR specified aggregation of the meta-class).

}|()

**[constr\_2622] The [shortName](#) of [ReferenceTailoring](#) shall match the name of an AUTOSAR specified reference of the meta-class** [The [shortName](#) of [ReferenceTailoring](#) shall match the name of an AUTOSAR specified reference of the meta-class).

}|()

**[constr\_2623] Referenced [SdgClass](#) shall be part of a [SdgDef](#) that is referenced by the [Baseline](#)** [Referenced [SdgClass](#) shall be part of a [SdgDef](#) that is referenced by the [Baseline](#) of this Profile of Data Exchange Point.

]()

**[constr\_2624] [AttributeTailoring.variationRestriction](#) only applicable for <<atpVariation>> attributes** [If the tailored attribute is not marked with stereotype <<atpVariation>> then [AttributeTailoring.variationRestriction](#) shall not be defined.

]()

**[constr\_2625] Allowed uptraces wrt. life cycles** [Table 2.29 defines the allowed combinations of uptraces with respect to life cycle states [TPS\_STDT\_00064].

]()

Trace from	Trace to			
	draft	valid	obsolete	removed
draft	1	1	0	0
valid	0	1	0	0
obsolete	1	1	1	0
removed	1	1	1	1

**Table 2.29: Matrix of allowed uptraces wrt. life cycles**

## 2.9 TPS\_SystemTemplate

**[constr\_1001] Value of [dataId](#) shall be unique** [The value of the [dataId](#) shall be unique within the scope of the [System](#).

]()

**[constr\_1002] End-to-end protection does not support n:1 communication** [As the n:1 communication scenario implies that probably not all senders use the same [dataId](#) this scenario is explicitly not supported.

]()

**[constr\_1198] [TriggerToSignalMapping.systemSignals](#) eligible for a [TriggerToSignalMapping](#) in case no [DataTransformation](#) is used** [The [ISignal](#) that is referenced by a [SystemSignal](#) that in turn is referenced by a [TriggerToSignalMapping](#) in the role [systemSignal](#) shall have the length attribute set to 0 if the [ISignal](#) does not reference a [DataTransformation](#) in the role [dataTransformation](#).

]()

**[constr\_1199] [ISignals](#) relating to [systemSignals](#) eligible for a [TriggerToSignalMapping](#) shall use update bit in case no [DataTransformation](#) is used** [An [ISignal](#)

- that is used to reference a [systemSignal](#) that in turn is referenced by a [TriggerToSignalMapping](#) and

- does not reference a `DataTransformation` in the role `dataTransformation`

shall be referenced by an `ISignalToIPduMapping` where the attribute `updateIndicationBitPosition` is defined.

]()

**[constr\_1265] `DoIpGidSynchronizationNeeds` can only exist once per `ECU_EXTRACT`** [Within the context of one `System` of `category` `ECU_EXTRACT`, there can only be at most one `DoIpGidSynchronizationNeeds`.

]()

**[constr\_1266] `DoIpGidNeeds` can only exist once per `ECU_EXTRACT`** [Within the context of one `System` of `category` `ECU_EXTRACT`, there can only be at most one `DoIpGidNeeds`.

]()

**[constr\_1267] `DoIpActivationLineNeeds` can only exist once per `ECU_EXTRACT`** [Within the context of one `System` of `category` `ECU_EXTRACT`, there can only be at most one `DoIpActivationLineNeeds`.

]()

**[constr\_1367] `periodicResponseUdt.periodicResponseUdt` shall only refer to a `DcmIPdu`** [If the role `periodicResponseUdt` exists then every `PduTriggering` referenced in the role `periodicResponseUdt` shall only refer to a `DcmIPdu`.

]()

**[constr\_1368] Limitation of the target of references from `DiagnosticConnection`** [`DiagnosticConnection` shall only reference (via the indirection created by `TpConnectionIdent`) the following sub-classes of the meta-class `TpConnection`:

- `CanTpConnection`
- `FlexrayTpConnection`
- `FlexrayArTpConnection`
- `DoIpTpConnection`

]()

**[constr\_1369] `CommunicationConnectors` shall be attached to the same `CommunicationCluster`** [All `CommunicationConnectors` referenced from `GlobalTimeMaster` and `GlobalTimeSlaves` aggregated in one `GlobalTimeDomain` shall be referenced in the role `commConnector` by the same `PhysicalChannel` aggregated by the same `CommunicationCluster`.

]()

**[constr\_1370] Consistency of `GlobalTimeDomain`** [The `GlobalTimeSlave` referenced in the role `GlobalTimeGateway.slave` and the `GlobalTimeMaster` referenced in the role `GlobalTimeGateway.master` shall **not** be aggregated by the same `GlobalTimeDomain`.

]()

**[constr\_1371] Consistency of attribute `host`** [Within the context of an aggregating `GlobalTimeDomain`, the `CommunicationConnectors` referenced in the role `GlobalTimeGateway.master.communicationConnector` and `GlobalTimeGateway.slave.communicationConnector` shall be aggregated by the same `EcuInstance` that is referenced in the role `GlobalTimeGateway.host`.

]()

**[constr\_1372] Consistency of attribute `pduTriggering`** [Within the context of an aggregating `GlobalTimeDomain`, the `pduTriggering` shall be owned by `PhysicalChannel` that is also referencing the `CommunicationConnectors` referenced in the roles `GlobalTimeSlave.communicationConnector` and `GlobalTimeMaster.communicationConnector`.

]()

**[constr\_1373] `GlobalTimeMaster` with attribute `isSystemWideGlobalTimeMaster` set to `TRUE`** [`GlobalTimeMaster` with attribute `isSystemWideGlobalTimeMaster` set to `TRUE` shall not be referenced in the role `GlobalTimeGateway.master`.

]()

**[constr\_1374] Only fan-out possible for `GlobalTimeGateway`** [For all `GlobalTimeGateways` that refer to the same `EcuInstance` the condition applies that no two `GlobalTimeGateways` shall refer to the same `GlobalTimeMaster`.

]()

**[constr\_1387] Transmission of Variable-Size Array Data Types by means of a Transformer** [If a Transformer is used for the transmission of a Variable-Size Array Data Types then the Variable-Size Array Data Type shall be a “new-world” variable-size array data type according to [TPS\_SWCT\_01644] and [TPS\_SWCT\_01645]. “Old-world” dynamic-size array data types according to [TPS\_SWCT\_01642] and [TPS\_SWCT\_01643] are not supported.

]()

**[constr\_1441] In AUTOSAR, the transmission of union data types over the network is only supported by the SOME/IP Transformer** [If an `ImplementationDataType` according to [TPS\_SWCT\_01700], i.e. of `category` `STRUCT` that encloses an `ImplementationDataTypeElement` of `category` `UNION`, is used to directly or (via a `DataTypeMap`) indirectly type an `AutosarDataPrototype` and the latter is mapped to a `SystemSignal` then the `ISignal` that references that `SystemSignal`



shall aggregate `SOMEIPTransformationISignalProps` in the role `transformationISignalProps`.

]()

**[constr\_1463] Applicable values for `J1939Cluster.networkId`** [The values of the attribute `J1939Cluster.networkId` shall always be within the interval 1..4.

]()

**[constr\_1641] Consistent assignment of TLV data ids to `ApplicationRecordDataType`** [For every `ApplicationRecordDataType` where direct members set the attribute `ApplicationRecordElement.isOptional` to the value `True` references to all direct members of this `ApplicationRecordDataType` shall be created on the basis of the definition of `TlvDataIdDefinition`.

]()

**[constr\_1642] Consistent assignment of TLV data ids to `ImplementationDataType` or `ImplementationDataTypeElement`** [For every `ImplementationDataType` or `ImplementationDataTypeElement` of category `STRUCTURE` where direct members set the attribute `ImplementationDataTypeElement.isOptional` to the value `True` references to all direct members of this `ImplementationDataType` resp `ImplementationDataTypeElement` shall be created on the basis of the definition of `TlvDataIdDefinition`.

]()

**[constr\_1643] Completeness of the existence of a set of `TlvDataIdDefinition.tlvArguments`** [If the reference `TlvDataIdDefinition.tlvArguments` exists for one `argument` of a given `ClientServerOperation` then further `TlvDataIdDefinition.tlvArguments` shall exist for all `arguments` of the given `ClientServerOperation` and all affected `TlvDataIdDefinitions` shall be referenced by the same `SOMEIPTransformationISignalProps` via `TlvDataIdDefinitionSet`.

]()

**[constr\_1644] Completeness of the existence of a set of `TlvDataIdDefinition.tlvRecordElements`** [If the reference `TlvDataIdDefinition.tlvRecordElement` exists for one element of a given `ApplicationRecordDataType` then further `TlvDataIdDefinition.tlvRecordElement` shall exist for all elements of the given `ApplicationRecordDataType` and all affected `TlvDataIdDefinitions` shall be referenced by the same `SOMEIPTransformationISignalProps` via `TlvDataIdDefinitionSet`.

]()

**[constr\_1645] Completeness of the existence of a set of `TlvDataIdDefinition.tlvImplementationDataTypeElements`** [Completeness of the existence of a set of `TlvDataIdDefinition.tlvImplementationDataTypeElements` If the reference `TlvDataIdDefinition.tlvImplementationDataTypeElement` exists for one `subElement` of a given `ImplementationDataType` or `Implementation-`

`DataTypeElement` then further `TlvDataIdDefinition.tlvImplementation-DataTypeElement` shall exist for all `subElements` of the given `Implementation-DataType` or `ImplementationDataTypeElement` and all affected `TlvDataId-Definitions` shall be referenced by the same `SOMEIPTransformationISignal-Props` via `TlvDataIdDefinitionSet`.

]()

**[constr\_1646] Scope of the uniqueness of the value of `TlvDataIdDefinition.id` for references to `ArgumentDataPrototype`** [For all `TlvDataIdDefinition` that are referencing `ArgumentDataPrototypes` of a given `ClientServerOperation` in the role `tlvArgument` the attribute `TlvDataIdDefinition.id` shall exist and have a unique value in the context of respective `arguments` of the enclosing `ClientServerOperation` where attribute `direction` is set to the value `in/inout` or `out/inout`.

Note: an `argument` where attribute `direction` is set to the value `in` may have the same data id as an `argument` where attribute `direction` is set to the value `out` since the two are transferred in separate messages.

]()

**[constr\_1647] Scope of the uniqueness of the value of `TlvDataIdDefinition.id` for references to `ApplicationRecordElement`** [For all `TlvDataIdDefinition` that are referencing `ApplicationRecordElements` of a given `ApplicationDataType` in the role `tlvRecordElement` the attribute `TlvDataIdDefinition.id` shall exist and have a unique value in the context of respective enclosing `ApplicationRecordDataType`.

]()

**[constr\_1648] Scope of the uniqueness of the value of `TlvDataIdDefinition.id` for references to `ImplementationDataTypeElement`** [For all `TlvDataIdDefinition` that are referencing `ImplementationDataTypeElements` of a given `ImplementationDataType/ImplementationDataTypeElement` in the role `tlvImplementationDataTypeElement` the attribute `TlvDataIdDefinition.id` shall exist and have a unique value in the context of respective enclosing `ImplementationDataType` or `ImplementationDataTypeElement`.

]()

**[constr\_1649] `TlvDataIdDefinition` referencing `ArgumentDataPrototype`** [Each `ArgumentDataPrototype` shall be referenced at most once in the role `tlvArgument` in the context of the same `SOMEIPTransformationISignalProps`.

]()

**[constr\_1650] `TlvDataIdDefinition` referencing `ApplicationRecordElement`** [Each `ApplicationRecordElement` shall be referenced at most once in

the role `tlvRecordElement` in the context of the same `SOMEIPTransformationISignalProps`.

]()

**[constr\_1651] TlvDataIdDefinition referencing ImplementationDataTypeElement** [Each `ImplementationDataTypeElement` shall be referenced at most once in the role `tlvImplementationDataTypeElement` in the context of the same `SOMEIPTransformationISignalProps`.

]()

**[constr\_1652] Definition of static length fields sizes in case of TLV usage** [If `TlvDataIdDefinitions` are defined for a `SOMEIPTransformationISignalProps`, the attributes `sizeOfArrayLengthFields`, `sizeOfStructLengthFields`, `sizeOfStringLengthFields` and `sizeOfUnionLengthFields` shall be greater than 0.

]()

**[constr\_1653] Identical values for length fields sizes in case of TLV usage** [If `TlvDataIdDefinitions` are defined for a `SOMEIPTransformationISignalProps`, the attributes `sizeOfArrayLengthFields`, `sizeOfStructLengthFields`, `sizeOfStringLengthFields` and `sizeOfUnionLengthFields` shall have an identical value.

]()

**[constr\_1654] No definition of length field sizes on DataPrototype level in case of TLV usage** [If `TlvDataIdDefinitions` are defined for a `SOMEIPTransformationISignalProps`, the attributes `sizeOfArrayLengthFields`, `sizeOfStructLengthFields` and `sizeOfUnionLengthFields` shall not be defined on `DataPrototype` level but only on `ISignal` level.

]()

**[constr\_1655] The mutual existence of LinMasters in the LinSlave EcuExtract** [A `LinMaster` shall not be part of the `EcuExtract` of a corresponding `LinSlave`.

]()

**[constr\_1656] No application-level write access to LinErrorResponse.responseError on Lin slave** [The `SystemSignal` referenced in the role `systemSignal` by the `ISignal` referenced by the `ISignalTriggering` that in turn is referenced in the role `LinErrorResponse.responseError` shall not be referenced by a `DataMapping` that allows for writing to the `SystemSignal`.

]()

**[constr\_1657] Existence of LinPhysicalChannel.scheduleTable** [In any given `Ecu Extract` that contains a `LinSlave`, the `LinPhysicalChannel` that relates to the

respective `LinSlave` via `commConnector.commController` shall not aggregate a `LinScheduleTable`.

]()

**[constr\_1669] Existence of `PduTriggering.secOcCryptoMapping`** [The reference `PduTriggering.secOcCryptoMapping` shall only exist if the `PduTriggering` also references a `SecuredIPdu` in the role `ipdu`.

]()

**[constr\_1670] Prohibition of usage of `tlsCryptoMapping` in case of UDP socket connections** [A `TlsCryptoServiceMapping` may only be referenced by an `ApplicationEndpoint` in the role `tlsCryptoMapping` if that `ApplicationEndpoint` aggregates a `TcpTp` in the role `tpConfiguration`.

]()

**[constr\_1671] Supported values of `TlsCryptoServiceMapping.category`** [The only supported values of attribute `TlsCryptoServiceMapping.category` are:

- **TLS\_SERVER**: the `TlsCryptoServiceMapping` assumes the role of the *server* in the TLS connection.
- **TLS\_CLIENT**: the `TlsCryptoServiceMapping` assumes the role of the *client* in the TLS connection.

]()

**[constr\_1672] Existence of `TlsCryptoCipherSuite.certificate` and `TlsCryptoCipherSuite.pskIdentity` in the *server* role** [Either

- the reference to `CryptoServiceCertificate` in the role `TlsCryptoCipherSuite.certificate`
- the aggregation of `TlsPskIdentity` in the role `TlsCryptoCipherSuite.pskIdentity`

shall exist if the `TlsCryptoCipherSuite` is aggregated by a `TlsCryptoServiceMapping` that has attribute `category` set to the value `TLS_SERVER`.

]()

**[constr\_2025] Uniqueness of `symbol` attributes** [With the exception of Runnable Entities that are subject to 1234 (RunnableEntities owned by `NvBlockSwComponentTypes`), in the context of a single `EcuInstance` the values of the `RunnableEntity.symbol` in combination with the attribute `symbol` of the meta-class `SymbolProps` owned by `AtomicSwComponentType` of all deployed RunnableEntities shall be unique such that no two (or more) combinations of `RunnableEntity.symbol` and the `symbol` of the meta-class `SymbolProps` owned by `AtomicSwComponentType` in the role `symbolProps` share the same value.

]()

**[constr\_3000] valid [SenderRecCompositeTypeMappings](#)** [All [SenderRecRecordElementMappings](#) or [SenderRecArrayElementMappings](#) aggregated in the context of a given [SenderReceiverToSignalGroupMapping](#) shall reference a [SystemSignal](#) that is also referenced in the role [systemSignal](#) by the [SystemSignalGroup](#) that is referenced by the enclosing [SenderReceiverToSignalGroupMapping](#) in the role [signalGroup](#).

]()

**[constr\_3002] valid [swcToImplMapping](#)** [The referenced [SwcImplementation](#) refers to a [SwcInternalBehavior](#) that is part of a [AtomicSwComponentType](#). The same [AtomicSwComponentType](#) shall be the type of the referenced [SwComponentPrototype](#).

[SwcToImplMapping.componentImplementation.behavior.component](#) == [SwcToImplMapping.component.type](#)

]()

**[constr\_3003] Number of CAN channels** [CAN clusters shall aggregate exactly one [PhysicalChannel](#).

]()

**[constr\_3004] Clustering and separation shall be exclusive** [Clustering and separation shall be exclusive, i.e. it SHALL NOT be possible that two [SwComponentPrototypes](#) A and B are associated both by a [ComponentClustering](#) and by a [ComponentSeparation](#) at the same time.

]()

**[constr\_3005] valid [EcuResourceEstimation](#)** [The same [EcuInstance](#) shall be referenced directly from the [EcuResourceEstimation](#) and from the [SwcToEcuMapping](#):

[EcuResourceEstimation.swCompToEcuMapping.ecuInstance](#) == [EcuResourceEstimation.ecuInstance](#)

]()

**[constr\_3006] valid [EcuMapping](#)** [The referenced [hwCommunicationController](#) and [hwCommunicationPort](#) shall be part of the referenced [ecu](#).

[ECUMapping.ecu.nestedElement](#) contains [ECUMapping.commControllerMapping.hwCommunicationController](#)

[ECUMapping.ecu.nestedElement](#) contains [ECUMapping.hwPortMapping.hwCommunicationPort](#)

]()

**[constr\_3007] selectorFieldCodes for dynamic part alternatives** [The `selectorFieldCodes` for the dynamic part alternatives within one `MultiplexedIPdu` shall differ from each other.

]()

**[constr\_3008] EcuInstance subelements** [The `CommunicationConnector` and the `CommunicationController` that is referenced by the `CommunicationConnector` shall be owned by the same `EcuInstance`.

]()

**[constr\_3009] Overlapping of ISignals is prohibited** [`ISignals` mapped to an `ISignalIPdu` shall not overlap.

]()

**[constr\_3010] ISignalIPdu length shall not be exceeded** [The combined length of all `ISignals` and `updateIndicationBitPositions` that are mapped into an `ISignalIPdu` shall not exceed the defined `Pdu` length.

]()

**[constr\_3011] Overlapping of updateIndicationBits of ISignals is prohibited** [The `updateIndicationBitPosition` for an `ISignal` in an `ISignalIPdu` shall not overlap with other `updateIndicationBitPositions` or `ISignal` locations.

]()

**[constr\_3012] Overlapping of Pdus is prohibited** [`Pdus` mapped to a `FlexrayFrame` shall NOT overlap.

]()

**[constr\_3013] FlexrayFrame length shall not be exceeded** [The combined length of all `Pdus` that are mapped into a `FlexrayFrame` shall not exceed the defined `FlexrayFrame` length.

]()

**[constr\_3014] Overlapping of updateIndicationBits for Pdus is prohibited** [The `updateIndicationBitPosition` for a `Pdu` in a `FlexrayFrame` shall NOT overlap with other `updateIndicationBitPositions` and `Pdu` locations.

]()

**[constr\_3015] Number of LIN channels** [LIN clusters shall aggregate exactly one `LinPhysicalChannel`.

]()

**[constr\_3018] Number of FlexRay channels** [A `FlexrayCluster` shall use either one `FlexrayPhysicalChannel` with `channelName` set to either `channelA` or

`channelB` or else two `FlexrayPhysicalChannels` with one `channelName channelA` and one `channelName channelB`.

]()

**[constr\_3019] In the flat ECU extract each required interface shall be satisfied by connected provided interfaces** [In case of the flat `System` with `category ECU_EXTRACT` all `VariableDataPrototypes` specified by the `SenderReceiverInterface` of the `RPortPrototype` need to be supplied by some of the `PPortPrototypes` being connected with `SwConnectors`.

]()

**[constr\_3020] `communicationDirection` of `containedISignalIPduGroups`** [The value of the attribute `communicationDirection` of `containedISignalIPduGroup` shall be identical to the value of the attribute `communicationDirection` of the enclosing `ISignalIPduGroup`.

]()

**[constr\_3021] Mapping of `SensorActuatorSwComponents` to `SensorActuatorHwElements`** [Only `SwComponentPrototypes` that are typed by `SensorActuatorSwComponentType` shall be mapped to a `HwElement` with `category SensorActuator` via the `controlledHwElement` relation.

]()

**[constr\_3025] Usage of `NPdus` in `TpConnections`** [In case several `TpConnections` use the same Frame ID for their communication needs only one `NPdu` element per Frame Id shall exist. This constraint applies for all supported AUTOSAR transport protocols (CanTp, LinTp, FrTp, FrArTp and J1939Tp).

]()

**[constr\_3027] Existence of `ecuExtractVersion`** [In case the category of the System is `SYSTEM_EXTRACT` or `ECU_EXTRACT` the `ecuExtractVersion` attribute shall be defined.

]()

**[constr\_3028] `FibexElements`** [Each `FibexElement` that is used in the System Description shall be referenced by the `System` element in the role `FibexElement`.

]()

**[constr\_3029] Assign-Frame command usage** [For the LIN 2.0 Assign-Frame command the `LinConfigurableFrame` list shall be used. For the LIN 2.1 Assign-Frame-PID-Range command the `LinOrderedConfigurableFrame` list shall be used.

]()



**[constr\_3030] valid relationship between ECUMapping and EcuInstance** [If an `EcuInstance` is assigned to a `HwElement` the `EcuInstance` shall belong to the same `System` as the `ECUMapping`.

]()

**[constr\_3031] Complete System Description does not have ports on the outermost composition** [In a complete `System` with `category` `ABSTRACT_SYSTEM_DESCRIPTION` or `System` with `category` `SYSTEM_DESCRIPTION` this outermost `CompositionSwComponentType` has the unique feature that it doesn't have any outside ports, but all the SWC contained in it are connected to each other and fully specified by their `SwComponentTypes`, `PortPrototypes`, `PortInterfaces`, `VariableDataPrototypes`, `InternalBehavior` etc.

]()

**[constr\_3036] Pdus in CAN and LIN Frames** [CAN Frames and LIN Frames shall only contain one `Pdu`.

]()

**[constr\_3037] maximum Frame frameLength for CAN and LIN** [For CAN and LIN the maximum `frameLength` is 8 bytes and 64 bytes in case of CAN FD.

]()

**[constr\_3038] maximum Frame frameLength for FlexRay** [For FlexRay the maximum `frameLength` is 254 bytes.

]()

**[constr\_3039] pncIdentifier range** [The `pncIdentifier` value shall be in the range of 8..63 for normal CAN and in the range of 8..511 for CAN FD, FlexRay and Ethernet.

]()

**[constr\_3040] Restriction of pncIdentifier values** [The `pncIdentifier` value shall be within the range described by `pncVectorOffset` and `pncVectorLength`.

]()

**[constr\_3044] CBV configuration in case partial network is used** [In case a partial network is used the control bit vector (CBV) shall be defined in Byte 0 of the `NmPdu` (`nmCbvPosition` = 0).

]()

**[constr\_3045] Signal content evaluation vs. Mode evaluation** [The mode evaluation and the signal content evaluation shall not be used in the same `IPdu`. A mix of these two types is not allowed.

]()

**[constr\_3046] Consistency of `TransmissionModeCondition.iSignalInIPdu`** [The `ISignalToIPduMapping` referenced by the `TransmissionModeCondition` in the role `iSignalInIPdu` shall belong to the same `ISignalIPdu` as the `TransmissionModeCondition`.

]()

**[constr\_3047] Uniqueness of `macMulticastAddresses`** [A `macMulticastAddress` shall be unique in a particular `EthernetCluster`.

]()

**[constr\_3048] Range of `vlanIdentifier`** [The allowed values of `vlanIdentifier` range from 0 to 4095.

]()

**[constr\_3050] `J1939Cluster` uses exactly one `CanPhysicalChannel`** [A `J1939Cluster` shall aggregate exactly one `CanPhysicalChannel`.

]()

**[constr\_3051] Restriction of `ISignalMapping` references** [If the `sourceSignal` references an `ISignal` then the `targetSignal` shall also reference an `ISignal`.

]()

**[constr\_3052] Complete `ISignalMapping` of `ISignalGroup` signals** [If an `ISignalMapping` to an `ISignal` that is a member of a `ISignalGroup` exists then (see [TPS\_SYST\_01120]) an `ISignalMapping` to the enclosing `ISignalGroup` shall exist as well.

]()

**[constr\_3053] Complete `ISignalMapping` of target `ISignalGroup`** [If an `ISignalGroup` is referenced by a `targetSignal` then [TPS\_SYST\_02162] applies for each of the contained `ISignal` of that `ISignalGroup`.

]()

**[constr\_3057] Maximal one `BusspecificNmEcu` per `NmEcu` and bus system is allowed to be defined** [For each `NmEcu` at most one `BusspecificNmEcu` per bus system (FlexRay/Can/Udp/J1939) is allowed to be defined.

]()

**[constr\_3058] References from `SenderRecArrayElementMapping` and from `SenderRecRecordElementMapping` to `SystemSignals` are not allowed within a `SenderReceiverCompositeElementToSignalMapping`** [The reference from `SenderRecArrayElementMapping` to `SystemSignal` and from `SenderRecRecordElementMapping` to `SystemSignal` shall not exist if the enclosing `SenderRecCompositeTypeMapping` is owned by a `SenderReceiverCompositeElementToSignalMapping`.

]()

**[constr\_3060] Usage of [networkRepresentationProps](#) and [physicalProps](#)**

[Usage of [networkRepresentationProps](#) and [physicalProps](#) shall follow the restrictions given in table 2.30.

]()

Attributes of SwDataDefProps	SystemSignal.physicalProps	ISignal.networkProps
<a href="#">additionalNativeTypeQualifier</a>	NA	NA
<a href="#">annotation</a>	NA	NA
<a href="#">baseType</a>	NA	D
<a href="#">baseType.category</a>	NA	M
<a href="#">BaseTypeDirectDefinition.baseTypeEncoding</a>	NA	D
<a href="#">BaseTypeDirectDefinition.byteOrder</a>	NA	NA
<a href="#">BaseTypeDirectDefinition.baseTypeSize</a>	NA	0..1
<a href="#">BaseTypeDirectDefinition.memAlignment</a>	NA	NA
<a href="#">BaseTypeDirectDefinition.nativeDeclaration</a>	NA	NA
<a href="#">compuMethod</a>	D	I
<a href="#">dataConstr</a>	D	M
<a href="#">displayFormat</a>	D	M
<a href="#">implementationDataType</a>	NA	NA
<a href="#">invalidValue</a>	NA	D
<a href="#">stepSize</a>	NA	NA
<a href="#">swAddrMethod</a>	NA	NA
<a href="#">swAlignment</a>	NA	NA
<a href="#">swBitRepresentation</a>	NA	NA
<a href="#">swCalibrationAccess</a>	NA	NA
<a href="#">swCalprmAxisSet</a>	NA	NA
<a href="#">swComparisonVariable</a>	NA	NA
<a href="#">swDataDependency</a>	NA	NA
<a href="#">swHostVariable</a>	NA	NA
<a href="#">swImplPolicy</a>	NA	NA
<a href="#">swIntendedResolution</a>	NA	NA
<a href="#">swInterpolationMethod</a>	NA	NA
<a href="#">swIsVirtual</a>	NA	NA
<a href="#">swPointerTargetProps</a>	NA	NA
<a href="#">swRecordLayout</a>	NA	NA
<a href="#">swRefreshTiming</a>	NA	NA
<a href="#">swTextProps</a>	NA	NA
<a href="#">swValueBlockSize</a>	NA	NA
<a href="#">unit</a>	D	M
<a href="#">valueAxisDataType</a>	NA	NA

Table 2.30: Allowed SwDataDefProps Attributes for the ISignal and SystemSignal

**[constr\_3062] The [EcuInstance](#) that is referenced from a specific [CouplingElement](#) shall be connected to the same [EthernetCluster](#) as the specific [CouplingElement](#)**

[The [EcuInstance](#) referenced from a specific [CouplingElement](#) in the role [ecuInstance](#) shall be connected via the [CommunicationConnector](#) and a [EthernetPhysicalChannel](#) that refers the [CommunicationConnector](#)

tor to the `EthernetCluster` referenced by the specific `CouplingElement` in the role `communicationCluster`.

]()

**[constr\_3067] `initValue` defined in the context of `ISignal`** [The definition of an `initValue` in the context of an `ISignal` shall only be a `NumericalValueSpecification`, `TextValueSpecification` or `ArrayValueSpecification` that aggregates elements of type `NumericalValueSpecification` or `TextValueSpecification`.

]()

**[constr\_3068] `DoIpPowerModeStatusNeeds` in the category `ECU_EXTRACT`** [If and only if `DoIP` (i.e. any of the subclasses of `DoIpServiceNeeds` are present) is used on an Ecu then the `DoIpPowerModeStatusNeeds` shall exist exactly once in a `System` of category `ECU_EXTRACT`.

]()

**[constr\_3069] Allowed `CanNmCluster.nmNidPosition` values** [If defined, the value of `CanNmCluster.nmNidPosition` shall only be set to either 0 or 1.

]()

**[constr\_3070] Allowed `CanNmCluster.nmCbvPosition` values** [If defined, the value of `CanNmCluster.nmCbvPosition` shall only be set to either 0 or 1.

]()

**[constr\_3071] `CanNmCluster.nmCbvPosition` and `CanNmCluster.nmNidPosition` shall never have the same value** [`CanNmCluster.nmCbvPosition` and `CanNmCluster.nmNidPosition` shall never have the same value.

]()

**[constr\_3073] `nmVoteInformation` only valid for `FrNm`** [The `nmVoteInformation` attribute is only valid for `FrNm`.

]()

**[constr\_3074] No `TransmissionAcknowledgementRequest` for multiple senders** [If more than one `SenderComSpec` exist (in different `PortPrototypes` on atomic level) that refer to data elements effectively mapped to the same `SystemSignal` it is not allowed that any `SenderComSpec` aggregates `transmissionAcknowledge`.

]()

**[constr\_3078] Allowed `UdpNmCluster.nmNidPosition` values** [If defined, the value of `UdpNmCluster.nmNidPosition` shall only be set to either 0 or 1.

]()

**[constr\_3079] Allowed `UdpNmCluster.nmCbvPosition` values** [If defined, the value of `UdpNmCluster.nmCbvPosition` shall only be set to either 0 or 1.

]()

**[constr\_3080] `UdpNmCluster.nmCbvPosition` and `UdpNmCluster.nmNidPosition` shall never have the same value** [`UdpNmCluster.nmCbvPosition` and `UdpNmCluster.nmNidPosition` shall never have the same value.

]()

**[constr\_3081] Value of category in `GeneralPurposePdu`** [The attribute `category` of `GeneralPurposePdu` can have the following values:

- SD (Service Discovery)
- GLOBAL\_TIME
- DoIP

]()

**[constr\_3082] Value of category in `GeneralPurposeIPdu`** [The attribute `category` of `GeneralPurposeIPdu` can have the following values:

- XCP
- SOMEIP\_SEGMENTED\_IPDU
- DLT

]()

**[constr\_3083] Exactly one `AtomicSwComponentType` on an `EcuInstance` may use `GeneralCallbackEventDataChanged` / `GeneralCallbackEventStatusChange`** [The Dem only supports exactly one `AtomicSwComponentType` using `GeneralCallbackEventDataChanged` / `GeneralCallbackEventStatusChange` on one `EcuInstance`.

]()

**[constr\_3084] Service port in the role `PowerTakeOff`** [Within the context of one `EcuInstance`, there can only be one service port that uses the role `PowerTakeOff` in the `RoleBasedPortAssignment.role`.

]()

**[constr\_3085] Service port in the role `CallbackDCMRequestServices`** [Within the context of one `EcuInstance`, there can only be one service port that uses the role `CallbackDCMRequestServices` in the `RoleBasedPortAssignment.role`.

]()

**[constr\_3086] Role of `SystemSignal` in n:1 sender-receiver communication** [In case of n:1 communications

- if `DataTransformation` is used each sender shall be mapped to the same `SystemSignal`
- if `DataTransformation` is not used each sender shall be mapped
  - to the same `SystemSignal` in case of a primitive `DataType` on the sender side,
  - to the same `SystemSignalGroup` in case of a composite `DataType` on the sender side.

]()

**[constr\_3090] `tpSdu` transmission on a `PhysicalChannel`** [The `IPdu` that is referenced by a `TpConnection` in the role `tpSdu` shall be referenced by exactly one `PduTriggering` aggregated on the `PhysicalChannel` of the `TpConnection`.

]()

**[constr\_3094] Consistent `ISignalPort.communicationDirection` for `ISignalTriggerings` of `ISignalGroups` and contained `ISignals`** [In case the `ISignals` contained in an `ISignalGroup` are referenced by an `ISignalTriggering`, the `communicationDirection` of the `ISignalPort` referenced by the `ISignal`'s `ISignalTriggering` shall be identical to the `communicationDirection` of the `ISignalPort` referenced by the containing `ISignalGroup`'s `ISignalTriggering`.

]()

**[constr\_3095] `canControllerFdAttributes` and `canControllerFdRequirements` are mutually exclusive** [The existence of `canControllerFdAttributes` and `canControllerFdRequirements` is mutually exclusive.

]()

**[constr\_3096] Allowed values for `diagnosticMessageType`** [The allowed values of `diagnosticMessageType` range from 1..57.

]()

**[constr\_3097] Overlapping of segments of one `MultiplexedIPdu` is not allowed** [The segments defined by the `SegmentPosition` elements of one and the same `MultiplexedIPdu` - aggregated via `StaticPart` and `DynamicPart` - shall not overlap.

]()

**[constr\_3098] Defined segments of one `MultiplexedIPdu` shall not exceed the length of the `MultiplexedIPdu`** [The segments defined by the `SegmentPosition` elements of one and the same `MultiplexedIPdu` - aggregated via `StaticPart` and `DynamicPart` - shall not exceed the length of the `MultiplexedIPdu`.

]()

**[constr\_3099] Defined segments in a `DynamicPart` shall not exceed the length of any `DynamicPartAlternative.iPdu`** [The segments defined by the `SegmentPosition` elements aggregated in the `DynamicPart` of a `MultiplexedIPdu` shall not exceed the length of any `DynamicPartAlternative.iPdu`.

]()

**[constr\_3100] Defined segments in a `StaticPart` shall not exceed the length of the `StaticPart.iPdu`** [The segments defined by the `SegmentPosition` elements aggregated in the `StaticPart` of a `MultiplexedIPdu` shall not exceed the length of the `StaticPart.iPdu`

]()

**[constr\_3101] Signal representation of selector field for `DynamicPartAlternative`** [Every `ISignalIPdu` that is referenced by the `DynamicPartAlternative` shall contain an `ISignal` that represents the selector field. The selector field signal shall be located at the position that is described by the `selectorFieldLength` and `selectorFieldStartPosition`.

]()

**[constr\_3102] Restriction on usage of `J1939NodeName` attributes** [A `J1939NmCluster` shall not aggregate two `J1939NmNodes` with identical `J1939NodeName` attributes.

]()

**[constr\_3103] Range of `ecuInstance`** [The allowed values of `ecuInstance` range from 0 to 7.

]()

**[constr\_3104] Range of `function`** [The allowed values of `function` range from 0 to 255.

]()

**[constr\_3105] Range of `functionInstance`** [The allowed values of `functionInstance` range from 0 to 31.

]()

**[constr\_3106] Range of `identityNumber`** [The allowed values of `identityNumber` range from 0 to 2097151.

]()

**[constr\_3107] Range of `industryGroup`** [The allowed values of `industryGroup` range from 0 to 7.

]()



**[constr\_3108] Range of `manufacturerCode`** [The allowed values of `manufacturerCode` range from 0 to 2047.

]()

**[constr\_3109] Range of `vehicleSystem`** [The allowed values of `vehicleSystem` range from 0 to 127.

]()

**[constr\_3110] Range of `vehicleSystemInstance`** [The allowed values of `vehicleSystemInstance` range from 0 to 15.

]()

**[constr\_3111] `returnSignal` in `ClientServerToSignalMapping` is mandatory** [A `ClientServerToSignalMapping` shall always have a `returnSignal` defined.

]()

**[constr\_3112] Invalidation support for partial mapping of a data element typed by composite data type** [If a `VariableDataPrototype` with a composite data type in a `PPortPrototype` is mapped to a `SystemSignalGroup` and only a subset of elements of the composite data type that are primitives is mapped to separate `SystemSignals` of the `SystemSignalGroup` then at least one mapped primitive shall have an `invalidValue` defined.

]()

**[constr\_3113] `AbstractEthernetFrame` shall not have a `PduToFrameMapping`** [It is not allowed to map `Pdus` into `AbstractEthernetFrames`.

]()

**[constr\_3114] `FlatInstanceDescriptors` pointing to the same `ParameterDataPrototype` shall have different `postBuildVariantConditions`** [`FlatInstanceDescriptors` that are pointing as an `atpTarget` to the same `ParameterDataPrototype` instance shall have different `postBuildVariantConditions`.

]()

**[constr\_3115] `FlatInstanceDescriptors` pointing to the same `ParameterDataPrototype` instance** [When several `FlatInstanceDescriptors` point to the same `ParameterDataPrototype` instance as an `atpTarget` in the context of a `ParameterInterface` the different `FlatInstanceDescriptors` shall point to the `PPortPrototype` of the owning `ParameterSwComponentType`. In this case the `PPortPrototype` typed by the `ParameterInterface` is part of the context of the according `AnyInstanceRef`.

]()

**[constr\_3116] Overlap of `ClientIdRanges` in the context of the enclosing System** [The `ClientIdRange` defined for an `EcuInstance` shall not overlap with the `ClientIdRange` of any other `EcuInstance` in the context of the enclosing System.

]()

**[constr\_3117] Allowed value of attribute `clientId`** [Within the context of one `ClientIdDefinition`, the value of attribute `clientId` shall be in the range of `ClientIdRange.lowerLimit` and `ClientIdRange.upperLimit` for the `ClientIdRange` that is aggregated by the `EcuInstance` onto which the `SwComponentPrototypes` included in the `ClientIdDefinition.clientServerOperation` are mapped.

]()

**[constr\_3118] Valid reference target for `ClientIdDefinition.clientServerOperation.contextPort`** [In the context of the definition of a `ClientIdDefinition`, the reference `clientServerOperation.contextPort` shall only refer to an `RPortPrototype`.

]()

**[constr\_3121] The length of transformer chains is limited to 255 transformers** [The maximum number of `DataTransformation.transformerChain` references in the context of one `DataTransformation` shall be limited to 255.

]()

**[constr\_3122] At most one transformer of each transformer class inside a transformer chain** [If the value of a `transformerClass` of a `TransformationTechnology` referenced by a `DataTransformation` does not equal `custom`, it shall be different from all other `transformerClass` values of `TransformationTechnologies` referenced by the same `DataTransformation`.

]()

**[constr\_3123] Serializer transformer shall be the first in a chain** [A serializer transformer (`TransformationTechnology` with attribute `transformerClass` set to `serializer`) shall be the first transformer in a transformer chain.

]()

**[constr\_3124] Applicability of `needsOriginalData`** [The attribute `needsOriginalData` of a `TransformationTechnology` shall only be used for the non-first transformers in the transformer chain.

]()

**[constr\_3125] Value of attribute `inPlace` for the first transformer in a chain** [The attribute `inPlace` shall be set to `false` if the `TransformationTechnology` of the `BufferProperties` is referenced as first reference in the ordered list of references `transformerChain` from a `DataTransformation`.

]()

**[constr\_3127] Certain ISignals always need a reference to DataTransformation** [An ISignal which references a SystemSignal which is referenced by a SystemSignalGroup in the role transformingSystemSignal shall always reference a DataTransformation.

]()

**[constr\_3128] SOME/IP transformer configuration** [For each TransformationDescription variant that is a SOMEIPTransformationDescription

- attribute protocol of TransformationTechnology shall be set to SOMEIP
- attribute version of TransformationTechnology shall be set to 1.0.0
- attribute transformerClass of TransformationTechnology shall be set to serializer
- attribute headerLength of BufferProperties shall be set to 64 (bits).

]()

**[constr\_3129] Byte Order of SOME/IP transformer** [The attribute byteOrder of SOMEIPTransformationDescription shall be different from opaque.

]()

**[constr\_3130] Range of Interface Version** [The value of the attribute interfaceVersion shall be in the range [0; 255]

]()

**[constr\_3132] Required COM Based Transformation for comBasedSignalGroupTransformation** [If a ISignalGroup has a reference to the DataTransformation element in the role comBasedSignalGroupTransformation then this DataTransformation shall be the handled by the COM Based Transformer [13].

]()

**[constr\_3133] physicalLayerType of connected CouplingPorts** [The physicalLayerType of two CouplingPorts which are connected via a CouplingPortConnection shall be equal.

]()

**[constr\_3134] The connection of two CouplingPorts with connectionNegotiationBehavior set to master is forbidden** [The connectionNegotiationBehavior of two CouplingPorts which are connected via a CouplingPortConnection shall not be both set to master.

]()

**[constr\_3135] The connection of two CouplingPorts with connectionNegotiationBehavior set to slave is forbidden** [The connectionNegotiationBe-

havior of two `CouplingPorts` which are connected via a `CouplingPortConnection` shall not be both set to `slave`.

]()

**[constr\_3136] Allowed payload of `SecuredIPdus`** [ `SecuredIPdus` are allowed to reference `PduTriggerings` of `ISignalIPdus`, `ContainerIPdus`, `DcmIPdus`, `MultiplexedIPdus`, `GeneralPurposeIPdus` with category `SOMEIP_SEGMENTED_IPDU` and `UserDefinedIPdus`.

]()

**[constr\_3137] `IPduPort.rxSecurityVerification` is configurable on the receiver side** [The `IPduPort.rxSecurityVerification` attribute shall only be used in `IPduPorts` with the `communicationDirection` = `in`.

]()

**[constr\_3138] `IPduPort.rxSecurityVerification` validness** [The `IPduPort.rxSecurityVerification` information is only valid for `SecuredIPdus`.

]()

**[constr\_3140] No `ByteOrderEnum.opaque` allowed for `System.containerIPduHeaderByteOrder`** [The values of `System.containerIPduHeaderByteOrder` are restricted to `ByteOrderEnum.mostSignificantByteFirst` and `ByteOrderEnum.mostSignificantByteLast`. I.e. the value `ByteOrderEnum.opaque` is not allowed.

]()

**[constr\_3141] Only `IPdus` shall be part of a `ContainerIPdu`** [The `PduTriggering` which is referenced in the role `ContainerIPdu.containedPduTriggering` or `ContainerIPdu.containedIPduTriggeringProps.containedPduTriggering` shall refer to a subclass of an `IPdu` in the role `PduTriggering.ipdu`.

]()

**[constr\_3142] Mandatory `headerIdLongHeader` for `longHeader`** [For each `IPdu` which is assigned to a `ContainerIPdu` in the role `ContainerIPdu.containedPduTriggering` or `ContainerIPdu.containedIPduTriggeringProps.containedPduTriggering` with `ContainerIPdu.headerType` = `longHeader` the `ContainedIPduProps.headerIdLongHeader` shall be defined.

]()

**[constr\_3143] Mandatory `headerIdShortHeader` for `shortHeader`** [For each `IPdu` which is assigned to a `ContainerIPdu` in the role `ContainerIPdu.containedPduTriggering` or `ContainerIPdu.containedIPduTriggeringProps.containedPduTriggering` with `ContainerIPdu.headerType` = `shortHeader` the `ContainedIPduProps.headerIdShortHeader` shall be defined.

]()

**[constr\_3144] Mandatory `IPdu.containedIPduProps` for contained `IPdus`** [For each `IPdu` which is assigned to a `ContainerIPdu` in the role `ContainerIPdu.containedPduTriggering` the `IPdu.containedIPduProps` shall be defined.

]()

**[constr\_3146] Partial Networking timing constraint** [For Partial Networking the following timing constraints shall be ensured:

- CAN / Ethernet:  $(pnResetTime + pncPrepareSleepTimer) < nmNetworkTimeout$
- FlexRay:  $(pnResetTime + pncPrepareSleepTimer) < nmReadySleepTime$

]()

**[constr\_3148] `executeDespiteDataUnavailability` setting in case an E2E Transformer is used** [A transformer chain using E2E shall be configured with `DataTransformation.executeDespiteDataUnavailability = TRUE`.

]()

**[constr\_3149] `TransformationTechnology.needsOriginalData` settings for E2E Transformer** [The `TransformationTechnology.needsOriginalData` attribute of a `TransformationTechnology` element of an E2E transformer shall be set to FALSE.

]()

**[constr\_3151] `BufferProperties.headerLength` settings for an E2E transformer used in combination with a SOME/IP transformer** [The `BufferProperties.headerLength` for an E2E transformer located in a transformer chain with a SOME/IP transformer shall be configured with the following values depending on the value of the `EndToEndTransformationDescription.profileName` attribute:

1. PROFILE\_01: `BufferProperties.headerLength` = 16 bits
2. PROFILE\_02: `BufferProperties.headerLength` = 16 bits
3. PROFILE\_04: `BufferProperties.headerLength` = 96 bits
4. PROFILE\_05: `BufferProperties.headerLength` = 24 bits
5. PROFILE\_06: `BufferProperties.headerLength` = 40 bits
6. PROFILE\_07: `BufferProperties.headerLength` = 160 bits
7. PROFILE\_08: `BufferProperties.headerLength` = 128 bits
8. PROFILE\_11: `BufferProperties.headerLength` = 16 bits
9. PROFILE\_22: `BufferProperties.headerLength` = 16 bits
10. PROFILE\_04m: `BufferProperties.headerLength` = 128 bits

11. PROFILE\_07m: `BufferProperties.headerLength` = 192 bits
12. PROFILE\_08m: `BufferProperties.headerLength` = 160 bits
13. PROFILE\_44: `BufferProperties.headerLength` = 96 bits
14. PROFILE\_44m: `BufferProperties.headerLength` = 128 bits

]()

**[constr\_3152] `BufferProperties.headerLength` settings for any transformer used in combination with a COM Based transformer** [A transformer used in a transformer chain with a COM Based transformer shall be configured with the following values:

- `BufferProperties.headerLength` = 0

]()

**[constr\_3153] E2E header field reservation required by COM Based transformer** [A COM Based transformer that is used in a transformer chain with an E2E transformer requires that the following amount of space is allocated for the E2E header fields using a proper `ISignalGroup` layout according to [TPS\_SYST\_02068]:

**PROFILE\_01:** if `dataIdMode` == `lower12Bit`: 16 bits

**PROFILE\_01:** if `dataIdMode` != `lower12Bit`: 12 bits

**PROFILE\_02:** 16 bits

**PROFILE\_04:** 96 bits

**PROFILE\_05:** 24 bits

**PROFILE\_06:** 40 bits

**PROFILE\_07:** 160 bits

**PROFILE\_08:** 128 bits

**PROFILE\_11:** if `dataIdMode` == `lower12Bit`: 16 bits

**PROFILE\_11:** if `dataIdMode` == `all16Bit`: 12 bits

**PROFILE\_22:** 16 bits

**PROFILE\_04m:** 128 bits

**PROFILE\_07m:** 192 bits

**PROFILE\_08m:** 160 bits

**PROFILE\_44:** 96 bits

**PROFILE\_44m:** 128 bits

]()

**[constr\_3155] Allowed values for `EndToEndTransformationDescription.upperHeaderBitsToShift`** [The value of of the `EndToEndTransformationDescription.upperHeaderBitsToShift` attribute depends on the used serializing transformer:

**COM based transformer:** 0 (no bits are shifted)

**SOME/IP transformer:** 64 (to support the header shift of SOME/IP).

**Custom transformer:** no restriction (depends on header length and placement of custom transformer)

]()

**[constr\_3156] Allowed values for `EndToEndTransformationISignalProps.dataId` in PROFILE\_01 and PROFILE\_11** [If the `EndToEndTransformationDescription.profileName` attribute has a value of PROFILE\_01 or PROFILE\_11 then the value of the `EndToEndTransformationISignalProps.dataId` attribute shall be in the range of 0-65535.

]()

**[constr\_3157] Allowed values for `EndToEndTransformationISignalProps.dataId` in PROFILE\_01 and PROFILE\_11 in case `dataIdMode` is set to `lower12Bit`** [If the `EndToEndTransformationDescription.profileName` attribute has a value of PROFILE\_01 or PROFILE\_11 and the value of `EndToEndTransformationDescription.dataIdMode` attribute has a value of `lower12Bit` then the value of the `EndToEndTransformationISignalProps.dataId` attribute shall be in the range of 256-65535.

]()

**[constr\_3158] Allowed values for `EndToEndTransformationDescription.maxDeltaCounter` in PROFILE\_01 and PROFILE\_11** [If the `EndToEndTransformationDescription.profileName` attribute has a value of PROFILE\_01 or PROFILE\_11 then the attribute `maxDeltaCounter` shall be in the range 1-14.

]()

**[constr\_3159] Allowed values for `EndToEndTransformationDescription.maxDeltaCounter` in PROFILE\_04, PROFILE\_04m PROFILE\_44 and PROFILE\_44m** [If the `EndToEndTransformationDescription.profileName` attribute has a value of PROFILE\_04, PROFILE\_04m, PROFILE\_44, or PROFILE\_44m the value of `maxDeltaCounter` attribute shall be in the range 1-65535.

]()

**[constr\_3160] `EndToEndTransformationISignalProps.dataId` in PROFILE\_02 and PROFILE\_22** [If the `EndToEndTransformationDescription.profileName` attribute has a value of PROFILE\_02 or PROFILE\_22 then the multiplicity of the `dataId` attribute shall be 16 and the value of each instance shall be in the range 0..255.



]()

**[constr\_3161]** [EndToEndTransformationISignalProps.dataLength](#) in **PROFILE\_01, PROFILE\_02, PROFILE\_05, PROFILE\_11, PROFILE\_22** [If the [EndToEndTransformationDescription.profileName](#) attribute has a value of **PROFILE\_01, PROFILE\_02, PROFILE\_05, PROFILE\_11, or PROFILE\_22** then the multiplicity of the [EndToEndTransformationISignalProps.dataLength](#) attribute shall be 1.

]()

**[constr\_3162]** [EndToEndTransformationISignalProps.minDataLength](#) and [EndToEndTransformationISignalProps.maxDataLength](#) in **PROFILE\_01, PROFILE\_02, PROFILE\_05, PROFILE\_11, PROFILE\_22** [If the [EndToEndTransformationDescription.profileName](#) attribute has a value of **PROFILE\_01, PROFILE\_02, PROFILE\_05, PROFILE\_11, or PROFILE\_22** then the multiplicity of the attributes [EndToEndTransformationISignalProps.minDataLength](#) and [EndToEndTransformationISignalProps.maxDataLength](#) shall be 0.

]()

**[constr\_3163]** [EndToEndTransformationISignalProps.minDataLength](#) and [EndToEndTransformationISignalProps.maxDataLength](#) in **PROFILE\_04, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44, and PROFILE\_44m** [If the [EndToEndTransformationDescription.profileName](#) attribute has a value of **PROFILE\_04, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44, or PROFILE\_44m** then the multiplicity of the attributes [EndToEndTransformationISignalProps.minDataLength](#) and [EndToEndTransformationISignalProps.maxDataLength](#) shall be 1.

]()

**[constr\_3164]** [EndToEndTransformationISignalProps.dataLength](#) in **PROFILE\_04, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44 and PROFILE\_44m** [If the [EndToEndTransformationDescription.profileName](#) attribute has a value of **PROFILE\_04, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44, or PROFILE\_44m** then the multiplicity of the attribute [EndToEndTransformationISignalProps.dataLength](#) shall be 0.

]()

**[constr\_3165]** Effect of [EndToEndTransformationDescription.upperHeaderBitsToShift](#) value in **PROFILE\_01, PROFILE\_11** [If the [EndToEndTransformationDescription.profileName](#) attribute has a value of **PROFILE\_01 or PROFILE\_11** and the serializing transformer is different than the ComBasedTransformer then:

1. [EndToEndTransformationDescription.crcOffset](#) shall be set to the same value of [upperHeaderBitsToShift](#).

2. `EndToEndTransformationDescription.counterOffset` shall be set to the value of `upperHeaderBitsToShift + 8`.
3. (if used) `EndToEndTransformationDescription.dataIdNibbleOffset` shall be set to the value of `upperHeaderBitsToShift + 12`.

]()

**[constr\_3166]** `EndToEndTransformationDescription.upperHeaderBitsToShift` in **PROFILE\_02** [If the `EndToEndTransformationDescription.profileName` attribute has a value of **PROFILE\_02** then the value of the `upperHeaderBitsToShift` attribute shall be 0.

]()

**[constr\_3167]** Effect of `EndToEndTransformationDescription.upperHeaderBitsToShift` value in **PROFILE\_04**, **PROFILE\_05**, **PROFILE\_06**, **PROFILE\_07**, **PROFILE\_08**, **PROFILE\_04m**, **PROFILE\_07m**, **PROFILE\_08m**, **PROFILE\_44**, and **PROFILE\_44m** [If the `EndToEndTransformationDescription.profileName` attribute has a value of **PROFILE\_04**, **PROFILE\_05**, **PROFILE\_06**, **PROFILE\_07**, **PROFILE\_08**, **PROFILE\_04m**, **PROFILE\_07m**, **PROFILE\_08m**, **PROFILE\_44**, or **PROFILE\_44m** the value of the `EndToEndTransformationDescription.offset` attribute shall be equal to the value of the `EndToEndTransformationDescription.upperHeaderBitsToShift` attribute.

]()

**[constr\_3169]** `EndToEndTransformationDescription.offset` value in **PROFILE\_02** and **PROFILE\_22** [If the `EndToEndTransformationDescription.profileName` attribute has a value of **PROFILE\_02** or **PROFILE\_22** then the value of the `EndToEndTransformationDescription.offset` attribute shall be 0.

]()

**[constr\_3172]** Effect of `EndToEndTransformationDescription.profileBehavior` value in **PROFILE\_01** [If the `EndToEndTransformationDescription.profileName` attribute has a value of **PROFILE\_01** and the value of the `profileBehavior` attribute is **R4\_2** then:

- the value of the `EndToEndTransformationDescription.maxNoNewOrRepeatedData` attribute shall be 14.
- the value of the `EndToEndTransformationDescription.syncCounterInit` attribute shall be 1.

]()

**[constr\_3173]** Effect of `EndToEndTransformationDescription.profileBehavior` value in **PROFILE\_02** [If the `EndToEndTransformationDescription.profileName` attribute has a value of **PROFILE\_02** and the value of the `profileBehavior` attribute is **R4\_2** then:

- the value of the `EndToEndTransformationDescription.maxNoNewOrRepeatedData` attribute shall be 15.
- the value of the `EndToEndTransformationDescription.syncCounterInit` attribute shall be 1.

]()

**[constr\_3174] `EndToEndTransformationDescription` settings not allowed in PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_11, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44 and PROFILE\_44m** [If the `EndToEndTransformationDescription.profileName` attribute has a value of PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_11, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44 or PROFILE\_44m then:

1. the multiplicity of the `EndToEndTransformationDescription.maxNoNewOrRepeatedData` attribute shall be 0.
2. the multiplicity of the `EndToEndTransformationDescription.syncCounterInit` attribute shall be 0.
3. the multiplicity of the `EndToEndTransformationDescription.profileBehavior` attribute shall be 0.

]()

**[constr\_3182] Restriction on `TransformationTechnology.transformationDescriptionVariationPoint`** [The `EndToEndTransformationDescription.profileName` attribute shall not be subject to variability for a given `ISignal / ISignalGroup`, i.e., the value of the `EndToEndTransformationDescription.profileName` attribute shall be the same in all different variants.

]()

**[constr\_3183] `ISignalGroup` with `transformationISignalProps`** [An `ISignalGroup` that aggregates `transformationISignalProps` shall reference the `DataTransformation` in the role `comBasedSignalGroupTransformation`.

]()

**[constr\_3184] Only one `EndToEndTransformationISignalProps.dataId` element in PROFILE\_01 and PROFILE\_11** [If the `EndToEndTransformationDescription.profileName` attribute has a value of PROFILE\_01 or PROFILE\_11 then the multiplicity of the `EndToEndTransformationISignalProps.dataId` attribute shall be 1.

]()

**[constr\_3185] Multiplicity of `EndToEndTransformationDescription.dataIdMode` in PROFILE\_01 and PROFILE\_11** [If the `EndToEndTransformationDescription.profileName` attribute is set to PROFILE\_01 or PROFILE\_11 then the

multiplicity of the `EndToEndTransformationDescription.dataIdMode` attribute shall be 1.

]()

**[constr\_3186] Multiplicity of `EndToEndTransformationDescription.dataIdMode` in PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44 and PROFILE\_44m** [If the `EndToEndTransformationDescription.profileName` attribute is set to a value of PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44, or PROFILE\_44m then the multiplicity of the `EndToEndTransformationDescription.dataIdMode` attribute shall be 0.

]()

**[constr\_3187] Multiplicity of `EndToEndTransformationDescription.counterOffset` in PROFILE\_01 and PROFILE\_11** [If the `EndToEndTransformationDescription.profileName` attribute is set to PROFILE\_01 or PROFILE\_11 then the multiplicity of the `EndToEndTransformationDescription.counterOffset` attribute shall be 1.

]()

**[constr\_3188] Multiplicity of `EndToEndTransformationDescription.counterOffset` in PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44, and PROFILE\_44m** [If the `EndToEndTransformationDescription.profileName` attribute is set to a value of PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44, or PROFILE\_44m then the multiplicity of the `EndToEndTransformationDescription.counterOffset` attribute shall be 0.

]()

**[constr\_3189] Multiplicity of `EndToEndTransformationDescription.crcOffset` in PROFILE\_01 and PROFILE\_11** [If the `EndToEndTransformationDescription.profileName` attribute is set to PROFILE\_01 or PROFILE\_11 then the multiplicity of the `EndToEndTransformationDescription.crcOffset` attribute shall be 1.

]()

**[constr\_3190] Multiplicity of `EndToEndTransformationDescription.crcOffset` in PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44 and PROFILE\_44m** [If the `EndToEndTransformationDescription.profileName` attribute is set to a value of PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m,

PROFILE\_07m, PROFILE\_08m, PROFILE\_44, or PROFILE\_44m then the multiplicity of the `EndToEndTransformationDescription.crcOffset` attribute shall be 0.

]()

**[constr\_3191] Multiplicity of `EndToEndTransformationDescription.dataIdNibbleOffset` in PROFILE\_01, PROFILE\_11 and `dataIdMode` equal to `lower12Bit`** [If the `EndToEndTransformationDescription.profileName` attribute is set to PROFILE\_01 or PROFILE\_11 and the value of the `EndToEndTransformationDescription.dataIdMode` attribute is set to `lower12Bit` then the multiplicity of the `EndToEndTransformationDescription.dataIdNibbleOffset` attribute shall be 1.

]()

**[constr\_3192] Multiplicity of `EndToEndTransformationDescription.dataIdNibbleOffset` in PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44, and PROFILE\_44m or `dataIdMode` different from `lower12Bit`** [If the `EndToEndTransformationDescription.profileName` attribute is set to a value of PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44, or PROFILE\_44m or the `EndToEndTransformationDescription.dataIdMode` attribute is set to value different from `lower12Bit` then the multiplicity of the `EndToEndTransformationDescription.dataIdNibbleOffset` attribute shall be 0.

]()

**[constr\_3193] Multiplicity of `EndToEndTransformationDescription.offset` in PROFILE\_01 and PROFILE\_11** [If the `EndToEndTransformationDescription.profileName` attribute is set to PROFILE\_01 or PROFILE\_11 then the multiplicity of the `EndToEndTransformationDescription.offset` attribute shall be 0.

]()

**[constr\_3194] Multiplicity of `EndToEndTransformationDescription.offset` in PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44 and PROFILE\_44m** [If the `EndToEndTransformationDescription.profileName` attribute is set to a value PROFILE\_02, PROFILE\_04, PROFILE\_05, PROFILE\_06, PROFILE\_07, PROFILE\_08, PROFILE\_22, PROFILE\_04m, PROFILE\_07m, PROFILE\_08m, PROFILE\_44 or PROFILE\_44m then the multiplicity of the `EndToEndTransformationDescription.offset` attribute shall be 1.

]()

**[constr\_3195] Allowed values for `EndToEndTransformationDescription.maxDeltaCounter` in PROFILE\_02 and PROFILE\_22** [If the `EndToEndTransformationDescription.profileName` attribute is set to PROFILE\_02 or PROFILE\_22 then the allowed values for the `maxDeltaCounter` attribute shall be 1.

`mationDescription.profileName` attribute has a value of `PROFILE_02` or `PROFILE_22` then the attribute `maxDeltaCounter` shall be in the range 1-15.

]()

**[constr\_3196] Allowed values for `EndToEndTransformationDescription.maxDeltaCounter` in `PROFILE_05`** [If the `EndToEndTransformationDescription.profileName` attribute has a value of `PROFILE_05` then the attribute `maxDeltaCounter` shall be in the range 1-255.

]()

**[constr\_3197] Allowed values for `EndToEndTransformationDescription.maxDeltaCounter` in `PROFILE_06`** [If the `EndToEndTransformationDescription.profileName` attribute has a value of `PROFILE_06` then the attribute `maxDeltaCounter` shall be in the range 1-255.

]()

**[constr\_3198] Uniqueness of `PncMapping.shortLabel`** [If the optional `shortLabel` attribute is used it shall be unique in the `System` scope.

]()

**[constr\_3199] `ISignal` that has `dataTypePolicy` set to `transformingISignal` shall reference a `DataTransformation`** [In a complete model every `ISignal` that has `dataTypePolicy` set to `transformingISignal` shall reference a `DataTransformation`.

]()

**[constr\_3202] `LinFrameTriggering` to `LinUnconditionalFrame` reference restriction in `LinEventTriggeredFrame` context** [Within a `PhysicalChannel` a `LinUnconditionalFrame` shall be referenced by only one `LinFrameTriggering` to allow a derivation of the identifier of a substituted Frame if the `LinUnconditionalFrame` is referenced by a `LinEventTriggeredFrame` in the role `linUnconditionalFrame`.

]()

**[constr\_3203] `LinFrameTriggering` to `LinSporadicFrame` reference restriction in `LinSporadicFrame` context** [Within a `PhysicalChannel` a `LinUnconditionalFrame` shall be referenced by only one `LinFrameTriggering` to allow a derivation of the identifier of a substituted Frame if the `LinUnconditionalFrame` is referenced by a `LinSporadicFrame` in the role `substitutedFrame`.

]()

**[constr\_3204] `LinUnconditionalFrames` associated with a `LinSporadicFrame`** [A `LinUnconditionalFrame` associated with a `LinSporadicFrame` shall not be allocated in the same `LinScheduleTable` as the `LinSporadicFrame`.

]()

**[constr\_3205] Existence of `FramePort` for a `FrameTriggering` that references a `LinSporadicFrame`** [A `FrameTriggering` that references a `LinSporadicFrame` shall not have a reference to a `FramePort`.

]()

**[constr\_3206] Existence of `FramePort` for a `FrameTriggering` that references a `LinEventTriggeredFrame`** [A `FrameTriggering` that references a `LinEventTriggeredFrame` shall not have a reference to a `FramePort`.

]()

**[constr\_3208] `executeDespiteDataUnavailability` usage restriction** [In the set of more than one `ISignal` which reference the same `SystemSignal` in the role `systemSignal`, there shall be no `ISignal` which references a `DataTransformation` where `executeDespiteDataUnavailability` is set to true.

]()

**[constr\_3209] `CanFrameTriggerings` with identical PGN** [For all `CanFrameTriggerings` where the attribute `identifier` contains the identical PGN (as defined in section 5.2 Protocol Data Unit in [14]) the attribute `j1939requestable` shall also have an identical value.

]()

**[constr\_3210] `J1939TpPgs` with identical `pgn` value** [For all `J1939TpPgs` where the attribute `pgn` has an identical value the attribute `requestable` shall also have an identical value.

]()

**[constr\_3211] `PduTriggerings` with `triggerIPduSendCondition`** [Only `PduTriggerings` with references to `ISignalIPdus` are allowed to contain a `triggerIPduSendCondition`.

]()

**[constr\_3212] Limitation of `DolpTpConnection.tpSdu`** [`DoIpTpConnection` shall only reference `PduTriggerings` of `DcmIPdus` or `UserDefinedIPdus` in the role `tpSdu`.

]()

**[constr\_3213] `TransformationISignalProps.csErrorReaction` setting in case that the `serializer transformerClass` and Client/Server communication is used** [In `TransformationISignalProps` the attribute `csErrorReaction` shall be set if the `TransformationISignalProps` specifies the details for a `TransformationTechnology` with `transformerClass` equal to `serializer` and the `ISignal` that aggregates the `TransformationISignalProps` transports a client/server communication.



|()

**[constr\_3214] TransformationISignalProps.csErrorReaction setting in case that a transformerClass different from serializer is used or the Client/Server communication is not used** [In TransformationISignalProps the attribute csErrorReaction shall not be used if the TransformationISignalProps specifies the details for a TransformationTechnology with transformerClass not equal to serializer or the ISignal that aggregates the TransformationISignalProps does not transport a client/server communication.

|()

**[constr\_3215] TransformationTechnology.version and TransformationTechnology.protocol settings for request and response of a client/server communication** [TransformationTechnology.version and TransformationTechnology.protocol shall be identical for ISignals that are derived from the same ClientServerOperation. This means that all ISignals that refer to ClientServerToSignalMapping.callSignal or to ClientServerToSignalMapping.returnSignal of the same ClientServerToSignalMapping shall have the same TransformationTechnology.protocol and TransformationTechnology.version defined.

|()

**[constr\_3216] Usage of SOMEIPTransformationISignalProps.sessionHandlingSR** [The attribute sessionHandlingSR of SOMEIPTransformationISignalProps shall only be used for ISignals which reference SystemSignals which are mapped via a SenderReceiverToSignalMapping.

|()

**[constr\_3218] Range of Size of Array Length Fields** [The value of attribute sizeofArrayLengthFields of SOMEIPTransformationISignalProps shall be either 0, 1, 2 or 4.

|()

**[constr\_3219] The mutual existence of LinSlaves in the LinMaster EcuExtract** [LinSlaves shall not be part of the EcuExtract of the corresponding LinMaster.

|()

**[constr\_3220] Range of Size of Structure Length Fields** [The value of attribute sizeofStructLengthFields of SOMEIPTransformationISignalProps shall be either 0, 1, 2 or 4.

|()

**[constr\_3221] Range of Size of Union Length Fields** [The value of attribute sizeofUnionLengthFields of SOMEIPTransformationISignalProps shall be either 0, 1, 2 or 4.

]()

**[constr\_3222] No `ByteOrderEnum.opaque` allowed for `PduToFrameMapping.packingByteOrder`** [The values of `PduToFrameMapping.packingByteOrder` are restricted to `ByteOrderEnum.mostSignificantByteFirst` and `ByteOrderEnum.mostSignificantByteLast`. I.e. the value `ByteOrderEnum.opaque` is not allowed.

]()

**[constr\_3223] No `ByteOrderEnum.opaque` allowed for `MultiplexedIPdu.selectorFieldByteOrder`** [The values of `MultiplexedIPdu.selectorFieldByteOrder` are restricted to `ByteOrderEnum.mostSignificantByteFirst` and `ByteOrderEnum.mostSignificantByteLast`. I.e. the value `ByteOrderEnum.opaque` is not allowed.

]()

**[constr\_3224] No `ByteOrderEnum.opaque` allowed for `SegmentPosition.segmentByteOrder`** [The values of `SegmentPosition.segmentByteOrder` are restricted to `ByteOrderEnum.mostSignificantByteFirst` and `ByteOrderEnum.mostSignificantByteLast`. I.e. the value `ByteOrderEnum.opaque` is not allowed.

]()

**[constr\_3225] `LinFrameTriggering.linChecksum` not allowed for `LinSporadicFrames`** [The `linChecksum` attribute of a `LinFrameTriggering` that references a `LinSporadicFrame` shall not be set.

]()

**[constr\_3226] `LinFrameTriggering.linChecksum` for `LinEventTriggeredFrames`** [Within a `PhysicalChannel` the `linChecksum` attribute of a `LinFrameTriggering` that references a `LinEventTriggeredFrame` shall have the same value as the `linChecksum` attribute of each `LinFrameTriggering` that references a `LinUnconditionalFrame` that in turn is referenced by that `LinEventTriggeredFrame`.

]()

**[constr\_3227] `NmNode.nmPassiveModeEnabled` setting** [`NmNode.nmPassiveModeEnabled` shall be set to the same value in all `NmClusters` with the same bus protocol in the scope of one `NmEcu`.

]()

**[constr\_3229] `SwComponentPrototype` mapped to an `ApplicationPartition` and `EcuInstance`** [If the `SwcToEcuMapping.ecuInstance` exists then a `SwComponentPrototype` that is mapped to an `ApplicationPartition` via the `SwcToApplicationPartitionMapping` shall only be mapped by an `Application-`

`PartitionToEcuPartitionMapping` to an `EcuPartition` that is aggregated by the `EcuInstance` referenced by means of `SwcToEcuMapping.ecuInstance`.

]()

**[constr\_3230] Usage of `SenderRecRecordElementMapping.applicationRecordElement`** [ `SenderRecRecordElementMapping.applicationRecordElement` shall only be used if the referenced context element (`VariableDataPrototype` that is referenced by the `SenderReceiverToSignalGroupMapping.dataElement`) is typed by an `ApplicationDataType`.

]()

**[constr\_3231] Usage of `IndexedArrayElement.applicationArrayElement`** [ `IndexedArrayElement.applicationArrayElement` shall only be used if the referenced context element (`VariableDataPrototype` that is referenced by the `SenderReceiverToSignalGroupMapping.dataElement`) is typed by an `ApplicationDataType`.

]()

**[constr\_3232] `ApplicationPartition` is allowed to be mapped to only one `EcuPartition`** [Each `ApplicationPartition` shall be mapped at most once to an `EcuPartition` via the `ApplicationPartitionToEcuPartitionMapping`.

]()

**[constr\_3239] Consistent mapping of software-component to `J1939NmNode`** [The value of attribute `J1939NmNode.nodeName.function` of a `J1939NmNode` referenced by `J1939ControllerApplicationToJ1939NmNodeMapping` in the role `j1939NmNode` shall be identical to the value of `J1939ControllerApplication.functionId`.

]()

**[constr\_3240] Consistent mapping of `J1939ControllerApplication` to `EcuInstance`** [A `SwComponentPrototype` that is referenced by a `J1939ControllerApplication` mapped to a specific `J1939NmNode` shall only be mapped to an `EcuInstance` that in turn owns the same `J1939NmNode`.

]()

**[constr\_3243] `FrameTriggering.pduTriggering` condition** [A `FrameTriggering` shall reference a `PduTriggering` if the `PduTriggering` references a `Pdu` that is referenced by a `PduToFrameMapping` which in turn is aggregated by the `Frame` that is referenced by that `FrameTriggering`.

]()

**[constr\_3244] Usage of `SenderRecRecordElementMapping.implementationRecordElement`** [ `SenderRecRecordElementMapping.implementationRecordElement` shall only be used if the referenced context element (

`VariableDataPrototype` that is referenced by the `SenderReceiverToSignalGroupMapping.dataElement`) is typed by an `ImplementationDataType`.

]()

**[constr\_3245] Usage of `IndexedArrayElement.implementationArrayElement`** [ `IndexedArrayElement.implementationArrayElement` shall only be used if the referenced context element (`VariableDataPrototype` that is referenced by the `SenderReceiverToSignalGroupMapping.dataElement`) is typed by an `ImplementationDataType`.

]()

**[constr\_3246] `Frame.packingByteOrder` mix within a `Frame` is not allowed** [All `PduToFrameMappings` within a `Frame` shall have the same `packingByteOrder` value.

]()

**[constr\_3247] Byte order mix within a `MultiplexedIPdu` is not allowed** [The `segmentByteOrder` of all `SegmentPositions` and the `selectorFieldByteOrder` shall have the same value in the `MultiplexedIPdu`.

]()

**[constr\_3248] Category of `HwElement` for `ECUMapping`** [The `HwElement` which is referenced from `ECUMapping` in the role `ecu` shall be of category `MicroController`

]()

**[constr\_3249] Category of `HwElement` for `SwcToEcuMapping`** [The `HwElement` which is referenced from `SwcToEcuMapping` in the role `processingUnit` shall be of category "ProcessingUnit".

]()

**[constr\_3250] `PduTriggering.iSignalTriggering` condition** [A `PduTriggering` shall reference an `ISignalTriggering` if the `ISignalTriggering` references an `ISignal` or an `ISignalGroup` that is referenced by an `ISignalToIPduMapping` which in turn is aggregated by the `Pdu` that is referenced by that `PduTriggering`.

]()

**[constr\_3251] Value of `GlobalTimeDomain.domainId` in `globalTimeSubDomain` chains** [In a chain of `GlobalTimeDomain.globalTimeSubDomain` the value of the attribute `GlobalTimeDomain.domainId` shall be identical.

]()

**[constr\_3252] `ISignalTriggering.iSignalPort` reference condition** [An `ISignalTriggering` shall only reference an `ISignalPort` if the `Communica-`

tionConnector aggregating that ISignalPort is referenced by the PhysicalChannel which in turn aggregates that ISignalTriggering.

]()

**[constr\_3253] PduTriggering.iPduPort reference condition** [A PduTriggering shall only reference an IPduPort if the CommunicationConnector aggregating that IPduPort is referenced by the PhysicalChannel which in turn aggregates that PduTriggering.

]()

**[constr\_3254] FrameTriggering.framePort reference condition** [A FrameTriggering shall only reference a FramePort if the CommunicationConnector aggregating that FramePort is referenced by the PhysicalChannel which in turn aggregates that FrameTriggering.

]()

**[constr\_3255] FrameTriggering.pduTriggering reference condition with regard to the PhysicalChannel** [A FrameTriggering shall only reference a PduTriggering in the role pduTriggering if both the FrameTriggering and PduTriggering are aggregated by the same PhysicalChannel.

]()

**[constr\_3256] PduTriggering.iSignalTriggering reference condition with regard to the PhysicalChannel** [A PduTriggering shall only reference an ISignalTriggering in the role iSignalTriggering if both the PduTriggering and ISignalTriggering are aggregated by the same PhysicalChannel.

]()

**[constr\_3257] TimeSyncTechnology of servers and clients in a time synchronized network.** [TimeSyncClientConfiguration.timeSyncTechnology shall have the same value as the TimeSyncServerConfiguration.timeSyncTechnology that is referenced in the TimeSyncClientConfiguration.orderedMaster list.

]()

**[constr\_3258] Restriction on ISignal.length in case iSignalType is set to array** [If ISignal.iSignalType is set to array then ISignal.length shall be a multiple of 8.

]()

**[constr\_3261] GlobalTimeDomain.pduTriggering category** [The Pdu that is referenced by the PduTriggering that in turn is referenced by GlobalTimeDomain in the role pduTriggering shall be a GeneralPurposePdu of category GLOBAL\_TIME.

]()

**[constr\_3262] ConsumedEventGroup.eventGroupIdentifier is mandatory** [The `ConsumedEventGroup.eventGroupIdentifier` is mandatory.

]()

**[constr\_3263] Restriction of usage of SwcToEcuMapping in a System** [For all `SwcToEcuMappings` in a `System` the following restriction applies: No two `SwcToEcuMappings` shall have the exact same reference to

- `SwComponentPrototype`
- `EcuInstance`
- `processingUnit`
- `controlledHwElement`

]()

**[constr\_3264] Server side ClientServerToSignalMappings in case of a n:1 inter-ECU client-server communication** [If within the `System` with category `SYSTEM_DESCRIPTION` or `SYSTEM_EXTRACT` the `ClientServerToSignalMappings` for inter-ECU n:1 client-server communication are placed on the provider (server) side, then each of these `ClientServerToSignalMappings` shall (in the hierarchy of `SwComponentPrototypes`) refer to a "unique communication path" w.r.t. the `EcuInstances` the client `SwComponentPrototypes` are mapped to.

]()

**[constr\_3265] TransformationTechnology.hasInternalState setting for an E2E transformer** [The value of `hasInternalState` shall be set to true for a `TransformationTechnology` with `transformerClass` set to `safety`.

]()

**[constr\_3266] TransformationTechnology.hasInternalState setting for a SOME/IP Transformer** [The value of `hasInternalState` shall be set to true for a SOME/IP Transformer if `SOMEIPTransformationISignalProps.sessionHandlingSR` for the `ISignal` is set to active.

]()

**[constr\_3267] PduTriggerings in Service Discovery StaticSocketConnections** [SD `StaticSocketConnections` defined in [TPS\_SYST\_02119] shall only refer to `PduTriggerings` which point to `GeneralPurposePdus` of category SD.

]()

**[constr\_3268] Service Discovery StaticSocketConnection aggregation by an ApplicationEndpoint** [Each SD `StaticSocketConnection` defined in [TPS\_SYST\_02119] shall be aggregated by an `ApplicationEndpoint` that defines a `UdpPort`.

|()

**[constr\_3269] Service Discovery `StaticSocketConnection` `remoteAddress` reference to a `TpPort`** [Each SD `StaticSocketConnection` defined in [TPS\_SYST\_02119] shall refer with the `remoteAddress` reference to an `ApplicationEndpoint` with Udp Port `portNumber` set to 0. This means that the port number is dynamically assigned at runtime.

|()

**[constr\_3270] Service Discovery `SocketConnection` `remoteAddress` reference to an IP Address** [Each SD `StaticSocketConnection` defined in [TPS\_SYST\_02119] shall refer with the `remoteAddress` reference to an `ApplicationEndpoint` that points to a `NetworkEndpoint` that defines an IP Address ANY (IPv4 or IPv6).

|()

**[constr\_3272] `SoConIPduIdentifier.headerId` setting for SD `StaticSocketConnections`** [The `SoConIPduIdentifier.headerId` of SD `StaticSocketConnections` defined in [TPS\_SYST\_02119] shall always be set to 0xFFFF8100 for SD messages.

|()

**[constr\_3273] Service Discovery multicast `StaticSocketConnection`'s aggregation by an `ApplicationEndpoint`** [The SD `StaticSocketConnection` for multicast defined in [TPS\_SYST\_02119] shall be aggregated by an `ApplicationEndpoint` that points to a `NetworkEndpoint` that defines an IP Multicast Address.

|()

**[constr\_3274] Service Discovery unicast `StaticSocketConnection`'s aggregation by an `ApplicationEndpoint`** [The SD `StaticSocketConnection` for unicast defined in [TPS\_SYST\_02119] shall be aggregated by an `ApplicationEndpoint` that points to a `NetworkEndpoint` that defines an IP Unicast Address.

|()

**[constr\_3276] Prohibition of usage of `allowedIPv6ExtHeaders` in IPv4 `SocketAddress`** [IPv4 `SocketAddress` shall not define `allowedIPv6ExtHeaders`. An IPv4 `SocketAddress` aggregates an `ApplicationEndpoint` that refers to a `NetworkEndpoint` that has an `Ipv4Configuration` as `networkEndpointAddress`.

|()

**[constr\_3277] Restriction of usage of `IPv6ExtHeaderFilterLists` in IPv6 `SocketAddress`** [All `SocketAddresses` related to the same IPv6 `NetworkEndpoint` shall all reference either no or exactly the same `IPv6ExtHeaderFilterList` with the `allowedIPv6ExtHeaders` attribute.

|()



**[constr\_3278] Usage of `SOMEIPTransformationProps.sizeOfArrayLengthField`** [The attribute `sizeOfArrayLengthField` of `SOMEIPTransformationProps` shall only be defined if the `DataPrototypeTransformationProps` is defined for a static size array according to [TPS\_SYST\_02121].

]()

**[constr\_3279] Usage of `SOMEIPTransformationProps.sizeOfStructLengthField`** [The attribute `sizeOfStructLengthField` of `SOMEIPTransformationProps` shall only be defined if the `DataPrototypeTransformationProps` is defined for a structure according to [TPS\_SYST\_02121].

]()

**[constr\_3280] Usage of `SOMEIPTransformationProps.sizeOfUnionLengthField`** [The attribute `sizeOfUnionLengthField` of `SOMEIPTransformationProps` shall only be defined if the `DataPrototypeTransformationProps` is defined for a union according to [TPS\_SYST\_02121].

]()

**[constr\_3281] Usage of `SOMEIPTransformationProps.alignment`** [The attribute `alignment` of `SOMEIPTransformationProps` shall only be defined if the `DataPrototypeTransformationProps` is defined for a variable data length data element according to [TPS\_SYST\_02121].

]()

**[constr\_3282] SOME/IP Transformation settings for arrays in the context of an `ISignal`** [In the context of an `ISignal` the usage of `DataPrototypeTransformationProps.transformationProps.sizeOfArrayLengthField` is only allowed if the `SOMEIPTransformationISignalProps.sizeOfArrayLengthFields` is not defined.

]()

**[constr\_3283] SOME/IP Transformation settings for structures in the context of an `ISignal`** [In the context of an `ISignal` the usage of `DataPrototypeTransformationProps.transformationProps.sizeOfStructLengthField` is only allowed if the `SOMEIPTransformationISignalProps.sizeOfStructLengthFields` is not defined.

]()

**[constr\_3284] SOME/IP Transformation settings for unions in the context of an `ISignal`** [In the context of an `ISignal` the usage of `DataPrototypeTransformationProps.transformationProps.sizeOfUnionLengthField` is only allowed if the `SOMEIPTransformationISignalProps.sizeOfUnionLengthFields` is not defined.

]()

**[constr\_3285] Alignment of variable data length data elements in the context of an ISignal** [The definition of `DataPrototypeTransformationProps.transformationProps.alignment` is only allowed if the `SOMEIPTransformationDescription.alignment` is not defined.

]()

**[constr\_3297] Prohibition of usage of `allowedTcpOptions` in Udp `SocketAddress`** [Udp `SocketAddress` shall not define `allowedTcpOptions`. A Udp `SocketAddress` aggregates an `ApplicationEndpoint` that has a `UdpTp` defined as `tpConfiguration`.

]()

**[constr\_3298] `Ipv6Configuration.ipv6Address` range in case of `enableAnycast`** [If `Ipv6Configuration.enableAnycast` is set to true then the `Ipv6Configuration.ipv6Address` needs to be in the unicast addressing range.

]()

**[constr\_3299] `SocketAddress.pathMtuDiscoveryEnabled` setting dependency** [`SocketAddress.pathMtuDiscoveryEnabled` shall only be set to TRUE if `EthernetCommunicationConnector.pathMtuEnabled` == TRUE.

]()

**[constr\_3311] Usage of `SocketAddress.flowLabel`** [`SocketAddress.flowLabel` shall only be used if the aggregated `ApplicationEndpoint` refers to a `NetworkEndpoint` with an `Ipv6Configuration`.

]()

**[constr\_3312] Consistency of `vlanPriority` and `EthernetCommunicationConnector`** [A `GlobalTimeEthMaster` refers to an `EthernetCommunicationConnector` in the role `communicationConnector`. If that `EthernetCommunicationConnector` is referenced by an `EthernetPhysicalChannel` in the role `commConnector` and the `EthernetPhysicalChannel` has a `vLan` tag defined via the `VlanConfig` then the `GlobalTimeDomain` of the `GlobalTimeEthMaster` shall aggregate `EthGlobalTimeDomainProps` in the role `globalTimeDomainProperty` and the attribute `EthGlobalTimeDomainProps.vlanPriority` shall exist.

]()

**[constr\_3313] E2E transformer configuration** [For each `TransformationDescription` variant that is a `EndToEndTransformationDescription`

- attribute `protocol` of `TransformationTechnology` shall be set to E2E
- attribute `version` of `TransformationTechnology` shall be set to 1.0.0
- attribute `transformerClass` of `TransformationTechnology` shall be set to `safety`

]()

**[constr\_3316] Allowed values for [EndToEndTransformationDescription.maxDeltaCounter](#) in PROFILE\_07, PROFILE\_08, PROFILE\_07m and PROFILE\_08m** [If the [EndToEndTransformationDescription.profileName](#) attribute has a value of PROFILE\_07, PROFILE\_08, PROFILE\_07m, or PROFILE\_08m the value of [maxDeltaCounter](#) attribute shall be in the range 1-4'294'967'295.

]()

**[constr\_3317] Assuring the same data interpretation on the sender and receiver sides in case of serialization based on the [ImplementationDataTypes](#)** [In order to assure the same interpretation of the serialized data by the SOME/IP transformers on the sender and receiver sides in case of serialization based on either a primitive or a composite [ImplementationDataType](#), the same [SwBaseType](#) shall be defined

- for this primitive [DataPrototype](#) or
- for each primitive [DataPrototype](#) of the leaf elements of the composite [DataPrototype](#) starting from the first element until and including the last element that is requested by the receiver,

by the [ImplementationDataTypes](#) that either types the corresponding [PortPrototypes](#) on the top level Software Composition of the communicating [EcuInstances](#), or it is mapped to the [ApplicationDataType](#) that types it.

]()

**[constr\_3318] Allowed use of [ISignal.networkRepresentationProps](#)** [If a reference from [ISignal](#) to [DataTransformation](#) in the role [dataTransformation](#) exists, this [ISignal](#) SHALL NOT aggregate [SwDataDefProps](#) in the role [networkRepresentationProps](#).

]()

**[constr\_3319] Existence of [DataPrototypeTransformationProps.networkRepresentationProps](#)** [[ISignal.transformationISignalProps.dataPrototypeTransformationProps.networkRepresentationProps](#) shall either

- not exist at all or
- shall be defined for all leaf elements of the root [DataPrototype](#) transmitted in the [ISignal](#)

]()

**[constr\_3322] Consistent setting of [SoConIPduIdentifier.pduCollectionSemantics](#) in the context of one [SocketAddress](#)** [The value of the attribute [SoConIPduIdentifier.pduCollectionSemantics](#) shall be identical for all referenced [SoConIPduIdentifiers](#) within the context of a given [SocketAddress](#).

]()

**[constr\_3323] Relation between `NmCluster.nmPncParticipation` and `PncMapping.pncGroup`** [If a `PncMapping` references an `ISignalIPduGroup` in role `pncGroup` which in turn

- contains (either directly or via one of its subordinate `ISignalIPduGroups` referenced in role `containedISignalIPduGroup`) `ISignalIPdus` that are referenced by a `PduTriggering` in role `ipdu` which in turn
- is composed by a `PhysicalChannel` in role `pduTriggering` which in turn
- is composed by `CommunicationCluster` in role `physicalChannel` which in turn
- is referenced by an `NmCluster` in role `communicationCluster`,

then this `NmCluster` shall have its `nmPncParticipation` attribute set to TRUE unless the `PhysicalChannel` is referenced in the role `managedPhysicalChannel`.

]()

**[constr\_3324] Category of `SecureCommunicationFreshnessProps` and `SecureCommunicationAuthenticationProps`** [`SecureCommunicationFreshnessProps` that is referenced by a `SecuredIPdu` in the role `freshnessProps` shall have the same `category` value as the `SecureCommunicationAuthenticationProps` that is referenced by the same `SecuredIPdu` in the role `authenticationProps`.

]()

**[constr\_3325] `SecureCommunicationFreshnessProps`, `SecureCommunicationAuthenticationProps` and `CryptoServicePrimitive` attribute values for predefined categories** [Table 2.31 defines applicable attribute values for security profiles that are standardized by AUTOSAR.

]()

Attributes	PROFILE_01	PROFILE_02	PROFILE_03
<code>algorithmFamily</code>	CRYPTO_ALGOFAM_AES	CRYPTO_ALGOFAM_AES	CRYPTO_ALGOFAM_AES
<code>algorithmMode</code>	CRYPTO_ALGOMODE_CMIC	CRYPTO_ALGOMODE_CMIC	CRYPTO_ALGOMODE_CMIC
<code>length</code>	128 bits	128 bits	128 bits
<code>authInfoTxLength</code>	24 bits	24 bits	28 bits
<code>freshnessValueLength</code>	Not specified	0 bits	64 bits
<code>freshnessValueTxLength</code>	8 bits	0 bits	4 bits

Table 2.31: Security Profiles that are standardized by AUTOSAR

**[constr\_3326] Allowed values for `EndToEndTransformationDescription.dataIdMode` in PROFILE\_11** [If the `EndToEndTransformationDescription`.`profileName` attribute has a value of PROFILE\_11 then the value of the `EndToEndTransformationDescription.dataIdMode` attribute shall be set to `all16Bit` or `lower12Bit`.

]()

**[constr\_3327] Effect of `EndToEndTransformationDescription.upperHeaderBitsToShift` value in `PROFILE_22`** [If the `EndToEndTransformationDescription.profileName` attribute has a value of `PROFILE_22` and the serializing transformer is different than the `ComBasedTransformer`, then `EndToEndTransformationDescription.offset` shall be set to the same value of `upperHeaderBitsToShift`.

]()

**[constr\_3328] `SomeipTpConnection.transportPdu` reference restriction** [A `PduTriggering` that is referenced by a `SomeipTpConnection` in the role `transportPdu` shall reference a `GeneralPurposeIPdu` with category `SOMEIP_SEGMENTED_IPDU` in the role `iPdu`.

]()

**[constr\_3329] `SomeipTpConnection.tpSdu` reference restriction** [A `PduTriggering` that is referenced by a `SomeipTpConnection` in the role `tpSdu` shall reference an `IPdu` in the role `iPdu`.

]()

**[constr\_3330] Same `transportPdu` shall not be used in different `SomeipTpConnections`** [A `PduTriggering` that is referencing a `GeneralPurposeIPdu` with category `SOMEIP_SEGMENTED_IPDU` in the role `iPdu` shall be referenced at most once by a `SomeipTpConnection` in the role `transportPdu`.

]()

**[constr\_3331] Standardized values for the attribute `category` of meta-class `EthernetCommunicationConnector`** [The following values of the attribute `category` of meta-class `EthernetCommunicationConnector` are reserved by the AUTOSAR standard:

- WIRED: This represents the usage of the `EthernetCommunicationConnector` in case of a wired ethernet connection
- WIRELESS: This represents the usage of the `EthernetCommunicationConnector` in case of a wireless ethernet connection

]()

**[constr\_3332] Standardized values for the attribute `category` of meta-class `EthernetCommunicationController`** [The following values of the attribute `category` of meta-class `EthernetCommunicationController` are reserved by the AUTOSAR standard:

- WIRED: This represents the usage of the `EthernetCommunicationController` in case of a wired ethernet connection

- WIRELESS: This represents the usage of the `EthernetCommunicationController` in case of a wireless ethernet connection

]()

**[constr\_3333] Standardized values for the attribute `category` of meta-class `EthernetPhysicalChannel`** [The following values of the attribute `category` of meta-class `EthernetPhysicalChannel` are reserved by the AUTOSAR standard:

- WIRED: This represents the usage of the `EthernetPhysicalChannel` in case of a wired ethernet connection
- WIRELESS: This represents the usage of the `EthernetPhysicalChannel` in case of a wireless ethernet connection

]()

**[constr\_3334] Allowed references between `EthernetPhysicalChannel` and `EthernetCommunicationConnector`** [An `EthernetPhysicalChannel` is only allowed to reference `EthernetCommunicationConnectors` in the role `commConnector` that have the same `category` value as the referencing `EthernetPhysicalChannel`.

]()

**[constr\_3335] Allowed references between `EthernetCommunicationConnector` and `EthernetCommunicationController`** [An `EthernetCommunicationConnector` is only allowed to reference an `EthernetCommunicationController` in the role `commController` that has the same `category` value as the referencing `EthernetCommunicationConnector`.

]()

**[constr\_3336] `EthernetPhysicalChannel.soAdConfig` in case of WIRELESS `EthernetPhysicalChannel`** [If `EthernetPhysicalChannel` has the `category` `WIRELESS` then the `EthernetPhysicalChannel` shall not aggregate the `SoAdConfig`.

]()

**[constr\_3337] `IPduPort.useAuthDataFreshness` is configurable on the receiver side** [The `IPduPort.useAuthDataFreshness` attribute shall only be used in `IPduPorts` with the `communicationDirection` = in.

]()

**[constr\_3338] `IPduPort.useAuthDataFreshness` validness** [The `IPduPort.useAuthDataFreshness` information is only valid for `SecuredIPdus`.

]()

**[constr\_3339] Relation between `authDataFreshnessStartPosition`, `authDataFreshnessLength` and `useAuthDataFreshness`** [If `authDataFresh-`

`nessStartPosition` and `authDataFreshnessLength` are set to a value for a `SecuredIPdu` then the `useAuthDataFreshness` shall be set as well to a value on all `IPduPorts` with `communicationDirection` = in that are referenced by a `PduTriggering` of the `SecuredIPdu`.

]()

**[constr\_3364] `headerLength` shall be a multiple of 8** [The header length in bits specified by `headerLength` shall be a multiple of 8.

]()

**[constr\_3365] `EthernetPhysicalChannels` with different `category` values are not allowed within an `EthernetCluster`** [A mix of `EthernetPhysicalChannels` with different `category` values within an `EthernetCluster` is currently not supported by AUTOSAR.

]()

**[constr\_3373] Limitation on the number of `PhysicalChannels` that are referencing a `CommunicationConnector`** [A `CommunicationConnector` shall only be referenced by at most one `PhysicalChannel`.

]()

**[constr\_3378] Maximal one `AliasNameAssignment` allowed per `FlatInstanceDescriptor`** [In a given instance of `AliasNameSet` in the bound system there shall be at most one `aliasName` per `FlatInstanceDescriptor`.

]()

**[constr\_3379] Multiple `SocketAddress` entries with the same IP Address, Protocol and Port in the context of a given `EcuInstance`** [If there are two or more `SocketAddress` entities within the scope of one `SoAdConfig` in the scope of one `EcuInstance` that have the same static (fixed at configuration time) IP Address, Protocol and Port in the aggregated `ApplicationEndpoint` and `NetworkEndpoint`, (e.g., 192.168.1.1, Tcp and 10000, respectively) then only one of these `SocketAddress` elements shall be referenced by `ProvidedServiceInstances/ConsumedServiceInstances` in the role `localUnicastAddress`.

]()

**[constr\_3383] Standardized values for the attribute `category` of meta-class `GeneralPurposeConnection`** [The following values of the attribute `category` of meta-class `GeneralPurposeConnection` are reserved by the AUTOSAR standard:

- `XcpChannel`

]()

**[constr\_3384] `PduTriggerings` referenced by `GeneralPurposeConnection` shall be defined on the same `PhysicalChannel`** [The `PduTriggerings` that are



referenced by the `GeneralPurposeConnection` in the role `pduTriggering` shall be defined on the same `PhysicalChannel`.

]()

**[constr\_3385] XcpChannel is allowed to reference exactly two PduTriggerings** [In case that the `category` of meta-class `GeneralPurposeConnection` is set to the value `XcpChannel` the `GeneralPurposeConnection` is allowed to reference exactly two `PduTriggerings` in the role `pduTriggering`.

]()

**[constr\_3386] XcpChannel is only allowed to reference PduTriggerings of GeneralPurposeIPdus with category XCP** [In case that the `category` of meta-class `GeneralPurposeConnection` is set to the value `XcpChannel` the `GeneralPurposeConnection` is allowed to reference `PduTriggerings` of `GeneralPurposeIPdus` with category `XCP`.

]()

**[constr\_3399] Existence of securedAreaOffset and securedAreaLength** [If the `securedAreaOffset` is defined then the `securedAreaLength` shall be defined as well and vice versa.

]()

**[constr\_3402] Mandatory offset if noHeader is used** [For each `IPdu` which is assigned to a `ContainerIPdu` in the role `ContainerIPdu.containedPduTriggering` or `ContainerIPdu.containedIPduTriggeringProps.containedPduTriggering` with `ContainerIPdu.headerType = noHeader` the `ContainerIPduProps.offset` shall be defined.

]()

**[constr\_3403] Usage of ContainerIPdu.rxAcceptContainedIPdu if noHeader is used** [If the `ContainerIPdu.headerType` is set to `noHeader` then the `ContainerIPdu.rxAcceptContainedIPdu` attribute value shall be set to `acceptConfigured`.

]()

**[constr\_3404] Usage of ContainedIPduProps.updateIndicationBitPosition** [`ContainedIPduProps.updateIndicationBitPosition` is only allowed to be set to a value if the `headerType` of the `ContainerIPdu` that contains the `IPdu` with `ContainerIPdu.containedPduTriggering` or `ContainerIPdu.containedIPduTriggeringProps.containedPduTriggering` is set to `noHeader`.

]()

**[constr\_3405] Dynamic Length IPdu inside of a static configured ContainerIPdu** [Only the last contained `IPdu` (according to the `ContainedIPduProps.offset`) of a `ContainerIPdu` with static container layout (i.e., a `ContainerIPdu` with

`headerType` set to `noHeader`) is allowed to be a dynamic length `IPdu` (i.e, a contained `IPdu` that at runtime may exhibit a length different from the one statically configured via `Pdu.length` of the respective `Pdu`). All other contained `IPdus` of a `ContainerIPdu` with static container layout have to be static length `IPdus`.

]()

**[constr\_3406] All signals before `authDataFreshnessStartPosition` shall have a static length** [In case that

- an `ISignalIPdu` is referenced by the `SecuredIPdu` with the `payload` reference via the `PduTriggering` and
- the `authDataFreshnessStartPosition` and `authDataFreshnessLength` define the area in the `ISignalIPdu` that is taken to verify and generate the Freshness then

all `ISignals` that are mapped into the `ISignalIPdu` in front of the configured `authDataFreshnessStartPosition` shall have a static length.

]()

**[constr\_3407] Freshness Value in Authentic `IPdu` is not allowed to be used in case of `ContainerIPdu` with a dynamic layout** [If a `ContainerIPdu` that is referenced by the `SecuredIPdu` with the `payload` reference via the `PduTriggering` contains a dynamic layout (i.e. `ContainerIPdu.headerType` is set to `longHeader` or `shortHeader`) and multiple contained `IPdus` then each `IPduPort` that is referenced by the `PduTriggering` of the `SecuredIPdu` shall have the attribute `useAuthDataFreshness` set to false.

]()

**[constr\_3435] Applicability of `CouplingPort.macMulticastAddress`** [The reference `CouplingPort.macMulticastAddress` is only applicable if the `CouplingPort` is aggregated by a `CouplingElement` with `couplingType` = `switch`.

]()

**[constr\_3436] Value range of `minimumTxContainerQueueSize` and `minimumRxContainerQueueSize`** [If defined, the value of `minimumTxContainerQueueSize` and `minimumRxContainerQueueSize` shall be in the range of 0..255.

]()

**[constr\_3437] `invalidValue` defined in the context of `ISignal`** [The definition of `SwDataDefProps.invalidValue` aggregated by an `ISignal` in the role `networkRepresentationProps` shall only be a `NumericalValueSpecification`, `TextValueSpecification` or `ArrayValueSpecification` that aggregates elements of type `NumericalValueSpecification` or `TextValueSpecification`.

]()

**[constr\_3438] timeoutSubstitutionValue defined in the context of ISignal** [The definition of an `timeoutSubstitutionValue` in the context of an `ISignal` shall only be a `NumericalValueSpecification`, `TextValueSpecification` or `ArrayValueSpecification` that aggregates elements of type `NumericalValueSpecification` or `TextValueSpecification`.

]()

**[constr\_3448] Restriction for usage of Pdu.hasDynamicLength** [The `Pdu.hasDynamicLength` attribute is only relevant for `UserDefinedPduS`, `UserDefinedIPduS`, `J1939DcmIPduS`.

]()

**[constr\_3454] Unique headerIdLongHeader for acceptConfigured** [For a `ContainerIPdu` with `ContainerIPdu.rxAcceptContainedIPdu = RxAcceptContainedIPduEnum.acceptConfigured` and `ContainerIPdu.headerType = longHeader` the following shall apply: All referenced `IPdus` (via `ContainerIPdu.containedPduTriggering` or `ContainerIPdu.containedIPduTriggeringProps.containedPduTriggering`) shall have a unique `ContainedIPduProps.headerIdLongHeader` within the scope of this `ContainerIPdu`.

]()

**[constr\_3455] Unique headerIdShortHeader for acceptConfigured** [For a `ContainerIPdu` with `ContainerIPdu.rxAcceptContainedIPdu = RxAcceptContainedIPduEnum.acceptConfigured` and `ContainerIPdu.headerType = shortHeader` the following shall apply: All referenced `IPdus` (via `ContainerIPdu.containedPduTriggering` or `ContainerIPdu.containedIPduTriggeringProps.containedPduTriggering`) shall have a unique `ContainedIPduProps.headerIdShortHeader` within the scope of this `ContainerIPdu`.

]()

**[constr\_3456] Existence of ProvidedServiceInstance.loadBalancingPriority and ProvidedServiceInstance.loadBalancingWeight** [The attributes `ProvidedServiceInstance.loadBalancingPriority` and `ProvidedServiceInstance.loadBalancingWeight` shall either not exist or be defined both.

]()

**[constr\_3457] Uniqueness of ConsumedEventGroup.eventGroupIdentifier in the scope of a ConsumedServiceInstance** [Each `ConsumedEventGroup` that is aggregated by a `ConsumedServiceInstance` shall have a unique `eventGroupIdentifier` value in the scope of the aggregating `ConsumedServiceInstance`.

]()

**[constr\_3458] FlatInstanceDescriptor.rtePluginProps shall only reference a EcucContainerValue representing a RteRipsPlugin** [`FlatInstanceDescriptor.rtePluginProps` shall only reference an `EcucContainerValue` which defines the identity of the RTE Implementation Plug-In. This re-

quires that the according `EcucContainerValue`'s `definition` references a `EcucContainerDef` having a `destinationUri` set to `/AUTOSAR/EcucDestinationUriDefSets/RteRipsUriDefSet/RteRipsPlugin`

]()

**[constr\_3459] Applicable `transferProperty` for group signal** [If the `ISignalToIPduMapping` refers to an `ISignal` in the role `iSignal` and this `ISignal` is referenced by an `ISignalGroup` in the role `iSignal` then the `ISignalToIPduMapping` of the `ISignal` shall either

- have `transferProperty` `pending` or `triggeredOnChange` defined, or
- have no `transferProperty` defined.

]()

**[constr\_3460] Full definition of `transferProperty` for group signal** [If at least one of the `ISignals` belonging to an `ISignalGroup` has a `transferProperty` defined (via their respective `ISignalToIPduMapping`) then all other `ISignals` belonging to the same `ISignalGroup` shall have a `transferProperty` defined as well.

]()

**[constr\_3461] `TransferProperty` for group signals if `ISignalGroup` has `transferProperty=pending`** [If the `ISignalToIPduMapping` refers to an `ISignalGroup` in the role `iSignalGroup` and the `transferProperty` is set to `pending` then the group signals of this `ISignalGroup` shall either

- have no `transferProperty` defined (via their respective `ISignalToIPduMapping`) or
- every `ISignal` belonging to the `ISignalGroup` shall have the `transferProperty=pending` defined.

]()

**[constr\_3464] Allowed Pdu type on `BusMirrorChannelMapping.targetChannel`** [Each `PduTriggering` that is referenced by `BusMirrorChannelMapping` in the role `targetPduTriggering` is only allowed to reference a `GeneralPurposeIPdu` of category `BUS_MIRRORING`.

]()

**[constr\_3465] Identical `BusMirrorChannel.busMirrorNetworkId` for `BusMirrorChannels` referencing the same `PhysicalChannel`** [The attribute `BusMirrorChannel.busMirrorNetworkId` shall be identical in all `BusMirrorChannels` that are referencing the same `PhysicalChannel` in the scope of the `System`.

]()

**[constr\_3466] Unique `BusMirrorChannel.busMirrorNetworkIds` for each specialization of `PhysicalChannel`** [The attribute `BusMirrorChannel.busMirrorNetworkId` associated with `PhysicalChannels` that have the same specialization (e.g. all `CanPhysicalChannels`) shall have unique `BusMirrorChannel.busMirrorNetworkIds` within the scope of the `System`].

]()

**[constr\_3467] `CanPhysicalChannel` as destination channel of `BusMirrorChannelMappingCan`** [The `BusMirrorChannel` that is aggregated by `BusMirrorChannelMappingCan` shall only reference a `CanPhysicalChannel` in the role `targetChannel`].

]()

**[constr\_3468] `BusMirrorChannelMappingCan.targetPduTriggering` restriction** [`BusMirrorChannelMappingCan` is allowed to reference only one single `PduTriggering` in the role `targetPduTriggering`].

]()

**[constr\_3469] `CanFrameTriggering.txMask` setting for the destination frame** [The `CanFrameTriggering` of a `Frame` that contains a `Pdu` of which the `PduTriggering` is referenced by `BusMirrorChannelMappingCan` in the role `targetPduTriggering` shall set the `txMask` to 0].

]()

**[constr\_3470] `PaddingValue` used to transmit the `Pdu` on a Can-Fd destination bus** [In case that the `BusMirrorChannelMappingCan` references a `PduTriggering` in the role `targetPduTriggering` and

- the `CanFrameTriggering` of the `Frame` that contains this `targetPduTriggering` has the `canFrameTxBehavior` set to `canFd` and
- the `CanFrameTriggering` has a reference to an “out” `FramePort` (i.e. the `Frame` is transmitted by an `Ecu` on a Can-Fd destination bus) and
- the `CommunicationController` of the transmitting `EcuInstance` that is referenced via the `CommunicationConnector` by the `PhysicalChannel` on which the `targetPduTriggering` is located then the `CanControllerFdConfiguration.paddingValue` or `CanControllerFdConfigurationRequirements.paddingValue` shall have the value 0.

]()

**[constr\_3471] `FlexrayPhysicalChannel` as destination channel of `BusMirrorChannelMappingFlexray`** [The `BusMirrorChannel` that is aggregated by `BusMirrorChannelMappingFlexray` shall only reference a `FlexrayPhysicalChannel` in the role `targetChannel`].

]()

**[constr\_3472] Number of `BusMirrorChannels` derived for one `FlexrayCluster`**  
[For each `FlexrayCluster`, only one `BusMirrorChannel` shall be derived. I.e. if both channels A and B are derived, only one of the two `FlexrayPhysicalChannels` of one `FlexrayCluster` shall be referenced by a `BusMirrorChannel` in the `System`.

]()

**[constr\_3473] `BusMirrorChannelMappingFlexray.targetPduTriggering` restriction**  
[The `FlexrayFrameTriggering` of a `Frame` that contains a `Pdu` of which the `PduTriggering` is referenced by `BusMirrorChannelMappingFlexray` in the role `targetPduTriggering` shall have the `allowDynamicLSduLength` attribute set to true.

]()

**[constr\_3474] `EthernetPhysicalChannel` as destination channel of `BusMirrorChannelMappingIp`**  
[The `BusMirrorChannel` that is aggregated by `BusMirrorChannelMappingIp` shall only reference an `EthernetPhysicalChannel` in the role `targetChannel`.

]()

**[constr\_3475] `BusMirrorChannelMappingIp.targetPduTriggering` restriction**  
[`BusMirrorChannelMappingIp` is allowed to reference only one single `PduTriggering` in the role `targetPduTriggering`.

]()

**[constr\_3476] `UserDefinedPhysicalChannel` as destination channel of `BusMirrorChannelMappingUserDefined`**  
[The `BusMirrorChannel` that is aggregated by `BusMirrorChannelMappingUserDefined` shall only reference a `UserDefinedPhysicalChannel` in the role `targetChannel`.

]()

**[constr\_3477] `BusMirrorChannelMappingUserDefined.targetPduTriggering` restriction**  
[`BusMirrorChannelMappingUserDefined` is allowed to reference only one single `PduTriggering` in the role `targetPduTriggering`.

]()

**[constr\_3479] `PhysicalChannel` is not allowed to be a `managedPhysicalChannel` and a managing `PhysicalChannel`**  
[If a `PhysicalChannel` is referenced in role `managedPhysicalChannel`, then it shall not be the source of another `managedPhysicalChannel` relation.

]()

**[constr\_3480] `PhysicalChannel` shall be referenced in the role `managedPhysicalChannel` only once**  
[A `PhysicalChannel` shall be referenced in the role `managedPhysicalChannel` only up to once.

|()

**[constr\_3481] UdpNmCluster is not allowed to reference a managedPhysicalChannel in the role vlan** [If an EthernetPhysicalChannel is target of a managedPhysicalChannel reference, then no UdpNmCluster shall reference this managedPhysicalChannel in the role vlan.

|()

**[constr\_3482] NmCluster is not allowed to reference a CommunicationCluster that aggregates a managedPhysicalChannel** [If a PhysicalChannel, except EthernetPhysicalChannel, is target of a managedPhysicalChannel, then the aggregating CommunicationCluster shall not be referenced by any NmCluster in the role communicationCluster.

|()

**[constr\_3484] PncMapping that refers a managedPhysicalChannel shall also refer the managing PhysicalChannel** [If a PncMapping refers to a PhysicalChannel (either directly in the role physicalChannel or indirectly by referencing an ISignalIPduGroup in the role pncGroup) and this PhysicalChannel is referenced in the role managedPhysicalChannel, then the according managing PhysicalChannel (the source of the managedPhysicalChannel reference) shall also be referenced by the PncMapping (either directly in the role physicalChannel or indirectly by referencing an ISignalIPduGroup in the role pncGroup).

|()

**[constr\_3488] Value range of ContainedIPduProps.priority** [If defined, the value of ContainedIPduProps.priority shall be in the range of 0..255.

|()

**[constr\_3489] ContainedIPduProps.priority is only applicable if a ContainerIPdu header is used** [ContainedIPduProps.priority is only applicable if the headerType of the ContainerIPdu is set to shortHeader or longHeader.

|()

**[constr\_3490] ContainedIPduProps.priority is only applicable if collectionSemantics is set to lastIsBest** [ContainedIPduProps.priority is only applicable if ContainedIPduProps.collectionSemantics is set to lastIsBest.

|()

**[constr\_3501] Role of SystemSignal in 1:n communication** [In case of 1:n communication the VariableDataPrototype in the PPortPrototype of the SwComponentPrototype shall be mapped to only one SystemSignal.

|()

**[constr\_3506] Mapping of composite data type to SystemSignals in SystemSignalGroup** [Either all or a subset of elements of a composite data type shall be



mapped to `SystemSignals` which shall be members of one `SystemSignalGroup` if no data transformation (except COM Based Transformer) is used.

There are two exceptions to this rule:

- it is allowed to map an array `VariableDataPrototype` consisting of `UINT8` elements to exactly one `SystemSignal` in the context of one `SenderReceiverToSignalMapping` (see [TPS\_SYST\_01037]).
- in case the COM Based Transformer [13] is used it is the integral part of the approach to have a fixed mapping of the individual elements of composite data types to `SystemSignals` in a `SystemSignalGroup` ([TPS\_SYST\_02058]).

]()

**[constr\_3508] Value of `nmReadySleepTime`** [The `nmReadySleepTime` value shall be a multiple of `cycle * nmRepetitionCycle`.

]()

**[constr\_3514] No two `ISignalToIPduMappings` shall reference the identical `ISignal`** [No two `ISignalToIPduMappings` shall reference the identical `ISignal` in the role `iSignal` in the scope of one System.

]()

**[constr\_3515] Fully filled `EthernetPriorityRegeneration` table** [In case the `CouplingPortDetails.ethernetPriorityRegeneration` is defined it shall contain exactly 8 elements of `EthernetPriorityRegeneration`, one for each value of `ingressPriority` (0-7).

]()

**[constr\_3516] limitation of `Frame.frameLength` for CAN L-PDUs** [The `Frame.frameLength` of CAN PDUs shall be restricted to 0..8 for classic CAN L-PDUs and 0..8, 12, 16, 20, 24, 32, 48, 64 for CAN FD L-PDUs.

]()

**[constr\_3517] Consistent setting of `ContainedIPduProps.collectionSemantics` in the context of one `ContainerIPdu`** [The value of the attribute `ContainedIPduProps.collectionSemantics` shall be identical for all contained IPdus within the context of a given `ContainerIPdu`.

]()

**[constr\_3518] Range of `CanControllerFdConfiguration.paddingValue` and `CanControllerFdConfigurationRequirements.paddingValue`** [The value given for `CanControllerFdConfiguration.paddingValue` and `CanControllerFdConfigurationRequirements.paddingValue` shall be in the range from 0 to 255.

]()

**[constr\_3519] Value of `category` of `GlobalTimeDomain`** [The attribute `category` of `GlobalTimeDomain` can have the following values:

- SYNCHRONIZED: this time base does not depend on the existence of another time base
- OFFSET: this time base depends on the existence of another time base. It delivers a value that represents an offset relative to the referenced (`GlobalTimeDomain.offsetTimeDomain`) synchronized time base.

]()

**[constr\_3520] Offset time domain shall be based on a synchronized time domain**

[If a `GlobalTimeDomain` has a reference with the role `GlobalTimeDomain.offsetTimeDomain` the reference source shall have a `GlobalTimeDomain.domainId` in the range of 16-31 and the reference target shall have a `GlobalTimeDomain.domainId` in the range of 0-15.

]()

**[constr\_3521] `defaultVlan` and `vlanMembership`** [If a `CouplingPort` refers to an `EthernetPhysicalChannel` in the role `defaultVlan` the `CouplingPort` shall also have a `vlanMembership` defined. This `VlanMembership` shall point to the same `EthernetPhysicalChannel` in the role `vlan` as the `defaultVlan`.

]()

**[constr\_3522] `vlanModifier` and `vlanMembership`** [If a `CouplingPort` refers to an `EthernetPhysicalChannel` in the role `vlanModifier` the `CouplingPort` shall also have a `vlanMembership` defined. This `VlanMembership` shall point to the same `EthernetPhysicalChannel` in the role `vlan` as the `vlanModifier`.

]()

**[constr\_3523] `CouplingPort` and `PncMapping` in the scope of an `EthernetPhysicalChannel`** [If

- a `CouplingPort` referring to an `EthernetPhysicalChannel` – via a `VlanMembership` – references at least one `PncMapping`
- and that `PncMapping` contains PDUs – via the assignment of `PncMapping.pncGroup` – that are transported on this `EthernetPhysicalChannel`

then every `CouplingPort` referring to that `EthernetPhysicalChannel` shall reference at least one `PncMapping` as well.

]()

**[constr\_3524] Definition of `couplingPortRole` on `CouplingPort` for managed `CouplingElement`** [A managed `CouplingElement` shall have either

- at most one `CouplingPort` with `couplingPortRole` set to `hostPort` or
- at least one `CouplingPort` with `couplingPortRole` set to `upLinkPort`.

]()

**[constr\_3525] Connection of `CouplingPort` with `couplingPortRole` set to `upLinkPort`** [A `CouplingPort` with `couplingPortRole` set to `upLinkPort` shall be connected to exactly one other `CouplingPort` with `couplingPortRole` set to `upLinkPort`.

]()

**[constr\_3533] `EndToEndTransformationISignalProps.dataLength` shall be a multiple of 8** [The value of `EndToEndTransformationISignalProps.dataLength`, `EndToEndTransformationISignalProps.maxDataLength`, and `EndToEndTransformationISignalProps.minDataLength` shall be a multiple of 8.

]()

**[constr\_3534] `EthernetPhysicalChannel` shall only be referenced by one `VlanMembership`** [An `EthernetPhysicalChannel` shall only be referenced by one `VlanMembership` in the role `VlanMembership.vlan` in the scope of one `CouplingPort`.

]()

**[constr\_3535] `EthernetCommunicationController` shall aggregate at most one `CouplingPort`** [An `EthernetCommunicationController` is allowed to aggregate at most one `CouplingPort`.

]()

**[constr\_3545] Mandatory reference to a `Pnc` in case of `partialNetwork`** [If the `SignalServiceTranslationProps.serviceControl` equals `partialNetwork` then the reference `SignalServiceTranslationProps.controlPnc` shall point to at least one `PncMappingIdent`.

]()

**[constr\_3546] Mandatory reference to a `ConsumedEventGroup` in case of `serviceControl`** [For a provided translated service instance, if the `SignalServiceTranslationProps.serviceControl` equals `serviceDiscovery` then the reference `SignalServiceTranslationProps.controlConsumedEventGroup` shall point to at least one `ConsumedEventGroup`.

]()

**[constr\_3548] EndToEnd profile for both ends of `safeTranslation`** [If the `SignalServiceTranslationEventProps.safeTranslation` equals `true` then both, the signal-based payload as well as the service-oriented payload shall have an EndTo profile defined.

]()

**[constr\_3549] Secure payload for both ends in case of `secureTranslation`** [If the `SignalServiceTranslationEventProps.secureTranslation` equals `true`

then both, the signal-based payload as well as the service-oriented payload shall have a secure communication defined.

]()

**[constr\_3559]{DRAFT} ConsumedServiceInstance.blacklistedVersion is restricted to the usage of minorVersion** [The `majorVersion` attribute shall not be used in the `SomeipServiceVersion` that is aggregated by the `ConsumedServiceInstance` in the role `blacklistedVersion`.

]()

**[constr\_3560]{DRAFT} minimumMinorVersion and ConsumedServiceInstance.minorVersion value** [The `ConsumedServiceInstance.minorVersion` shall not have the value `ANY` if `versionDrivenFindBehavior = minimumMinorVersion`.

]()

**[constr\_3600] Setting of EthernetCommunicationController.slaveActAsPassiveCommunicationSlave** [The attribute `EthernetCommunicationController.slaveActAsPassiveCommunicationSlave` may only be set to `TRUE`, if the following conditions apply:

- the `EthernetCommunicationController` is not referenced by any `NmNode` in the role `controller`
- the `EthernetCommunicationController` aggregates at least one `CouplingPort`
- the `couplingPortRole` of that `CouplingPort` is set to `standardPort`
- the `physicalLayerType` of that `CouplingPort` is set to either `_100BASE_T1` or `_1000BASE_T1`

In all other cases the attribute `slaveActAsPassiveCommunicationSlave` shall be set to `FALSE` or shall not be defined.

]()

**[constr\_3601] Mandatory attributes of EthernetWakeupSleepOnDatelineConfig** [The following attributes of `EthernetWakeupSleepOnDatelineConfig` shall be defined at the time when the COM Stack is generated:

- `wakeupLocalEnabled`
- `wakeupRemoteEnabled`

]()

**[constr\_3602] Existence of wakeupForwardLocalEnabled** [The attribute `wakeupForwardLocalEnabled` shall be defined if `wakeupRemoteEnabled` is set to `TRUE`.

]()

**[constr\_3603] Existence of `wakeupLocalDurationTime`** [The attribute `wakeupLocalDurationTime` shall be defined if `wakeupForwardLocalEnabled` is set to TRUE.

]()

**[constr\_3604] Existence of `wakeupForwardRemoteEnabled`** [The attribute `wakeupForwardRemoteEnabled` shall be defined if `wakeupLocalEnabled` is set to TRUE.

]()

**[constr\_3605] Existence of `wakeupLocalDetectionTime`** [The attribute `wakeupLocalDetectionTime` shall be defined if `wakeupForwardRemoteEnabled` is set to TRUE.

]()

**[constr\_3606] Values of `wakeupLocalDurationTime` and `wakeupLocalDetectionTime`** [If defined, then the value of `wakeupLocalDurationTime` shall be greater than the value of `wakeupLocalDetectionTime`.

]()

**[constr\_3607] Existence of `sleepRepetitionDelayOfSleepRequest`** [The attribute `sleepRepetitionDelayOfSleepRequest` shall be defined if `sleepRepetitionsOfSleepRequest` is defined and has a value greater than 0.

]()

**[constr\_3608] Existence of `wakeupRepetitionDelayOfWakeupRequest`** [The attribute `wakeupRepetitionDelayOfWakeupRequest` shall only be defined if `wakeupRepetitionsOfWakeupRequest` is defined and has a value greater than 0.

]()

**[constr\_3609] Values of `wakeupLocalDurationTime` in the context of a `CouplingElement`** [All `CouplingPorts` which have the reference `wakeupSleepOnDatalineConfig` defined and

- where the `CouplingPorts` are aggregated by the same `CouplingElement` and
- where the referenced `EthernetWakeupSleepOnDatalineConfig` has the attribute `wakeupLocalDurationTime` defined

shall refer to `EthernetWakeupSleepOnDatalineConfigs` where the value of `wakeupLocalDurationTime` is identical for all referencing `CouplingPorts`.

]()

**[constr\_3610] Values of `wakeupLocalDetectionTime` in the context of a `CouplingElement`** [All `CouplingPorts` which have the reference `wakeupSleepOnDatalineConfig` defined and

- where the `CouplingPorts` are aggregated by the same `CouplingElement` and
- where the referenced `EthernetWakeupSleepOnDatalineConfig` has the attribute `wakeupLocalDetectionTime` defined

shall refer to `EthernetWakeupSleepOnDatalineConfigs` where the value of `wakeupLocalDetectionTime` is identical for all referencing `CouplingPorts`.

]()

**[constr\_3611] Existence of `EthernetCommunicationController.slaveQualifiedUnexpectedLinkDownTime`** [The attribute `slaveQualifiedUnexpectedLinkDownTime` shall be defined if `slaveActAsPassiveCommunicationSlave` is set to TRUE.

]()

**[constr\_3615] Existence of `EthernetCluster.couplingPortSwitchoffDelay`** [The attribute `EthernetCluster.couplingPortSwitchoffDelay` shall be defined if at least one `EcuInstance` connected to that `EthernetCluster` has the attribute `ethSwitchPortGroupDerivation` set to TRUE.

]()

**[constr\_3616] Value of `EthernetCluster.couplingPortSwitchoffDelay`** [If defined, the value of `EthernetCluster.couplingPortSwitchoffDelay` shall be greater than `UdpNmCluster.nmNetworkTimeout` + `UdpNmCluster.nmWaitBusSleepTime` of the respective `EthernetCluster`.

]()

**[constr\_3617] Existence of `EthernetCluster.couplingPortStartupActiveTime`** [The attribute `EthernetCluster.couplingPortStartupActiveTime` shall be defined if at least one `EcuInstance` connected to that `EthernetCluster` has the attribute `ethSwitchPortGroupDerivation` set to TRUE.

]()

**[constr\_3618] Value of `EthernetCluster.couplingPortStartupActiveTime`** [If defined, the value of `EthernetCluster.couplingPortStartupActiveTime` shall be greater than `UdpNmCluster.nmNetworkTimeout` + `UdpNmCluster.nmWaitBusSleepTime` of the respective `EthernetCluster`.

]()

**[constr\_3620] `GlobalTimeDomain.networkSegmentId` only applicable to `GlobalTime` sub domains** [The aggregation `GlobalTimeDomain.networkSeg-`

`mentId` shall only be defined if the `GlobalTimeDomain` is itself referenced in the role `GlobalTimeDomain.globalTimeSubDomain`.

]()

**[constr\_3621] Value range of `GlobalTimeDomain.networkSegmentId`** [If defined, the value of `GlobalTimeDomain.networkSegmentId` shall be in the range 0..255.

]()

**[constr\_3651] No `element` in case `translationTarget` is primitive** [If `SignalServiceTranslationEventProps.translationTarget` refers to a `VariableDataPrototype` that is typed by a primitive `AutosarDataType` then the reference `SignalServiceTranslationElementProps.element` shall not be defined.

]()

**[constr\_3652] Allowed sub-classes of `DataPrototypeReference` in the context of signal/service translation** [If a `DataPrototypeReference` in the role `SignalServiceTranslationElementProps.element` is used then following sub-classes are supported:

- if the reference target is typed by an `ApplicationDataType` then the `DataPrototypeInSenderReceiverInterfaceInstanceRef` shall be used and shall target an `ApplicationCompositeElementDataPrototype`.
- if the reference target is typed by an `ImplementationDataType` then the `ImplementationDataTypeElementInPortInterfaceRef` shall be used.

]()

**[constr\_3653] Consistent `translationTarget` and `element` in case `ApplicationDataType` is used** [If the `SignalServiceTranslationEventProps.translationTarget` refers to a `VariableDataPrototype` that is typed by an `ApplicationDataType` (`targetDataPrototype` of the `VariableDataPrototypeInSystemInstanceRef`) then every `SignalServiceTranslationElementProps.element` reference that is defined in the context of the `SignalServiceTranslationEventProps` shall have that `VariableDataPrototype` as the `rootDataPrototypeInSr` of the `DataPrototypeInSenderReceiverInterfaceInstanceRef`.

]()

**[constr\_3654] Consistent `translationTarget` and `element` in case `ImplementationDataType` is used** [If the `SignalServiceTranslationEventProps.translationTarget` refers to a `VariableDataPrototype` that is typed by an `ImplementationDataType` (`targetDataPrototype` of the `VariableDataPrototypeInSystemInstanceRef`) then every `SignalServiceTranslationElementProps.element` reference that is defined in the context of the `SignalServiceTranslationEventProps` shall have that `VariableDataPrototype` as the



`rootDataPrototype` of the `ImplementationDataTypeElementInPortInterfaceRef`.

⌋()

**[constr\_3655] Supported filter types for primitive `SignalServiceTranslationElementProps`** [If the target for `SignalServiceTranslationElementProps` is defined as primitive according to [TPS\_SYST\_03062] then the following values for `dataFilterType` are supported:

- `always`
- `maskedNewDiffersMaskedOld`
- `maskedNewDiffersX`
- `maskedNewEqualsX`
- `never`
- `newIsOutside`
- `newIsWithin`
- `oneEveryN`.

⌋()

**[constr\_3656] Supported filter types for composite `SignalServiceTranslationElementProps`** [If the target for `SignalServiceTranslationElementProps` is defined as composite according to [TPS\_SYST\_03062] then the following values for `dataFilterType` are supported:

- `always`
- `never`
- `oneEveryN`.

⌋()

**[constr\_3668] Existence of `TlsCryptoCipherSuite.cipherSuiteShortLabel`** [If a `TlsCryptoCipherSuite.cipherSuiteShortLabel` is defined then:

- the attribute `TlsCryptoCipherSuite.cipherSuiteId` shall be defined as well
- the value of `TlsCryptoCipherSuite.cipherSuiteShortLabel` shall match the *Description* value corresponding to the *Value* field defined in `TlsCryptoCipherSuite.cipherSuiteId` according to `TlsCryptoCipherSuite` Parameter set defined in [15].

⌋()

**[constr\_3669] eventMulticastSubscriptionAddress** shall refer to a **multicast address** [The reference `ConsumedServiceInstance.eventMulticastSubscriptionAddress` shall refer to an `ApplicationEndpoint` which in turn refers to a `NetworkEndpoint` that represents a multicast address.

]()

**[constr\_3670] No support for parallel localUnicastAddress and eventMulticastSubscriptionAddress** [If a `eventMulticastSubscriptionAddress` is defined for a `ConsumedServiceInstance` then there shall not be a `localUnicastAddress` defined at the same `ConsumedServiceInstance`.

]()

**[constr\_3671] remoteMulticastSubscriptionAddress** shall refer to a **multicast address** [The reference `ProvidedServiceInstance.remoteMulticastSubscriptionAddress` shall refer to an `ApplicationEndpoint` which in turn refers to a `NetworkEndpoint` that represents a multicast address.

]()

**[constr\_3672] No support for methods in multicast subscription at the client** [If a `ConsumedServiceInstance` aggregates a `PduActivationRoutingGroup` in the role `methodActivationRoutingGroup`, then the `ConsumedServiceInstance` shall not define a `eventMulticastSubscriptionAddress`.

]()

**[constr\_3673] No support for methods in multicast subscription at the server static configuration** [If a `ProvidedServiceInstance` aggregates a `PduActivationRoutingGroup` in the role `methodActivationRoutingGroup`, then the `ProvidedServiceInstance.remoteMulticastSubscriptionAddress` shall not be defined.

]()

**[constr\_3685] Allowed values for each element of pncFilterArrayMask** [The value for each element of `CommunicationConnector.pncFilterArrayMask` shall be in the range between 0 and 255.

]()

**[constr\_3686] Allowed number of entries for pncFilterArrayMask** [The number of `CommunicationConnector.pncFilterArrayMask` elements shall be:

- `NmCluster.pncClusterVectorLength`, if defined
- `System.pncVectorLength`, otherwise.

]()

**[constr\_3687] Limited value range for `NmCluster.pncClusterVectorLength`** [The value of `NmCluster.pncClusterVectorLength` shall be equal or smaller than `System.pncVectorLength`.]

]()

**[constr\_4000] Local communication of mode switches** [Ports with `ModeSwitch-Interfaces` cannot be connected across ECU boundaries.]

]()

**[constr\_5029] `J1939NmCluster` is not allowed to reference a `TtcanCluster`** [A `J1939NmCluster` is not allowed to reference a `TtcanCluster` in the role `communicationCluster`.]

]()

**[constr\_5030] Uniqueness of `LinOrderedConfigurableFrame.index`** [ `LinOrderedConfigurableFrame.index` shall always be set and be unique in the context of the aggregating `LinCommunicationConnector`.]

]()

**[constr\_5031] Uniqueness of `FramePid.index`** [`FramePid.index` shall always be set and be unique in the context of the aggregating `AssignFrameIdRange`.]

]()

**[constr\_5032] Maximal one `NmConfig` per `System` is allowed to be defined** [Each `System` element is allowed to reference at most one `NmConfig` element with the `fibexElement` reference.]

]()

**[constr\_5049] Ethernet switch packet to traffic class assignment restriction** [For one `CouplingPortDetails` there exists either

- one `ethernetTrafficClassAssignment` with no `priority` attribute or
- up to 8 `ethernetTrafficClassAssignment` elements with a set of `priority` attributes

]()

**[constr\_5050] `VariableDataPrototype` of COM Based Transformer** [The `VariableDataPrototype` of [TPS\_SYST\_02058] shall be typed by an `Application-RecordDataType` or an `ImplementationDataType` of category STRUCTURE.]

]()

**[constr\_5051] Existence of `CanFrameTriggering.identifier` in case of bus mirror target** [The `CanFrameTriggering` of a `Frame` that contains a `Pdu` of which the `PduTriggering` is referenced by `BusMirrorChannelMappingCan` in the role `targetPduTriggering` shall not define an `identifier`.]

]()

**[constr\_5053] Existence of `ISignalPort.handleInvalid`** [If the `ISignalPort` has a `networkRepresentationProps.invalidValue` defined then the `ISignalPort.communicationDirection` shall equal `in`.

]()

**[constr\_5054] `externalReplacement` not applicable for `ISignalPort.handleInvalid`** [In the context of `ISignalPort.handleInvalid` the value `externalReplacement` shall not be used.

]()

**[constr\_5055] `DataMapping` of elements of `PRPortPrototypes` is not supported** [A `DataMapping` shall not map elements of `PRPortPrototypes` to `SystemSignals`

]()

**[constr\_5058] Value range for `CryptoServiceQueue.queueSize`** [If the `CryptoServiceQueue.queueSize` is defined it shall have a value which is equal or greater than 1.

]()

**[constr\_5060] Mapping of a `SecuredIPdu` into a `LinFrame` is not allowed** [The mapping of a `SecuredIPdu` into a `LinFrame` with a `PduToFrameMapping` is not allowed.

]()

**[constr\_5061] `EthernetCommunicationConnectors` and referencing `SocketAddresses` shall be in the same VLAN** [Each `EthernetCommunicationConnector` that is referenced by a `SocketAddress` in the role `connector` or `multicastConnector` shall be referenced by the same `EthernetPhysicalChannel` that aggregates the `SoAdConfig` that in turn aggregates the `SocketAddress`.

]()

**[constr\_5062] SOME/IP `ProvidedServiceInstances` of the same serviceInterface on one `EcuInstance`** [Different `ProvidedServiceInstances` with the same `serviceIdentifier` and the same `majorVersion` and different `instanceIdentifiers` shall not be mapped to the same UDP/TCP port number and IP address combination that is represented by referenced `ApplicationEndpoint` and its referenced `NetworkEndpoint`.

]()

**[constr\_5063] `ProvidedServiceInstance.serviceIdentifier` is mandatory** [The `ProvidedServiceInstance.serviceIdentifier` is mandatory.

]()

[constr\_5064] **ProvidedServiceInstance.majorVersion** is mandatory [The `ProvidedServiceInstance.majorVersion` is mandatory.

]()

[constr\_5065] **ProvidedServiceInstance.minorVersion** is mandatory [The `ProvidedServiceInstance.minorVersion` is mandatory.

]()

[constr\_5066] **ProvidedServiceInstance.instanceIdentifier** is mandatory [The `ProvidedServiceInstance.instanceIdentifier` is mandatory.

]()

[constr\_5067] **ProvidedServiceInstance** shall be unique in respect of **serviceIdentifier**, **instanceIdentifier**, **majorVersion** [On a VLAN each `ProvidedServiceInstance` shall have a different `serviceIdentifier`, `instanceIdentifier` and `majorVersion` value combination.

]()

[constr\_5068] **ProvidedServiceInstance.localUnicastAddress** shall be IP Unicast [If defined, the `ProvidedServiceInstance.localUnicastAddress` shall point to an IP Unicast address.

]()

[constr\_5069] **ProvidedServiceInstance.remoteUnicastAddress** shall be IP Unicast [The `ProvidedServiceInstance.remoteUnicastAddress` shall point to an IP Unicast address.

]()

[constr\_5071] **EventHandler.eventMulticastAddress** reference target [The `ApplicationEndpoint` that is referenced by an `EventHandler` in the role `eventMulticastAddress` shall reference a `NetworkEndpoint` that defines an IP Multicast Address.

]()

[constr\_5072] **EventHandler** without defined **eventMulticastAddress** [If an `EventHandler` that is aggregated by a `ProvidedServiceInstance` does not have a defined `eventMulticastAddress` then the `multicastThreshold` shall be set to the value 0 (IP Unicast only).

]()

[constr\_5073] **PduActivationRoutingGroup** with **eventGroupControlType** set to **activationUnicast** or **triggerUnicast** or **activationAndTriggerUnicast** that is aggregated by an **EventHandler** [An `EventHandler` that aggregates a `PduActivationRoutingGroup` with the `PduActivationRoutingGroup.eventGroupControlType` set to `activationUnicast` or `triggerUni-`

cast or activationAndTriggerUnicast shall be aggregated by a `ProvidedServiceInstance` that has a `localUnicastAddress` reference that points to an IP Unicast Address.

]()

**[constr\_5074] `PduActivationRoutingGroup` with `eventGroupControlType` set to `activationMulticast` that is aggregated by an `EventHandler`** [An `EventHandler` that aggregates a `PduActivationRoutingGroup` with the `PduActivationRoutingGroup.eventGroupControlType` set to `activationMulticast` shall have an `eventMulticastAddress` reference that points to a “remote” IP Multicast Address. The `ProvidedServiceInstance` that aggregates the `EventHandler` shall have a `localUnicastAddress` reference to a “local” UDP `ApplicationEndpoint`.

]()

**[constr\_5075] Allowed references of `SoConIPduIdentifiers` by `PduActivationRoutingGroup` with `eventGroupControlType` set to `activationMulticast` and allowed `SoConIPduIdentifier` references** [A `PduActivationRoutingGroup` with `eventGroupControlType` set to `activationMulticast` is allowed to reference `SoConIPduIdentifiers` only in the `ipduIdentifierUdp` role.

]()

**[constr\_5076] `PduActivationRoutingGroup` with `ipduIdentifierTcp` reference that is aggregated by a `ProvidedServiceInstance`** [If the `PduActivationRoutingGroup` contains the `ipduIdentifierTcp` reference then the aggregating `ProvidedServiceInstance` shall contain a `localUnicastAddress` reference to an `ApplicationEndpoint` that defines a TCP address.

]()

**[constr\_5077] `PduActivationRoutingGroup` with `ipduIdentifierUdp` reference that is aggregated by a `ProvidedServiceInstance`** [If the `PduActivationRoutingGroup` contains the `ipduIdentifierUdp` reference then the aggregating `ProvidedServiceInstance` shall contain a `localUnicastAddress` reference to an `ApplicationEndpoint` that defines a UDP address.

]()

**[constr\_5078] `PduTriggerings` referenced by a `PduActivationRoutingGroup` shall be on the same VLAN as the referencing `PduActivationRoutingGroup`** [Each `PduTriggering` referenced by a `PduActivationRoutingGroup` via `SoConIPduIdentifier` shall be aggregated by the same VLAN (`EthernetPhysicalChannel`) to which the `AbstractServiceInstance` that aggregates the `PduActivationRoutingGroup` belongs via the `localUnicastAddress`.

]()

**[constr\_5079] Service communication is restricted to one VLAN** [All `SocketAddress` elements that are referenced by a `AbstractServiceInstance` with the `localUnicastAddress` and `remoteUnicastAddress` shall belong to the same VLAN (`EthernetPhysicalChannel`).

]()

**[constr\_5080] `ApplicationEndpoints` referenced by `EventHandlers` and by the aggregating `ProvidedServiceInstance` shall be in the same VLAN** [The `ApplicationEndpoint` that is referenced by an `EventHandler` in the role `event-MulticastAddress` shall belong to the same VLAN (`EthernetPhysicalChannel`) as the `ApplicationEndpoint` that is referenced by the `localUnicastAddress` reference from the `ProvidedServiceInstance` that aggregates the `EventHandler`.

]()

**[constr\_5081] `ConsumedServiceInstance.serviceIdentifier` is mandatory** [The `ConsumedServiceInstance.serviceIdentifier` is mandatory.

]()

**[constr\_5082] `ConsumedServiceInstance.majorVersion` is mandatory** [The `ConsumedServiceInstance.majorVersion` is mandatory.

]()

**[constr\_5083] `ConsumedServiceInstance.minorVersion` is mandatory** [The `ConsumedServiceInstance.minorVersion` is mandatory.

]()

**[constr\_5084] `ConsumedServiceInstance.instanceIdentifier` is mandatory** [The `ConsumedServiceInstance.instanceIdentifier` is mandatory.

]()

**[constr\_5085] `ConsumedServiceInstance.localUnicastAddress` shall be IP Unicast** [If defined, the `ConsumedServiceInstance.localUnicastAddress` shall point to an IP Unicast address.

]()

**[constr\_5086] `ConsumedServiceInstance.remoteUnicastAddress` shall be IP Unicast** [The `ConsumedServiceInstance.remoteUnicastAddress` shall point to an IP Unicast address.

]()

**[constr\_5087] `PduActivationRoutingGroup` with `eventGroupControlType` set to `activationUnicast` or `triggerUnicast` or `activationAndTriggerUnicast` that is referenced by a `ConsumedEventGroup`** [A `ConsumedEventGroup` that aggregates a `PduActivationRoutingGroup` with the `PduActiva-`



`tionRoutingGroup.eventGroupControlType` set to `activationUnicast` or `triggerUnicast` or `activationAndTriggerUnicast` shall be aggregated by a `ConsumedServiceInstance` that has a `localUnicastAddress` reference that points to an IP Unicast Address.

]()

**[constr\_5088] `PduActivationRoutingGroup` with `iPduIdentifierTcp` reference that is aggregated by a `ConsumedServiceInstance`** [If the `PduActivationRoutingGroup` contains the `iPduIdentifierTcp` reference then the aggregating `ConsumedServiceInstance` shall contain a `localUnicastAddress` reference to an `ApplicationEndpoint` that defines a TCP address.

]()

**[constr\_5089] `PduActivationRoutingGroup` with `iPduIdentifierUdp` reference that is aggregated by a `ConsumedServiceInstance`** [If the `PduActivationRoutingGroup` contains the `iPduIdentifierUdp` reference then the aggregating `ConsumedServiceInstance` shall contain a `localUnicastAddress` reference to an `ApplicationEndpoint` that defines a UDP address.

]()

**[constr\_5090] `ApplicationEndpoints` referenced by `ConsumedEventGroups` and by the aggregating `ConsumedServiceInstance` shall be in the same VLAN** [The `ApplicationEndpoint` that is referenced by an `ConsumedEventGroup` in the role `eventMulticastAddress` shall belong to the same VLAN (`EthernetPhysicalChannel`) as the `ApplicationEndpoint` that is referenced by the `localUnicastAddress` reference from the `ConsumedServiceInstance` that aggregates the `ConsumedEventGroup`.

]()

**[constr\_5091] Relevance of `tcpRole` attribute** [The attribute `tcpRole` is only relevant if the `StaticSocketConnection` is aggregated by a `SocketAddress` that defines a TCP Port in the aggregated `ApplicationEndpoint`.

]()

**[constr\_5092] Local and remoteAddress of a `StaticSocketConnection` shall define the same transport protocol** [The transport protocol that is defined by the `SocketAddress` that aggregates the `StaticSocketConnection` shall be the same in the `SocketAddress` that is referenced by the same `StaticSocketConnection` in the role `remoteAddress`.

]()

**[constr\_5093] `pncGatewayType` and `PhysicalChannel`** [When multiple `CommunicationConnectors` with `pncGatewayType` set to a value other than `none` are referenced by the same `PhysicalChannel` then only up to one `CommunicationConnector` shall have the `pncGatewayType` set to `active`.

]()

**[constr\_5094] pncGatewayType and ECU** [When an ECU is connected to more than one `PhysicalChannel` and has a relation to a Partial Network then all `CommunicationConnectors` of this ECU where this Partial Network is related to shall have the `pncGatewayType` value either set to `none` or to a value different than `none` (i.e. `active` or `passive`).

]()

**[constr\_5095] Relationship between the timing behavior of the ConsumedEventGroup retry and the timing behavior of an Offer message** [The timing behavior for a retry to a `ConsumedEventGroup` (`subscribeEventgroupRetryMax`, `subscribeEventgroupRetryDelay`) shall not overlap to the timing behavior (`SomeipSdServerServiceInstanceConfig.offerCyclicDelay`) of the corresponding `ProvidedServiceInstance`.

]()

**[constr\_5096] ConsumedEventGroup with value subscribeEventgroupRetryMax set to 255** [Retry to a `ConsumedEventGroup` with value `subscribeEventgroupRetryMax` set to 255 is only allowed if the `SomeipSdServerServiceInstanceConfig.offerCyclicDelay` is set 0 and `serviceOfferTimeToLive` is set to 0xffffffff of the corresponding `ProvidedServiceInstance`.

]()

**[constr\_5097] DltLogChannel.txPduTriggering and DltLogChannel.rxPduTriggering** shall point to **GeneralPurposeIPdus** of category DLT [DltLogChannel shall only reference `PduTriggerings` that are pointing to `GeneralPurposeIPdus` of category DLT in the roles `txPduTriggering` and `rxPduTriggering`.

]()

**[constr\_5100] Compatibility of two MetaDataItemSets** [Under the condition that sender and receiver typed by a `SenderReceiverInterface` use meta-data and are mapped to the same `EcuInstance` the following condition applies: two `MetaDataItemSets` are compatible if all of the following conditions are fulfilled:

- They aggregate the same number of `MetaDataItems`.
- The value of `MetaDataItem.length` of corresponding `MetaDataItems` is identical.
- The value of `MetaDataItem.metaDataItemType` of corresponding `MetaDataItems` is identical.

]()

**[constr\_5101] Consistent Definition of meta-data** [If the `dataElement` referenced by a `SenderReceiverToSignalMapping` is also referenced by a `MetaDataItem-`

Set in the role `dataElement` and the mapping via `SystemSignal`, `ISignal`, and `ISignalToIPduMapping` down to an `ISignalIPdu` exists then all other `dataElements` that are also mapped to the same `ISignalIPdu` shall either

- not be referenced by a `MetaDataSet` in the role `dataElement` (i.e. does not make use of meta-data) or
- the definition of meta-data in the context of the affected `SenderReceiverInterfaces` is compatible (according to the definition of compatible specification of meta-data described in [constr\_5100]).

]()

**[constr\_5104] Assignment of a `FlexrayFrame` where `allowDynamicLSduLength` is set to true** [ `FlexrayFrames` which are referenced by a `FlexrayFrameTriggering` where `allowDynamicLSduLength` is set to true shall always be assigned to the dynamic segment.

]()

**[constr\_5105] Mapping of `Pdu` with dynamic length in a `FlexrayFrame`** [Only the last `Pdu` in a `FlexrayFrame` is allowed to be a `Pdu` with `hasDynamicLength` = true.

]()

**[constr\_5106] `ISignalGroup` and `ISignal` referenced from `ISignalTriggering`** [Either an `ISignalGroup` and all `ISignals` referenced from the `ISignalGroup` are also referenced from `ISignalTriggerings` aggregated at the same `PhysicalChannel` or neither the `ISignalGroup` nor any of the `ISignals` referenced by the `ISignalGroup` shall be referenced from `ISignalTriggerings`.

]()

**[constr\_5110] Search for a collection of `ServiceInstances` is not supported** [The `ConsumedServiceInstance.instanceIdentifier` is not allowed to be set to the value ANY or ALL.

]()

**[constr\_5111] Existence of references `TlvDataIdDefinition.tlvArgument`, `TlvDataIdDefinition.tlvRecordElement`, and `TlvDataIdDefinition.tlvImplementationDataTypeElement`** [For each `TlvDataIdDefinition`, only one out of the following references shall exist:

- reference to `ArgumentDataPrototype` in the role `tlvArgument`
- reference to `ApplicationRecordElement` in the role `tlvRecordElement`
- reference to `ImplementationDataTypeElement` in the role `tlvImplementationDataTypeElement`.

]()

**[constr\_5112] `ImplementationDataType` needs to be defined if a “new-world” variable-size `ApplicationArrayDataType` is mapped to a single `SystemSignal`** [A `SenderReceiverInterface.dataElement` that is typed by a “new-world” variable-size `ApplicationArrayDataType` according to [TPS\_SWCT\_01644] (see definition in Software Component Template [2]) is only allowed to be mapped to a single `SystemSignal` by the `SenderReceiverToSignalMapping` if a `DataTypeMap` exists that points to both the `ApplicationArrayDataType` and an `ImplementationDataType` that fulfills the conditions of a “new-world” dynamic size array data type according to [TPS\_SWCT\_01645] (see definition in Software Component Template [2]).

]()

**[constr\_5113] Mapping of “old-world” variable size arrays to a single `SystemSignal` is not supported.** [The `SenderReceiverToSignalMapping` is not allowed to map a `dataElement` that is typed by an “old-world” variable size array defined by [TPS\_SWCT\_01641] and [TPS\_SWCT\_01642] (see definition in Software Component Template [2]) to a single `SystemSignal`.

]()

**[constr\_5114] Semantics of `InterpolationRoutine.isDefault`** [For each `SwRecordLayout` that is referenced by one or more `InterpolationRoutineMappings` that are aggregated by `InterpolationRoutineMappingSets` that are referenced from a `System` in the role `interpolationRoutineMappingSet`, only one of the collection of aggregated `InterpolationRoutines` shall have attribute `isDefault` set to `True`.

]()

**[constr\_5116] Uniqueness of the symbols of software-components and BSW modules** [For all `SwComponentPrototypes` typed by an `ApplicationSwComponentType`, `NvBlockSwComponentType` or `SensorActuatorSwComponentType` mapped to a given `EcuInstance` by means of `SwcToEcuMapping` respectively `SwcToApplicationPartitionMapping` and `ApplicationPartitionToEcuPartitionMapping` the following restriction applies:

The symbolic name of an `AtomicSwComponentType` referenced by a respective `SwComponentPrototype` in the role `type` shall not overlap with the module implementation prefix (MIP) of any of the basic software-modules existing on the `EcuInstance`.

The symbolic name of an `AtomicSwComponentType` is derived from the value of

- `AtomicSwComponentType.symbol`, or if this attribute does not exist
- `AtomicSwComponentType.shortName`.

]()

**[constr\_5117] Client-Server communication over Ethernet** [A `SystemSignal` that is referenced by a `ClientServerToSignalMapping` in the role `callSignal` or

`returnSignal` shall only be referenced by an `ISignal` that in turn is referenced by an `ISignalTriggering` aggregated by an `EthernetPhysicalChannel`.

]()

**[constr\_5118] Value range of `UdpProps.udpTtl`** [If defined, the value of `UdpProps.udpTtl` shall be in the range of 1..255.

]()

**[constr\_5119] Value range of `TcpProps.tcpTtl`** [If defined, the value of `TcpProps.tcpTtl` shall be in the range of 1..255.

]()

**[constr\_5120] Value range of `TcpProps.tcpDelayedAckTimeout`** [If defined, the value of `TcpProps.tcpDelayedAckTimeout` shall be in the range of 0..0.5.

]()

**[constr\_5121] Value range of `TcpProps.tcpSynMaxRtx`** [If defined, the value of `TcpProps.tcpSynMaxRtx` shall be in the range of 0..255.

]()

**[constr\_5122] Value range of `TcpProps.tcpMaxRtx`** [If defined, the value of `TcpProps.tcpMaxRtx` shall be in the range of 0..255.

]()

**[constr\_5123] Value range of `TcpProps.tcpKeepAliveProbesMax`** [If defined, the value of `TcpProps.tcpKeepAliveProbesMax` shall be in the range of 0..65535.

]()

**[constr\_5124] Value range of `TcpProps.tcpReceiveWindowMax`** [If defined, the value of `TcpProps.tcpReceiveWindowMax` shall be in the range of 0..65535.

]()

**[constr\_5125] Value range of `TcpIpIcmpv4Props.tcpIpIcmpV4Ttl`** [If defined, the value of `TcpIpIcmpv4Props.tcpIpIcmpV4Ttl` shall be in the range of 1..255.

]()

**[constr\_5126] Value range of `Ipv4ArpProps.tcpIpArpNumGratuitousArpOnStartup`** [If defined, the value of `Ipv4ArpProps.tcpIpArpNumGratuitousArpOnStartup` shall be in the range of 0..255.

]()

**[constr\_5127] Value range of `Ipv4FragmentationProps.tcpIpIpNumFragments`** [If defined, the value of `Ipv4FragmentationProps.tcpIpIpNumFragments` shall be in the range of 0..255.

|()

**[constr\_5128] Value range of `Ipv4FragmentationProps.tcpIpIpNumReassDgrams`** [If defined, the value of `Ipv4FragmentationProps.tcpIpIpNumReassDgrams` shall be in the range of 0..65535.

|()

**[constr\_5129] Value range of `Ipv6FragmentationProps.tcpIpIpReassemblyBufferCount`** [If defined, the value of `Ipv6FragmentationProps.tcpIpIpReassemblyBufferCount` shall be in the range of 0..255.

|()

**[constr\_5130] Value range of `Ipv6FragmentationProps.tcpIpIpReassemblyBufferSize`** [If defined, the value of `Ipv6FragmentationProps.tcpIpIpReassemblyBufferSize` shall be in the range of 1500..65535.

|()

**[constr\_5131] Value range of `Ipv6FragmentationProps.tcpIpIpReassemblyTimeout`** [If defined, the value of `Ipv6FragmentationProps.tcpIpIpReassemblyTimeout` shall be in the range of 0.001..100.

|()

**[constr\_5132] Value range of `Ipv6FragmentationProps.tcpIpIpReassemblySegmentCount`** [If defined, the value of `Ipv6FragmentationProps.tcpIpIpReassemblySegmentCount` shall be in the range of 1..255.

|()

**[constr\_5133] Value range of `Ipv6FragmentationProps.tcpIpIpTxFragmentBufferCount`** [If defined, the value of `Ipv6FragmentationProps.tcpIpIpTxFragmentBufferCount` shall be in the range of 1..1000.

|()

**[constr\_5134] Value range of `Ipv6FragmentationProps.tcpIpIpTxFragmentBufferSize`** [If defined, the value of `Ipv6FragmentationProps.tcpIpIpTxFragmentBufferSize` shall be in the range of 1500..65535.

|()

**[constr\_5135] Value range of `Dhcpv6Props.tcpIpDhcpV6CnfDelayMin` and `Dhcpv6Props.tcpIpDhcpV6CnfDelayMax`** [If defined, the value of `Dhcpv6Props.tcpIpDhcpV6CnfDelayMin` and the value of `Dhcpv6Props.tcpIpDhcpV6CnfDelayMax` shall be in the range of 0..100 and the value of `Dhcpv6Props.tcpIpDhcpV6CnfDelayMax` shall be greater than the value of `Dhcpv6Props.tcpIpDhcpV6CnfDelayMin`.

|()

**[constr\_5136] Value range of `Dhcpv6Props.tcpIpDhcpV6InfDelayMin` and `Dhcpv6Props.tcpIpDhcpV6InfDelayMax`** [If defined, the value of `Dhcpv6Props.tcpIpDhcpV6InfDelayMin` and the value of `Dhcpv6Props.tcpIpDhcpV6InfDelayMax` shall be in the range of 0..100 and the value of `Dhcpv6Props.tcpIpDhcpV6InfDelayMax` shall be greater than the value of `Dhcpv6Props.tcpIpDhcpV6InfDelayMin`.

]()

**[constr\_5137] Value range of `Dhcpv6Props.tcpIpDhcpV6SolDelayMin` and `Dhcpv6Props.tcpIpDhcpV6SolDelayMax`** [If defined, the value of `Dhcpv6Props.tcpIpDhcpV6SolDelayMin` and the value of `Dhcpv6Props.tcpIpDhcpV6SolDelayMax` shall be in the range of 0..100 and the value of `Dhcpv6Props.tcpIpDhcpV6SolDelayMax` shall be greater than the value of `Dhcpv6Props.tcpIpDhcpV6SolDelayMin`.

]()

**[constr\_5138] Value range of `Ipv6NdpProps.tcpIpNdpSlaacDadNumberOfTransmissions`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpSlaacDadNumberOfTransmissions` shall be in the range of 0..254.

]()

**[constr\_5139] Value range of `Ipv6NdpProps.tcpIpNdpSlaacDadRetransmissionDelay`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpSlaacDadRetransmissionDelay` shall be in the range of 0..10.

]()

**[constr\_5140] Value range of `Ipv6NdpProps.tcpIpNdpDefaultReachableTime`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpDefaultReachableTime` shall be in the range of 0..120.

]()

**[constr\_5141] Value range of `Ipv6NdpProps.tcpIpNdpDefaultRetransTimer`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpDefaultRetransTimer` shall be in the range of 0..60.

]()

**[constr\_5142] Value range of `Ipv6NdpProps.tcpIpNdpNumUnicastSolicitations`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpNumUnicastSolicitations` shall be in the range of 0..255.

]()

**[constr\_5143] Value range of `Ipv6NdpProps.tcpIpNdpNumMulticastSolicitations`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpNumMulticastSolicitations` shall be in the range of 0..255.

]()



**[constr\_5144] Value range of `Ipv6NdpProps.tcpIpNdpDelayFirstProbeTime`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpDelayFirstProbeTime` shall be in the range of 0..60.

]()

**[constr\_5145] Value range of `Ipv6NdpProps.tcpIpNdpMinRandomFactor`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpMinRandomFactor` shall be in the range of 0..100.

]()

**[constr\_5146] Value range of `Ipv6NdpProps.tcpIpNdpMaxRandomFactor`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpMaxRandomFactor` shall be in the range of 0..100.

]()

**[constr\_5147] Value range of `Ipv6NdpProps.tcpIpNdpDestinationCacheSize`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpDestinationCacheSize` shall be in the range of 1..254.

]()

**[constr\_5148] Value range of `Ipv6NdpProps.tcpIpNdpPrefixListSize`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpPrefixListSize` shall be in the range of 1..254.

]()

**[constr\_5149] Value range of `Ipv6NdpProps.tcpIpNdpDefaultRouterListSize`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpDefaultRouterListSize` shall be in the range of 2..254.

]()

**[constr\_5151] Value range of `Ipv6NdpProps.tcpIpNdpMaxRtrSolicitations`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpMaxRtrSolicitations` shall be in the range of 0..255.

]()

**[constr\_5152] Value range of `Ipv6NdpProps.tcpIpNdpMaxRtrSolicitationDelay`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpMaxRtrSolicitationDelay` shall be in the range of 0.001..60.

]()

**[constr\_5153] Value range of `Ipv6NdpProps.tcpIpNdpRtrSolicitationInterval`** [If defined, the value of `Ipv6NdpProps.tcpIpNdpRtrSolicitationInterval` shall be in the range of 0.001..60.

]()

**[constr\_5154] Value range of `TcpIpIcmpv6Props.tcpIpIcmpV6HopLimit`** [If defined, the value of `TcpIpIcmpv6Props.tcpIpIcmpV6HopLimit` shall be in the range of 1..255.

]()

**[constr\_5157] Mixing of Point-To-Point and Multi-Drop is not allowed in a `CouplingPortConnection`** [The `CouplingPortConnection` is allowed to reference a `CouplingPort` either:

- in the role `firstPort` and/or `secondPort` or
- in the role `nodePort`

]()

**[constr\_5158] Usage of `plcaProps` only allowed on 10BASE-T1S networks** [A `CouplingPort` is allowed to aggregate `plcaProps` only if:

- the `CouplingPort.physicalLayerType` is set to 10BASE-T1S
- the `CouplingPort.macLayerType` is set to xMII
- the `CouplingPort` is referenced by a `CouplingPortConnection` with the `nodePort` reference.

]()

**[constr\_5159] Mandatory `CouplingPortConnection` settings if multi-drop feature is used** [If a `CouplingPortConnection` uses the `nodePort` reference then the attribute `CouplingPortConnection.plcaLocalNodeCount` and the attribute `CouplingPortConnection.plcaTransmitOpportunityTimer` shall be set to a value.

]()

**[constr\_5160] Mandatory `PlcaProps` settings if multi-drop feature is used** [If a `CouplingPort` is referenced by a `CouplingPortConnection` in the role `nodePort` then the `CouplingPort` shall aggregate the `PlcaProps` and the following attributes shall be set to a value:

- `plcaMaxBurstCount`
- `plcaMaxBurstTimer`
- `plcaLocalNodeId`

]()

**[constr\_5162] Valid `TextTableMapping` in the context of `SenderRecRecordElementMapping`** [The aggregation of a `TextTableMapping` at `SenderRecRecordElementMapping` is only valid if the `SenderRecRecordElementMapping` also references a `SystemSignal` in the role `systemSignal`.

]()

**[constr\_5163] Existence of attribute `IPSecRule.headerType`** [For each `IPSecRule`, the attribute `headerType` shall exist at the time when the COM Stack is generated.

]()

**[constr\_5164] Existence of attribute `IPSecRule.ipProtocol`** [For each `IPSecRule`, the attribute `ipProtocol` shall exist at the time when the COM Stack is generated.

]()

**[constr\_5165] Existence of attribute `IPSecRule.policy`** [For each `IPSecRule`, the attribute `policy` shall exist at the time when the COM Stack is generated.

]()

**[constr\_5166] Existence of `IPduMapping.pduMaxLength`** [If several `IPduMappings` refer to the same `PduTriggering` in `IPduMapping.sourceIPdu`, then all of these `IPduMappings` shall provide either no `IPduMapping.pduMaxLength` value, or the same `IPduMapping.pduMaxLength` value.

]()

**[constr\_5167]{DRAFT} `pncGatewayType` and ECU over the whole system** [Only one PNC Gateway ECU in the whole System shall exist that sets on all its `CommunicationConnectors` the `pncGatewayType` to `active`.

]()

**[constr\_5168]{DRAFT} `pncGatewayType` passive and connected ECUs** [For all `CommunicationConnectors` with `pncGatewayType` set to `passive` belonging to one PNC Gateway ECU, all connected counterpart `CommunicationConnectors` where `pncGatewayType` is set to `active` shall belong to one ECU.

]()

**[constr\_5169]{DRAFT} `pncGatewayType` and (routing) paths** [No path over all networks shall exist that connects a `CommunicationConnector` with `pncGatewayType` `active` to a `CommunicationConnector` with `pncGatewayType` `passive` where both `CommunicationConnectors` belong to the same ECU.

]()

**[constr\_5170]{DRAFT} `nmPassiveModeEnabled` and `dynamicPncToChannelMappingEnabled`** [If `nmPassiveModeEnabled` is set to `TRUE` on a `NmNode` then `dynamicPncToChannelMappingEnabled` shall be set to `FALSE` on the according `CommunicationConnector` referring to the same `CommunicationController`.

]()

[constr\_5175]{DRAFT} **RtePluginProps** shall reference at least one **EcucContainerValue** representing a **RteRipsPlugin** [If a **FlatInstanceDescriptor** owns a **RtePluginProps** this **RtePluginProps** shall define the **associatedRtePlugin** reference and/or the **associatedCrossSwClusterComRtePlugin** reference.

]()

[constr\_5176]{DRAFT} **Existence of CpSoftwareCluster of category HOST\_SOFTWARE\_CLUSTER on one EcuInstance** [On each **EcuInstance**, exactly one **CpSoftwareCluster** of category **HOST\_SOFTWARE\_CLUSTER** shall exist.

]()

[constr\_5177]{DRAFT} **Validity of reference CpSoftwareClusterToEcuInstanceMapping.swCluster** [A **CpSoftwareClusterToEcuInstanceMapping** that references a given **CpSoftwareCluster** in the role **CpSoftwareClusterToEcuInstanceMapping.swCluster** shall be aggregated by the same **System** (in the role **System.mapping.swMapping**) that also refers to the referenced **CpSoftwareCluster** in the role **System.swCluster**.

]()

[constr\_5178]{DRAFT} **Existence of attribute CpSoftwareClusterResource.globalResourceId** [For each **CpSoftwareClusterResource**, attribute **globalResourceId** shall exist **at the time when the definition of the resource pool is finished**.

]()

[constr\_5179]{DRAFT} **Existence of attribute CpSoftwareClusterResource.isMandatory** [For each **CpSoftwareClusterResource**, attribute **isMandatory** shall exist **at the time when the definition of the resource pool is finished**.

]()

[constr\_5180]{DRAFT} **Allowed values for CpSoftwareClusterResource.globalResourceId** [Attribute **CpSoftwareClusterResource.globalResourceId** shall not be set to 0.

]()

[constr\_5181]{DRAFT} **Existence of attribute CpSoftwareClusterServiceResource.category** [For each **CpSoftwareClusterServiceResource**, attribute **category** shall exist **at the time when the definition of the resource pool is finished**.

]()

[constr\_5182]{DRAFT} **PRPortPrototypes are excluded as CpSoftwareCluster interfaces** [A **CpSoftwareClusterCommunicationResource** is not allowed

to be mapped by a [PortElementToCommunicationResourceMapping](#) to an element of a [PortInterface](#) in the context of a [PRPortPrototype](#).

]()

**[constr\_5183]{DRAFT}** [PortElementToCommunicationResourceMapping](#) shall reference exactly one element of a [PortInterface](#) [For any given [PortElementToCommunicationResourceMapping](#), either the reference

- [parameterDataPrototype](#) or
- [modeDeclarationGroupPrototype](#) or
- [trigger](#) or
- [clientServerOperation](#) or
- [variableDataPrototype](#)

shall exist.

]()

**[constr\_5184]{DRAFT}** [CpSoftwareClusterServiceResource](#) can be provided only once on an [EcuInstance](#) [A [CpSoftwareClusterServiceResource](#) shall not be mapped by several [CpSoftwareClusterToResourceMappings](#) to [CpSoftwareClusters](#) in the [provider](#) role if the [CpSoftwareClusters](#) are mapped to the same [EcuInstance](#) by [CpSoftwareClusterToEcuInstanceMappings](#).

]()

**[constr\_5185]{DRAFT}** Existence of attribute [BinaryManifestProvideResource.globalResourceId](#) [For each [BinaryManifestProvideResource](#), attribute [globalResourceId](#) shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5186]{DRAFT}** Existence of attribute [BinaryManifestProvideResource.resourceGuardValue](#) [For each [BinaryManifestProvideResource](#), attribute [resourceGuardValue](#) shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5187]{DRAFT}** Existence of attribute [BinaryManifestProvideResource.supportsMultipleNotifierSets](#) [For each [BinaryManifestProvideResource](#), attribute [supportsMultipleNotifierSets](#) shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5188]{DRAFT}** Existence of attribute [BinaryManifestProvideResource.numberOfNotifierSets](#) [For each [BinaryManifestProvideResource](#),

`source`, attribute `numberOfNotifierSets` shall exist at the time when the definition of binary object meta-data is finished.

]()

[constr\_5189]{DRAFT} Existence of reference `BinaryManifestProvideResource.resourceDefinition` [For each `BinaryManifestProvideResource`, the reference in the role `resourceDefinition` shall exist at the time when the definition of binary object meta-data is finished.

]()

[constr\_5190]{DRAFT} Existence of aggregation `BinaryManifestProvideResource.item` [For each `BinaryManifestProvideResource`, the aggregation in the role `item` shall exist at least once at the time when the definition of binary object meta-data is finished.

]()

[constr\_5191]{DRAFT} Consequence of attribute `BinaryManifestProvideResource.item.category` [The following values of attribute `BinaryManifestProvideResource.item.category` shall require the existence of aggregations:

- If `category` is set to `PROVIDER_HANDLE` and the attribute `isUnused` is not set to true then the aggregation `BinaryManifestProvideResource.item.value` shall exist at the time when the definition of binary object meta-data is finished.
- If `category` is set to `NOTIFIER_HANDLE` and the attribute `isUnused` is not set to true then the aggregation `BinaryManifestProvideResource.item.defaultValue` shall exist at the time when the definition of binary object meta-data is finished.
- If `category` is set to `AUXILARY_ACTUAL_NUMBER_NOTIFIER_SETS` then the aggregation `BinaryManifestProvideResource.item.defaultValue` shall exist at the time when the definition of binary object meta-data is finished.

]()

[constr\_5192]{DRAFT} Existence of attribute `BinaryManifestRequireResource.globalResourceId` [For each `BinaryManifestRequireResource`, attribute `globalResourceId` shall exist at the time when the definition of binary object meta-data is finished.

]()

[constr\_5193]{DRAFT} Existence of attribute `BinaryManifestRequireResource.resourceGuardValue` [For each `BinaryManifestRequireResource`, attribute `resourceGuardValue` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5194]{DRAFT} Existence of reference [BinaryManifestRequireResource.resourceDefinition](#)** [For each [BinaryManifestRequireResource](#), the reference in the role [resourceDefinition](#) shall exist **at the time when the definition of binary object meta-data is finished.**

]()

**[constr\_5195]{DRAFT} Existence of aggregation [BinaryManifestRequireResource.item](#)** [For each [BinaryManifestRequireResource](#), the aggregation in the role [item](#) shall exist at least once **at the time when the definition of binary object meta-data is finished.**

]()

**[constr\_5196]{DRAFT} Consequence of attribute [BinaryManifestRequireResource.item.category](#)** [The following values of attribute [BinaryManifestRequireResource.item.category](#) shall require the existence of aggregations:

- If [category](#) is set to PROVIDER\_HANDLE then the aggregation [BinaryManifestRequireResource.item.defaultValue](#) shall exist **at the time when the definition of binary object meta-data is finished.**
- If [category](#) is set to NOTIFIER\_HANDLE then the aggregation [BinaryManifestRequireResource.item.value](#) shall exist **at the time when the definition of binary object meta-data is finished.**

]()

**[constr\_5197]{DRAFT} Existence of aggregation [BinaryManifestResourceDefinition.itemDefinition](#)** [For each [BinaryManifestResourceDefinition](#), the aggregation in the role [itemDefinition](#) shall exist at least once **at the time when the definition of binary object meta-data is finished.**

]()

**[constr\_5198]{DRAFT} Allowed [BinaryManifestResourceDefinition](#)** [An [BinaryManifestResourceDefinition](#) shall only be referenced from a [BinaryManifestResource](#) that is aggregated in the same [CpSoftwareClusterBinaryManifestDescriptor](#) as the referenced [BinaryManifestResourceDefinition](#).

]()

**[constr\_5199]{DRAFT} Consequence of attribute [BinaryManifestItem.auxiliaryField.category](#)** [If attribute [BinaryManifestItem.auxiliaryField.category](#) is set to value AUXILARY\_CONNECTED\_SW\_CLUSTER\_ID then attribute [BinaryManifestItem.auxiliaryField.defaultValue](#) shall exist **at the time when the definition of binary object meta-data is finished.**

]()



**[constr\_5200]{DRAFT} Existence of attribute `BinaryManifestItemDefinition.category`** [For each `BinaryManifestItemDefinition`, attribute `category` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5201]{DRAFT} Existence of attribute `BinaryManifestItemDefinition.size`** [For each `BinaryManifestItemDefinition`, attribute `size` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5202]{DRAFT} Existence of attribute `BinaryManifestItemNumericalValue.value`** [For each `BinaryManifestItemNumericalValue`, attribute `value` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5203]{DRAFT} Existence of attribute `BinaryManifestItemPointerValue.symbol`** [For each `BinaryManifestItemPointerValue`, attribute `symbol` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5204]{DRAFT} Existence of attribute `BinaryManifestMetaDataMember.category`** [For each `BinaryManifestMetaDataMember`, attribute `category` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5205]{DRAFT} Existence of attribute `BinaryManifestMetaDataMember.size`** [For each `BinaryManifestMetaDataMember`, attribute `size` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5206]{DRAFT} Existence of attribute `BinaryManifestMetaDataMember.symbol`** [For each `BinaryManifestMetaDataMember`, attribute `symbol` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5207]{DRAFT} Existence of attribute `BinaryManifestMetaDataMember.address`** [For each `BinaryManifestMetaDataMember`, attribute `address` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5208]{DRAFT} Existence of `System.swCluster`** [In a `System` with category `SW_CLUSTER_SYSTEM_DESCRIPTION`, the reference `System.swCluster`

shall exist at least once **at the time when the software cluster extraction is finished.**

]()

**[constr\_5209]{DRAFT} Existence of reference [CpSoftwareCluster.swComponentAssignmentswComponent](#)** [In a [System](#) with [category](#) [SW\\_CLUSTER\\_SYSTEM\\_DESCRIPTION](#), the reference [System.swCluster.swComponentAssignmentswComponent](#) shall exist **at the time when the software cluster extraction is finished.**

]()

**[constr\_5210]{DRAFT} Existence of reference [SystemMapping.portElementToComResourceMapping](#)** [In a [System](#) with [category](#) [SW\\_CLUSTER\\_SYSTEM\\_DESCRIPTION](#), the reference [System.mapping.portElementToComResourceMapping](#) shall exist at least once **at the time when the software cluster extraction is finished.**

]()

**[constr\_5211]{DRAFT} Existence of reference [PortElementToCommunicationResourceMapping.communicationResource](#)** [In a [System](#) with [category](#) [SW\\_CLUSTER\\_SYSTEM\\_DESCRIPTION](#), the reference [System.mapping.portElementToComResourceMapping.communicationResource](#) shall exist at least once **at the time when the software cluster extraction is finished.**

]()

**[constr\_5212]{DRAFT} Existence of reference [SystemMapping.resourceToApplicationPartitionMapping](#)** [In a [System](#) with [category](#) [SW\\_CLUSTER\\_SYSTEM\\_DESCRIPTION](#), the reference [System.mapping.resourceToApplicationPartitionMapping](#) shall exist **at the time when the software cluster extraction is finished.**

]()

**[constr\_5213]{DRAFT} Existence of reference [CpSoftwareClusterResourceToApplicationPartitionMapping.applicationPartition](#)** [In a [System](#) with [category](#) [SW\\_CLUSTER\\_SYSTEM\\_DESCRIPTION](#), the reference [System.mapping.resourceToApplicationPartitionMapping.applicationPartition](#) shall exist **at the time when the software cluster extraction is finished.**

]()

**[constr\_5214]{DRAFT} Existence of reference [CpSoftwareClusterResourceToApplicationPartitionMapping.resource](#)** [In a [System](#) with [category](#) [SW\\_CLUSTER\\_SYSTEM\\_DESCRIPTION](#), the reference [System.mapping.resourceToApplicationPartitionMapping.resource](#) shall exist **at the time when the software cluster extraction is finished.**

]()

**[constr\_5215]{DRAFT} Existence of reference `CpSoftwareClusterToResourceMapping.serviceResource`** [In a `System` with category `SW_CLUSTER_SYSTEM_DESCRIPTION`, the reference `System.mapping.softwareClusterToResourceMapping.serviceResource` shall exist **at the time when the software cluster extraction is finished**.

]()

**[constr\_5216]{DRAFT} Existence of reference `CpSoftwareClusterToResourceMapping.requester` and/or `provider`** [In a `System` with category `SW_CLUSTER_SYSTEM_DESCRIPTION`, at least one of the references `System.mapping.softwareClusterToResourceMapping.requester` or `System.mapping.softwareClusterToResourceMapping.provider` shall exist **at the time when the software cluster extraction is finished**.

]()

**[constr\_5217]{DRAFT} Existence of attribute `BinaryManifestMetaDataField.value`** [For each `BinaryManifestMetaDataField` of category `IMMUTABLE_TABLES_CHECKSUM`, attribute `value` shall exist **at the time when the definition of binary object meta-data is finished**.

]()

**[constr\_5218]{DRAFT} Existence of attribute `BinaryManifestItemPointerValue.address`** [For each `BinaryManifestItemPointerValue`, attribute `address` shall exist **at the time when the definition of binary object meta-data is finished**.

]()

**[constr\_5219]{DRAFT} `CpSoftwareCluster` shall only be mapped to one `EcuInstance`** [Within the context of one `CpSoftwareCluster`, for all `CpSoftwareCluster.swComponentAssignment.swComponent` (and nested instances of `SwComponentPrototypes`) that are referenced by a `SwcToEcuMapping` in the role `component` the following condition shall be fulfilled: all referencing `SwcToEcuMappings` shall refer to the same `EcuInstance` in the role `ecuInstance` and this `EcuInstance` shall also be referenced in the role `ecuInstance` by all `CpSoftwareClusterToEcuInstanceMappings` that also refer to said `CpSoftwareCluster` in the role `swCluster`.

]()

**[constr\_5220] Multiplicity of `EndToEndTransformationISignalProps.sourceId` in `PROFILE_04m`, `PROFILE_07m`, `PROFILE_08m` and `PROFILE_44m`** [If the `EndToEndTransformationDescription.profileName` attribute is set to `PROFILE_04m`, `PROFILE_07m`, `PROFILE_08m`, or `PROFILE_44m` then the multiplicity of the `EndToEndTransformationISignalProps.sourceId` attribute shall be 1.

]()

**[constr\_5221]** Multiplicity of **EndToEndTransformationISignalProps.sourceId** in **PROFILE\_01**, **PROFILE\_02**, **PROFILE\_04**, **PROFILE\_05**, **PROFILE\_06**, **PROFILE\_07**, **PROFILE\_11**, and **PROFILE\_22** [If the **EndToEndTransformationDescription.profileName** attribute is set to **PROFILE\_01**, **PROFILE\_02**, **PROFILE\_04**, **PROFILE\_05**, **PROFILE\_06**, **PROFILE\_07**, **PROFILE\_11**, or **PROFILE\_22** then the multiplicity of the **EndToEndTransformationISignalProps.sourceId** attribute shall be 0.

]()

**[constr\_5222]** Mandatory elements of **UdpNmCluster** [The following attributes shall always be defined for the **UdpNmCluster**:

- **nmMsgCycleTime**
- **nmMessageTimeoutTime**
- **nmNetworkTimeout**
- **nmRemoteSleepIndicationTime**
- **nmRepeatMessageTime**
- **nmWaitBusSleepTime**
- **communicationCluster**

]()

**[constr\_5223]** Mandatory elements of **UdpNmNode** [The following attributes shall always be defined for the **UdpNmNode**:

- **nmMsgCycleOffset**

]()

**[constr\_5224]** **UdpNmNode.nmMsgCycleOffset** < **UdpNmCluster.nmMsgCycleTime** [The value of **UdpNmNode.nmMsgCycleOffset** shall be smaller than the value of **UdpNmCluster.nmMsgCycleTime**.

]()

**[constr\_5225]** **UdpNmCluster.nmNetworkTimeout** multiple of **UdpNmCluster.nmMsgCycleTime** [The value of **UdpNmCluster.nmNetworkTimeout** shall be  $n * \text{UdpNmCluster.nmMsgCycleTime}$  with  $n > 1$ .

]()

**[constr\_5226]** **UdpNmCluster.nmRepeatMessageTime** multiple of **UdpNmCluster.nmMsgCycleTime** [The value of **UdpNmCluster.nmRepeatMessageTime** shall be  $n * \text{UdpNmCluster.nmMsgCycleTime}$ .

]()

**[constr\_5229] Existence of attribute `E2EProfileCompatibilityProps.transitToInvalidExtended` is mandatory for each `EndToEndTransformationDescription`** [For each `EndToEndTransformationDescription`, a reference to `E2EProfileCompatibilityProps` in the role `e2eProfileCompatibilityProps` shall exist and the referenced `E2EProfileCompatibilityProps` shall define a value for the attribute `transitToInvalidExtended`.

]()

**[constr\_5231] Allowed values for `SOMEIPTransformationProps.alignment` and `SOMEIPTransformationDescription.alignment`** [The valid values for `SOMEIPTransformationProps.alignment` and `SOMEIPTransformationDescription.alignment` shall be 8, 16, 32, 64, 128 or 256.

]()

**[constr\_5232] Triggering in case of application writing the selector field signal** [If

- the `ISignal` representing the selector field is referenced by an `ISignalTriggering` and that `ISignalTriggering` refers to an `ISignalPort` where the `communicationDirection` is set to `out` and
- the `ISignal` representing the selector field is referring to a `SystemSignal` and that `SystemSignal` is either
  - referenced by a `SenderReceiverToSignalMapping` in the role `system-Signal` or
  - part of a `SystemSignalGroup` that in turn is referenced by a `Sender-ReceiverToSignalGroupMapping`

then any `ISignal` other than the `ISignal` representing the selector field shall be mapped into that dynamic part alternative `ISignalIPdu` using the `transferProperty` set to `pending`.

]()

**[constr\_5233] Usage of `invalidValue` in case of application writing the selector field signal** [If

- the `ISignal` representing the selector field is referenced by an `ISignalTriggering` and that `ISignalTriggering` refers to an `ISignalPort` where the `communicationDirection` is set to `out` and
- the `ISignal` representing the selector field is referring to a `SystemSignal` and that `SystemSignal` is either
  - referenced by a `SenderReceiverToSignalMapping` in the role `system-Signal` or
  - part of a `SystemSignalGroup` that in turn is referenced by a `Sender-ReceiverToSignalGroupMapping`

then

- the `ISignal` representing the selector field shall either
  - define no invalid value (`ISignal.networkRepresentationProps.invalidValue`) or
  - the `invalidValue` defined shall be different than any of the defined selector field values for that `MultiplexedIPdu`.

}]()

**[constr\_5235] Maximum `Frame.frameLength` of the used bus protocol shall not be exceeded** [The `Pdu.length` used for an `IPdu` and the `IPduMapping.pduMaxLength` used for a `targetIPdu` shall not exceed the limitation of the maximum `Frame.frameLength` of the used bus protocol (e.g. CAN2.0 max. `Frame.frameLength` == 8Byte, CAN-FD `Frame.frameLength` == 64byte).

}]()

**[constr\_5236] Restriction of `IPduMapping.pduMaxLength`** [`IPduMapping.pduMaxLength` shall be equal or greater than the maximum `Pdu.length` of `sourceIPdu` and `targetIPdu`. For a N:1 routing and 1:N routing, respectively, the maximum `Pdu.length` of all involved `Pdus` shall be used to evaluate a proper `IPduMapping.pduMaxLength`.

}]()

**[constr\_5244] Value of attribute `SOMEIPTransformationISignalProps.sizeOfArrayLengthFields`** [If attribute `SOMEIPTransformationISignalProps.sizeOfArrayLengthFields` is configured, then the value of attribute `SOMEIPTransformationISignalProps.sizeOfArrayLengthFields` shall be at least as high as the number of bytes required to fit the maximum result of the individual length field computation of all variable-size arrays that are transported in the SOME/IP message.

In other words, for each variable-size array contained in the SOME/IP message, the numerical value of *maximum number of elements \* sizeof(data type of array element)* shall be computed which yields the maximum number of bytes required to store the individual variable-size array.

The size of the attribute `SOMEIPTransformationISignalProps.sizeOfArrayLengthFields` shall be set such that the highest value (or bigger) obtained from the individual computations for the contained variable-size arrays can fit into the length field. The unit of attribute `SOMEIPTransformationISignalProps.sizeOfArrayLengthFields` is bytes.

}]()

**[constr\_5245] Value of attribute `SOMEIPTransformationISignalProps.sizeOfStringLengthFields`** [If attribute `SOMEIPTransformationISignalProps.sizeOfStringLengthFields` is configured, then the value of attribute `SOMEIP-`

`TransformationISignalProps.sizeOfStringLengthFields` shall be at least as high as the number of bytes required to fit the maximum result of the individual length field computation of all strings that are transported in the SOME/IP message.

In other words, for each string contained in the SOME/IP message, the numerical value of *maximum number of characters in the string \* maximum number of code units per character (of the used character encoding) \* maximum number of bytes per code unit (of the used character encoding)* shall be computed which yields the maximum number of bytes required to store the individual string.

The size of the attribute `SOMEIPTransformationISignalProps.sizeOfStringLengthFields` shall be set such that the highest value (or bigger) obtained from the individual computations for the contained strings can fit into the length field. The unit of attribute `SOMEIPTransformationISignalProps.sizeOfStringLengthFields` is bytes.

]()

**[constr\_5246] SOME/IP Transformation settings for strings in the context of an ISignal** [In the context of an `ISignal` the usage of `DataPrototypeTransformationProps.transformationProps.sizeOfStringLengthField` is only allowed if the `SOMEIPTransformationISignalProps.sizeOfStringLengthFields` is not defined.

]()

**[constr\_5247] Value of attribute DataPrototypeTransformationProps.transformationProps.sizeOfArrayLengthField** [If the configuration of length field is done using `DataPrototypeTransformationProps.transformationProps.sizeOfArrayLengthField` then the value of attribute `DataPrototypeTransformationProps.transformationProps.sizeOfArrayLengthField` shall be at least as high as the number of bytes required to fit the result of the expression *maximum number of elements \* sizeof(data type of array element)*.

]()

**[constr\_5248] Value of attribute DataPrototypeTransformationProps.transformationProps.sizeOfStringLengthField** [If the configuration of length field is done using `DataPrototypeTransformationProps.transformationProps.sizeOfStringLengthField` then the value of attribute `DataPrototypeTransformationProps.transformationProps.sizeOfStringLengthField` shall be at least as high as the number of bytes required to fit the result of the expression *maximum number of characters in the string \* maximum number of code units per character (of the used character encoding) \* maximum number of bytes per code unit (of the used character encoding)*.

]()

**[constr\_5249] Existence of Pdu.length** [For each `Pdu`, attribute `length` shall exist at the time when the Ecu configuration of the COM stack is created.



]()

**[constr\_5251] `CouplingPort.connectionNegotiationBehavior` shall exist** [The attribute `CouplingPort.connectionNegotiationBehavior` shall be defined at the time the Base EcuC is created.

]()

**[constr\_5252] `LinSlaveConfig.protocolVersion` shall exist** [The attribute `LinSlaveConfig.protocolVersion` shall be defined at the time the Base EcuC is created.

]()

**[constr\_5253] Value range of `ISignal.length`** [The value of `ISignal.length` shall be in the range of 0..34359738360 Bits.

]()

**[constr\_5254] Value range of `MultiplexedIPdu.selectorFieldLength`** [The value of `MultiplexedIPdu.selectorFieldLength` shall be in the range of 1..16 Bits.

]()

**[constr\_5258] `TriggerToSignalMapping.systemSignals` eligible for a `TriggerToSignalMapping` in case `DataTransformation` is used** [The `ISignal` that is referenced by a `SystemSignal` that in turn is referenced by a `TriggerToSignalMapping` in the role `systemSignal` shall have its `length` attribute set to the value of `BufferProperties.headerLength` attribute of the respective `TransformationTechnology` if the `ISignal` references a `DataTransformation` in the role `dataTransformation` that in turn references the `TransformationTechnology`.

]()

**[constr\_5259] `PduTriggerings` and `FrameTriggerings` of `SecuredIPdu` with `useAsCryptographicIPdu = true`** [In case that a `SecuredIPdu` is defined with `useAsCryptographicIPdu = true` as described by [TPS\_SYST\_02173] then:

- the `PduTriggering` of the `AuthenticPdu`
- the `PduTriggering` of the `CryptographicPdu`
- the `FrameTriggering` that references the `Frame` to which the `AuthenticPdu` is mapped
- the `FrameTriggering` that references the `Frame` to which the `CryptographicPdu` is mapped

shall be aggregated by the same `PhysicalChannel`.

]()

**[constr\_5262] `SystemSignal` used for Trigger communication shall not be part of any `SystemSignalGroup`** [A `SystemSignal` that is target of a `TriggerToSignalMapping` in the role `systemSignal` shall not be referenced by a `SystemSignalGroup` in the role `systemSignal`.]

]()

**[constr\_5263] `NetworkEndpoint.networkEndpointAddress` restriction for IPv4** [A `NetworkEndpoint` shall not aggregate several `Ipv4Configurations` that have their `ipv4AddressSource` set to fixed.

]()

**[constr\_5264] `NetworkEndpoint.networkEndpointAddress` restriction for IPv6** [A `NetworkEndpoint` shall not aggregate several `Ipv6Configurations` that have their `ipv6AddressSource` set to fixed.

]()

**[constr\_5265] `NetworkEndpoint.networkEndpointAddress` restriction** [A `NetworkEndpoint` shall not aggregate an `Ipv4Configuration` and an `Ipv6Configuration` as `networkEndpointAddress` at the same time.

]()

**[constr\_5266] `VariableDataPrototype` of `NvDataInterface` shall not be mapped to a `SystemSignal`** [A `VariableDataPrototype` that is aggregated by a `NvDataInterface` shall not be referenced by

- `SenderReceiverToSignalGroupMapping` in the role `dataElement` and
- `SenderReceiverToSignalMapping` in the role `dataElement`.

]()

**[constr\_5267] `VariableDataPrototype` of `NvDataInterface` shall not be mapped to a `SystemSignal` via a delegation to a `PortPrototype` with a `SenderReceiverInterface`** [If a `VariableDataPrototype` that is aggregated by a

- `SenderReceiverInterface` and that `SenderReceiverInterface` is referenced by a `PortPrototype` of a Composition and
- that `PortPrototype` is connected by a delegation connector with an inner `PortPrototype` of a `NvBlockSwComponentType` and
- that `PortPrototype` is typed by a `NvDataInterface`

then this `PortPrototype` shall not be referenced by:

- `SenderReceiverToSignalGroupMapping` in the role `dataElement` and
- `SenderReceiverToSignalMapping` in the role `dataElement`.

]()

**[constr\_5268] Existence of ContainedIPduProps.containedPduTriggering reference** [If a `ContainedIPduProps` is aggregated at the `ContainerIPdu` in the role `ContainerIPdu.containedIPduTriggeringProps` then the reference `ContainedIPduProps.containedPduTriggering` shall exist.

]()

**[constr\_5269] Exclusion of ContainedIPduProps.containedPduTriggering reference** [If a `ContainedIPduProps` is aggregated at the `IPdu` in the role `IPdu.containedIPduProps` then the reference `ContainedIPduProps.containedPduTriggering` shall NOT exist.

]()

**[constr\_5270] Exclusive usage of ContainerIPdu.containedPduTriggering and ContainerIPdu.containedIPduTriggeringProps** [A `ContainerIPdu` shall only have either `ContainerIPdu.containedPduTriggering` OR `ContainerIPdu.containedIPduTriggeringProps` defined.

]()

**[constr\_5271] Existence of attribute BinaryManifestItem.isUnused** [For each `BinaryManifestItem`, the attribute `isUnused` shall exist at the time when the definition of binary object meta-data is finished.

]()

**[constr\_5272] Value of attribute BinaryManifestItem.isUnused** [The attribute `BinaryManifestItem.isUnused` shall only be permitted to be set to true if the related `BinaryManifestItemDefinition` has its attribute `isOptional` set to true,

]()

**[constr\_5273] One ISignalTriggering pair allowed per EthernetPhysicalChannel for a ClientServerOperation** [In the context of a `System` of category `ECU_SYSTEM_DESCRIPTION` or `ECU_EXTRACT`, for each `EthernetPhysicalChannel` at most one pair of

- `ISignalTriggering` that refers to an `ISignal` that in turn refers to a `SystemSignal` that is referenced by a specific `ClientServerToSignalMapping` in the role `callSignal`
- `ISignalTriggering` that refers to an `ISignal` that in turn refers to a `SystemSignal` that is referenced by the same `ClientServerToSignalMapping` in the role `returnSignal`

shall exist.

]()

**[constr\_5274] ISignalTriggerings that represent the callSignal and returnSignal of the same ClientServerOperation on a PhysicalChannel shall be referenced by the same ClientServerToSignalMapping** [If on an `Eth-`

`EthernetPhysicalChannel` an `ISignalTriggering` that refers to an `ISignal` that in turn refers to a `SystemSignal` that is referenced by a specific `ClientServerToSignalMapping` in the role `callSignal` is defined, then another `ISignalTriggering` shall be aggregated by the same `EthernetPhysicalChannel` and that `ISignalTriggering` shall refer to an `ISignal` that in turn refers to a `SystemSignal` that is referenced by the same `ClientServerToSignalMapping` in the role `returnSignal`, and vice versa.

]()

**[constr\_5306] Restriction of `DltLogChannel.logChannelId` attribute value** [The `DltLogChannel.logChannelId` attribute value shall be composed of maximum four ASCII characters.

]()

**[constr\_5307] Existence of `DltLogChannel.logChannelId`** [For each `DltLogChannel`, the attribute `logChannelId` shall exist when the Base ECU Configuration is defined.

]()

**[constr\_5308] Existence of `DltLogChannel.nonVerboseMode`** [For each `DltLogChannel`, the attribute `nonVerboseMode` shall exist when the Base ECU Configuration is defined.

]()

**[constr\_5309] Existence of `DltConfig.sessionIdSupport`** [For each `DltConfig`, the attribute `sessionIdSupport` shall exist when the Base ECU Configuration is defined.

]()

**[constr\_5310] Existence of `DltConfig.timestampSupport`** [For each `DltConfig`, the attribute `timestampSupport` shall exist when the Base ECU Configuration is defined.

]()

**[constr\_5311] Existence of `DltLogChannel.logTraceDefaultLogThreshold`** [For each `DltLogChannel`, the attribute `logTraceDefaultLogThreshold` shall exist when the Base ECU Configuration is defined.

]()

**[constr\_5312] Existence of `DltLogChannel.defaultTraceState`** [For each `DltLogChannel`, the attribute `defaultTraceState` shall exist when the Base ECU Configuration is defined.

]()

**[constr\_5313] Existence of `DltLogChannel.txPduTriggering`** [For each `DltLogChannel`, the reference to `PduTriggering` in the role `txPduTriggering` shall exist when the Base ECU Configuration is defined.

]()

**[constr\_5314] `DltLogChannel.txPduTriggering` and `rxPduTriggering` shall be on the same network** [The `PduTriggerings` that are referenced by a `DltLogChannel` in the role `txPduTriggering` and `rxPduTriggering` shall be aggregated by the same `PhysicalChannel`.

]()

**[constr\_5315] `FlexrayArTpConnections` within the same `FlexrayArTpChannel` not allowed to have the same address information** [`FlexrayArTpConnections` that are aggregated by the same or reverse `FlexrayArTpChannel` are not allowed to reference the same pair of `FlexrayArTpNodes` at the time when the Ecu configuration of the COM stack is created.

]()

**[constr\_5319] TCP endpoint using `TLS_SERVER` role can only serve provided service instances** [An `ApplicationEndpoint` that refers to `TlsCryptoServiceMapping` with category `TLS_SERVER` in the role `tlsCryptoMapping` is only allowed to be referenced by `ProvidedServiceInstances` in the role `localUnicastAddress` in case that the `ProvidedServiceInstance` does not have a `remoteUnicastAddress` defined.

]()

**[constr\_5320] TCP endpoint using `TLS_CLIENT` role can only serve consumed service instances** [An `ApplicationEndpoint` that refers to `TlsCryptoServiceMapping` with category `TLS_CLIENT` in the role `tlsCryptoMapping` is only allowed to be referenced by `ConsumedServiceInstances` in the role `localUnicastAddress` in case that the `ConsumedServiceInstance` does not have a `remoteUnicastAddress` defined.

]()

**[constr\_5321] Value range of `Pdu.length`** [The value of `Pdu.length` shall be in the range of 0..4294967295 Bytes.

]()

**[constr\_5322] Value range of `ISignalToIPduMapping.startPosition`** [The value of `ISignalToIPduMapping.startPosition` shall be in the range of 0..4294967295 Bits.

]()

**[constr\_5323] Value range of [ISignalToIPduMapping.updateIndicationBitPosition](#)** [The value of [ISignalToIPduMapping.updateIndicationBitPosition](#) shall be in the range of 0..4294967295 Bits.

]()

## 2.10 TPS\_TimingExtensions

**[constr\_4500] Restricted usage of functions** [The functions *TIMEX\_occurs*, *TIMEX\_hasOccurred*, *TIMEX\_timeSinceLastOccurrence*, *TIMEX\_angleSinceLastOccurrence*, and *TIMEX\_modeActive* can only be used for occurrence expressions, which are applied to events of type [TDEventComplex](#).

]()

**[constr\_4501] Application rule for the occurrence expression in [TDEventComplex](#)** [The occurrence expression shall be specified such that it describes an *event* rather than a state. As a consequence the occurrence expression shall ensure that a complex timing event *could* only occur at the occurrence time of one of the referenced [TimingDescriptionEvents](#).

]()

**[constr\_4502] Use references only as function operands** [The references to model elements (e.g. the *timing event* reference targeting [TimingDescriptionEvent](#)) do have specific semantics. The usage of these references within the expression is *only* allowed as operand of the functions mentioned above.

]()

**[constr\_4503] Restricted usage of [AutosarOperationArgumentInstance](#) for Content Filter** [If a content filter is defined for an atomic event then references to [AutosarOperationArgumentInstances](#) are only allowed if the atomic event is of type [TDEventOperation](#). Only if such an atomic event occurs, the value of the operation arguments can be evaluated. Thus, also the scope of the atomic event shall be the same as the [AutosarOperationArgumentInstance](#), meaning that they shall point to the same [ClientServerOperation](#). Finally, references to an [AutosarOperationArgumentInstance](#) with argument direction "out" are only allowed, if the atomic event of type [TDEventOperation](#) refers either to the point in time when the operation call response has been sent (TD-EVENT-OPERATION-TYPE=OPERATION-CALL-RESPONSE-SENT) or to the point in time when the operation call response has been received (TD-EVENT-OPERATION-TYPE=OPERATION-CALL-RESPONSE-RECEIVED).

]()

**[constr\_4504] Restricted usage of [AgeConstraint](#)** [An [AgeConstraint](#) shall only be defined for events of type [TimingDescriptionEvent](#) associated with the receipt and reading of data.

]()

**[constr\_4505] Specifying minimum and maximum number of occurrences** [The minimum and maximum number of occurrences shall be specified such that the following holds:  $0 \leq \text{minNumberOfOccurrences} \leq \text{maxNumberOfOccurrences}$ .

]()

**[constr\_4506] Specifying minimum inter-arrival time and pattern length** [The minimum inter-arrival time and pattern length shall be specified such that the following holds:  $0 < \text{minimumInterArrivalTime} \leq \text{patternLength}$ .

]()

**[constr\_4507] Specifying pattern length, pattern jitter and pattern period** [The pattern length, pattern jitter and pattern period shall be specified such that the following holds:  $\text{patternLength} + \text{patternJitter} < \text{patternPeriod}$ .

]()

**[constr\_4508] TDEventVfb shall reference PortPrototypeBlueprint only in Blueprints** [An event type TDEventVfb only shall reference PortPrototypeBlueprint in blueprints.

]()

**[constr\_4509] Only VfbTiming shall be a Blueprint** [Only the VfbTiming is blueprintable.

]()

**[constr\_4510] Specifying references to RunnableEntity and VariableAccess** [A RunnableEntity and VariableAccess shall be referenced at the same time if and only if the value of tdEventSwcInternalBehaviorType is "runnableEntityVariableAccess". These two references are not mutual exclusive.

]()

**[constr\_4511] Validity of referencing RunnableEntity** [A RunnableEntity shall be referenced if and only if the value of tdEventSwcInternalBehaviorType is "runnableEntityActivated", "runnableEntityStarted", "runnableEntityTerminated", or "runnableEntityVariableAccess".

]()

**[constr\_4512] Validity of referencing VariableAccess** [A VariableAccess shall be referenced if and only if the value of tdEventSwcInternalBehaviorType is "runnableEntityVariableAccess".

]()

**[constr\_4513] SynchronizationTimingConstraint shall reference at least two events** [In the case, that the SynchronizationTimingConstraint is imposed on events then at least two (2) timing description events shall be referenced.



|()

**[constr\_4514] SynchronizationTimingConstraint shall reference at least two event chains** [In the case, that the [SynchronizationTimingConstraint](#) is imposed on event chains then at least two (2) timing description event chains shall be referenced.

|()

**[constr\_4515] Specifying stimulus and response in TimingDescription-EventChain** [The references between [TimingDescriptionEventChain](#) and [TimingDescriptionEvent](#) playing the role [stimulus](#) and [response](#) shall not reference the same [TimingDescriptionEvent](#).

|()

**[constr\_4516] Specifying event chain segments** [If a [TimingDescription-EventChain](#) consists of further event chain segments then at least one sequence of event chain segments shall exists from the event chain's [stimulus](#) to the [response](#).

|()

**[constr\_4517] Referencing no further event chain segments** [If a [TimingDescriptionEventChain](#) is not subdivided in further event chain segments, then the reference playing the role of [segment](#) shall reference this [TimingDescription-EventChain](#). In other words, an event chain without any event chain segment shall reference itself.

|()

**[constr\_4518] Specifying stimulus event and response event of first and last event chain segment** [The [stimulus](#) event of the first event chain segment and the [response](#) event of the last event chain segment shall reference the [stimulus](#) and [response](#) of the parent event chain the event chain segments directly belong to.

|()

**[constr\_4519] Specifying patternLength** [The [patternLength](#) shall be specified such that the following holds:  $0 \leq \max(\text{offset}) \leq \text{patternLength}$ .

|()

**[constr\_4520] Specifying attribute synchronizationConstraintType** [The attribute [synchronizationConstraintType](#) shall be specified if the [SynchronizationTimingConstraint](#) is imposed on events.

|()

**[constr\_4521] Specifying attribute synchronizationConstraintType** [The attribute [synchronizationConstraintType](#) shall be specified if the [SynchronizationTimingConstraint](#) is imposed on event chains.

|()

**[constr\_4522] SynchronizationTimingConstraint shall either reference events or event chains** [The [SynchronizationTimingConstraint](#) shall either reference timing description events or timing description event chains, but not both at the same time.

]()

**[constr\_4523] Specifying attributes [maxCycles](#) and [maxSlots](#)** [The optional attributes [maxCycles](#) and [maxSlots](#) shall never be specified in any element [EOCExecutableEntityRefGroup](#) that is part of a hierarchical execution order constraint.

]()

**[constr\_4524] Referencing [TimingDescriptionEvent](#)** [Any element [EOCExecutableEntityRefGroup](#) that is part of a hierarchical execution order constraint shall not reference any timing description event [TimingDescriptionEvent](#).

]()

**[constr\_4525] Precedence of successor relationships [successor](#) and [directSuccessor](#)** [The successor relationships [successor](#) and [directSuccessor](#) take always precedence over the [ordered](#) multiplicity of the association [nestedElement](#).

]()

**[constr\_4526] Specifying [maxCycles](#) and [maxSlots](#) in a Repetitive Execution Order Constraint** [The optional attributes [maxCycles](#) and [maxSlots](#) shall be specified only by the *root* group of executable entity references [EOCExecutableEntityRefGroup](#).

]()

**[constr\_4527] Referencing [TimingDescriptionEvent](#) in a Repetitive Execution Order Constraint** [The [TimingDescriptionEvent](#) shall be specified only by the *root* group of executable entity references [EOCExecutableEntityRefGroup](#).

]()

**[constr\_4528] The *root* [EOCExecutableEntityRefGroup](#) shall reference only [EOCExecutableEntityRefGroups](#)** [The *root* [EOCExecutableEntityRefGroup](#) shall reference only groups of executable entity references respectively event references grouped by the element [EOCExecutableEntityRefGroups](#).

]()

**[constr\_4529] Number of nested elements referenced by the *root* [EOCExecutableEntityRefGroup](#)** [The number of nested elements referenced by the *root* [EOCExecutableEntityRefGroup](#) shall be exactly the number given by the attribute [maxCycles](#).

]()

**[constr\_4530] An [EOCExecutableEntityRefGroup](#) representing a cycle shall reference only [EOCExecutableEntityRefs](#) respectively [EOCEventRefs](#)** [The [EOCExecutableEntityRefGroup](#) representing a cycle shall reference only executable entity references [EOCExecutableEntityRefs](#) respectively event references [EOCEventRefs](#).

]()

**[constr\_4531] Number of nested elements referenced by [EOCExecutableEntityRefGroup](#) representing a cycle** [The number of nested elements referenced by a [EOCExecutableEntityRefGroup](#) representing a cycle shall be exactly the number given by the attribute [maxSlots](#).

]()

**[constr\_4532] Successor relationship is not self-referencing** [The target and source of the successor relationships [successor](#) and [directSuccessor](#) shall not be the same. In other words an [EOCExecutableEntityRef](#) and [EOCExecutableEntityRefGroup](#) shall not reference itself as its logical or direct successor.

]()

**[constr\_4533] Maximum number of successor relationships** [The maximum number of successor relationships, namely [successor](#) or [directSuccessor](#), between two [EOCExecutableEntityRefs](#), between two [EOCEventRefs](#), between two [EOCExecutableEntityRefGroups](#), between an [EOCExecutableEntityRef](#) and an [EOCExecutableEntityRefGroup](#), or between an [EOCEventRef](#) and an [EOCExecutableEntityRefGroup](#) is one (1).

]()

**[constr\_4534] Maximum number of [directSuccessor](#) relationships** [The number of [directSuccessor](#) relationships of an [EOCExecutableEntityRef](#), an [EOCEventRef](#), or an [EOCExecutableEntityRefGroup](#) shall not exceed the number of independent execution units available in a system.

]()

**[constr\_4536] Compatible recurrence of any [ExecutableEntity](#)** [In an [ExecutionOrderConstraint](#) the [ExecutableEntities](#), referenced by all [EOCExecutableEntityRefs](#) respectively all [EOCEventRefs](#), shall be compatible with regard to their recurrence.

]()

**[constr\_4537] References among elements in an [ExecutionOrderConstraint](#)** [An [EOCExecutableEntityRef](#) respectively [EOCEventRef](#) or an [EOCExecutableEntityRefGroup](#) shall reference only [EOCExecutableEntityRefs](#), respectively all [EOCEventRefs](#), or [EOCExecutableEntityRefGroups](#) which are part of the same [ExecutionOrderConstraint](#).

]()

**[constr\_4538] Hierarchical Execution Order Constraint:** `EOExecutableEntityRef`, `EOEventRef`, and `EOExecutableEntityRefGroup` shall be target or source of a successor relationship [In a given Hierarchical Execution Order Constraint, each `EOExecutableEntityRef`, `EOEventRef`, and `EOExecutableEntityRefGroup` which is not part of an `EOExecutableEntityRefGroup` shall be target or source of at least one successor relationship.

]()

**[constr\_4539] The successor relationships `successor` and `directSuccessor` shall not be used** [The successor relationships `successor` and `directSuccessor` shall not be used in a Repetitive Execution Order Constraint.

]()

**[constr\_4540] `maxCycles` and `maxSlots` shall not be zero** [If the optional attributes `maxCycles` and `maxSlots` are used, then the values of the optional attributes `maxCycles` and `maxSlots` shall be greater than zero (0).

]()

**[constr\_4541] `EOExecutableEntityRef` shall reference `ExecutableEntity` in Ordinary Execution Order Constraint** [In an Ordinary Execution Order Constraint all `EOExecutableEntityRefs` shall reference an `ExecutableEntity`.

]()

**[constr\_4542] `EOExecutableEntityRef` shall reference `ExecutableEntity` in Hierarchical Execution Order Constraint** [In an Hierarchical Execution Order Constraint all `EOExecutableEntityRefs` shall reference an `ExecutableEntity`.

]()

**[constr\_4543] Maximum value of the parameter `minimumInterArrivalTime`** [The value of the parameter `minimumInterArrivalTime` shall be less than or equal the value of the parameter `period`.

]()

**[constr\_4544] Specifying `patternLength`, `patternJitter` and `patternPeriod`** [The pattern length, pattern jitter and pattern period shall be specified such that the following holds:  $\text{patternLength} + \text{patternJitter} < \text{patternPeriod}$ .

]()

**[constr\_4545] Referring either `ExecutableEntitys` or `AbstractEvents`** [An `ExecutionOrderConstraint` shall contain either only `EOExecutableEntityRef` or only `EOEventRef`, but not both. In the former case `ExecutableEntitys` are referenced and in the latter case `AbstractEvents` are referenced.

]()

**[constr\_4546] Setting the attribute `isEvent`** [The value of the attribute `isEvent` shall be set to "TRUE" if and only if the execution order constraint refers to events only (refer to [constr\_4545]). The value of the attribute `isEvent` shall be set to "FALSE" if and only if the execution order constraint refers to executable entities only (refer to [constr\_4545]).

]()

**[constr\_4547] Setting the attribute `permitMultipleReferencesToEE`** [The value of the attribute `permitMultipleReferencesToEE` shall be specified if and only if the value of the attribute `isEvent` (refer to [constr\_4546]) is set to "FALSE". In other words specifying whether an executable entity is permitted to be referenced more than once in an execution order constraint is only allowed in case of an execution order constraint referring to executable entities only.

]()

**[constr\_4548] `EOCEventRef` shall reference `AbstractEvent` in Ordinary Execution Order Constraint** [In an Ordinary Execution Order Constraint all `EOCEventRefs` shall reference an `AbstractEvent`.

]()

**[constr\_4549] `EOCEventRef` shall reference `AbstractEvent` in Hierarchical Execution Order Constraint** [In an Hierarchical Execution Order Constraint all `EOCEventRefs` shall reference an `AbstractEvent`.

]()

**[constr\_4550] A Hierarchical Execution Order Constraint shall have an unambiguous root `EOCExecutableEntityRefGroup`** [A Hierarchical Execution Order Constraint may contain multiple `orderedElements`, which may be any combination of any number of `EOCExecutableEntityRefs` respectively `EOCEventRefs` and `EOCExecutableEntityRefGroups`. Among these needs to be exactly one `EOCExecutableEntityRefGroup` being neither target nor source of any `successor` or `directSuccessor` relationship. This `EOCExecutableEntityRefGroup` is the *root* of the Hierarchical Execution Order Constraint.

]()

**[constr\_4551] Use only Numericals in `TDEventOccurrenceExpression`** [The target data prototype of the instance references of `variable` and `argument` shall be `Numerical`.

]()

**[constr\_4552] Restricted usage of `AutosarVariableInstance` for Content Filter** [If a content filter is defined for an atomic event then references to `AutosarVariableInstances` are only allowed if the atomic event is of type `TDEventVariableDataPrototype`. Only if such an atomic event occurs, the value of the variables can be evaluated. Thus, also the scope of the atomic event shall be the same as the

[AutosarVariableInstance](#), meaning that they shall point to the same [Variable-DataPrototype](#).

]()

**[constr\_4553] Usage of optional attribute [ignoreOrderAllowed](#)** [This optional attribute shall only be used in the context of Logical Execution Time when an [EOCExecutableEntityRefGroup](#) is used to specify clusters of executable entities — executable entities cluster.

]()

**[constr\_4554] Usage of optional directed association/reference [letInterval](#)** [This optional directed association/reference shall only be used in the context of Logical Execution Time when an [EOCExecutableEntityRefGroup](#) is used to specify clusters of executable entities — executable entities cluster.

]()

**[constr\_4555] Usage of the category value LET\_RELEASE in [TimingDescriptionEvent](#)** [The value LET\_RELEASE of the attribute [category](#) of a [TimingDescriptionEvent](#) shall be set if and only if the timing description event plays the role of a stimulus event and the corresponding timing description event chain, referencing this timing description event, plays the role of a LET interval.

]()

**[constr\_4556] Usage of the category value LET\_TERMINATE in [TimingDescriptionEvent](#)** [The value LET\_TERMINATE of the attribute [category](#) of a [TimingDescriptionEvent](#) shall be set if and only if the timing description event plays the role of a response event and the corresponding timing description event chain, referencing this timing description event, plays the role of a LET interval.

]()

**[constr\_4557] Usage of the category value LET\_INTERVAL in [TimingDescriptionEventChain](#)** [The value LET\_INTERVAL of the attribute [category](#) of a [TimingDescriptionEventChain](#) shall be set if and only if the timing description event chain references 1) a timing description event playing the role stimulus and the value of the [category](#) of this referenced [TimingDescriptionEvent](#) is set to LET\_RELEASE; and 2) a timing description event playing the role response and the value of the [category](#) of this referenced [TimingDescriptionEvent](#) is set to LET\_TERMINATE.

]()

**[constr\_4558] Applicability of LET semantics** [The LET semantics applies only to *implicit* sender-receiver communication.

]()

**[constr\_4559] [category](#) of [TimingDescriptionEvent](#) shall not be extended** [In contrast to the general rule that [category](#) can be extended by user-specific values it

is not allowed to extend the meaning of the attribute `category` of meta-class `TimingDescriptionEvent`.

]()

**[constr\_4560] `category` of `TimingDescriptionEventChain` shall not be extended** [In contrast to the general rule that `category` can be extended by user-specific values it is not allowed to extend the meaning of the attribute `category` of meta-class `TimingDescriptionEventChain`.

]()

**[constr\_4561]{DRAFT} Usage of the category value `DISPATCH_ENTRY_POINT` in `TimingDescriptionEvent`** [The value `DISPATCH_ENTRY_POINT` of the attribute `category` of a `TimingDescriptionEvent` shall be set if and only if the timing description event plays the role of a stimulus event and the corresponding timing description event chain, referencing this timing description event, represents a dispatcher in the context of describing timing of a software cluster.

]()

**[constr\_4562]{DRAFT} Usage of the category value `DISPATCH_EXIT_POINT` in `TimingDescriptionEvent`** [The value `DISPATCH_EXIT_POINT` of the attribute `category` of a `TimingDescriptionEvent` shall be set if and only if the timing description event plays the role of a response event and the corresponding timing description event chain, referencing this timing description event, represents a dispatcher in the context of describing timing of a software cluster.

]()

**[constr\_4563]{DRAFT} `TDCpSoftwareClusterMapping` shall reference only dispatchers or LET intervals** [The element `TDCpSoftwareClusterMapping` shall reference as timing description either `TDEventComplex` with the `category` set to `DISPATCH_ENTRY_POINT`, or `TimingDescriptionEventChain` with the `category` set to `LET_INTERVAL`.

]()

**[constr\_4564]{DRAFT} `TDCpSoftwareClusterResourceMapping` shall reference only dispatchers or LET intervals** [The element `TDCpSoftwareClusterResourceMapping` shall reference as timing description either `TDEventComplex` with the `category` set to `DISPATCH_ENTRY_POINT`, or `TimingDescriptionEventChain` with the `category` set to `LET_INTERVAL`.

]()

**[constr\_4565]{DRAFT} Consistency of `TDCpSoftwareClusterMapping` and `TDCpSoftwareClusterResourceMapping`** [The timing descriptions referenced by the element `TDCpSoftwareClusterMapping` and the element `TDCpSoftwareClusterResourceMapping` shall be consistent.

]()



**[constr\_4566]{DRAFT} SystemTiming** describing timing of software clusters and category of **System** [A **SystemTiming** used to describe the timing of one or more software clusters shall reference a **System** with the **category** set to **SW\_CLUSTER\_SYSTEM\_DESCRIPTION**

]()

**[constr\_4567]{DRAFT} Reference provider of TDCpSoftwareClusterMapping** [The reference **provider** of **TDCpSoftwareClusterMapping** shall point to a **CpSoftwareCluster** which represents a host software cluster.

]()

**[constr\_4568]{DRAFT} Reference requestor of TDCpSoftwareClusterMapping** [The reference **requestor** of **TDCpSoftwareClusterMapping** shall point to a **CpSoftwareCluster** which represents an application software cluster.

]()

## A Mentioned Class Tables

<b>Class</b>	<b>ARElement</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::ARPackage			
<b>Note</b>	An element that can be defined stand-alone, i.e. without being part of another element (except for packages of course).			
<b>Base</b>	<i>ARObject</i> , <i>CollectableElement</i> , <i>Identifiable</i> , <i>MultilanguageReferrable</i> , <i>PackageableElement</i> , <i>Referrable</i>			
<b>Subclasses</b>	AclObjectSet, AclOperation, AclPermission, AclRole, <i>AliasNameSet</i> , <i>ApplicationPartition</i> , <i>AutosarData Type</i> , <i>BaseType</i> , BlueprintMappingSet, BswEntryRelationshipSet, <i>BswModuleDescription</i> , <i>BswModule Entry</i> , BuildActionManifest, CalibrationParameterValueSet, ClientIdDefinitionSet, <i>ClientServerInterfaceTo BswModuleEntryBlueprintMapping</i> , <i>Collection</i> , <i>CompuMethod</i> , ConsistencyNeedsBlueprintSet, <i>Constant Specification</i> , ConstantSpecificationMappingSet, <i>CpSoftwareCluster</i> , <i>CpSoftwareClusterBinaryManifest Descriptor</i> , CpSoftwareClusterMappingSet, CpSoftwareClusterResourcePool, CryptoEllipticCurveProps, <i>CryptoServiceCertificate</i> , CryptoServiceKey, <i>CryptoServicePrimitive</i> , <i>CryptoServiceQueue</i> , Crypto SignatureScheme, <i>DataConstr</i> , DataExchangePoint, DataTransformationSet, <i>DataTypeMappingSet</i> , <i>DiagnosticCommonElement</i> , <i>DiagnosticConnection</i> , <i>DiagnosticContributionSet</i> , DltContext, DltEcu, Documentation, <i>E2EProfileCompatibilityProps</i> , EcucDefinitionCollection, <i>EcucDestinationUriDefSet</i> , <i>EcucModuleConfigurationValues</i> , <i>EcucModuleDef</i> , <i>EcucValueCollection</i> , EndToEndProtectionSet, Ethlp Props, EthTcplplcmpProps, EthTcplpProps, <i>EvaluatedVariantSet</i> , FMFeature, FMFeatureMap, FM FeatureModel, FMFeatureSelectionSet, FlatMap, <i>GeneralPurposeConnection</i> , HwCategory, <i>HwElement</i> , <i>HwType</i> , IPsecConfigProps, IPv6ExtHeaderFilterSet, <i>IdsCommonElement</i> , IdsDesign, <i>Implementation</i> , InterpolationRoutineMappingSet, J1939ControllerApplication, KeywordSet, <i>LifeCycleInfoSet</i> , <i>LifeCycle StateDefinitionGroup</i> , LogAndTraceMessageCollectionSet, <i>McFunction</i> , <i>McGroup</i> , <i>ModeDeclaration Group</i> , <i>ModeDeclarationMappingSet</i> , OsTaskProxy, <i>PhysicalDimension</i> , PhysicalDimensionMappingSet, <i>PortInterface</i> , PortInterfaceMappingSet, <i>PortPrototypeBlueprint</i> , PostBuildVariantCriterion, PostBuild VariantCriterionValueSet, <i>PredefinedVariant</i> , <i>RapidPrototypingScenario</i> , <i>SdgDef</i> , SignalService TranslationPropsSet, <i>SomeipSdClientEventGroupTimingConfig</i> , <i>SomeipSdClientServiceInstanceConfig</i> , <i>SomeipSdServerEventGroupTimingConfig</i> , <i>SomeipSdServerServiceInstanceConfig</i> , <i>SwAddrMethod</i> , Sw AxisType, SwComponentMappingConstraints, <i>SwComponentType</i> , <i>SwRecordLayout</i> , <i>SwSystemconst</i> , <i>SwSystemconstantValueSet</i> , <i>SwCbswMapping</i> , <i>System</i> , <i>SystemSignal</i> , <i>SystemSignalGroup</i> , TDCp SoftwareClusterMappingSet, TcpOptionFilterSet, <i>TimingExtension</i> , TlsConnectionGroup, <i>TlvDataId DefinitionSet</i> , TransformationPropsSet, <i>Unit</i> , UnitGroup, ViewMapSet			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	ARElement (abstract)			
–	–	–	–	–

**Table A.1: ARElement**

Class	ARPackage			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::ARPackage			
Note	<p>AUTOSAR package, allowing to create top level packages to structure the contained ARElements.</p> <p>ARPackages are open sets. This means that in a file based description system multiple files can be used to partially describe the contents of a package.</p> <p>This is an extended version of MSR's SW-SYSTEM.</p>			
Base	ARObject, <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
arPackage	<a href="#">ARPackage</a>	*	aggr	<p>This represents a sub package within an ARPackage, thus allowing for an unlimited package hierarchy.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=arPackage.shortName, arPackage.variationPoint.shortLabel  vh.latestBindingTime=blueprintDerivationTime  xml.sequenceOffset=30</p>
element	<a href="#">PackageableElement</a>	*	aggr	<p>Elements that are part of this package</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=element.shortName, element.definition, element.variationPoint.shortLabel  vh.latestBindingTime=systemDesignTime  xml.sequenceOffset=20</p>
referenceBase	<a href="#">ReferenceBase</a>	*	aggr	<p>This denotes the reference bases for the package. This is the basis for all relative references within the package. The base needs to be selected according to the base attribute within the references.</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b>  atp.Splitkey=referenceBase.shortLabel  xml.sequenceOffset=10</p>

**Table A.2: ARPackage**

Class	AUTOSAR			
Package	M2::AUTOSARTemplates::AutosarTopLevelStructure			
Note	<p>Root element of an AUTOSAR description, also the root element in corresponding XML documents.</p> <p><b>Tags:</b>xml.globalElement=true</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
adminData	<a href="#">AdminData</a>	0..1	aggr	<p>This represents the administrative data of an Autosar file.</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>





Class	AUTOSAR			
arPackage	<a href="#">ARPackage</a>	*	aggr	This is the top level package in an AUTOSAR model. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=arPackage.shortName, arPackage.variationPoint.shortLabel vh.latestBindingTime=blueprintDerivationTime xml.sequenceOffset=30
fileInfoComment	FileInfoComment	0..1	aggr	This represents a possibility to provide a structured comment in an AUTOSAR file. <b>Stereotypes:</b> atpStructuredComment <b>Tags:</b> xml.roleElement=true xml.sequenceOffset=-10 xml.typeElement=false
introduction	<a href="#">DocumentationBlock</a>	0..1	aggr	This represents an introduction on the Autosar file. It is intended for example to represent disclaimers and legal notes. <b>Tags:</b> xml.sequenceOffset=20

**Table A.3: AUTOSAR**

Class	<b>AbstractAccessPoint</b> (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::AccessCount			
Note	Abstract class indicating an access point from an ExecutableEntity.			
Base	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">AsynchronousServerCallResultPoint</a> , <a href="#">ExternalTriggeringPointIdent</a> , <a href="#">InternalTriggeringPoint</a> , <a href="#">ModeAccessPointIdent</a> , <a href="#">ModeSwitchPoint</a> , <a href="#">ParameterAccess</a> , <a href="#">ServerCallPoint</a> , <a href="#">VariableAccess</a>			
Attribute	Type	Mult.	Kind	Note
returnValueProvision	RteApiReturnValueProvisionEnum	0..1	attr	This attribute controls the provision of return values for RTE APIs that correspond to the enclosing access point.

**Table A.4: AbstractAccessPoint**

Class	<b>AbstractCanCommunicationControllerAttributes</b> (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	For the configuration of the CanController parameters two different approaches can be used: 1. Providing exact values which are taken by the ECU developer (CanControllerConfiguration). 2. Providing ranges of values which are taken as requirements and have to be respected by the ECU developer (CanControllerConfigurationRequirements).			
Base	ARObject			
Subclasses	CanControllerConfiguration, CanControllerConfigurationRequirements			
Attribute	Type	Mult.	Kind	Note
canControllerFdAttributes	<a href="#">CanControllerFdConfiguration</a>	0..1	aggr	Bit timing related configuration of a CAN controller for payload and CRC of a CanFD frame. If this element exists the controller supports CanFD frames and the ECU developer shall take these values for the configuration of the CanFD controller.





Class	<b>AbstractCanCommunicationControllerAttributes</b> (abstract)			
canControllerFd Requirements	<a href="#">CanControllerFd Configuration Requirements</a>	0..1	aggr	Additional CanFD ranges of the bit timing related configuration of a CanFD controller. If this element exists the controller supports CanFD frames and the ECU developer shall take these ranges as requirements for the configuration of the CanFD controller.

**Table A.5: AbstractCanCommunicationControllerAttributes**

Class	<b>AbstractClassTailoring</b>			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::DataFormatTailoring			
Note	Tailoring of abstract classes in the AUTOSAR meta-model			
Base	ARObject, <a href="#">ClassTailoring</a> , <a href="#">DataFormatElementReference</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">SpecElementReference</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.6: AbstractClassTailoring**

Class	<<atpMixedString>> <b>AbstractEnumerationValueVariationPoint</b> (abstract)			
Package	M2::AUTOSARTemplates::GenericStructure::VariantHandling::AttributeValueVariationPoints			
Note	This is an abstract EnumerationValueVariationPoint. It is introduced to support the case that additional attributes are required for particular purposes.			
Base	ARObject, <a href="#">AttributeValueVariationPoint</a> , <a href="#">FormulaExpression</a> , <a href="#">SwSystemconstDependentFormula</a>			
Subclasses				
Attribute	Type	Mult.	Kind	Note
base	<a href="#">Identifier</a>	0..1	attr	This attribute reflects the base to be used in context of EnumerationMappingTable for this reference. <b>Tags:</b> xml.attribute=true
enumTable	<a href="#">Ref</a>	0..1	attr	This represents the assigned enumeration table. <b>Tags:</b> xml.attribute=true

**Table A.7: AbstractEnumerationValueVariationPoint**

Class	<b>AbstractEthernetFrame</b> (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetFrame			
Note	Ethernet specific attributes to the Frame.			
Base	ARObject, <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Frame</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Subclasses	GenericEthernetFrame, Ieee1722TpEthernetFrame, UserDefinedEthernetFrame			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.8: AbstractEthernetFrame**

<b>Class</b>	<b>AbstractEvent</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::InternalBehavior			
<b>Note</b>	This meta-class represents the abstract ability to model an event that can be taken to implement application software or basic software in AUTOSAR.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">BswEvent</a> , <a href="#">RTEEvent</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
activation Reason Representation	<a href="#">ExecutableEntity</a> <a href="#">ActivationReason</a>	0..1	ref	If the activationReasonRepresentation is referenced from the enclosing AbstractEvent this shall be taken as an indication that the latter contributes to the activating vector of this ExecutableEntity that owns the referenced ExecutableEntityActivationReason.

**Table A.9: AbstractEvent**

<b>Class</b>	<b>AbstractImplementationDataType</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ImplementationDataTypes			
<b>Note</b>	This meta-class represents an abstract base class for different flavors of ImplementationDataType.			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">AutosarDataType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">ImplementationDataType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.10: AbstractImplementationDataType**

<b>Class</b>	<b>AbstractImplementationDataTypeElement</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ImplementationDataTypes			
<b>Note</b>	This meta-class represents the ability to act as an abstract base class for specific derived meta-classes that support the modeling of ImplementationDataTypes for a particular language binding.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">ImplementationDataTypeElement</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.11: AbstractImplementationDataTypeElement**

<b>Class</b>	<b>AbstractMultiplicityRestriction</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::ModelRestrictionTypes			
<b>Note</b>	Restriction that specifies the valid number of occurrences of an element in the current context.			
<b>Base</b>	ARObject			
<b>Subclasses</b>	<a href="#">AttributeCondition</a> , <a href="#">MultiplicityRestrictionWithSeverity</a> , <a href="#">SdgAttribute</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	<b>AbstractMultiplicityRestriction</b> (abstract)			
lowerMultiplicity	PositiveInteger	0..1	attr	Specifies the minimal number of times an object shall occur. If this primitive attribute is not set, then the object is optional.
upperMultiplicity	PositiveInteger	0..1	attr	Specifies the maximum number of times an object may occur. If this primitive attribute is not set, then there is no limit with respect to the maximum occurrence.
upperMultiplicityInfinite	Boolean	0..1	attr	This explicitly specifies, that the upper multiplicity is NOT restricted. Note: The use of 'upperMultiplicityInfinite' and 'upperMultiplicity' is mutual exclusive.

**Table A.12: AbstractMultiplicityRestriction**

Class	<b>AbstractProvidedPortPrototype</b> (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	This abstract class provides the ability to become a provided PortPrototype.			
Base	ARObject, AtpBlueprintable, AtpFeature, <a href="#">AtpPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PortPrototype</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">PPortPrototype</a> , <a href="#">PRPortPrototype</a>			
Attribute	Type	Mult.	Kind	Note
providedComSpec	<a href="#">PPortComSpec</a>	*	aggr	Provided communication attributes per interface element (data element or operation).

**Table A.13: AbstractProvidedPortPrototype**

Class	<b>AbstractRequiredPortPrototype</b> (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	This abstract class provides the ability to become a required PortPrototype.			
Base	ARObject, AtpBlueprintable, AtpFeature, <a href="#">AtpPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PortPrototype</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">PRPortPrototype</a> , <a href="#">RPortPrototype</a>			
Attribute	Type	Mult.	Kind	Note
requiredComSpec	<a href="#">RPortComSpec</a>	*	aggr	Required communication attributes, one for each interface element.

**Table A.14: AbstractRequiredPortPrototype**

Class	<b>AbstractRuleBasedValueSpecification</b> (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	This represents an abstract base class for all rule-based value specifications.			
Base	ARObject, <a href="#">ValueSpecification</a>			
Subclasses	<a href="#">ApplicationRuleBasedValueSpecification</a> , <a href="#">CompositeRuleBasedValueSpecification</a> , <a href="#">NumericalRuleBasedValueSpecification</a>			
Attribute	Type	Mult.	Kind	Note
—	—	—	—	—

**Table A.15: AbstractRuleBasedValueSpecification**

<b>Class</b>	<b>AbstractServiceInstance</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
<b>Note</b>	Provided and Consumed Ethernet Service Instances that are available at the ApplicationEndpoint.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">ConsumedServiceInstance</a> , <a href="#">ProvidedServiceInstance</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
capability Record	TagWithOptionalValue	*	aggr	A sequence of records to store arbitrary name/value pairs conveying additional information about the named service.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
majorVersion	PositiveInteger	0..1	attr	Major Version of the ServiceInterface. Value can be set to a number that represents the Major Version of the service.
method Activation RoutingGroup	<a href="#">PduActivationRoutingGroup</a>	0..1	aggr	The ServiceDiscovery module is able to activate and deactivate the PDU routing for ClientServerOperations (SOME/IP methods).  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
routingGroup	SoAdRoutingGroup	*	ref	The ServiceDiscovery module is able to activate and deactivate the PDU routing from and to TCP/IP-sockets.  <b>Tags:</b> atp.Status=obsolete

**Table A.16: AbstractServiceInstance**

<b>Class</b>	<b>AccessCount</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::AccessCount			
<b>Note</b>	This meta-class provides one count value for a AbstractAccessPoint.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
accessPoint	<a href="#">AbstractAccessPoint</a>	0..1	ref	AbstractAccessPoint for which the count value is applicable.
value	PositiveInteger	1	attr	This attribute represents the number of determined accesses  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.17: AccessCount**

<b>Class</b>	<b>AccessCountSet</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::AccessCount			
<b>Note</b>	This meta-class provides a set of count values evaluated according to the rules of a specific countProfile.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
accessCount	<a href="#">AccessCount</a>	*	aggr	Count value for a AbstractAccessPoint.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime







Class	AccessCountSet			
countProfile	NameToken	1	attr	This attribute defines the name of the count profile used to determine the AccessCount.value numbers.

**Table A.18: AccessCountSet**

Class	AdminData			
Package	M2::MSR::AsamHdo::AdminData			
Note	AdminData represents the ability to express administrative information for an element. This administration information is to be treated as meta-data such as revision id or state of the file. There are basically four kinds of meta-data <ul style="list-style-type: none"> <li>The language and/or used languages.</li> <li>Revision information covering e.g. revision number, state, release date, changes. Note that this information can be given in general as well as related to a particular company.</li> <li>Document meta-data specific for a company</li> </ul>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
docRevision (ordered)	DocRevision	*	aggr	This allows to denote information about the current revision of the object.  Note that information about previous revisions can also be logged here. The entries shall be sorted descendant by date in order to reflect the history. Therefore the most recent entry representing the current version is denoted first.  <b>Tags:</b> xml.roleElement=true xml.roleWrapperElement=true xml.sequenceOffset=50 xml.typeElement=false xml.typeWrapperElement=false
language	LEnum	0..1	attr	This attribute specifies the master language of the document or the document fragment. The master language is the one in which the document is maintained and from which the other languages are derived from. In particular in case of inconsistencies, the information in the master language is priority.  <b>Tags:</b> xml.sequenceOffset=20
sdg	Sdg	*	aggr	This property allows to keep special data which is not represented by the standard model. It can be utilized to keep e.g. tool specific data.  <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=sdg, sdg.variationPoint.shortLabel xml.roleElement=true xml.roleWrapperElement=true xml.sequenceOffset=60 xml.typeElement=false xml.typeWrapperElement=false





Class	AdminData			
usedLanguages	MultiLanguagePlainText	0..1	aggr	<p>This property specifies the languages which are provided in the document. Therefore it should only be specified in the top level admin data. For each language provided in the document there is one entry in MultiLanguagePlainText. The content of each entry can be used for illustration of the language. The used language itself depends on the language attribute in the entry.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>

**Table A.19: AdminData**

Class	AgeConstraint			
Package	M2::AUTOSARTemplates::CommonStructure::Timing::TimingConstraint::AgeConstraint			
Note	<p>The AgeConstraint is used to impose a constraint on an Timing Description Event referenced by the scope.</p> <p>A minimum and a maximum age can be specified.</p>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TimingConstraint</a> , <a href="#">Traceable</a>			
Attribute	Type	Mult.	Kind	Note
maximum	MultidimensionalTime	0..1	aggr	The maximum age.
minimum	MultidimensionalTime	0..1	aggr	The minimum age.
scope	<a href="#">TimingDescriptionEvent</a>	0..1	ref	The scope of an AgeConstraint is any TimingDescription Event that indicates any receipt of data.

**Table A.20: AgeConstraint**

Class	AggregationCondition			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::DataFormatTailoring			
Note	The AggregationCondition evaluates to true, if the referenced aggregation is accepted by all rules of this condition.			
Base	ARObject, <a href="#">AbstractCondition</a> , <a href="#">AbstractMultiplicityRestriction</a> , <a href="#">AttributeCondition</a>			
Attribute	Type	Mult.	Kind	Note
aggregation	<a href="#">AggregationTailoring</a>	1	ref	The aggregation that has to be accepted by the restrictions of this AggregationCondition

**Table A.21: AggregationCondition**

Class	AggregationTailoring			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::DataFormatTailoring			
Note	Tailoring of aggregations in the AUTOSAR meta-model			
Base	ARObject, <a href="#">AttributeTailoring</a> , <a href="#">DataFormatElementReference</a> , <a href="#">DataFormatElementScope</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">SpecElementReference</a> , <a href="#">SpecElementScope</a>			
Attribute	Type	Mult.	Kind	Note





Class	AggregationTailoring			
typeTailoring	<a href="#">ClassTailoring</a>	*	aggr	Local class tailoring which is applied if the content is contained by this aggregation.

**Table A.22: AggregationTailoring**

Class	AliasNameAssignment			
Package	M2::AUTOSARTemplates::CommonStructure::FlatMap			
Note	<p>This meta-class represents the ability to associate an alternative name to a flat representations or an Identifiable.</p> <p>The usage of this name is defined outside of AUTOSAR. For example this name can be used by MCD tools or as a name for component instances in the ECU extract.</p> <p>Note that flatInstance and identifiable are mutually exclusive.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
flatInstance	<a href="#">FlatInstanceDescriptor</a>	0..1	ref	Assignment of a unique name to a flat representation. <b>Tags:</b> xml.sequenceOffset=60
identifiable	<a href="#">Identifiable</a>	0..1	ref	Assignment of a unique name to an Identifiable. <b>Tags:</b> xml.sequenceOffset=50
label	MultilanguageLong Name	0..1	aggr	This represents an "Alias LongName". <b>Tags:</b> xml.sequenceOffset=20
shortLabel	String	1	attr	<p>This attribute represents the alias name. It is modeled as string because the alias name is used outside of AUTOSAR and therefore no naming conventions can be applied within AUTOSAR.</p> <p><b>Stereotypes:</b> atpIdentityContributor <b>Tags:</b>xml.sequenceOffset=10</p>

**Table A.23: AliasNameAssignment**

Class	AliasNameSet			
Package	M2::AUTOSARTemplates::CommonStructure::FlatMap			
Note	<p>This meta-class represents a set of AliasNames. The AliasNameSet can for example be an input to the A2L-Generator.</p> <p><b>Tags:</b>atp.recommendedPackage=AliasNameSets</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
aliasName	<a href="#">AliasNameAssignment</a>	1..*	aggr	<p>AliasNames contained in the AliasNameSet.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=aliasName.shortLabel, aliasName.variation Point.shortLabel vh.latestBindingTime=preCompileTime</p>

**Table A.24: AliasNameSet**

<b>Class</b>	<b>AnalyzedExecutionTime</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::ExecutionTime			
<b>Note</b>	AnalyzedExecutionTime provides an analytic method for specifying the best and worst case execution time.			
<b>Base</b>	ARObject, ExecutionTime, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bestCaseExecutionTime	MultidimensionalTime	1	aggr	The best case execution time (BCET) defines the minimum amount of time the related executable entity requires for its execution.
worstCaseExecutionTime	MultidimensionalTime	1	aggr	The worst case execution time (WCET) defines the maximum amount of time the related executable entity requires for its execution.

**Table A.25: AnalyzedExecutionTime**

<b>Class</b>	<b>AnyInstanceRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::AnyInstanceRef			
<b>Note</b>	Describes a reference to any instance in an AUTOSAR model. This is the most generic form of an instance ref. Refer to the superclass notes for more details.			
<b>Base</b>	ARObject, <a href="#">AtpInstanceRef</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
base	<a href="#">AtpClassifier</a>	1	ref	This is the base from which navigation path begins. <b>Stereotypes:</b> atpDerived
contextElement (ordered)	AtpFeature	*	ref	This is one step in the navigation path specified by the instance ref.
target	AtpFeature	1	ref	This is the target of the instance ref.

**Table A.26: AnyInstanceRef**

<b>Primitive</b>	<b>AnyServiceInstancelId</b>			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes			
<b>Note</b>	This is a positive integer or the literal ALL (the value ANY is technically supported but deprecated) which can be denoted in decimal, octal and hexadecimal. The value is between 0 and 65535.  <b>Tags:</b> xml.xsd.customType=ANY-SERVICE-INSTANCE-ID xml.xsd.pattern=[1-9][0-9]*[0[xX]][0-9a-fA-F]+[0[0-7]]*[0[bB]][0-1]+ ANY ALL xml.xsd.type=string			

**Table A.27: AnyServiceInstancelId**

<b>Class</b>	<b>ApplicationArrayDataType</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
<b>Note</b>	An application data type which is an array, each element is of the same application data type.  <b>Tags:</b> atp.recommendedPackage=ApplicationDataTypes			





Class	ApplicationArrayDataType			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">ApplicationCompositeDataType</a> , <a href="#">ApplicationDataType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">AutosarDataType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
dynamicArraySizeProfile	String	0..1	attr	Specifies the profile which the array will follow if it is a variable size array.
element	<a href="#">ApplicationArrayElement</a>	0..1	aggr	This association implements the concept of an array element. That is, in some cases it is necessary to be able to identify single array elements, e.g. as input values for an interpolation routine.

**Table A.28: ApplicationArrayDataType**

Class	ApplicationArrayElement			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
Note	Describes the properties of the elements of an application array data type.			
Base	<a href="#">ARObject</a> , <a href="#">ApplicationCompositeElementDataPrototype</a> , <a href="#">AtpFeature</a> , <a href="#">AtpPrototype</a> , <a href="#">DataPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
arraySizeHandling	<a href="#">ArraySizeHandlingEnum</a>	0..1	attr	The way how the size of the array is handled.
arraySizeSemantics	<a href="#">ArraySizeSemanticsEnum</a>	0..1	attr	This attribute controls how the information about the array size shall be interpreted.
indexDataType	<a href="#">ApplicationPrimitiveDataType</a>	0..1	ref	This reference can be taken to assign a CompuMethod of category TEXTTABLE to the array. The texttable entries associate a textual value to an index number such that the element with that index number is represented by a symbolic name.
maxNumberOfElements	PositiveInteger	0..1	attr	The maximum number of elements that the array can contain.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.29: ApplicationArrayElement**

Class	<a href="#">ApplicationCompositeDataType</a> (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	Abstract base class for all application data types composed of other data types.			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">ApplicationDataType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">AutosarDataType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">ApplicationArrayDataType</a> , <a href="#">ApplicationRecordDataType</a>			
Attribute	Type	Mult.	Kind	Note
—	—	—	—	—

**Table A.30: ApplicationCompositeDataType**

<b>Class</b>	<b>ApplicationCompositeDataTypeSubElementRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	This meta-class represents the specialization of SubElementMapping with respect to Application CompositeDataTypes.			
<b>Base</b>	ARObject, SubElementRef			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
application Composite Element	<a href="#">ApplicationCompositeElementDataPrototype</a>	0..1	iref	This represents the referenced ApplicationComposite DataPrototype.  <b>InstanceRef implemented by:</b> <a href="#">ApplicationCompositeElementInPortInterfaceInstanceRef</a>

**Table A.31: ApplicationCompositeDataTypeSubElementRef**

<b>Class</b>	<b>ApplicationCompositeElementDataPrototype</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
<b>Note</b>	This class represents a data prototype which is aggregated within a composite application data type (record or array). It is introduced to provide a better distinction between target and context in instance Refs.			
<b>Base</b>	ARObject, AtpFeature, <a href="#">AtpPrototype</a> , <a href="#">DataPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">ApplicationArrayElement</a> , <a href="#">ApplicationRecordElement</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
type	<a href="#">ApplicationDataType</a>	0..1	tref	This represents the corresponding data type.  <b>Stereotypes:</b> isOfType

**Table A.32: ApplicationCompositeElementDataPrototype**

<b>Class</b>	<b>ApplicationCompositeElementInPortInterfaceInstanceRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface::InstanceRefs			
<b>Note</b>				
<b>Base</b>	ARObject, <a href="#">AtpInstanceRef</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
base	<a href="#">DataInterface</a>	0..1	ref	This represents the SenderReceiverInterface that acts as the base in this InstanceRef definition  <b>Stereotypes:</b> atpDerived <b>Tags:</b> xml.sequenceOffset=10
contextData Prototype (ordered)	<a href="#">ApplicationCompositeElementDataPrototype</a>	*	ref	This represents a context ApplicationCompositeData Prototype  <b>Tags:</b> xml.sequenceOffset=20
rootData Prototype	<a href="#">AutosarDataPrototype</a>	0..1	ref	This refers to the dataPrototype which is typed by the ApplicationDatatype in which which the target can be found.  <b>Tags:</b> xml.sequenceOffset=15
targetData Prototype	<a href="#">ApplicationCompositeElementDataPrototype</a>	0..1	ref	This represents the referenced ApplicationComposite DataPrototype.  <b>Tags:</b> xml.sequenceOffset=30

**Table A.33: ApplicationCompositeElementInPortInterfaceInstanceRef**

<b>Class</b>	<b>ApplicationDataType</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
<b>Note</b>	<p>ApplicationDataType defines a data type from the application point of view. Especially it should be used whenever something "physical" is at stake.</p> <p>An ApplicationDataType represents a set of values as seen in the application model, such as measurement units. It does not consider implementation details such as bit-size, endianness, etc.</p> <p>It should be possible to model the application level aspects of a VFB system by using ApplicationDataTypes only.</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">AutosarDataType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">ApplicationCompositeDataType</a> , <a href="#">ApplicationPrimitiveDataType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.34: ApplicationDataType**

<b>Class</b>	<b>ApplicationEndpoint</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	<p>An application endpoint is the endpoint on an Ecu in terms of application addressing (e.g. socket). The application endpoint represents e.g. the listen socket in client-server-based communication.</p>			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
consumedServiceInstance	<a href="#">ConsumedServiceInstance</a>	*	aggr	<p>Consumed service instances.</p> <p><b>Tags:</b>atp.Status=obsolete</p>
maxNumberOfConnections	PositiveInteger	0..1	attr	This attribute defines the maximal number of clients the Server is able to deal with in case of Service Discovery.
networkEndpoint	<a href="#">NetworkEndpoint</a>	1	ref	Reference to the network address.
priority	PositiveInteger	0..1	attr	Defines the frame priority where values from 0 (best effort) to 7 (highest) are allowed.
providedServiceInstance	<a href="#">ProvidedServiceInstance</a>	*	aggr	<p>Provided service instances.</p> <p><b>Tags:</b>atp.Status=obsolete</p>
tlsCryptoMapping	<a href="#">TlsCryptoServiceMapping</a>	0..1	ref	This reference identifies the applicable TlsCryptoServiceMapping that adds the ability for TLS-based encryption on the enclosing ApplicationEndpoint.
tpConfiguration	TransportProtocolConfiguration	0..1	aggr	Configuration of the used transport protocol.

**Table A.35: ApplicationEndpoint**

<b>Class</b>	<b>ApplicationError</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	<p>This is a user-defined error that is associated with an element of an AUTOSAR interface. It is specific for the particular functionality or service provided by the AUTOSAR software component.</p>			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			







Class	ApplicationError			
Attribute	Type	Mult.	Kind	Note
errorCode	Integer	0..1	attr	The RTE generator is forced to assign this value to the corresponding error symbol. Note that for error codes certain ranges are predefined (see RTE specification).

**Table A.36: ApplicationError**

Class	ApplicationPartition			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	ApplicationPartition to which SwComponentPrototypes are mapped at a point in time when the corresponding EcuInstance is not yet known or defined. In a later methodology step the Application Partition can be assigned to an EcuPartition. <b>Tags:</b> atp.recommendedPackage=ApplicationPartitions			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.37: ApplicationPartition**

Class	ApplicationPartitionToEcuPartitionMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Maps ApplicationPartitions to EcuPartitions. With this mapping an OEM has the option to predefine an allocation of Software Components to EcuPartitions in the System Design phase. The final and complete assignment is described in the OS Configuration.			
Base	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
application Partition	<a href="#">ApplicationPartition</a>	*	ref	Reference to ApplicationPartitions that are mapped to an EcuPartition.
ecuPartition	<a href="#">EcuPartition</a>	0..1	ref	Reference to EcuPartition to which the Application Partitions are assigned.

**Table A.38: ApplicationPartitionToEcuPartitionMapping**

Class	ApplicationPrimitiveDataType			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	A primitive data type defines a set of allowed values. <b>Tags:</b> atp.recommendedPackage=ApplicationDataTypes			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">ApplicationDataType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">AutosarDataType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.39: ApplicationPrimitiveDataType**

<b>Class</b>	<b>ApplicationRecordDataType</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
<b>Note</b>	An application data type which can be decomposed into prototypes of other application data types. <b>Tags:</b> atp.recommendedPackage=ApplicationDataTypes			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">ApplicationCompositeDataType</a> , <a href="#">ApplicationDataType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">AutosarDataType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
element (ordered)	<a href="#">ApplicationRecordElement</a>	*	aggr	Specifies an element of a record.  The aggregation of ApplicationRecordElement is subject to variability with the purpose to support the conditional existence of elements inside a ApplicationrecordData Type.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.40: ApplicationRecordDataType**

<b>Class</b>	<b>ApplicationRecordElement</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
<b>Note</b>	Describes the properties of one particular element of an application record data type.			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">ApplicationCompositeElementDataPrototype</a> , <a href="#">AtpFeature</a> , <a href="#">AtpPrototype</a> , <a href="#">DataPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
isOptional	Boolean	0..1	attr	This attribute represents the ability to declare the enclosing ApplicationRecordElement as optional. This means the that, at runtime, the ApplicationRecord Element may or may not have a valid value and shall therefore be ignored.  The underlying runtime software provides means to set the ApplicationRecordElement as not valid at the sending end of a communication and determine its validity at the receiving end.

**Table A.41: ApplicationRecordElement**

<b>Class</b>	<b>ApplicationRuleBasedValueSpecification</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Constants			
<b>Note</b>	This meta-class represents rule based values for DataPrototypes typed by ApplicationDataTypes (ApplicationArrayDataType or a compound ApplicationPrimitiveDataType which also boils down to an array-nature).			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">AbstractRuleBasedValueSpecification</a> , <a href="#">CompositeRuleBasedValueArgument</a> , <a href="#">ValueSpecification</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
category	<a href="#">Identifier</a>	0..1	attr	This represents the category of the RuleBasedValue Specification  <b>Tags:</b> xml.sequenceOffset=-20





Class	ApplicationRuleBasedValueSpecification			
swAxisCont (ordered)	<a href="#">RuleBasedAxisCont</a>	*	aggr	This represents the axis values of a Compound Primitive Data Type (curve or map).  The first swAxisCont describes the x-axis, the second swAxisCont describes the y-axis, the third swAxisCont describes the z-axis. In addition to this, the axis can be denoted in swAxisIndex.
swValueCont	<a href="#">RuleBasedValueCont</a>	0..1	aggr	This represents the values of an array or Compound Primitive Data Type.

**Table A.42: ApplicationRuleBasedValueSpecification**

Class	ApplicationSwComponentType			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	The ApplicationSwComponentType is used to represent the application software. <b>Tags:</b> atp.recommendedPackage=SwComponentTypes			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtomicSwComponentType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.43: ApplicationSwComponentType**

Class	ApplicationValueSpecification			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	This meta-class represents values for DataPrototypes typed by ApplicationDataTypes (this includes in particular compound primitives).  For further details refer to ASAM CDF 2.0. This meta-class corresponds to some extent with SW-INSTANCE in ASAM CDF 2.0.			
Base	<a href="#">ARObject</a> , <a href="#">CompositeRuleBasedValueArgument</a> , <a href="#">ValueSpecification</a>			
Attribute	Type	Mult.	Kind	Note
category	<a href="#">Identifier</a>	0..1	attr	Specifies to which category of ApplicationDataType this ApplicationValueSpecification can be applied (e.g. as an initial value), thus imposing constraints on the structure and semantics of the contained values, see <a href="#">[constr_1006]</a> and <a href="#">[constr_2051]</a> .
swAxisCont (ordered)	<a href="#">SwAxisCont</a>	*	aggr	This represents the axis values of a Compound Primitive Data Type (curve or map).  The first swAxisCont describes the x-axis, the second swAxisCont describes the y-axis, the third swAxisCont describes the z-axis. In addition to this, the axis can be denoted in swAxisIndex.
swValueCont	<a href="#">SwValueCont</a>	0..1	aggr	This represents the values of a Compound Primitive Data Type.

**Table A.44: ApplicationValueSpecification**

<b>Class</b>	<b>ArParameterInImplementationDataInstanceRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::DataElements			
<b>Note</b>	<p>This class represents the ability to navigate into an element inside of an ParameterDataPrototype typed by an ImplementationDatatype.</p> <p>Note that it shall not be used if the target is the ParameterDataPrototype itself (e.g. if the target is a primitive data type).</p> <p>Note that this class follows the pattern of an InstanceRef but is not implemented based on the abstract classes because the ImplementationDataType isn't either, especially because ImplementationDataType Element (intentionally) isn't derived from AtpPrototype.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
contextData Prototype (ordered)	<a href="#">AbstractImplementationDataTypeElement</a>	*	ref	This is a context in case there are subelements with explicit types. The reference has to be ordered to properly reflect the nested structure.
portPrototype	<a href="#">PortPrototype</a>	0..1	ref	This reference points to the PortPrototype providing/ receiving the root of the parameter.
rootParameter DataPrototype	<a href="#">ParameterData Prototype</a>	0..1	ref	This refers to the ParameterDataPrototype typed by the implementationDataType in which the target can be found.
targetData Prototype	<a href="#">AbstractImplementationDataTypeElement</a>	0..1	ref	This reference points to the target ImplementationData TypeElement.

**Table A.45: ArParameterInImplementationDataInstanceRef**

<b>Class</b>	<b>ArVariableInImplementationDataInstanceRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::DataElements			
<b>Note</b>	<p>This class represents the ability to navigate into a data element inside of an VariableDataPrototype which is typed by an ImplementationDatatype.</p> <p>Note that it shall not be used if the target is the VariableDataPrototype itself (e.g. if its a primitive).</p> <p>Note that this class follows the pattern of an InstanceRef but is not implemented based on the abstract classes because the ImplementationDataType isn't either, especially because ImplementationDataType Element isn't derived from AtpPrototype.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
contextData Prototype (ordered)	<a href="#">AbstractImplementationDataTypeElement</a>	*	ref	<p>This is a context in case there are subelements with explicit types. The reference has to be ordered to properly reflect the nested structure.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
portPrototype	<a href="#">PortPrototype</a>	0..1	ref	<p>This is the port providing/receiving the root of the variable</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>
rootVariable DataPrototype	<a href="#">VariableDataPrototype</a>	0..1	ref	<p>This refers to the VariableDataPrototype typed by the ImplementationDatatype in which the target can be found.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
targetData Prototype	<a href="#">AbstractImplementationDataTypeElement</a>	0..1	ref	<p>This reference points to the target ImplementationData TypeElement.</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>

**Table A.46: ArVariableInImplementationDataInstanceRef**

<b>Class</b>	<b>ArgumentDataPrototype</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	An argument of an operation, much like a data element, but also carries direction information and is owned by a particular ClientServerOperation.			
<b>Base</b>	ARObject, AtpFeature, <a href="#">AtpPrototype</a> , <a href="#">AutosarDataPrototype</a> , <a href="#">DataPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
direction	<a href="#">ArgumentDirectionEnum</a>	0..1	attr	This attribute specifies the direction of the argument prototype.
serverArgumentImplPolicy	<a href="#">ServerArgumentImplPolicyEnum</a>	0..1	attr	This defines how the argument type of the servers RunnableEntity is implemented.  If the attribute is not defined this has the same semantics as if the attribute is set to the value useArgumentType for primitive arguments and structures.

**Table A.47: ArgumentDataPrototype**

<b>Enumeration</b>	<b>ArgumentDirectionEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes
<b>Note</b>	Use cases: <ul style="list-style-type: none"> <li>Arguments in ClientServerOperation can have different directions that need to be formally indicated because they have an impact on how the function signature looks like eventually.</li> <li>Arguments in BswModuleEntry already determine a function signature, but the direction is used to specify the semantics, especially of pointer arguments.</li> </ul>
<b>Literal</b>	<b>Description</b>
in	The argument value is passed to the callee. <b>Tags:</b> atp.EnumerationLiteralIndex=0
inout	The argument value is passed to the callee but also passed back from the callee to the caller. <b>Tags:</b> atp.EnumerationLiteralIndex=1
out	The argument value is passed from the callee to the caller. <b>Tags:</b> atp.EnumerationLiteralIndex=2

**Table A.48: ArgumentDirectionEnum**

<b>Enumeration</b>	<b>ArraySizeHandlingEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes
<b>Note</b>	This enumeration defines different ways to handle the sizes of variable size arrays.
<b>Literal</b>	<b>Description</b>
allIndicesDifferent ArraySize	All elements of the variable size array may have different sizes. <b>Tags:</b> atp.EnumerationLiteralIndex=0
allIndicesSame ArraySize	All elements of the variable size array have the same size. <b>Tags:</b> atp.EnumerationLiteralIndex=1





Enumeration	ArraySizeHandlingEnum
inheritedFromArray ElementTypeSize	The size of all dimensions of the variable size array is determined by the size of the contained array element. <b>Tags:</b> atp.EnumerationLiteralIndex=2

**Table A.49: ArraySizeHandlingEnum**

Enumeration	ArraySizeSemanticsEnum
Package	M2::AUTOSARTemplates::CommonStructure::ImplementationDataTypes
Note	This type controls how the information about the number of elements in an ApplicationArrayDataType is to be interpreted.
Literal	Description
fixedSize	This means that the ApplicationArrayDataType will always have a fixed number of elements. <b>Tags:</b> atp.EnumerationLiteralIndex=0
variableSize	This implies that the actual number of elements in the ApplicationArrayDataType might vary at run-time. The value of arraySize represents the maximum number of elements in the array. <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.50: ArraySizeSemanticsEnum**

Class	ArrayValueSpecification			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	Specifies the values for an array.			
Base	ARObject, <a href="#">CompositeValueSpecification</a> , <a href="#">ValueSpecification</a>			
Attribute	Type	Mult.	Kind	Note
element (ordered)	<a href="#">ValueSpecification</a>	*	aggr	The value for a single array element. All Value Specifications aggregated by ArrayValueSpecification shall have the same structure. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
intendedPartial Initialization Count	PositiveInteger	0..1	attr	This attribute shall only have a meaning for dynamic arrays and shall be taken as a sanity check: the number filled in the attribute shall be identical to the number of ArrayValueSpecification.element.  If the attribute does not exist it means that no partial initialization is intended.

**Table A.51: ArrayValueSpecification**

Class	AssemblySwConnector			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	AssemblySwConnectors are exclusively used to connect SwComponentPrototypes in the context of a CompositionSwComponentType.			
Base	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">SwConnector</a>			
Attribute	Type	Mult.	Kind	Note





Class	AssemblySwConnector			
provider	<a href="#">AbstractProvidedPort Prototype</a>	0..1	iref	Instance of providing port. <b>InstanceRef implemented by:</b> PPortInComposition InstanceRef
requester	<a href="#">AbstractRequiredPort Prototype</a>	0..1	iref	Instance of requiring port. <b>InstanceRef implemented by:</b> RPortInComposition InstanceRef

**Table A.52: AssemblySwConnector**

Class	AssignFrameIdRange			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	AssignFrameIdRange generates an assign frame PID range request.			
Base	ARObject, LinConfigurationEntry, ScheduleTableEntry			
Attribute	Type	Mult.	Kind	Note
framePid	<a href="#">FramePid</a>	0..4	aggr	Optional assignment of frame_PID values that are included in the request. The frame_PIDs are ordered.
startIndex	Integer	1	attr	The startIndex sets the index to the first frame to assign a PID.

**Table A.53: AssignFrameIdRange**

Class	AsynchronousServerCallPoint			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::ServerCall			
Note	An AsynchronousServerCallPoint is used for asynchronous invocation of a ClientServerOperation.  IMPORTANT: a ServerCallPoint cannot be used concurrently. Once the client RunnableEntity has made the invocation, the ServerCallPoint cannot be used until the call returns (or an error occurs!) at which point the ServerCallPoint becomes available again.			
Base	ARObject, <a href="#">AbstractAccessPoint</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServerCallPoint</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.54: AsynchronousServerCallPoint**

Class	AsynchronousServerCallResultPoint			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::ServerCall			
Note	If a RunnableEntity owns a AsynchronousServerCallResultPoint it is entitled to get the result of the referenced AsynchronousServerCallPoint. If it is associated with AsynchronousServerCallReturnsEvent, this RTEEvent notifies the completion of the required ClientServerOperation or a timeout. The occurrence of this event can either unblock a WaitPoint or can lead to the invocation of a RunnableEntity.			
Base	ARObject, <a href="#">AbstractAccessPoint</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note







Class	AsynchronousServerCallResultPoint			
asynchronous ServerCallPoint	<a href="#">AsynchronousServerCallPoint</a>	0..1	ref	The referenced Asynchronous Server Call Point defines the asynchronous server call from which the results are returned.

**Table A.55: AsynchronousServerCallResultPoint**

Class	AsynchronousServerCallReturnsEvent			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	This event is raised when an asynchronous server call is finished.			
Base	<a href="#">ARObject</a> , <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
eventSource	<a href="#">AsynchronousServerCallResultPoint</a>	0..1	ref	The referenced AsynchronousServerCallResultPoint raises this AsynchronousServerCallReturnsEvent when the asynchronous server call returns.

**Table A.56: AsynchronousServerCallReturnsEvent**

Class	AtomicSwComponentType (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	An atomic software component is atomic in the sense that it cannot be further decomposed and distributed across multiple ECUs.			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
Subclasses	<a href="#">ApplicationSwComponentType</a> , <a href="#">ComplexDeviceDriverSwComponentType</a> , <a href="#">EcuAbstractionSwComponentType</a> , <a href="#">NvBlockSwComponentType</a> , <a href="#">SensorActuatorSwComponentType</a> , <a href="#">ServiceProxySwComponentType</a> , <a href="#">ServiceSwComponentType</a>			
Attribute	Type	Mult.	Kind	Note
internalBehavior	<a href="#">SwcInternalBehavior</a>	0..1	aggr	The SwcInternalBehaviors owned by an AtomicSw ComponentType can be located in a different physical file. Therefore the aggregation is <<atpSplitable>>.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=internalBehavior.shortName, internalBehavior.variationPoint.shortLabel vh.latestBindingTime=preCompileTime
symbolProps	<a href="#">SymbolProps</a>	0..1	aggr	This represents the SymbolProps for the AtomicSw ComponentType.  <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=symbolProps.shortName

**Table A.57: AtomicSwComponentType**

Class	AtpBlueprint (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::AbstractBlueprintStructure			
Note	This meta-class represents the ability to act as a Blueprint. As this class is an abstract one, particular blueprint meta-classes inherit from this one.			





<b>Class</b>	<b>AtpBlueprint</b> (abstract)			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">ARPackage</a> , <a href="#">AbstractImplementationDataType</a> , <a href="#">AclObjectSet</a> , <a href="#">AclOperation</a> , <a href="#">AclPermission</a> , <a href="#">AclRole</a> , <a href="#">AliasNameSet</a> , <a href="#">ApplicationDataType</a> , <a href="#">BswEntryRelationshipSet</a> , <a href="#">BswModuleDescription</a> , <a href="#">BswModuleEntry</a> , <a href="#">BuildActionEntity</a> , <a href="#">BuildActionEnvironment</a> , <a href="#">BuildActionManifest</a> , <a href="#">ClientServerInterfaceToBswModuleEntryBlueprintMapping</a> , <a href="#">CompuMethod</a> , <a href="#">ConsistencyNeeds</a> , <a href="#">DataConstr</a> , <a href="#">DataTypeMappingSet</a> , <a href="#">EcucDefinitionCollection</a> , <a href="#">EcucDestinationUriDefSet</a> , <a href="#">EcucModuleDef</a> , <a href="#">FlatMap</a> , <a href="#">KeywordSet</a> , <a href="#">LifeCycleState</a> , <a href="#">LifeCycleStateDefinitionGroup</a> , <a href="#">ModeDeclarationGroup</a> , <a href="#">PortInterface</a> , <a href="#">PortInterfaceMapping</a> , <a href="#">PortInterfaceMappingSet</a> , <a href="#">PortPrototypeBlueprint</a> , <a href="#">SwAddrMethod</a> , <a href="#">SwBaseType</a> , <a href="#">SwComponentType</a> , <a href="#">VfbTiming</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
blueprintPolicy	<a href="#">BlueprintPolicy</a>	*	aggr	This role indicates whether the blueprintable element will be modifiable or not modifiable.

**Table A.58: AtpBlueprint**

<b>Class</b>	<b>AtpBlueprintMapping</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::AbstractBlueprintStructure			
<b>Note</b>	This meta-class represents the ability to express a particular mapping between a blueprint and an element derived from this blueprint.  Particular mappings are defined by specializations of this meta-class.			
<b>Base</b>	ARObject			
<b>Subclasses</b>	<a href="#">BlueprintMapping</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
atpBlueprint	<a href="#">AtpBlueprint</a>	1	ref	This represents the blueprint.  <b>Stereotypes:</b> atpAbstract; atpUriDef <b>Tags:</b> xml.sequenceOffset=50
atpBlueprinted Element	AtpBlueprintable	1	ref	This represents the blueprinted elements which shall be mapped to the blueprint.  <b>Stereotypes:</b> atpAbstract <b>Tags:</b> xml.sequenceOffset=60

**Table A.59: AtpBlueprintMapping**

<b>Class</b>	<b>AtpClassifier</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::AbstractStructure			
<b>Note</b>	A classifier classifies M0 instances according to their features. Or: a classifier is something that has instances - an M1 classifier has M0 instances.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">AtpStructureElement</a> , <a href="#">AtpType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
atpFeature	AtpFeature	*	aggr	This is a feature of the classifier.  <b>Stereotypes:</b> atpDerived

**Table A.60: AtpClassifier**

<b>Class</b>	<b>AtpInstanceRef</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::AbstractStructure			
<b>Note</b>	<p>An M0 instance of a classifier may be represented as a tree rooted at that instance, where under each node come the sub-trees representing the instances which act as features under that node.</p> <p>An instance ref specifies a navigation path from any M0 tree-instance of the base (which is a classifier) to a leaf (which is an instance of the target).</p>			
<b>Base</b>	ARObject			
<b>Subclasses</b>	AnyInstanceRef, ApplicationCompositeElementInPortInterfaceInstanceRef, ComponentInCompositionInstanceRef, ComponentInSystemInstanceRef, DataPrototypeInPortInterfaceInstanceRef, DataPrototypeInSystemInstanceRef, InnerDataPrototypeGroupInCompositionInstanceRef, InnerPortGroupInCompositionInstanceRef, InnerRunnableEntityGroupInCompositionInstanceRef, InstanceEventInCompositionInstanceRef, ModeDeclarationGroupPrototypeInSystemInstanceRef, ModeGroupInAtomicSwcInstanceRef, ModelInBswModuleDescriptionInstanceRef, ModelInSwcInstanceRef, OperationArgumentInComponentInstanceRef, OperationInAtomicSwcInstanceRef, OperationInSystemInstanceRef, PModelInSystemInstanceRef, ParameterDataPrototypeInSystemInstanceRef, ParameterInAtomicSWCTypeInstanceRef, PortGroupInSystemInstanceRef, PortInCompositionTypeInstanceRef, RModelInAtomicSwcInstanceRef, RteEventInCompositionInstanceRef, RteEventInEcuInstanceRef, RteEventInSystemInstanceRef, RunnableEntityInCompositionInstanceRef, SwcServiceDependencyInSystemInstanceRef, TriggerInAtomicSwcInstanceRef, TriggerInSystemInstanceRef, VariableAccessInEcuInstanceRef, VariableDataPrototypeInCompositionInstanceRef, VariableDataPrototypeInSystemInstanceRef, VariableInAtomicSWCTypeInstanceRef, VariableInAtomicSwcInstanceRef, VariableInComponentInstanceRef			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
atpBase	AtpClassifier	1	ref	This is the base from which the navigation path starts. <b>Stereotypes:</b> atpAbstract; atpDerived
atpContext Element (ordered)	AtpPrototype	*	ref	This is one particular step in the navigation path. <b>Stereotypes:</b> atpAbstract
atpTarget	AtpFeature	1	ref	This is the target of the instance ref. In other words it is the terminal of the navigation path. <b>Stereotypes:</b> atpAbstract

Table A.61: AtpInstanceRef

<b>Class</b>	<b>AtpPrototype</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::AbstractStructure			
<b>Note</b>	<p>A prototype is a typed feature. A prototype in a classifier indicates that instances of that classifier will have a feature, and the structure of that feature is given by the its type. An instance of that type will play the role indicated by the feature in the owning classifier.</p> <p>A feature is not an instance but an indication of an instance-to-be.</p>			
<b>Base</b>	ARObject, AtpFeature, Identifiable, MultilanguageReferrable, Referrable			
<b>Subclasses</b>	DataPrototype, ModeDeclarationGroupPrototype, PortPrototype, RootSwCompositionPrototype, SwComponentPrototype			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
atpType	AtpType	1	ref	This is the type of the feature. <b>Stereotypes:</b> atpAbstract

Table A.62: AtpPrototype

<b>Class</b>	<b>AtpStructureElement</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::AbstractStructure			
<b>Note</b>	A structure element is both a classifier and a feature. As a feature, its structure is given by the feature it owns as a classifier.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">AbstractAccessPoint</a> , <a href="#">AbstractImplementationDataTypeElement</a> , <a href="#">AsynchronousServerCallResultPoint</a> , <a href="#">BswModuleDescription</a> , <a href="#">BulkNvDataDescriptor</a> , <a href="#">ClientServerOperation</a> , <a href="#">DataPrototypeGroup</a> , <a href="#">IdentCaption</a> , <a href="#">InternalBehavior</a> , <a href="#">InternalTriggeringPoint</a> , <a href="#">ModeDeclaration</a> , <a href="#">ModeDeclarationMapping</a> , <a href="#">ModeSwitchPoint</a> , <a href="#">ModeTransition</a> , <a href="#">NvBlockDescriptor</a> , <a href="#">ParameterAccess</a> , <a href="#">PerInstanceMemory</a> , <a href="#">PortGroup</a> , <a href="#">PortPrototypeBlueprint</a> , <a href="#">RTEEvent</a> , <a href="#">RunnableEntity</a> , <a href="#">RunnableEntityGroup</a> , <a href="#">ServerCallPoint</a> , <a href="#">SwConnector</a> , <a href="#">SwcBswMapping</a> , <a href="#">SwcServiceDependency</a> , <a href="#">System</a> , <a href="#">Trigger</a> , <a href="#">VariableAccess</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.63: AtpStructureElement**

<b>Class</b>	<b>AtpType</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::AbstractStructure			
<b>Note</b>	A type is a classifier that may serve to type prototypes. It is a reusable classifier.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">AutosarDataType</a> , <a href="#">ModeDeclarationGroup</a> , <a href="#">ModeDeclarationMappingSet</a> , <a href="#">PortInterface</a> , <a href="#">SwComponentType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.64: AtpType**

<b>Class</b>	<b>AttributeTailoring</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::DataFormatTailoring			
<b>Note</b>	Tailoring of Attributes			
<b>Base</b>	ARObject, <a href="#">DataFormatElementReference</a> , <a href="#">DataFormatElementScope</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">SpecElementReference</a> , <a href="#">SpecElementScope</a>			
<b>Subclasses</b>	<a href="#">AggregationTailoring</a> , <a href="#">PrimitiveAttributeTailoring</a> , <a href="#">ReferenceTailoring</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
multiplicity Restriction	MultiplicityRestrictionWithSeverity	0..1	aggr	Multiplicity restriction of the attribute <b>Tags:</b> xml.sequenceOffset=10
variation Restriction	VariationRestrictionWithSeverity	0..1	aggr	Restrictions on the usage of variant handling. <b>Tags:</b> xml.sequenceOffset=20

**Table A.65: AttributeTailoring**

<b>Class</b>	<<atpMixedString>> <b>AttributeValueVariationPoint</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::VariantHandling::AttributeValueVariationPoints			
<b>Note</b>	This class represents the ability to derive the value of the Attribute from a system constant (by Sw SystemconstDependentFormula). It also provides a bindingTime.			
<b>Base</b>	ARObject, FormulaExpression, SwSystemconstDependentFormula			
<b>Subclasses</b>	<a href="#">AbstractEnumerationValueVariationPoint</a> , <a href="#">AbstractNumericalVariationPoint</a> , BooleanValueVariationPoint, FloatValueVariationPoint, IntegerValueVariationPoint, PositiveIntegerValueVariationPoint, TimeValueVariationPoint, UnlimitedIntegerValueVariationPoint			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bindingTime	BindingTimeEnum	0..1	attr	This is the binding time in which the attribute value needs to be bound.  If this attribute is missing, the attribute is not a variation point. In particular this means that It needs to be a single value according to the type specified in the pure model. It is an error if it is still a formula.  <b>Tags:</b> xml.attribute=true
blueprintValue	String	0..1	attr	This represents a description that documents how the value shall be defined when deriving objects from the blueprint.  <b>Tags:</b> xml.attribute=true
sd	String	0..1	attr	This special data is provided to allow synchronization of Attribute value variation points with variant management systems. The usage is subject of agreement between the involved parties.  <b>Tags:</b> xml.attribute=true
shortLabel	PrimitivIdentifier	0..1	attr	This allows to identify the variation point. It is also intended to allow RTE support for CompileTime Variation points.  <b>Tags:</b> xml.attribute=true

**Table A.66: AttributeValueVariationPoint**

<b>Class</b>	<b>AutosarDataPrototype</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
<b>Note</b>	Base class for prototypical roles of an AutosarDataType.			
<b>Base</b>	ARObject, AtpFeature, <a href="#">AtpPrototype</a> , <a href="#">DataPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">ArgumentDataPrototype</a> , <a href="#">ParameterDataPrototype</a> , <a href="#">VariableDataPrototype</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
type	<a href="#">AutosarDataType</a>	0..1	tref	This represents the corresponding data type.  <b>Stereotypes:</b> isOfType

**Table A.67: AutosarDataPrototype**

<b>Class</b>	<b>AutosarDataType</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
<b>Note</b>	Abstract base class for user defined AUTOSAR data types for software.			





<b>Class</b>	<b>AutosarDataType</b> (abstract)			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">AbstractImplementationDataType</a> , <a href="#">ApplicationDataType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
swDataDef Props	<a href="#">SwDataDefProps</a>	0..1	aggr	The properties of this AutosarDataType.

**Table A.68: AutosarDataType**

<b>Class</b>	<b>AutosarOperationArgumentInstance</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription::TimingDescriptionEvents::TDEventOccurrenceExpression::InstanceRefsUsage			
<b>Note</b>	<p>This class represents a reference to an argument instance. This way it is possible to reference an argument instance in the occurrence expression formula. The argument instance can target to one of the following arguments:</p> <ul style="list-style-type: none"> <li>a whole argument used in an operation of a PortPrototype with ClientServerInterface</li> <li>an element inside of a composite argument used in an operation of a PortPrototype with ClientServerInterface</li> </ul>			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
operation Argument Instance	<a href="#">DataPrototype</a>	1	iref	<p>This is the reference to the instanceRef definition.</p> <p><b>InstanceRef implemented by:</b> OperationArgumentInComponentInstanceRef</p>

**Table A.69: AutosarOperationArgumentInstance**

<b>Class</b>	<b>AutosarParameterRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::DataElements			
<b>Note</b>	<p>This class represents a reference to a parameter within AUTOSAR which can be one of the following use cases:</p> <p>localParameter:</p> <ul style="list-style-type: none"> <li>localParameter which is used as whole (e.g. sharedAxis for curve)</li> </ul> <p>autosarVariable:</p> <ul style="list-style-type: none"> <li>a parameter provided via PortPrototype which is used as whole (e.g. parameterAccess)</li> <li>an element inside of a composite local parameter typed by ApplicationDatatype (e.g. sharedAxis for a curve)</li> <li>an element inside of a composite parameter provided via Port and typed by ApplicationDatatype (e.g. sharedAxis for a curve)</li> </ul> <p>autosarParameterInImplDatatype:</p> <ul style="list-style-type: none"> <li>an element inside of a composite local parameter typed by ImplementationDatatype</li> <li>an element inside of a composite parameter provided via PortPrototype and typed by ImplementationDatatype</li> </ul>			
<b>Base</b>	<a href="#">ARObject</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	AutosarParameterRef			
autosarParameter	<a href="#">DataPrototype</a>	0..1	iref	<p>This instance reference is used if the calibration parameter is either imported via a port or is part of a composite data structure.</p> <p><b>InstanceRef implemented by:</b> <a href="#">ParameterInAtomicSWC</a> <a href="#">TypeInstanceRef</a></p>
localParameter	<a href="#">DataPrototype</a>	0..1	ref	<p>In the majority of cases this reference goes to Parameter DataPrototypes rather than VariableDataPrototypes. Pointing the reference to a VariableDataPrototype is limited to special use cases, e.g. if the AutosarParameterRef is used in the context of an SwAxisGrouped.</p> <p>This reference is used if the arParameter is local to the current component.</p> <p>Of course, it would technically also be feasible to use an InstanceRef for this case. However, the InstanceRef would not have a contextElement (because the current instance is the context).</p> <p>Hence, the local instance is a special case which may provide further optimization. Therefore an explicit reference is provided for this case.</p>

**Table A.70: AutosarParameterRef**

Class	AutosarVariableInstance			
Package	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription::TimingDescriptionEvents::TDEventOccurrenceExpression::InstanceRefsUsage			
Note	<p>This class represents a reference to a variable instance within AUTOSAR. This way it is possible to reference a variable instance in the occurrence expression formula. The variable instance can target to one of the following variables:</p> <ul style="list-style-type: none"> <li>• a variable provided via a PortPrototype as whole</li> <li>• an element inside of a composite variable provided via a PortPrototype</li> </ul>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
variableInstance	<a href="#">DataPrototype</a>	1	iref	<p>This is the reference to the instanceRef definition.</p> <p><b>InstanceRef implemented by:</b> <a href="#">VariableInComponent</a> <a href="#">InstanceRef</a></p>

**Table A.71: AutosarVariableInstance**

Class	AutosarVariableRef			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::DataElements			
Note	<p>This class represents a reference to a variable within AUTOSAR which can be one of the following use cases:</p> <p>localVariable:</p> <ul style="list-style-type: none"> <li>• localVariable which is used as whole (e.g. InterRunnableVariable, inputValue for curve)</li> </ul> <p>autosarVariable:</p> <ul style="list-style-type: none"> <li>• a variable provided via Port which is used as whole (e.g. dataAccesspoints)</li> <li>• an element inside of a composite local variable typed by ApplicationDatatype (e.g. inputValue for a curve)</li> </ul>			







Class	AutosarVariableRef			
	<div> <div> </div> <ul style="list-style-type: none"> <li>an element inside of a composite variable provided via Port and typed by ApplicationDatatype (e.g. inputValue for a curve)</li> </ul>           autosarVariableInImplDatatype:           <ul style="list-style-type: none"> <li>an element inside of a composite local variable typed by ImplementationDatatype (e.g. nvram Data mapping)</li> <li>an element inside of a composite variable provided via Port and typed by Implementation Datatype (e.g. inputValue for a curve)</li> </ul> </div>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
autosarVariable	DataPrototype	0..1	iref	This references a variable which is provided by a port and/or which is part of a CompositeDataType.  <b>InstanceRef implemented by:</b> <a href="#">VariableInAtomicSWCTypeInstanceRef</a>
autosarVariableInImplDatatype	ArVariableInImplementationDataInstanceRef	0..1	aggr	This is used if the target variable is inside of variableData Prototype typed by an ImplementationDataType.
localVariable	VariableDataPrototype	0..1	ref	This reference is used if the variable is local to the current component. It would also be possible to use the instance reference here. Such an instance ref would not have a contextElement, since the current instance is the context. But the local instance is a special case which may provide further optimization. Therefore an explicit reference is provided for this case.

Table A.72: AutosarVariableRef

Class	BaseType (abstract)			
Package	M2::MSR::AsamHdo::BaseTypes			
Note	This abstract meta-class represents the ability to specify a platform dependent base type.			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">SwBaseType</a>			
Attribute	Type	Mult.	Kind	Note
baseTypeDefinition	BaseTypeDefinition	1	aggr	This is the actual definition of the base type.  <b>Tags:</b> xml.roleElement=false xml.roleWrapperElement=false xml.sequenceOffset=20 xml.typeElement=false xml.typeWrapperElement=false

Table A.73: BaseType

Class	BaseTypeDirectDefinition			
Package	M2::MSR::AsamHdo::BaseTypes			
Note	This BaseType is defined directly (as opposite to a derived BaseType)			
Base	<a href="#">ARObject</a> , <a href="#">BaseTypeDefinition</a>			
Attribute	Type	Mult.	Kind	Note





Class	BaseTypeDirectDefinition			
baseTypeEncoding	BaseTypeEncodingString	0..1	attr	This specifies, how an object of the current BaseType is encoded, e.g. in an ECU within a message sequence. <b>Tags:</b> xml.sequenceOffset=90
baseTypeSize	PositiveInteger	0..1	attr	Describes the length of the data type specified in the container in bits. <b>Tags:</b> xml.sequenceOffset=70
byteOrder	ByteOrderEnum	0..1	attr	This attribute specifies the byte order of the base type. <b>Tags:</b> xml.sequenceOffset=110
memAlignment	PositiveInteger	0..1	attr	This attribute describes the alignment of the memory object in bits. E.g. "8" specifies, that the object in question is aligned to a byte while "32" specifies that it is aligned four byte. If the value is set to "0" the meaning shall be interpreted as "unspecified". <b>Tags:</b> xml.sequenceOffset=100
nativeDeclaration	NativeDeclarationString	0..1	attr	This attribute describes the declaration of such a base type in the native programming language, primarily in the Programming language C. This can then be used by a code generator to include the necessary declarations into a header file. For example BaseType with shortName: "MyUnsignedInt" native Declaration: "unsigned short" Results in typedef unsigned short MyUnsignedInt; If the attribute is not defined the referring Implementation DataTypes will not be generated as a typedef by RTE. If a nativeDeclaration type is given it shall fulfill the characteristic given by basetypeEncoding and baseTypeSize. This is required to ensure the consistent handling and interpretation by software components, RTE, COM and MCM systems. <b>Tags:</b> xml.sequenceOffset=120

**Table A.74: BaseTypeDirectDefinition**

Class	Baseline			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint			
Note	Specification of the baseline of the AUTOSAR standard this Data Exchange Point relates to. The baseline is specified by listing the AUTOSAR products and their revisions. Custom defined functionality and deviations to the standard can be provided as well. All references to specification elements in this Data Exchange Point refer to specification elements that are part of this specification baseline.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
customSdgDef	SdgDef	*	ref	Reference to custom SdgDefs that extend the data format of this baseline, <b>Tags:</b> xml.sequenceOffset=30
customSpecification	Documentation	*	ref	Reference to custom specifications that extend this baseline, <b>Tags:</b> xml.sequenceOffset=20





Class	Baseline			
standard Revision	String	*	attr	Specifies a combination of revisions of AUTOSAR standards that are used as the specification baseline of this Data Exchange Point. All standard specification elements that are referenced by this Profile of Data Exchange Point have to be part of specifications that belong to the defined AUTOSAR standards.  <b>Tags:</b> xml.sequenceOffset=10

**Table A.75: Baseline**

<b>Class</b>	<b>BinaryManifestAddressableObject</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
<b>Note</b>	This meta-class acts as an abstract base class for addressable objects in the context of the binary manifest of a CP software cluster.  <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">BinaryManifestItem</a> , <a href="#">BinaryManifestMetaDataField</a>			
Attribute	Type	Mult.	Kind	Note
address	Address	0..1	attr	This attribute specifies the address of the enclosing addressable object.  <b>Tags:</b> atp.Status=draft
symbol	SymbolString	0..1	attr	This attribute specifies the symbol of the addressable object.  <b>Tags:</b> atp.Status=draft

**Table A.76: BinaryManifestAddressableObject**

<b>Class</b>	<b>BinaryManifestItem</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
<b>Note</b>	This meta-class represents the ability to describe a specific handle or auxiliary field in the context of binary manifest resource.  <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, <a href="#">BinaryManifestAddressableObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
auxiliaryField	<a href="#">BinaryManifestItem</a>	*	aggr	This aggregation is used to define structured Binary ManifestItems.  <b>Tags:</b> atp.Status=draft xml.sequenceOffset=20
defaultValue	BinaryManifestItem Value	0..1	aggr	This aggregation represents the definition of a default value for a binary manifest handle or an auxiliaryField.  This value shall be taken if no connection for this resource is possible.  <b>Tags:</b> atp.Status=draft xml.sequenceOffset=10





Class	BinaryManifestItem			
isUnused	Boolean	0..1	attr	If true, the handle or auxiliary field in the context of binary manifest resource relates to an optional BinaryManifestItemDefinition and is not used. <b>Tags:</b> atp.Status=draft
value	BinaryManifestItemValue	0..1	aggr	This aggregation represents the definition of a value for a binary manifest handle or an auxiliaryField. This value shall be taken to establish a connection. <b>Tags:</b> atp.Status=draft

**Table A.77: BinaryManifestItem**

Class	BinaryManifestItemDefinition			
Package	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
Note	This meta-class provides the ability to define the handle definition or an auxiliary field of a binary manifest resource. <b>Tags:</b> atp.Status=draft			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
auxiliaryFieldDefinition	<a href="#">BinaryManifestItemDefinition</a>	*	aggr	This aggregation is used to define structured BinaryManifestItemDefinitions. <b>Tags:</b> atp.Status=draft
isOptional	Boolean	0..1	attr	If true, the handle definition or auxiliary field of a binary manifest resource is optional and may not be used in all BinaryManifestResources referring to this BinaryManifestResourceDefinition. <b>Tags:</b> atp.Status=draft
size	PositiveInteger	0..1	attr	This attribute provides the ability to specify the size of the enclosing BinaryManifestResourceDefinition. <b>Tags:</b> atp.Status=draft

**Table A.78: BinaryManifestItemDefinition**

Class	BinaryManifestItemNumericalValue			
Package	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
Note	This meta-class has the ability to provide a numerical value for a binary manifest item. <b>Tags:</b> atp.Status=draft			
Base	ARObject, <a href="#">BinaryManifestItemValue</a>			
Attribute	Type	Mult.	Kind	Note
value	<a href="#">Numerical</a>	0..1	attr	This attribute specifies the actual numerical value to be used in the binary manifest handle. <b>Tags:</b> atp.Status=draft

**Table A.79: BinaryManifestItemNumericalValue**

<b>Class</b>	<b>BinaryManifestItemPointerValue</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
<b>Note</b>	This meta-class has the ability to provide a value for a pointer in the context of a binary manifest item. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, BinaryManifestItemValue			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
address	Address	0..1	attr	This attribute represents the address value of the enclosing pointer value. <b>Tags:</b> atp.Status=draft
symbol	SymbolString	0..1	attr	This attribute represents the symbol associated with the binary manifest handle. <b>Tags:</b> atp.Status=draft

**Table A.80: BinaryManifestItemPointerValue**

<b>Class</b>	<b>BinaryManifestMetaDataMember</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
<b>Note</b>	This meta-class provides the ability to define a meta-data field for the binary manifest descriptor. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, BinaryManifestAddressableObject, Identifiable, MultilanguageReferrable, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
size	PositiveInteger	0..1	attr	The value of this attribute represents the size of the meta-data field in bytes. <b>Tags:</b> atp.Status=draft
value	VerbatimString	0..1	attr	This attribute specifies the value of the meta-data field. <b>Tags:</b> atp.Status=draft

**Table A.81: BinaryManifestMetaDataMember**

<b>Class</b>	<b>BinaryManifestProvideResource</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
<b>Note</b>	This meta-class represents a provided resource in the binary manifest. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, BinaryManifestResource, Identifiable, MultilanguageReferrable, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
numberOfNotifierSets	PositiveInteger	0..1	attr	This attribute provides an upper limit for the number of notifiers for this resource. <b>Tags:</b> atp.Status=draft
supportsMultipleNotifierSets	Boolean	0..1	attr	This attribute indicates whether the enclosing BinaryManifestResource supports multiple notifiers sets. <b>Tags:</b> atp.Status=draft

**Table A.82: BinaryManifestProvideResource**

<b>Class</b>	<b>BinaryManifestRequireResource</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
<b>Note</b>	This meta-class represents a required resource in the binary manifest. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, <a href="#">BinaryManifestResource</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
connectionIsMandatory	Boolean	0..1	attr	This attribute indicates whether the connection of the enclosing BinaryManifestResource is mandatory. <b>Tags:</b> atp.Status=draft

**Table A.83: BinaryManifestRequireResource**

<b>Class</b>	<b>BinaryManifestResource</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
<b>Note</b>	This meta-class acts as an abstract base class for specializations. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">BinaryManifestProvideResource</a> , <a href="#">BinaryManifestRequireResource</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
globalResourceId	PositiveInteger	0..1	attr	A unique identifiers per resource used for the connection process. The identifier is required to be unique in the scope of a single machine. If software clusters are designed to be reused on multiple machines the uniqueness requirements applies for all the intended machines. <b>Tags:</b> atp.Status=draft
item (ordered)	<a href="#">BinaryManifestItem</a>	*	aggr	This aggregation represents the collection of binary manifest handles owned by the enclosing binary manifest resource. <b>Tags:</b> atp.Status=draft
resource	<a href="#">CpSoftwareClusterResource</a>	0..1	ref	This reference identifies the CpSoftwareClusterResource (on design level) that corresponds to the BinaryManifestResource (on integration level). <b>Tags:</b> atp.Status=draft
resourceDefinition	<a href="#">BinaryManifestResourceDefinition</a>	0..1	ref	this reference identifies the definition of the BinaryManifestResource. The definition provides configuration information that is shared among all BinaryManifestResources that refer to the BinaryManifestResourceDefinition. <b>Tags:</b> atp.Status=draft
resourceGuardValue	String	0..1	attr	This attribute specifies the guard value of the enclosing binary manifest resource. <b>Tags:</b> atp.Status=draft

**Table A.84: BinaryManifestResource**

<b>Class</b>	<b>BinaryManifestResourceDefinition</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
<b>Note</b>	This meta-class represents the ability to specify a resource definition that provides information that can be shared by all resources that refer to the respective resource definition. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
itemDefinition (ordered)	<a href="#">BinaryManifestItem Definition</a>	*	aggr	This aggregation specifies the collection of handle definitions in the context of the enclosing binary manifest resource definitions. <b>Tags:</b> atp.Status=draft

**Table A.85: BinaryManifestResourceDefinition**

<b>Class</b>	<b>BlueprintMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::BlueprintDedicated::Generic Blueprint			
<b>Note</b>	This meta-class represents the ability to map two an object and its blueprint.			
<b>Base</b>	ARObject, <a href="#">AtpBlueprintMapping</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
blueprint	<a href="#">AtpBlueprint</a>	1	ref	This represents the mapped blueprint.
derivedObject	AtpBlueprintable	1	ref	This represents the object which was derived from the blueprint.

**Table A.86: BlueprintMapping**

<b>Class</b>	<b>BlueprintPolicy</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::AbstractBlueprintStructure			
<b>Note</b>	This meta-class represents the ability to indicate whether blueprintable elements will be modifiable or not modifiable.			
<b>Base</b>	ARObject			
<b>Subclasses</b>	<a href="#">BlueprintPolicyModifiable</a> , <a href="#">BlueprintPolicyNotModifiable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
attributeName	String	1	attr	This identifies the related attribute of a BlueprintPolicy. For navigation over the model a subset of xpath expressions is used.

**Table A.87: BlueprintPolicy**

<b>Class</b>	<b>BlueprintPolicyNotModifiable</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::AbstractBlueprintStructure			
<b>Note</b>	The class represents that the related attribute is not modifiable during the blueprinting.			
<b>Base</b>	ARObject, <a href="#">BlueprintPolicy</a>			







Class	BlueprintPolicyNotModifiable			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.88: BlueprintPolicyNotModifiable**

Class	BswAsynchronousServerCallPoint			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	Represents an asynchronous procedure call point via the BSW Scheduler.			
Base	ARObject, <a href="#">BswModuleCallPoint</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
calledEntry	<a href="#">BswModuleClientServerEntry</a>	1	ref	The entry to be called.

**Table A.89: BswAsynchronousServerCallPoint**

Class	BswAsynchronousServerCallResultPoint			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	The callback point for an BswAsynchronousServerCallPoint i.e. the point at which the result can be retrieved from the BSW Scheduler.			
Base	ARObject, <a href="#">BswModuleCallPoint</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
asynchronousServerCallPoint	<a href="#">BswAsynchronousServerCallPoint</a>	1	ref	The call point invoking the call to which the result belongs.

**Table A.90: BswAsynchronousServerCallResultPoint**

Enumeration	BswCallType			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswInterfaces			
Note	Denotes the mechanism by which the entry into the Bsw module shall be called.			
Literal	Description			
callback	Callback (i.e. the caller specifies the signature) <b>Tags:</b> atp.EnumerationLiteralIndex=0			
callout	Callout - provide defined means to extend the functionality of an existing module. In this case caller specifies the signature. <b>Tags:</b> atp.EnumerationLiteralIndex=4			
interrupt	Interrupt routine <b>Tags:</b> atp.EnumerationLiteralIndex=1			
regular	Regular API call <b>Tags:</b> atp.EnumerationLiteralIndex=2			
scheduled	Called by the scheduler <b>Tags:</b> atp.EnumerationLiteralIndex=3			

**Table A.91: BswCallType**

<b>Class</b>	<b>BswCalledEntity</b>			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	BSW module entity which is designed to be called from another BSW module or cluster.			
<b>Base</b>	ARObject, <a href="#">BswModuleEntity</a> , <a href="#">ExecutableEntity</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.92: BswCalledEntity**

<b>Class</b>	<b>BswDataReceptionPolicy</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	Specifies the reception policy for the referred data in sender-receiver communication over the BSW Scheduler. To be used for inter-partition and/or inter-core communication.			
<b>Base</b>	ARObject, <a href="#">BswApiOptions</a>			
<b>Subclasses</b>	BswQueuedDataReceptionPolicy			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
receivedData	<a href="#">VariableDataPrototype</a>	1	ref	The data received over the BSW Scheduler using this policy.

**Table A.93: BswDataReceptionPolicy**

<b>Class</b>	<b>BswDirectCallPoint</b>			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	Represents a concrete point in the code from where a BswModuleEntry is called directly, i.e. not via the BSW Scheduler.  This information can be used to analyze call tree and resource locking scenarios. It is not needed to configure the BSW Scheduler.			
<b>Base</b>	ARObject, <a href="#">BswModuleCallPoint</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
calledEntry	<a href="#">BswModuleEntry</a>	1	ref	The BswModuleEntry called at this point.
calledFrom WithinExclusive Area	ExclusiveAreaNesting Order	0..1	ref	This indicates that the call point is located at the deepest level inside one or more ExclusiveAreas that are nested in the given order.

**Table A.94: BswDirectCallPoint**

<b>Class</b>	<b>BswDistinguishedPartition</b>			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	Each instance of this meta-class represents an abstract partition in which context the code of the enclosing BswModuleBehavior can be executed.  The intended use case is to distinguish between several partitions in order to implement different behavior per partition, for example to behave either as a master or satellite in a multicore ECU with shared BSW code.			
<b>Base</b>	ARObject, <a href="#">Referrable</a>			





Class	BswDistinguishedPartition			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.95: BswDistinguishedPartition**

Class	<b>BswEvent</b> (abstract)			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	Base class of various kinds of events which are used to trigger a BswModuleEntity of this BSW module or cluster. The event is local to the BSW module or cluster. The short name of the meta-class instance is intended as an input to configure the required API of the BSW Scheduler.			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">BswOperationInvokedEvent</a> , <a href="#">BswScheduleEvent</a>			
Attribute	Type	Mult.	Kind	Note
context Limitation	<a href="#">BswDistinguishedPartition</a>	*	ref	The existence of this reference indicates that the usage of the event is limited to the context of the referred Bsw DistinguishedPartitions.
disabledInMode	<a href="#">ModeDeclaration</a>	*	iref	The modes, in which this event is disabled. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=disabledInMode.contextModeDeclarationGroup, disabledInMode.targetMode <b>InstanceRef implemented by:</b> ModeInBswModuleDescriptionInstanceRef
startsOnEvent	<a href="#">BswModuleEntity</a>	1	ref	The entity which is started by the event.

**Table A.96: BswEvent**

Class	<b>BswExclusiveAreaPolicy</b>			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	The ExclusiveArea for which the BSW Scheduler using this policy.			
Base	ARObject, <a href="#">BswApiOptions</a>			
Attribute	Type	Mult.	Kind	Note
apiPrinciple	ApiPrincipleEnum	0..1	attr	Specifies for this ExclusiveArea if either one common set of Enter and Exit APIs for the whole BSW module is requested from the SchM or if the set of Enter and Exit APIs is expected per BswModuleEntity. The default value is "common".
exclusiveArea	<a href="#">ExclusiveArea</a>	1	ref	The ExclusiveArea for which the BSW Scheduler using this policy.

**Table A.97: BswExclusiveAreaPolicy**

Enumeration	<b>BswExecutionContext</b>			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswInterfaces			
Note	Specifies the execution context required or guaranteed for the call associated with this service.			
Literal	Description			





Enumeration	BswExecutionContext
hook	Context of an OS "hook" routine always <b>Tags:</b> atp.EnumerationLiteralIndex=0
interruptCat1	CAT1 interrupt context always <b>Tags:</b> atp.EnumerationLiteralIndex=1
interruptCat2	CAT2 interrupt context always <b>Tags:</b> atp.EnumerationLiteralIndex=2
task	Task context always <b>Tags:</b> atp.EnumerationLiteralIndex=3
unspecified	The execution context is not specified by the API <b>Tags:</b> atp.EnumerationLiteralIndex=4

Table A.98: BswExecutionContext

Class	BswExternalTriggerOccurredEvent			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	A BswEvent resulting from a trigger released by another module or cluster.			
Base	ARObject, AbstractEvent, BswEvent, BswScheduleEvent, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mult.	Kind	Note
trigger	Trigger	1	ref	The trigger associated with this event. The trigger is external to this module.

Table A.99: BswExternalTriggerOccurredEvent

Class	BswImplementation			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswImplementation			
Note	Contains the implementation specific information in addition to the generic specification (BswModule Description and BswBehavior). It is possible to have several different BswImplementations referring to the same BswBehavior. <b>Tags:</b> atp.recommendedPackage=BswImplementations			
Base	ARElement, ARObject, CollectableElement, Identifiable, Implementation, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mult.	Kind	Note
arReleaseVersion	RevisionLabelString	1	attr	Version of the AUTOSAR Release on which this implementation is based. The numbering contains three levels (major, minor, revision) which are defined by AUTOSAR.
behavior	BswInternalBehavior	1	ref	The behavior of this implementation. This relation is made as an association because <ul style="list-style-type: none"> <li>it follows the pattern of the SWCT</li> <li>since ARElement cannot be splitted, but we want supply the implementation later, the Bsw Implementation is not aggregated in BswBehavior</li> </ul>





Class	BswImplementation			
preconfigured Configuration	<a href="#">EcucModuleConfigurationValues</a>	*	ref	<p>Reference to the set of preconfigured (i.e. fixed) configuration values for this BswImplementation.</p> <p>If the BswImplementation represents a cluster of several modules, more than one EcucModuleConfigurationValues element can be referred (at most one per module), otherwise at most one such element can be referred.</p> <p><b>Tags:</b>xml.roleWrapperElement=true</p>
recommended Configuration	<a href="#">EcucModuleConfigurationValues</a>	*	ref	<p>Reference to one or more sets of recommended configuration values for this module or module cluster.</p>
vendorApiInfix	<a href="#">Identifier</a>	0..1	attr	<p>In driver modules which can be instantiated several times on a single ECU, SRS_BSW_00347 requires that the names of files, APIs, published parameters and memory allocation keywords are extended by the vendorId and a vendor specific name. This parameter is used to specify the vendor specific name. In total, the implementation specific API name is generated as follows: &lt;Module Name&gt;_&lt;vendorId&gt;_&lt;vendorApiInfix&gt;_&lt;API name from SWS&gt;.</p> <p>E.g. assuming that the vendorId of the implementer is 123 and the implementer chose a vendorApiInfix of "v11r456" an API name Can_Write defined in the SWS will translate to Can_123_v11r456_Write.</p> <p>This attribute is mandatory for all modules with upper multiplicity &gt; 1. It shall not be used for modules with upper multiplicity =1.</p> <p>See also SWS_BSW_00102.</p>
vendorSpecific ModuleDef	<a href="#">EcucModuleDef</a>	*	ref	<p>Reference to</p> <ul style="list-style-type: none"> <li>the vendor specific EcucModuleDef used in this BswImplementation if it represents a single module</li> <li>several EcucModuleDefs used in this BswImplementation if it represents a cluster of modules</li> <li>one or no EcucModuleDefs used in this BswImplementation if it represents a library</li> </ul> <p><b>Tags:</b>xml.roleWrapperElement=true</p>

**Table A.100: BswImplementation**

Class	BswInternalBehavior			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	Specifies the behavior of a BSW module or a BSW cluster w.r.t. the code entities visible by the BSW Scheduler. It is possible to have several different BswInternalBehaviors referring to the same BswModule Description.			
Base	<a href="#">ARObject</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">InternalBehavior</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note





Class	BswInternalBehavior			
arTypedPerInstanceMemory	<a href="#">VariableDataPrototype</a>	*	aggr	<p>Defines an AUTOSAR typed memory-block that needs to be available for each instance of the Basic Software Module. The aggregation of arTypedPerInstanceMemory is subject to variability with the purpose to support variability in the Basic Software Module's implementations. Typically different algorithms in the implementation are requiring different number of memory objects.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=arTypedPerInstanceMemory.shortName, arTypedPerInstanceMemory.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
bswPerInstanceMemoryPolicy	BswPerInstanceMemoryPolicy	*	aggr	<p>Policy for a arTypedPerInstanceMemory The policy selects the options of the Schedule Manager API generation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=bswPerInstanceMemoryPolicy, bswPerInstanceMemoryPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
clientPolicy	BswClientPolicy	*	aggr	<p>Policy for a requiredClientServerEntry. The policy selects the options of the Schedule Manager API generation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=clientPolicy, clientPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
distinguishedPartition	<a href="#">BswDistinguishedPartition</a>	*	aggr	<p>Indicates an abstract partition context in which the enclosing BswModuleEntity can be executed.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=distinguishedPartition.shortName, distinguishedPartition.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=60</p>
entity	<a href="#">BswModuleEntity</a>	*	aggr	<p>A code entity for which the behavior is described</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=entity.shortName, entity.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=5</p>
event	<a href="#">BswEvent</a>	*	aggr	<p>An event required by this module behavior.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=event.shortName, event.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=10</p>
exclusiveAreaPolicy	<a href="#">BswExclusiveAreaPolicy</a>	*	aggr	<p>Policy for an ExclusiveArea in this BswInternalBehavior. The policy selects the options of the Schedule Manager API generation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=exclusiveAreaPolicy, exclusiveAreaPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>





Class	BswInternalBehavior			
includedDataTypeSet	IncludedDataTypeSet	*	aggr	<p>The includedDataTypeSet is used by a basic software module for its implementation.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b> atp.Splitkey=includedDataTypeSet</p>
includedModeDeclarationGroupSet	IncludedModeDeclarationGroupSet	*	aggr	<p>This aggregation represents the included Mode DeclarationGroups</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b> atp.Splitkey=includedModeDeclarationGroupSet</p>
internalTriggeringPoint	BswInternalTriggeringPoint	*	aggr	<p>An internal triggering point.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=internalTriggeringPoint.shortName, internalTriggeringPoint.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=2</p>
internalTriggeringPointPolicy	BswInternalTriggeringPointPolicy	*	aggr	<p>Policy for an internalTriggeringPoint in this BswInternalBehavior.. The policy selects the options of the Schedule Manager API generation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=internalTriggeringPointPolicy, internalTriggeringPointPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
modeReceiverPolicy	BswModeReceiverPolicy	*	aggr	<p>Implementation policy for the reception of mode switches.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=modeReceiverPolicy, modeReceiverPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=25</p>
modeSenderPolicy	BswModeSenderPolicy	*	aggr	<p>Implementation policy for providing a mode group.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=modeSenderPolicy, modeSenderPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=20</p>
parameterPolicy	BswParameterPolicy	*	aggr	<p>Policy for a perInstanceParameter in this BswInternalBehavior. The policy selects the options of the Schedule Manager API generation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=parameterPolicy, parameterPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
perInstanceParameter	ParameterDataPrototype	*	aggr	<p>Describes a read only memory object containing characteristic value(s) needed by this BswInternalBehavior. The role name perInstanceParameter is chosen in analogy to the similar role in the context of SwcInternalBehavior.</p> <p>In contrast to constantMemory, this object is not allocated locally by the module's code, but by the BSW Scheduler and it is accessed from the BSW module via the BSW Scheduler API. The main use case is the support of software emulation of calibration data.</p>







Class	BswInternalBehavior			
				<p>The aggregation is subject to variability with the purpose to support implementation variants.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=perInstanceParameter.shortName, perInstanceParameter.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=45</p>
receptionPolicy	BswDataReception Policy	*	aggr	<p>Data reception policy for inter-partition and/or inter-core communication.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=receptionPolicy, receptionPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=55</p>
releasedTrigger Policy	BswReleasedTrigger Policy	*	aggr	<p>Policy for a releasedTrigger. The policy selects the options of the Schedule Manager API generation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=releasedTriggerPolicy, releasedTriggerPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
schedulerName Prefix	BswSchedulerName Prefix	*	aggr	<p>Optional definition of one or more prefixes to be used for the BswScheduler.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=schedulerNamePrefix.shortName, schedulerNamePrefix.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=50</p>
sendPolicy	BswDataSendPolicy	*	aggr	<p>Policy for a providedData. The policy selects the options of the Schedule Manager API generation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=sendPolicy, sendPolicy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
service Dependency	BswService Dependency	*	aggr	<p>Defines the requirements on AUTOSAR Services for a particular item.</p> <p>The aggregation is subject to variability with the purpose to support the conditional existence of ServiceNeeds.</p> <p>The aggregation is splitable in order to support that ServiceNeeds might be provided in later development steps.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=serviceDependency.ident.shortName, serviceDependency.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=40</p>





Class	BswInternalBehavior			
triggerDirect Implementation	BswTriggerDirect Implementation	*	aggr	Specifies a trigger to be directly implemented via OS calls. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=triggerDirectImplementation, triggerDirectImplementation.variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=15
variationPoint Proxy	<a href="#">VariationPointProxy</a>	*	aggr	Proxy of a variation points in the C/C++ implementation. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=variationPointProxy.shortName

**Table A.101: BswInternalBehavior**

Class	BswInternalTriggeringPoint			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	Represents the activation point for one or more BswInternalTriggerOccurredEvents.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
swImplPolicy	<a href="#">SwImplPolicyEnum</a>	0..1	attr	This attribute, when set to value queued, specifies a queued processing of the internal trigger event.

**Table A.102: BswInternalTriggeringPoint**

Class	BswInterruptEntity			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	BSW module entity, which is designed to be triggered by an interrupt.			
Base	ARObject, <a href="#">BswModuleEntity</a> , <a href="#">ExecutableEntity</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
interrupt Category	BswInterruptCategory	1	attr	Category of the interrupt
interruptSource	String	1	attr	Allows a textual documentation of the intended interrupt source.

**Table A.103: BswInterruptEntity**

Class	BswMgrNeeds			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	Specifies the abstract needs on the configuration of the Basic Software Manager for one "user".			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.104: BswMgrNeeds**

<b>Class</b>	<b>BswModeManagerErrorEvent</b>			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	This represents the ability to react on errors occurring during mode handling.			
<b>Base</b>	ARObject, <a href="#">AbstractEvent</a> , <a href="#">BswEvent</a> , <a href="#">BswScheduleEvent</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
modeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	1	ref	This represents the ModeDeclarationGroupPrototype for which the error behavior of the mode manager applies.

**Table A.105: BswModeManagerErrorEvent**

<b>Class</b>	<b>BswModeSwitchEvent</b>			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	A BswEvent resulting from a mode switch.			
<b>Base</b>	ARObject, <a href="#">AbstractEvent</a> , <a href="#">BswEvent</a> , <a href="#">BswScheduleEvent</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
activation	<a href="#">ModeActivationKind</a>	1	attr	Kind of activation w.r.t. to the referred mode.
mode (ordered)	<a href="#">ModeDeclaration</a>	0..2	iref	Reference to one or two Modes that initiate the Mode Switch Event.  <b>InstanceRef implemented by:</b> ModeInBswModuleDescriptionInstanceRef

**Table A.106: BswModeSwitchEvent**

<b>Class</b>	<b>BswModeSwitchedAckEvent</b>			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	The event is raised after a switch of the referenced mode group has been acknowledged or an error occurs. The referenced mode group shall be provided by this module.			
<b>Base</b>	ARObject, <a href="#">AbstractEvent</a> , <a href="#">BswEvent</a> , <a href="#">BswScheduleEvent</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
modeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	1	ref	A mode group provided by this module. The acknowledgement of a switch of this group raises this event.

**Table A.107: BswModeSwitchedAckEvent**

<b>Class</b>	<b>BswModuleCallPoint</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	Represents a point at which a BswModuleEntity handles a procedure call into a BswModuleEntry, either directly or via the BSW Scheduler.			
<b>Base</b>	ARObject, <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">BswAsynchronousServerCallPoint</a> , <a href="#">BswAsynchronousServerCallResultPoint</a> , <a href="#">BswDirectCallPoint</a> , <a href="#">BswSynchronousServerCallPoint</a>			





Class	BswModuleCallPoint (abstract)			
Attribute	Type	Mult.	Kind	Note
context Limitation	BswDistinguished Partition	*	ref	The existence of this reference indicates that the call point is used only in the context of the referred Bsw DistinguishedPartitions.

**Table A.108: BswModuleCallPoint**

Class	BswModuleClientServerEntry			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswInterfaces			
Note	<p>This meta-class represents a single API entry into the BSW module or cluster that has the ability to be called in client-server fashion via the BSW Scheduler.</p> <p>In this regard it is more special than BswModuleEntry and can be seen as a wrapper around the Bsw ModuleEntry to which it refers (property encapsulatedEntry).</p> <p><b>Tags:</b>atp.recommendedPackage=BswModuleEntrys</p>			
Base	ARObject, <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
encapsulated Entry	<a href="#">BswModuleEntry</a>	1	ref	<p>The underlying BswModuleEntry.</p> <p><b>Tags:</b>xml.sequenceOffset=5</p>
isReentrant	Boolean	0..1	attr	<p>Reentrancy from the viewpoint of clients invoking the service via the BSW Scheduler:</p> <ul style="list-style-type: none"> <li>• True: Enables the service to be invoked again, before the service has finished.</li> <li>• False: It is prohibited to invoke the service again before is has finished.</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=10</p>
isSynchronous	Boolean	0..1	attr	<p>Synchronicity from the viewpoint of clients invoking the service via the BSW Scheduler:</p> <ul style="list-style-type: none"> <li>• True: This calls a synchronous service, i.e. the service is completed when the call returns.</li> <li>• False: The service (on semantical level) may not be complete when the call returns.</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=15</p>

**Table A.109: BswModuleClientServerEntry**

Class	BswModuleDependency			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswInterfaces			
Note	This class collects the dependencies of a BSW module or cluster on a certain other BSW module.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
targetModuleId	PositiveInteger	0..1	attr	<p>AUTOSAR identifier of the target module of which the dependencies are defined.</p> <p>This information is optional, because the target module may also be identified by targetModuleRef.</p> <p><b>Tags:</b>xml.sequenceOffset=5</p>





Class	BswModuleDependency			
targetModule Ref	<a href="#">BswModuleDescription</a>	0..1	ref	<p>Reference to the target module. It is an &lt;&lt;atpUriDef&gt;&gt; because the reference shall be used to identify the target module without actually needing the description of that target module.</p> <p><b>Stereotypes:</b> atpUriDef; atpVariation</p> <p><b>Tags:</b>  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=7</p>

**Table A.110: BswModuleDependency**

Class	BswModuleDescription			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswOverview			
Note	<p>Root element for the description of a single BSW module or BSW cluster. In case it describes a BSW module, the short name of this element equals the name of the BSW module.</p> <p><b>Tags:</b>atp.recommendedPackage=BswModuleDescriptions</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
bswModule Dependency	<a href="#">BswModuleDependency</a>	*	aggr	<p>Describes the dependency to another BSW module.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=bswModuleDependency.shortName, bswModuleDependency.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=20</p>
bswModule Documentation	SwComponent Documentation	0..1	aggr	<p>This adds a documentation to the BSW module.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=bswModuleDocumentation, bswModuleDocumentation.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=6</p>
expectedEntry	<a href="#">BswModuleEntry</a>	*	ref	<p>Indicates an entry which is required by this module. Replacement of outgoingCallback / requiredEntry.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=expectedEntry.bswModuleEntry, expectedEntry.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
implemented Entry	<a href="#">BswModuleEntry</a>	*	ref	<p>Specifies an entry provided by this module which can be called by other modules. This includes "main" functions, interrupt routines, and callbacks. Replacement of providedEntry / expectedCallback.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=implementedEntry.bswModuleEntry, implementedEntry.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>





Class	BswModuleDescription			
internalBehavior	<a href="#">BswInternalBehavior</a>	*	aggr	<p>The various BswInternalBehaviors associated with a Bsw ModuleDescription can be distributed over several physical files. Therefore the aggregation is &lt;&lt;atp Splitable&gt;&gt;.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b>  atp.Splitkey=internalBehavior.shortName  xml.sequenceOffset=65</p>
moduleId	PositiveInteger	0..1	attr	<p>Refers to the BSW Module Identifier defined by the AUTOSAR standard. For non-standardized modules, a proprietary identifier can be optionally chosen.</p> <p><b>Tags:</b>xml.sequenceOffset=5</p>
providedClientServerEntry	<a href="#">BswModuleClientServerEntry</a>	*	aggr	<p>Specifies that this module provides a client server entry which can be called from another partition or core. This entry is declared locally to this context and will be connected to the requiredClientServerEntry of another or the same module via the configuration of the BSW Scheduler.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=providedClientServerEntry.shortName,  providedClientServerEntry.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=45</p>
providedData	<a href="#">VariableDataPrototype</a>	*	aggr	<p>Specifies a data prototype provided by this module in order to be read from another partition or core. The providedData is declared locally to this context and will be connected to the requiredData of another or the same module via the configuration of the BSW Scheduler.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=providedData.shortName, providedData.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=55</p>
providedModeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	*	aggr	<p>A set of modes which is owned and provided by this module or cluster. It can be connected to the required ModeGroups of other modules or clusters via the configuration of the BswScheduler. It can also be synchronized with modes provided via ports by an associated ServiceSwComponentType, EcuAbstractionSwComponentType or ComplexDeviceDriverSwComponentType.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=providedModeGroup.shortName, providedModeGroup.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=25</p>





Class	BswModuleDescription			
releasedTrigger	Trigger	*	aggr	<p>A Trigger released by this module or cluster. It can be connected to the requiredTriggers of other modules or clusters via the configuration of the BswScheduler. It can also be synchronized with Triggers provided via ports by an associated ServiceSwComponentType, Ecu AbstractionSwComponentType or ComplexDeviceDriver SwComponentType.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=releasedTrigger.shortName, released Trigger.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=35</p>
requiredClientServerEntry	BswModuleClientServerEntry	*	aggr	<p>Specifies that this module requires a client server entry which can be implemented on another partition or core. This entry is declared locally to this context and will be connected to the providedClientServerEntry of another or the same module via the configuration of the BSW Scheduler.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=requiredClientServerEntry.shortName, requiredClientServerEntry.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=50</p>
requiredData	VariableDataPrototype	*	aggr	<p>Specifies a data prototype required by this module in order to be provided from another partition or core. The required Data is declared locally to this context and will be connected to the providedData of another or the same module via the configuration of the BswScheduler.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=requiredData.shortName, required Data.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=60</p>
requiredModeGroup	ModeDeclarationGroupPrototype	*	aggr	<p>Specifies that this module or cluster depends on a certain mode group. The requiredModeGroup is local to this context and will be connected to the providedModeGroup of another module or cluster via the configuration of the BswScheduler.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=requiredModeGroup.shortName, required ModeGroup.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=30</p>
requiredTrigger	Trigger	*	aggr	<p>Specifies that this module or cluster reacts upon an external trigger. This requiredTrigger is declared locally to this context and will be connected to the providedTrigger of another module or cluster via the configuration of the BswScheduler.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=requiredTrigger.shortName, required Trigger.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime  xml.sequenceOffset=40</p>

Table A.111: BswModuleDescription



<b>Class</b>	<b>BswModuleEntity</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	Specifies the smallest code fragment which can be described for a BSW module or cluster within AUTOSAR.			
<b>Base</b>	ARObject, ExecutableEntity, Identifiable, MultilanguageReferrable, Referrable			
<b>Subclasses</b>	BswCalledEntity, BswInterruptEntity, BswSchedulableEntity			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
accessedMode Group	ModeDeclarationGroup Prototype	*	ref	A mode group which is accessed via API call by this entity. It shall be a ModeDeclarationGroupPrototype required by this module or cluster.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
activationPoint	BswInternalTriggering Point	*	ref	Activation point used by the module entity to activate one or more internal triggers.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
callPoint	BswModuleCallPoint	*	aggr	A call point used in the code of this entity.  The variability of this association is especially targeted at debug scenarios: It is possible to have one variant calling into the AUTOSAR debug module and another one which doesn't.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
dataReceive Point	BswVariableAccess	*	aggr	The data is received via the BSW Scheduler.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
dataSendPoint	BswVariableAccess	*	aggr	The data is sent via the BSW Scheduler.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
implemented Entry	BswModuleEntry	1	ref	The entry which is implemented by this module entity.
issuedTrigger	Trigger	*	ref	A trigger issued by this entity via BSW Scheduler API call. It shall be a BswTrigger released (i.e. owned) by this module or cluster.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
managedMode Group	ModeDeclarationGroup Prototype	*	ref	A mode group which is managed by this entity. It shall be a ModeDeclarationGroupPrototype provided by this module or cluster.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
schedulerName Prefix	BswSchedulerName Prefix	0..1	ref	A prefix to be used in generated names for the Bsw ModuleScheduler in the context of this BswModuleEntity, for example entry point prototypes, macros for dealing with exclusive areas, header file names.  Details are defined in the SWS RTE.  The prefix supersedes default rules for the prefix of those names.

**Table A.112: BswModuleEntity**

<b>Class</b>	<b>BswModuleEntry</b>			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswInterfaces			
<b>Note</b>	<p>This class represents a single API entry (C-function prototype) into the BSW module or cluster.</p> <p>The name of the C-function is equal to the short name of this element with one exception: In case of multiple instances of a module on the same CPU, special rules for "infixes" apply, see description of class BswImplementation.</p> <p><b>Tags:</b>atp.recommendedPackage=BswModuleEntrys</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage</a> , <a href="#">Referrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
argument (ordered)	<a href="#">SwServiceArg</a>	*	aggr	<p>An argument belonging to this BswModuleEntry.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=blueprintDerivationTime xml.sequenceOffset=45</p>
bswEntryKind	BswEntryKindEnum	0..1	attr	<p>This describes whether the entry is concrete or abstract. If the attribute is missing the entry is considered as concrete.</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>
callType	<a href="#">BswCallType</a>	1	attr	<p>The type of call associated with this service.</p> <p><b>Tags:</b>xml.sequenceOffset=25</p>
execution Context	<a href="#">BswExecutionContext</a>	1	attr	<p>Specifies the execution context which is required (in case of entries into this module) or guaranteed (in case of entries called from this module) for this service.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
function Prototype Emitter	NameToken	0..1	attr	<p>This attribute is used to control the generation of function prototypes. If set to "RTE", the RTE generates the function prototypes in the Module Interlink Header File.</p>
isReentrant	Boolean	1	attr	<p>Reentrancy from the viewpoint of function callers:</p> <ul style="list-style-type: none"> <li>• True: Enables the service to be invoked again, before the service has finished.</li> <li>• False: It is prohibited to invoke the service again before it has finished.</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=15</p>
isSynchronous	Boolean	1	attr	<p>Synchronicity from the viewpoint of function callers:</p> <ul style="list-style-type: none"> <li>• True: This calls a synchronous service, i.e. the service is completed when the call returns.</li> <li>• False: The service (on semantical level) may not be complete when the call returns.</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=20</p>
returnType	<a href="#">SwServiceArg</a>	0..1	aggr	<p>The return type belonging to this bswModuleEntry.</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>
role	<a href="#">Identifier</a>	0..1	attr	<p>Specifies the role of the entry in the given context. It shall be equal to the standardized name of the service call, especially in cases where no ServiceIdentifier is specified, e.g. for callbacks. Note that the ShortName is not always sufficient because it maybe vendor specific (e.g. for callbacks which can have more than one instance).</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>





Class	BswModuleEntry			
serviceId	PositiveInteger	0..1	attr	Refers to the service identifier of the Standardized Interfaces of AUTOSAR basic software. For non-standardized interfaces, it can optionally be used for proprietary identification. <b>Tags:</b> xml.sequenceOffset=5
swServiceImplPolicy	SwServiceImplPolicy Enum	1	attr	Denotes the implementation policy as a standard function call, inline function or macro. This has to be specified on interface level because it determines the signature of the call. <b>Tags:</b> xml.sequenceOffset=35

**Table A.113: BswModuleEntry**

Class	BswOperationInvokedEvent			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	This event is thrown on operation invocation in Client-Server-Communication via the BSW Scheduler. Its "entry" reference provides the BswClientServerEntry that is called subsequently. Note this event is not needed in case of direct function calls.			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">BswEvent</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
entry	<a href="#">BswModuleClientServerEntry</a>	1	ref	The providedClientServerEntry invoked by this event.

**Table A.114: BswOperationInvokedEvent**

Class	BswSchedulableEntity			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	BSW module entity, which is designed for control by the BSW Scheduler. It may for example implement a so-called "main" function.			
Base	ARObject, <a href="#">BswModuleEntity</a> , <a href="#">ExecutableEntity</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.115: BswSchedulableEntity**

Class	<i>BswScheduleEvent</i> (abstract)			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	BswEvent that is able to start a BswSchedulableEntity.			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">BswEvent</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	BswAsynchronousServerCallReturnsEvent, BswBackgroundEvent, BswDataReceivedEvent, <a href="#">BswExternalTriggerOccurredEvent</a> , BswInternalTriggerOccurredEvent, <a href="#">BswModeManagerErrorEvent</a> , <a href="#">BswModeSwitchEvent</a> , <a href="#">BswModeSwitchedAckEvent</a> , BswOsTaskExecutionEvent, <a href="#">BswTimingEvent</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.116: BswScheduleEvent**

<b>Class</b>	<b>BswServiceDependency</b>			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	Specialization of ServiceDependency in the context of an BswInternalBehavior. It allows to associate BswModuleEntries and data defined for a BSW module or cluster to a given ServiceNeeds element.			
<b>Base</b>	ARObject, <a href="#">ServiceDependency</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
assignedData	<a href="#">RoleBasedDataAssignment</a>	*	aggr	Defines the role of an associated data object (owned by this module or cluster) in the context of the ServiceNeeds element.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
assignedEntryRole	RoleBasedBswModuleEntryAssignment	*	aggr	Defines the role of an associated BswModuleEntry in the context of the ServiceNeeds element.  <b>Stereotypes:</b> atpSplittable; atpVariation <b>Tags:</b> atp.Splitkey=assignedEntryRole, assignedEntryRole.variationPoint.shortLabel vh.latestBindingTime=preCompileTime
ident	<a href="#">BswServiceDependencyIdent</a>	0..1	aggr	This adds the ability to become referable to BswServiceDependency.  <b>Stereotypes:</b> atpIdentityContributor <b>Tags:</b> xml.sequenceOffset=-100
serviceNeeds	<a href="#">ServiceNeeds</a>	1	aggr	The associated ServiceNeeds.

**Table A.117: BswServiceDependency**

<b>Class</b>	<b>BswServiceDependencyIdent</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping::ServiceMapping			
<b>Note</b>	This meta-class is created to add the ability to become the target of a reference to the non-Referrable BswServiceDependency.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">IdentCaption</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
—	—	—	—	—

**Table A.118: BswServiceDependencyIdent**

<b>Class</b>	<b>BswSynchronousServerCallPoint</b>			
<b>Package</b>	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
<b>Note</b>	Represents a synchronous procedure call point via the BSW Scheduler.			
<b>Base</b>	ARObject, <a href="#">BswModuleCallPoint</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
calledEntry	<a href="#">BswModuleClientServerEntry</a>	1	ref	The entry to be called.





Class	BswSynchronousServerCallPoint			
calledFrom WithinExclusive Area	ExclusiveAreaNesting Order	0..1	ref	This indicates that the call point is located at the deepest level inside one or more ExclusiveAreas that are nested in the given order.

**Table A.119: BswSynchronousServerCallPoint**

Class	BswTimingEvent			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	A recurring BswEvent driven by a time period.			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">BswEvent</a> , <a href="#">BswScheduleEvent</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
period	TimeValue	1	attr	Requirement for the time period (in seconds) by which this event is triggered.

**Table A.120: BswTimingEvent**

Class	BswVariableAccess			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	The presence of a BswVariableAccess implies that a BswModuleEntity needs access to a VariableData Prototype via the BSW Scheduler. The kind of access is specified by the role in which the class is used.			
Base	ARObject, <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
accessed Variable	<a href="#">VariableDataPrototype</a>	1	ref	The data accessed via the BSW Scheduler.
context Limitation	<a href="#">BswDistinguished Partition</a>	*	ref	The existence of this reference indicates that the variable is received resp. sent only in the context of the referred BswDistinguishedPartitions.

**Table A.121: BswVariableAccess**

Class	BufferProperties			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	Configuration of the buffer properties the transformer needs to work.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
headerLength	Integer	1	attr	Defines the length of the header (in bits) this transformer will add in front of the data.
inPlace	Boolean	1	attr	If set, the transformer uses the input buffer as output buffer.

**Table A.122: BufferProperties**

<b>Class</b>	<b>BulkNvDataDescriptor</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::NvBlockComponent			
<b>Note</b>	This meta-class represents one bulk NV Data Block that is read-only for the application software. The purpose of a bulk NV Data Block is to provide access to information uploaded to the vehicle at e.g. the end of the production line.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bulkNvBlock	<a href="#">VariableDataPrototype</a>	0..1	aggr	This aggregation represents the actual bulk NVBlock.
nvBlockData Mapping	<a href="#">NvBlockDataMapping</a>	*	aggr	<p>Defines the mapping between the VariableData Prototypes in the NvBlockComponents ports and the VariableDataPrototypes of the non-volatile memory.</p> <p>The aggregation of NvBlockDataMapping is subject to variability with the purpose to support the conditional existence of nv data ports.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>

**Table A.123: BulkNvDataDescriptor**

<b>Class</b>	<b>BusMirrorChannel</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::BusMirror			
<b>Note</b>	This element assigns a busMirrorNetworkId to the referenced channel.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
busMirror NetworkId	PositiveInteger	1	attr	This attribute defines the networkId of the communication channel.
channel	<a href="#">PhysicalChannel</a>	0..1	ref	<p>Reference to PhysicalChannel that is used in the bus mirroring as sourceChannel or targetChannel.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=systemDesignTime</p>

**Table A.124: BusMirrorChannel**

<b>Class</b>	<b>BusMirrorChannelMapping</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::BusMirror			
<b>Note</b>	This element defines a bus mirroring in which the traffic from one communication bus (sourceChannel) is forwarded to another one (targetChannel).			
<b>Base</b>	ARObject, <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">BusMirrorChannelMappingCan</a> , <a href="#">BusMirrorChannelMappingFlexray</a> , <a href="#">BusMirrorChannelMappingIp</a> , <a href="#">BusMirrorChannelMappingUserDefined</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
sourceChannel	<a href="#">BusMirrorChannel</a>	0..1	aggr	Defines the sourceChannel from which frames are received.
targetChannel	<a href="#">BusMirrorChannel</a>	0..1	aggr	Defines the targetChannel to which frames are forwarded.





Class	<b>BusMirrorChannelMapping</b> (abstract)			
targetPduTriggering	<a href="#">PduTriggering</a>	*	ref	Reference to the PduTriggering that is used for transmission of the mirrored frames on the targetChannel. Please note that on FlexRay several targetPduTriggerings may be used. For all other communication channels only a single targetPduTriggering is supported.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild

**Table A.125: BusMirrorChannelMapping**

Class	<b>BusMirrorChannelMappingCan</b>			
Package	M2::AUTOSARTemplates::SystemTemplate::BusMirror			
Note	This element defines the bus mirroring between a CAN or LIN sourceChannel and a CAN targetChannel. <b>Tags:</b> atp.recommendedPackage=BusMirrorChannelMappings			
Base	ARObject, <a href="#">BusMirrorChannelMapping</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage</a> , <a href="#">Referrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
canIdRangeMapping	BusMirrorCanIdRangeMapping	*	aggr	Rules for remapping of a set of CAN IDs.
canIdToCanIdMapping	BusMirrorCanIdToCanIdMapping	*	aggr	Rules for remapping of single CanIds.
linPidToCanIdMapping	BusMirrorLinPidToCanIdMapping	*	aggr	Rules for remapping of single LIN Frames.
mirrorSourceLinToCanRangeBaseId	PositiveInteger	0..1	attr	Base ID merged with the LIN frame ID to form the CAN ID.  Only required when a BusMirrorChannel that refers to a LinPhysicalChannel in the role channel is referenced in the role sourceChannel.
mirrorStatusCanId	PositiveInteger	0..1	attr	CAN ID of the CAN status frame.  If configured, a status frame will be sent on the CAN destination bus that contains the state of all active source buses.

**Table A.126: BusMirrorChannelMappingCan**

Class	<b>BusMirrorChannelMappingFlexray</b>			
Package	M2::AUTOSARTemplates::SystemTemplate::BusMirror			
Note	This element defines the bus mirroring between a CAN, LIN or FlexRay sourceChannel and a FlexRay targetChannel. <b>Tags:</b> atp.recommendedPackage=BusMirrorChannelMappings			
Base	ARObject, <a href="#">BusMirrorChannelMapping</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage</a> , <a href="#">Referrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
transmissionDeadline	TimeValue	0..1	attr	Time in seconds after which the collection of source frames into the destination frame is stopped and the frame is sent at the latest.  If omitted, destination frames are only sent when full or when the time stamp overflows.

**Table A.127: BusMirrorChannelMappingFlexray**



<b>Class</b>	<b>BusMirrorChannelMappingIp</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::BusMirror			
<b>Note</b>	This element defines the bus mirroring between a CAN, LIN or FlexRay sourceChannel and an Ethernet IP targetChannel. <b>Tags:</b> atp.recommendedPackage=BusMirrorChannelMappings			
<b>Base</b>	ARObject, <a href="#">BusMirrorChannelMapping</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
transmission Deadline	TimeValue	0..1	attr	Time in seconds after which the collection of source frames into the destination frame is stopped and the frame is sent at the latest.  If omitted, destination frames are only sent when full or when the time stamp overflows.

**Table A.128: BusMirrorChannelMappingIp**

<b>Class</b>	<b>BusMirrorChannelMappingUserDefined</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::BusMirror			
<b>Note</b>	This element defines the bus mirroring between a CAN, LIN or FlexRay sourceChannel and a User Defined targetChannel. <b>Tags:</b> atp.recommendedPackage=BusMirrorChannelMappings			
<b>Base</b>	ARObject, <a href="#">BusMirrorChannelMapping</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
transmission Deadline	TimeValue	0..1	attr	Time in seconds after which the collection of source frames into the destination frame is stopped and the frame is sent at the latest.  If omitted, destination frames are only sent when full or when the time stamp overflows.

**Table A.129: BusMirrorChannelMappingUserDefined**

<b>Class</b>	<b>BusspecificNmEcu</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
<b>Note</b>	Busspecific NmEcu attributes.			
<b>Base</b>	ARObject			
<b>Subclasses</b>	CanNmEcu, FlexrayNmEcu, J1939NmEcu, UdpNmEcu			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
—	—	—	—	—

**Table A.130: BusspecificNmEcu**

<b>Enumeration</b>	<b>ByteOrderEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes
<b>Note</b>	<p>When more than one byte is stored in the memory the order of those bytes may differ depending on the architecture of the processing unit. If the least significant byte is stored at the lowest address, this architecture is called little endian and otherwise it is called big endian.</p> <p>ByteOrder is very important in case of communication between different PUs or ECUs.</p>
<b>Literal</b>	<b>Description</b>
mostSignificantByte First	<p>Most significant byte shall come at the lowest address (also known as BigEndian or as Motorola-Format)</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=0</p>
mostSignificantByte Last	<p>Most significant byte shall come highest address (also known as LittleEndian or as Intel-Format)</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=1</p>
opaque	<p>For opaque data endianness conversion has to be configured to Opaque. See AUTOSAR COM Specification for more details.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=2</p>

**Table A.131: ByteOrderEnum**

<b>Class</b>	<b>CalibrationParameterValue</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::MeasurementAndCalibration::CalibrationParameter Values			
<b>Note</b>	<p>Specifies instance specific calibration parameter values used to initialize the memory objects implementing calibration parameters in the generated RTE code.</p> <p>RTE generator will use the implInitValue to override the initial values specified for the DataPrototypes of a component type.</p> <p>The applInitValue is used to exchange init values with the component vendor not publishing the transformation algorithm between ApplicationDataTypes and ImplementationDataTypes or defining an instance specific initialization of components which are only defined with ApplicationDataTypes.</p> <p>Note: If both representations of init values are available these need to represent the same content.</p> <p>Note further that in this case an explicit mapping of ValueSpecification is not implemented because calibration parameters are delivered back after the calibration phase.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
applInitValue	ValueSpecification	0..1	aggr	This is the initial value specification structured according to the ApplicationDataType
implInitValue	ValueSpecification	0..1	aggr	This is the initial value specification structured according to the ImplementationDataType
initialized Parameter	FlatInstanceDescriptor	0..1	ref	This represents the parameter that is initialized by the CalibrationParameterValue.

**Table A.132: CalibrationParameterValue**

<b>Enumeration</b>	<b>CalprmAxisCategoryEnum</b>
<b>Package</b>	M2::MSR::DataDictionary::CalibrationParameter
<b>Note</b>	This enum specifies the possible values of the category property within SwCalprmAxis.
<b>Literal</b>	<b>Description</b>





Enumeration	CalprmAxisCategoryEnum
comAxis	<p>COM_AXIS is equal to an STD_AXIS, the difference is, that a COM_AXIS is an shared axis, that means this axis can be used multiple times by different CURVES, MAPs, CUBOIDs, CUBE_4s, and CUBE_5s.</p> <p><b>Tags:</b>  atp.EnumerationLiteralIndex=0  xml.name=COM_AXIS</p>
fixAxis	<p>FIX_AXIS means that the input axis is not stored. The axis is calculated using parameters and so on it is also not possible to modify the axis points.</p> <p><b>Tags:</b>  atp.EnumerationLiteralIndex=4  xml.name=FIX_AXIS</p>
resAxis	<p>RES_AXIS is also an shared axis like COM_AXIS, the difference is that this kind of axis can be used for rescaling.</p> <p><b>Tags:</b>  atp.EnumerationLiteralIndex=6  xml.name=RES_AXIS</p>
stdAxis	<p>STD_AXIS means that input and output axis definition are stored within this CURVE, MAP, CUBOID, CUBE_4, and CUBE_5.</p> <p>There is no shared or calculated axis.</p> <p><b>Tags:</b>  atp.EnumerationLiteralIndex=8  xml.name=STD_AXIS</p>

**Table A.133: CalprmAxisCategoryEnum**

Class	CanControllerFdConfiguration			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	Bit timing related configuration of a CAN controller for payload and CRC of a CAN FD frame.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
paddingValue	PositiveInteger	0..1	attr	Specifies the value which is used to pad unused data in CAN FD frames which are bigger than 8 byte if the length of a Pdu which was requested to be sent does not match the allowed DLC values of CAN FD.
propSeg	PositiveInteger	1	attr	Specifies propagation delay in time quantas.
sspOffset	PositiveInteger	0..1	attr	Specifies the Transmitter Delay Compensation Offset in minimum time quanta. Transmitter Delay Compensation Offset is used to adjust the position of the Secondary Sample Point (SSP), relative to the beginning of the received bit. If this parameter is configured, the Transmitter Delay Compensation is done by measurement of the CAN controller. If not specified Transmitter Delay Compensation is disabled.
syncJumpWidth	PositiveInteger	1	attr	Specifies the synchronization jump width for the controller in time quantas.
timeSeg1	PositiveInteger	1	attr	Specifies phase segment 1 in time quantas.
timeSeg2	PositiveInteger	1	attr	Specifies phase segment 2 in time quantas.





Class	CanControllerFdConfiguration			
txBitRateSwitch	Boolean	1	attr	<p>Specifies if the bit rate switching shall be used for transmissions.</p> <p>TRUE: CAN FD frames shall be sent with bit rate switching.</p> <p>FALSE: CAN FD frames shall be sent without bit rate switching.</p>

**Table A.134: CanControllerFdConfiguration**

Class	CanControllerFdConfigurationRequirements			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	This element allows the specification of ranges for the CanFD bit timing configuration parameters. These ranges are taken as requirements and shall be respected by the ECU developer.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
maxNumberOfTimeQuantaPerBit	Integer	0..1	attr	Maximum number of time quanta in the bit time.
maxSamplePoint	Float	0..1	attr	The max. value of the sample point as a percentage of the total bit time.
maxSyncJumpWidth	Float	0..1	attr	The max. Synchronization Jump Width value as a percentage of the total bit time. The (Re-)Synchronization Jump Width (SJW) defines how far a resynchronization may move the Sample Point inside the limits defined by the Phase Buffer Segments to compensate for edge phase errors.
maxTrcvDelayCompensationOffset	TimeValue	0..1	attr	Specifies the maximum Transceiver Delay Compensation Offset in seconds. If not specified Transceiver Delay Compensation is disabled.
minNumberOfTimeQuantaPerBit	Integer	0..1	attr	Minimum number of time quanta in the bit time.
minSamplePoint	Float	0..1	attr	The min. value of the sample point as a percentage of the total bit time.
minSyncJumpWidth	Float	0..1	attr	The min. Synchronization Jump Width value as a percentage of the total bit time. The (Re-)Synchronization Jump Width (SJW) defines how far a resynchronization may move the Sample Point inside the limits defined by the Phase Buffer Segments to compensate for edge phase errors.
minTrcvDelayCompensationOffset	TimeValue	0..1	attr	Specifies the minimum Transceiver Delay Compensation Offset in seconds. If not specified Transceiver Delay Compensation is disabled.
paddingValue	PositiveInteger	0..1	attr	Specifies the value which is used to pad unused data in CAN FD frames which are bigger than 8 byte if the length of a Pdu which was requested to be sent does not match the allowed DLC values of CAN FD.
txBitRateSwitch	Boolean	0..1	attr	<p>Specifies if the bit rate switching shall be used for transmissions.</p> <p>TRUE: CAN FD frames shall be sent with bit rate switching.</p> <p>FALSE: CAN FD frames shall be sent without bit rate switching.</p>

**Table A.135: CanControllerFdConfigurationRequirements**

<b>Class</b>	<b>CanFrameTriggering</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanCommunication			
<b>Note</b>	CAN specific attributes to the FrameTriggering			
<b>Base</b>	ARObject, <a href="#">FrameTriggering</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
absolutely Scheduled Timing	TtcanAbsolutely ScheduledTiming	*	aggr	Each frame in TTCAN is identified by its slot id and communication cycle. A description is provided by the usage of AbsolutelyScheduledTiming.
canAddressing Mode	CanAddressingMode Type	1	attr	The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B.
canFrameRx Behavior	CanFrameRxBehavior Enum	0..1	attr	Defines which CAN protocol shall be expected for frame reception.
canFrameTx Behavior	<a href="#">CanFrameTxBehavior Enum</a>	0..1	attr	Defines which CAN protocol shall be used for frame transmission.
identifier	Integer	0..1	attr	This attribute is used to define the identifier this frame shall use on the CAN network.
j1939requestable	Boolean	0..1	attr	Frame can be triggered by the J1939 request message.
rxIdentifier Range	RxIdentifierRange	0..1	aggr	Optional definition of a CanId range.
rxMask	PositiveInteger	0..1	attr	Identifier mask which denotes the relevant bits in the CAN Identifier. Together with the identifier, this parameter defines a CAN identifier range.
txMask	PositiveInteger	0..1	attr	Identifier mask which denotes static bits in the CAN identifier. The other bits can be set dynamically.

**Table A.136: CanFrameTriggering**

<b>Enumeration</b>	<b>CanFrameTxBehaviorEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanCommunication
<b>Note</b>	Defines different CAN protocols for frame transmission behavior.
<b>Literal</b>	<b>Description</b>
can20	This CAN frame shall be sent as CAN 2.0 only. <b>Tags:</b> atp.EnumerationLiteralIndex=0
canFd	This CAN frame shall be sent as CAN FD. <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.137: CanFrameTxBehaviorEnum**

<b>Class</b>	<b>CanNmCluster</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
<b>Note</b>	Can specific NmCluster attributes			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">NmCluster</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





<b>Class</b>	<b>CanNmCluster</b>			
nmBusloadReductionActive	Boolean	1	attr	It determines if bus load reduction for the respective Can Nm channel is active or not.
nmCarWakeUpBitPosition	PositiveInteger	0..1	attr	Specifies the bit position of the CarWakeUp within the Nm Pdu.
nmCarWakeUpFilterNodeId	PositiveInteger	0..1	attr	Source node identifier for CarWakeUp filtering.
nmCbvPosition	Integer	0..1	attr	Defines the position of the control bit vector within the Nm Pdu (Byte position). If this attribute is not configured, the Control Bit Vector is not used.
nmImmediateNmCycleTime	TimeValue	0..1	attr	Defines the immediate NmPdu cycle time in seconds which is used for nmImmediateNmTransmissions NmPdu transmissions. This parameter is only valid if CanNm ImmediateNmTransmissions is greater one.
nmImmediateNmTransmissions	PositiveInteger	1	attr	Defines the number of immediate NmPdus which shall be transmitted. If the value is zero no immediate NmPdus are transmitted. The cycle time of immediate NmPdus is defined by nmImmediateNmCycleTime.
nmMessageTimeoutTime	TimeValue	1	attr	Timeout of an NmPdu in seconds. It determines how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.
nmMsgCycleTime	TimeValue	1	attr	Period of a NmPdu in seconds. It determines the periodic rate in the periodic transmission mode with bus load reduction and is the basis for transmit scheduling in the periodic transmission mode without bus load reduction.
nmNetworkTimeout	TimeValue	1	attr	Network Timeout for NmPdus in seconds It denotes the time how long the CanNm shall stay in the Network Mode before transition into Prepare Bus-Sleep Mode shall take place.
nmNidPosition	Integer	0..1	attr	Defines the byte position of the source node identifier within the NmPdu. If this attribute is not configured, the Node Identification is not used.
nmRemoteSleepIndicationTime	TimeValue	1	attr	Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.
nmRepeatMessageTime	TimeValue	1	attr	Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.
nmWaitBusSleepTime	TimeValue	1	attr	Timeout for bus calm down phase in seconds. It denotes the time how long the CanNm shall stay in the Prepare Bus-Sleep Mode before transition into Bus-Sleep Mode shall take place.

**Table A.138: CanNmCluster**

<b>Class</b>	<b>CanPhysicalChannel</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
<b>Note</b>	CAN bus specific physical channel attributes.			
<b>Base</b>	ARObject, AbstractCanPhysicalChannel, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PhysicalChannel</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.139: CanPhysicalChannel**

<b>Class</b>	<b>CanTpConnection</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
<b>Note</b>	<p>A connection identifies the sender and the receiver of this particular communication. The CanTp module routes a Pdu through this connection.</p> <p>atpVariation: Derived, because TpNode can vary.</p>			
<b>Base</b>	ARObject, <a href="#">TpConnection</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
addressing Format	CanTpAddressing FormatType	1	attr	Declares which communication addressing mode is supported.
cancellation	Boolean	0..1	attr	With this switch Tx Cancellation can be turned on or off. Please note that the Rx Cancellation is always enabled.
canTpChannel	CanTpChannel	1	ref	Reference to the CanTpChannel on which this CanTp Connection is realized.
dataPdu	<a href="#">NPdu</a>	1	ref	Reference to an Data NPdu.
flowControlPdu	<a href="#">NPdu</a>	0..1	ref	Reference to the Flow Control NPdu.
maxBlockSize	Integer	0..1	attr	<p>The maximum number of N-PDUs the CanTp receiver allows the sender to send, before waiting for an authorization to continue transmission of the following N-PDUs. For further details on this parameter value see ISO 15765-2 specification.</p> <p>Note: For reasons of buffer length, the CAN Transport Layer can adapt the BS value within the limit of this maximum BS</p>
multicast	CanTpAddress	0..1	ref	TP address for 1:n connections.
padding Activation	Boolean	1	attr	<p>This specifies whether or not Sfs, FCs and the last CF shall be padded to 8 bytes length in case it contains less payload.</p> <p>true: The N-PDU received uses padding for SF, FC and the last CF. (N-PDU length is always 8 bytes)</p> <p>false: The N-PDU received does not use padding for SF, CF and the last CF. (N-PDU length is dynamic)</p>
receiver	CanTpNode	*	ref	The target of the TP connection.
taType	NetworkTargetAddress Type	0..1	attr	Network Target Address type.
timeoutBr	TimeValue	0..1	attr	Value in seconds of the performance requirement for (N_Br + N_Ar). N_Br is the elapsed time between the receiving indication of a FF or CF or the transmit confirmation of a FC, until the transmit request of the next FC.
timeoutBs	TimeValue	0..1	attr	This parameter defines the timeout for waiting for an FC or AF on the sender side in an 1:1 connection. Specified in seconds.
timeoutCr	TimeValue	0..1	attr	This parameter defines the timeout value for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side. Specified in seconds.
timeoutCs	TimeValue	0..1	attr	The attribute timeoutCs represents the time (in seconds) which elapses between the transmit request of a CF N-PDU until the transmit request of the next CF N-PDU.
tpSdu	<a href="#">IPdu</a>	1	ref	Reference to an IPdu that is segmented by the Transport Protocol.
transmitter	CanTpNode	0..1	ref	The source of the TP connection.

**Table A.140: CanTpConnection**



Class	Caption			
Package	M2::MSR::Documentation::BlockElements			
Note	This meta-class represents the ability to express a caption which is a title, and a shortName.			
Base	ARObject, <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
desc	MultiLanguageOverview Paragraph	0..1	aggr	<p>This represents a general but brief (one paragraph) description what the object in question is about. It is only one paragraph! This property helps a human reader to identify the object in question.</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>

**Table A.141: Caption**

Class	Chapter			
Package	M2::MSR::Documentation::Chapters			
Note	This meta-class represents a chapter of a document. Chapters are the primary structuring element in documentation.			
Base	ARObject, <a href="#">DocumentViewSelectable</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Paginateable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
chapterModel	ChapterModel	1	aggr	<p>This represents the overall contents of the chapter.</p> <p><b>Tags:</b>  xml.roleElement=false  xml.roleWrapperElement=false  xml.typeElement=false  xml.typeWrapperElement=false</p>
helpEntry	String	0..1	attr	<p>This specifies an entry point in an online help system to be linked with the parent class. The syntax shall be defined by the applied help system respectively help system generator.</p> <p>Maybe it is a concatenated Identifier, but as of now we leave it as an arbitrary string.</p> <p><b>Tags:</b>xml.attribute=true</p>

**Table A.142: Chapter**

Class	ClassContentConditional			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::Data FormatTailoring			
Note	Specifies the valid content of the class. The content can optionally depend on a condition. (E.g. value of attribute 'category')			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
attribute Tailoring	<a href="#">AttributeTailoring</a>	*	aggr	<p>Tailorings of the owned and inherited attributes of this Meta Classes</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>





Class	ClassContentConditional			
condition	AbstractCondition	0..1	aggr	The rules on the content of this class are enabled if the condition validates to true. <b>Tags:</b> xml.sequenceOffset=10
constraint Tailoring	ConstraintTailoring	*	aggr	Specification of tailorings of Constraints of that are owned by this Meta Classes <b>Tags:</b> xml.sequenceOffset=30
sdgTailoring	SdgTailoring	*	aggr	Specification of the applicable Special Data Group <b>Tags:</b> xml.sequenceOffset=40

**Table A.143: ClassContentConditional**

Class	ClassTailoring (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::DataFormatTailoring			
Note	The ClassTailoring is an abstract class that allows the tailoring of its attributes, applicable constraints and Sdgs.			
Base	ARObject			
Subclasses	AbstractClassTailoring, ConcreteClassTailoring			
Attribute	Type	Mult.	Kind	Note
classContent	ClassContentConditional	*	aggr	Specifies the accepted / not accepted content of the class. All rules apply that fulfill the condition of the ClassContentConditional <b>Tags:</b> xml.sequenceOffset=30
multiplicity Restriction	MultiplicityRestrictionWithSeverity	0..1	aggr	Specifies the multiplicity of the class in the current context. <b>Tags:</b> xml.sequenceOffset=10
variation Restriction	VariationRestrictionWithSeverity	0..1	aggr	Specifies restrictions on the usage of variant handling. <b>Tags:</b> xml.sequenceOffset=20

**Table A.144: ClassTailoring**

Class	ClientComSpec			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Client-specific communication attributes (RPortPrototype typed by ClientServerInterface).			
Base	ARObject, RPortComSpec			
Attribute	Type	Mult.	Kind	Note
endToEndCall Response Timeout	TimeValue	0..1	attr	This attribute defines the maximum time interval in which the application shall expect the servers's response (time between the sending of the call invocation until the arrival of the server's response).
operation	ClientServerOperation	0..1	ref	This represents the corresponding ClientServerOperation.
transformation ComSpecProps	TransformationComSpecProps	*	aggr	This references the TransformationComSpecProps which define port-specific configuration for data transformation.

**Table A.145: ClientComSpec**

<b>Class</b>	<b>ClientIdDefinition</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate			
<b>Note</b>	Several clients in one client-ECU can communicate via inter-ECU client-server communication with a server on a different ECU, if a client identifier is used to distinguish the different clients. The Client Identifier of the transaction handle that is used by the RTE can be defined by this element.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
clientId	<a href="#">Numerical</a>	1	attr	The Client Identifier of the transaction handle used for an inter-ECU client server communication is defined by this attribute. If defined the RTE generator shall use this client Id.
clientServerOperation	<a href="#">ClientServerOperation</a>	1	iref	Reference to the ClientServerOperation that is called by the client. <b>InstanceRef implemented by:</b> <a href="#">OperationInSystem</a> <a href="#">InstanceRef</a>

**Table A.146: ClientIdDefinition**

<b>Class</b>	<b>ClientIdRange</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
<b>Note</b>	With this element it is possible to restrict the Client Identifier of the transaction handle that is generated by the client RTE for inter-Ecu Client/Server communication to an allowed range of numerical values.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
lowerLimit	<a href="#">Limit</a>	1	attr	This specifies the lower limit of the ClientIdRange. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
upperLimit	<a href="#">Limit</a>	1	attr	This specifies the upper limit of the ClientIdRange. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.147: ClientIdRange**

<b>Class</b>	<b>ClientServerAnnotation</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::ApplicationAttributes			
<b>Note</b>	Annotation to a port regarding a certain Operation.			
<b>Base</b>	ARObject, <a href="#">GeneralAnnotation</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
operation	<a href="#">ClientServerOperation</a>	0..1	ref	This represents the ClientServerOperation that the Client ServerAnnotation corresponds to.

**Table A.148: ClientServerAnnotation**

<b>Class</b>	<b>ClientServerApplicationErrorMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	This meta-class represents the ability to map ApplicationErrors onto each other.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
firstApplicationError	<a href="#">ApplicationError</a>	0..1	ref	This represents the first ApplicationError in the context of the ClientServerApplicationErrorMapping.
secondApplicationError	<a href="#">ApplicationError</a>	0..1	ref	This represents the second ApplicationError in the context of the ClientServerApplicationErrorMapping.

**Table A.149: ClientServerApplicationErrorMapping**

<b>Class</b>	<b>ClientServerInterface</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	A client/server interface declares a number of operations that can be invoked on a server by a client. <b>Tags:</b> atp.recommendedPackage=PortInterfaces			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">PortInterface</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
operation	<a href="#">ClientServerOperation</a>	*	aggr	ClientServerOperation(s) of this ClientServerInterface. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=blueprintDerivationTime
possibleError	<a href="#">ApplicationError</a>	*	aggr	Application errors that are defined as part of this interface.

**Table A.150: ClientServerInterface**

<b>Class</b>	<b>ClientServerInterfaceMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	Defines the mapping of ClientServerOperations in context of two different ClientServerInterfaces.			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PortInterfaceMapping</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
errorMapping	<a href="#">ClientServerApplicationErrorMapping</a>	*	aggr	Map two different ApplicationErrors defined in the context of two different ClientServerInterfaces.
operationMapping	<a href="#">ClientServerOperationMapping</a>	*	aggr	Mapping of two ClientServerOperations in two different ClientServerInterfaces

**Table A.151: ClientServerInterfaceMapping**

<b>Class</b>	<b>ClientServerInterfaceToBswModuleEntryBlueprintMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::ClientServerInterfaceToBswModuleEntryMapping			





Class	ClientServerInterfaceToBswModuleEntryBlueprintMapping			
Note	<p>This represents a mapping between one ClientServerInterface blueprint and BswModuleEntry blueprint in order to express the intended implementation of ClientServerOperations by specific BswModuleEntries under consideration of PortDefinedArguments. Such a mapping enables the formal check whether the number of arguments and the data types of arguments of the operation + additional PortDefined Arguments matches the signature of the BswModuleEntry.</p> <p><b>Tags:</b>atp.recommendedPackage=BlueprintMappingSets</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
clientServer Interface	<a href="#">ClientServerInterface</a>	1	ref	The referenced ClientServerInterface represents the client server interface the mapping is dedicated to.
operation Mapping	<a href="#">ClientServerOperationBlueprintMapping</a>	1..*	aggr	<p>This specifies the operations used in the mapping between the ClientServerInterface and the BswModule Entry.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
portDefined Argument Blueprint (ordered)	PortDefinedArgument Blueprint	*	aggr	<p>This specifies the PortDefinedArguments used in the mapping between the ClientServerInterface and the Bsw ModuleEntry.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>

**Table A.152: ClientServerInterfaceToBswModuleEntryBlueprintMapping**

Class	ClientServerOperation			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	An operation declared within the scope of a client/server interface.			
Base	<a href="#">ARObject</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
argument (ordered)	<a href="#">ArgumentDataPrototype</a>	*	aggr	<p>An argument of this ClientServerOperation</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=blueprintDerivationTime</p>
diagArgIntegrity	Boolean	0..1	attr	<p>This attribute shall only be used in the implementation of diagnostic routines to support the case where input and output arguments are allocated in a shared buffer and might unintentionally overwrite input arguments by tentative write operations to output arguments.</p> <p>This situation can happen during sliced execution or while output parameters are arrays (call by reference). The value true means that the ClientServerOperation is aware of the usage of a shared buffer and takes precautions to avoid unintentional overwrite of input arguments.</p> <p>If the attribute does not exist or is set to false the Client ServerOperation does not have to consider the usage of a shared buffer.</p>
possibleError	<a href="#">ApplicationError</a>	*	ref	Possible errors that may be raised by the referring operation.

**Table A.153: ClientServerOperation**

<b>Class</b>	<b>ClientServerOperationBlueprintMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::ClientServerInterfaceToBswModuleEntryMapping			
<b>Note</b>	This class describes a specific mapping between a ClientServerOperation in a ClientServerInterface blueprint and a BswModuleEntry blueprint.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
blueprint MappingGuide	<a href="#">DocumentationBlock</a>	0..1	aggr	This attribute offers the possibility to provide additional information with respect to the mapping.
bswModule Entry	<a href="#">BswModuleEntry</a>	1	ref	The referenced BswModuleEntry represents the Bsw ModuleEntry the mapping is dedicated to.
clientServer Operation	<a href="#">ClientServerOperation</a>	1	ref	The referenced ClientServerOperation represents the client server operation the mapping is dedicated to.

**Table A.154: ClientServerOperationBlueprintMapping**

<b>Class</b>	<b>ClientServerOperationMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	Defines the mapping of two particular ClientServerOperations in context of two different ClientServer Interfaces.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
argument Mapping	<a href="#">DataPrototypeMapping</a>	*	aggr	Defines the mapping of two particular ArgumentData Prototypes with unequal names or unequal semantic (resolution or range) in context of Operations.
firstOperation	<a href="#">ClientServerOperation</a>	0..1	ref	First-to-be-mapped ClientServerOperation of a Client ServerInterface.
firstToSecond Data Transformation	<a href="#">DataTransformation</a>	0..1	ref	This reference indicates that a DataTransformation is intended in the context of the ClientServerOperation Mapping.
second Operation	<a href="#">ClientServerOperation</a>	0..1	ref	Second-to-be-mapped ClientServerOperation of a Client ServerInterface.

**Table A.155: ClientServerOperationMapping**

<b>Class</b>	<b>ClientServerToSignalMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
<b>Note</b>	This element maps the ClientServerOperation to call- and return-SystemSignals.			
<b>Base</b>	ARObject, <a href="#">DataMapping</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
callSignal	<a href="#">SystemSignal</a>	1	ref	Reference to the callSignal to which the IN and INOUT ArgumentDataPrototypes are mapped.
clientServer Operation	<a href="#">ClientServerOperation</a>	1	iref	Reference to a ClientServerOperation, which is mapped to a call SystemSignal and a return SystemSignal.  <b>InstanceRef implemented by:</b> <a href="#">OperationInSystem InstanceRef</a>





Class	ClientServerToSignalMapping			
returnSignal	<a href="#">SystemSignal</a>	0..1	ref	Reference to the returnSignal to which the OUT and INOUT ArgumentDataPrototypes are mapped.

**Table A.156: ClientServerToSignalMapping**

Class	Code			
Package	M2::AUTOSARTemplates::CommonStructure::Implementation			
Note	A generic code descriptor. The type of the code (source or object) is defined via the category attribute of the associated engineering object.			
Base	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
artifact Descriptor	AutosarEngineering Object	*	aggr	Refers to the artifact belonging to this code descriptor.
callbackHeader	<a href="#">ServiceNeeds</a>	*	ref	The association callbackHeader describes in which header files the function declarations of callback functions are provided to a service module. With this information the service module can include the appropriate header files in its configuration files.

**Table A.157: Code**

Class	Collection			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::ElementCollection			
Note	<p>This meta-class specifies a collection of elements. A collection can be utilized to express additional aspects for a set of elements.</p> <p>Note that Collection is an ARElement. Therefore it is applicable e.g. for EvaluatedVariant, even if this is not obvious.</p> <p>Usually the category of a Collection is "SET". On the other hand, a Collection can also express an arbitrary relationship between elements. This is denoted by the category "RELATION" (see also [TPS_GST_00347]).</p> <p>In this case the collection represents an association from "sourceElement" to "targetElement" in the role "role".</p> <p><b>Tags:</b>atp.recommendedPackage=Collections</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
autoCollect	AutoCollectEnum	0..1	attr	<p>This attribute reflects how far the referenced objects are part of the collection.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
collected Instance	AtpFeature	*	iref	<p>This instance ref supports the use case that a particular instance is part of the collection.</p> <p><b>Tags:</b>xml.sequenceOffset=60</p> <p><b>InstanceRef implemented by:</b><a href="#">AnyInstanceRef</a></p>
collection Semantics	NameToken	0..1	attr	<p>Provides the ability to express the semantics of a Collection depending on the intended use case. The collectionSemantics is specified as a NameToken which must be agreed by all stakeholders.</p> <p><b>Tags:</b>xml.sequenceOffset=25</p>







Class	Collection			
element	<a href="#">Identifiable</a>	*	ref	This is an element in the collection. Note that Collection itself is collectable. Therefore collections can be nested.  In case of category="RELATION" this represents the target end of the relation.  <b>Tags:</b> xml.sequenceOffset=40
elementRole	<a href="#">Identifier</a>	0..1	attr	This attribute allows to denote a particular role of the collection. Note that the applicable semantics shall be mutually agreed between the two parties.  In particular it denotes the role of element in the context of sourceElement.  <b>Tags:</b> xml.sequenceOffset=30
sourceElement	<a href="#">Identifiable</a>	*	ref	Only if Category = "RELATION". This represents the source of a relation.  <b>Tags:</b> xml.sequenceOffset=50
sourceInstance	AtpFeature	*	iref	Only if Category = "RELATION". This represents the source instance of a relation.  <b>Tags:</b> xml.sequenceOffset=70 <b>InstanceRef implemented by:</b> <a href="#">AnyInstanceRef</a>

**Table A.158: Collection**

Class	<i>CommConnectorPort</i> (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	<p>The Ecu communication relationship defines which signals, Pdus and frames are actually received and transmitted by this ECU.</p> <p>For each signal, Pdu or Frame that is transmitted or received and used by the Ecu an association between an ISignalPort, IPduPort or FramePort with the corresponding Triggering shall be created. An ISignalPort shall be created only if the corresponding signal is handled by COM (RTE or Signal Gateway). If a Pdu Gateway ECU only routes the Pdu without being interested in the content only a FramePort and an IPduPort needs to be created.</p>			
Base	<i>ARObject</i> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">FramePort</a> , <a href="#">IPduPort</a> , <a href="#">ISignalPort</a>			
Attribute	Type	Mult.	Kind	Note
communication Direction	<a href="#">CommunicationDirectionType</a>	1	attr	Communication Direction of the Connector Port (input or output Port).

**Table A.159: CommConnectorPort**

Class	CommunicationBufferLocking			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::PortAPIOptions			
Note	The aggregation of this meta-class specifies that a RunnableEntity supports locked communication buffers supplied by the RTE. It is able to cope with the error RTE_E_COM_BUSY.			
Base	<i>ARObject</i> , <i>SwcSupportedFeature</i>			
Attribute	Type	Mult.	Kind	Note
supportBuffer Locking	SupportBufferLocking Enum	0..1	attr	This attribute is used to indicate the intended buffer locking behavior.

**Table A.160: CommunicationBufferLocking**

<b>Class</b>	<<atpVariation>> <b>CommunicationCluster</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
<b>Note</b>	<p>The CommunicationCluster is the main element to describe the topological connection of communicating ECUs.</p> <p>A cluster describes the ensemble of ECUs, which are linked by a communication medium of arbitrary topology (bus, star, ring, ...). The nodes within the cluster share the same communication protocol, which may be event-triggered, time-triggered or a combination of both.</p> <p>A CommunicationCluster aggregates one or more physical channels.</p> <p><b>Tags:</b>vh.latestBindingTime=postBuild</p>			
<b>Base</b>	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
<b>Subclasses</b>	AbstractCanCluster, EthernetCluster, FlexrayCluster, LinCluster, UserDefinedCluster			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
baudrate	PositiveUnlimitedInteger	0..1	attr	Channels speed in bits/s.
physical Channel	PhysicalChannel	1..*	aggr	<p>This relationship defines which channel element belongs to which cluster. A channel shall be assigned to exactly one cluster, whereas a cluster may have one or more channels.</p> <p>Note: This atpSplitable property has no atp.Splitkey due to atpVariation (PropertySetPattern).</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>vh.latestBindingTime=systemDesignTime</p>
protocolName	String	0..1	attr	The name of the protocol used.
protocolVersion	String	0..1	attr	The version of the protocol used.

**Table A.161: CommunicationCluster**

<b>Class</b>	<b>CommunicationConnector</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
<b>Note</b>	<p>The connection between the referencing ECU and the referenced channel via the referenced controller.</p> <p>Connectors are used to describe the bus interfaces of the ECUs and to specify the sending/receiving behavior. Each CommunicationConnector has a reference to exactly one communicationController.</p> <p>Note: Several CommunicationConnectors can be assigned to one PhysicalChannel in the scope of one ECU Instance.</p>			
<b>Base</b>	ARObject, Identifiable, MultilanguageReferrable, Referrable			
<b>Subclasses</b>	AbstractCanCommunicationConnector, EthernetCommunicationConnector, FlexrayCommunicationConnector, LinCommunicationConnector, UserDefinedCommunicationConnector			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
commController	CommunicationController	1	ref	<p>Reference to the communication controller. The CommunicationConnector and referenced CommunicationController shall be aggregated by the same ECUInstance.</p> <p>The communicationController can be referenced by several CommunicationConnector elements. This is important for the FlexRay Bus. FlexRay communicates via two physical channels. But only one controller in an ECU is responsible for both channels. Thus, two connectors (for channel A and for channel B) shall reference to the same controller.</p>





Class	<b>CommunicationConnector</b> (abstract)			
createEcuWakeupSource	Boolean	0..1	attr	If this parameter is available and set to true then a channel wakeup source shall be created for the Physical Channel referencing this CommunicationConnector.
dynamicPncToChannelMappingEnabled	Boolean	0..1	attr	Defines if this EcuInstance shall implement the dynamic PNC-to-channel-mapping functionality on this CommunicationConnector and its respective Physical Channel. <b>Tags:</b> atp.Status=draft
ecuCommPortInstance	<a href="#">CommConnectorPort</a>	*	aggr	An ECUs reception or send ports. atpVariation: If signals/PDUs/frames are variable, the corresponding ports shall be variable, too. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
pncFilterArrayMask (ordered)	PositiveInteger	*	attr	Bit mask for NM-Pdu Payload used to configure the NM filter mask for the Network Management. <b>Tags:</b> atp.Status=draft
pncGatewayType	<a href="#">PncGatewayTypeEnum</a>	0..1	attr	Defines if this EcuInstance shall implement the Pnc Gateway functionality on this CommunicationConnector and its respective PhysicalChannel. Several Ecu Instances on the same PhysicalChannel can have the PncGateway functionality enabled, but only one of them shall have the pncGatewayType "active".

**Table A.162: CommunicationConnector**

Class	<<atpVariation>> <b>CommunicationController</b> (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	The communication controller is a dedicated hardware device by means of which hosts are sending frames to and receiving frames from the communication medium. <b>Tags:</b> vh.latestBindingTime=postBuild			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">AbstractCanCommunicationController</a> , <a href="#">EthernetCommunicationController</a> , <a href="#">FlexrayCommunicationController</a> , <a href="#">LinCommunicationController</a> , <a href="#">UserDefinedCommunicationController</a>			
Attribute	Type	Mult.	Kind	Note
wakeUpByControllerSupported	Boolean	0..1	attr	Defines whether the ECU shall be woken up by this CommunicationController. TRUE: wake up is possible FALSE: wake up is not supported Note: If wakeUpByControllerSupported is set to TRUE the feature shall be supported by both hardware and basic software.

**Table A.163: CommunicationController**

Class	<b>CommunicationControllerMapping</b>
Package	M2::AUTOSARTemplates::SystemTemplate::ECUResourceMapping
Note	CommunicationControllerMapping specifies the CommunicationPeripheral hardware (defined in the ECU Resource Template) to realize the specified CommunicationController in a physical topology.





Class	CommunicationControllerMapping			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
communication Controller	<a href="#">CommunicationController</a>	1	ref	Reference to the CommunicationController in the System Template
hw Communication Controller	<a href="#">HwElement</a>	1	ref	Reference to a HwElement of category Communication Controller in the ECU Resource Template.

**Table A.164: CommunicationControllerMapping**

Enumeration	CommunicationDirectionType
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Describes the communication direction.
Literal	Description
in	Reception (Input) <b>Tags:</b> atp.EnumerationLiteralIndex=0
out	Transmission (Output) <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.165: CommunicationDirectionType**

Class	ComplexDeviceDriverSwComponentType			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	The ComplexDeviceDriverSwComponentType is a special AtomicSwComponentType that has direct access to hardware on an ECU and which is therefore linked to a specific ECU or specific hardware. The ComplexDeviceDriverSwComponentType introduces the possibility to link from the software representation to its hardware description provided by the ECU Resource Template. <b>Tags:</b> atp.recommendedPackage=SwComponentTypes			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtomicSwComponentType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
Attribute	Type	Mult.	Kind	Note
hardware Element	<a href="#">HwDescriptionEntity</a>	*	ref	Reference from the ComplexDeviceDriverSwComponent Type to the description of the used HwElements.

**Table A.166: ComplexDeviceDriverSwComponentType**

Class	ComponentClustering			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Constraint that forces the mapping of all referenced SW component instances to the same ECU, Core, Partition depending on the defined mappingScope attribute. If mappingScope is not specified then mappingScopeEcu shall be assumed.			
Base	ARObject, MappingConstraint			
Attribute	Type	Mult.	Kind	Note





Class	ComponentClustering			
clustered Component	<a href="#">SwComponent Prototype</a>	1..*	iref	Reference to the components that have to be mapped together. <b>InstanceRef implemented by:</b> ComponentInSystem InstanceRef
mappingScope	MappingScopeEnum	0..1	attr	This attribute indicates whether the ComponentClustering mapping constraint applies to different ECUs, partitions or cores. If this attribute is not specified then mappingScope Ecu shall be assumed.

**Table A.167: ComponentClustering**

Class	ComponentSeparation			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	<p>Constraint that forces the two referenced SW components (called A and B in the following) not to be mapped to the same ECU, Core, Partition depending on the defined mappingScope attribute. If mapping Scope is not specified then mappingScopeEcu shall be assumed.</p> <p>If a SW component (e.g. A) is a composition, none of the atomic SW components making up the A composition shall be mapped together with any of the atomic SW components making up the B composition. Furthermore, A and B shall be disjoint.</p>			
Base	ARObject, MappingConstraint			
Attribute	Type	Mult.	Kind	Note
mappingScope	MappingScopeEnum	0..1	attr	This attribute indicates whether the Component Separation mapping constraint applies to different ECUs, partitions or cores. If this attribute is not specified then mappingScopeEcu shall be assumed.
separated Component	<a href="#">SwComponent Prototype</a>	2	iref	The two components that have to be mapped to different ECUs <b>InstanceRef implemented by:</b> ComponentInSystem InstanceRef

**Table A.168: ComponentSeparation**

Class	CompositeNetworkRepresentation			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	This meta-class is used to define the network representation of leaf elements of composite application data types.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
leafElement	<a href="#">ApplicationComposite ElementDataPrototype</a>	0..1	iref	This represents that leaf element of an application composite data type. <b>InstanceRef implemented by:</b> <a href="#">ApplicationComposite ElementInPortInterfaceInstanceRef</a>
network Representation	<a href="#">SwDataDefProps</a>	0..1	aggr	The SwDataDefProps owned by the CompositeNetwork Representation are used to define the network representation of the leaf element of an Application CompositeDataType.

**Table A.169: CompositeNetworkRepresentation**

<b>Class</b>	<b>CompositeRuleBasedValueSpecification</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Constants			
<b>Note</b>	This meta-class represents rule-based values for DataPrototypes typed by composite AutosarDataTypes.			
<b>Base</b>	ARObject, <a href="#">AbstractRuleBasedValueSpecification</a> , <a href="#">ValueSpecification</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
argument (ordered)	<a href="#">CompositeValueSpecification</a>	*	aggr	This represents the collection of aggregated Value Specifications. The last ValueSpecification in the collection shall be taken to execute the filling rule. <b>Tags:</b> xml.sequenceOffset=30
compound Primitive Argument (ordered)	CompositeRuleBased ValueArgument	*	aggr	This represents the collection of aggregated Value Specifications for compound primitive data type. The last ValueSpecification in the collection shall be taken to execute the filling rule. <b>Tags:</b> xml.sequenceOffset=35
maxSizeToFill	PositiveInteger	0..1	attr	If a rule is chosen which does not fill until the end, this determines until which size the rule shall fill the values. <b>Tags:</b> xml.sequenceOffset=40
rule	<a href="#">Identifier</a>	0..1	attr	This denotes the name of the rule of the RuleBasedValue Specification. The rule determines the calculation specification according which the arguments are used to calculated the values. <b>Tags:</b> xml.sequenceOffset=20

**Table A.170: CompositeRuleBasedValueSpecification**

<b>Class</b>	<b>CompositeValueSpecification</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Constants			
<b>Note</b>	This abstract meta-class acts a base class for ValueSpecifications that have a composite form.			
<b>Base</b>	ARObject, <a href="#">ValueSpecification</a>			
<b>Subclasses</b>	<a href="#">ArrayValueSpecification</a> , <a href="#">RecordValueSpecification</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.171: CompositeValueSpecification**

<b>Class</b>	<b>CompositionSwComponentType</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
<b>Note</b>	A CompositionSwComponentType aggregates SwComponentPrototypes (that in turn are typed by Sw ComponentTypes) as well as SwConnectors for primarily connecting SwComponentPrototypes among each others and towards the surface of the CompositionSwComponentType. By this means, hierarchical structures of software-components can be created. <b>Tags:</b> atp.recommendedPackage=SwComponentTypes			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	CompositionSwComponentType			
component	SwComponentPrototype	*	aggr	<p>The instantiated components that are part of this composition. The aggregation of SwComponentPrototype is subject to variability with the purpose to support the conditional existence of a SwComponentPrototype. Please be aware: if the conditional existence of SwComponentPrototypes is resolved post-build the deselected SwComponentPrototypes are still contained in the ECUs build but the instances are inactive in that they are not scheduled by the RTE.</p> <p>The aggregation is marked as atpSplitable in order to allow the addition of service components to the ECU extract during the ECU integration.</p> <p>The use case for having 0 components owned by the CompositionSwComponentType could be to deliver an empty CompositionSwComponentType to e.g. a supplier for filling the internal structure.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=component.shortName, component.variationPoint.shortLabel  vh.latestBindingTime=postBuild</p>
connector	SwConnector	*	aggr	<p>SwConnectors have the principal ability to establish a connection among PortPrototypes. They can have many roles in the context of a CompositionSwComponentType. Details are refined by subclasses.</p> <p>The aggregation of SwConnectors is subject to variability with the purpose to support variant data flow.</p> <p>The aggregation is marked as atpSplitable in order to allow the extension of the ECU extract with AssemblySwConnectors between ApplicationSwComponentTypes and ServiceSwComponentTypes during the ECU integration.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=connector.shortName, connector.variationPoint.shortLabel  vh.latestBindingTime=postBuild</p>
constantValueMapping	ConstantSpecificationMappingSet	*	ref	<p>Reference to the ConstantSpecificationMapping to be applied for initValues of PPortComSpecs and RPortComSpec.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b>atp.Splitkey=constantValueMapping</p>







Class	CompositionSwComponentType			
dataType Mapping	<a href="#">DataTypeMappingSet</a>	*	ref	<p>Reference to the DataTypeMapping to be applied for the used ApplicationDataTypes in PortInterfaces.</p> <p>Background: when developing subsystems it may happen that ApplicationDataTypes are used on the surface of CompositionSwComponentTypes. In this case it would be reasonable to be able to also provide the intended mapping to the ImplementationDataTypes. However, this mapping shall be informal and not technically binding for the implementors mainly because the RTE generator is not concerned about the CompositionSwComponentTypes.</p> <p>Rationale: if the mapping of ApplicationDataTypes on the delegated and inner PortPrototype matches then the mapping to ImplementationDataTypes is not impacting compatibility.</p> <p><b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=dataTypeMapping</p>
instantiation RTEEventProps	<a href="#">InstantiationRTEEventProps</a>	*	aggr	<p>This allows to define instantiation specific properties for RTE Events, in particular for instance specific scheduling.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=instantiationRTEEventProps.shortLabel, instantiationRTEEventProps.variationPoint.shortLabel vh.latestBindingTime=codeGenerationTime</p>

Table A.172: CompositionSwComponentType

Class	CompuConstTextContent			
Package	M2::MSR::AsamHdo::ComputationMethod			
Note	This meta-class represents the textual content of a scale.			
Base	ARObject, CompuConstContent			
Attribute	Type	Mult.	Kind	Note
vt	VerbatimString	0..1	attr	This represents a textual constant in the computation method.

Table A.173: CompuConstTextContent

Class	CompuMethod			
Package	M2::MSR::AsamHdo::ComputationMethod			
Note	<p>This meta-class represents the ability to express the relationship between a physical value and the mathematical representation.</p> <p>Note that this is still independent of the technical implementation in data types. It only specifies the formula how the internal value corresponds to its physical pendant.</p> <p><b>Tags:</b> atp.recommendedPackage=CompuMethods</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note





Class	CompuMethod			
compuInternalToPhys	Compu	0..1	aggr	This specifies the computation from internal values to physical values. <b>Tags:</b> xml.sequenceOffset=80
compuPhysToInternal	Compu	0..1	aggr	This represents the computation from physical values to the internal values. <b>Tags:</b> xml.sequenceOffset=90
displayFormat	DisplayFormatString	0..1	attr	This property specifies, how the physical value shall be displayed e.g. in documents or measurement and calibration tools. <b>Tags:</b> xml.sequenceOffset=20
unit	Unit	0..1	ref	This is the physical unit of the Physical values for which the CompuMethod applies. <b>Tags:</b> xml.sequenceOffset=30

Table A.174: CompuMethod

Class	CompuRationalCoeffs			
Package	M2::MSR::AsamHdo::ComputationMethod			
Note	This meta-class represents the ability to express a rational function by specifying the coefficients of nominator and denominator.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
compuDenominator	CompuNominatorDenominator	0..1	aggr	This is the denominator of the expression. <b>Tags:</b> xml.sequenceOffset=30
compuNumerator	CompuNominatorDenominator	0..1	aggr	This is the numerator of the rational expression. <b>Tags:</b> xml.sequenceOffset=20

Table A.175: CompuRationalCoeffs

Class	CompuScale			
Package	M2::MSR::AsamHdo::ComputationMethod			
Note	This meta-class represents the ability to specify one segment of a segmented computation method.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
compuInverseValue	CompuConst	0..1	aggr	This is the inverse value of the constraint. This supports the case that the scale is not reversible per se. <b>Tags:</b> xml.sequenceOffset=60
compuScaleContents	CompuScaleContents	0..1	aggr	This represents the computation details of the scale. <b>Tags:</b> xml.roleElement=false xml.roleWrapperElement=false xml.sequenceOffset=70 xml.typeElement=false xml.typeWrapperElement=false





Class	CompuScale			
desc	MultiLanguageOverviewParagraph	0..1	aggr	<p>&lt;desc&gt; represents a general but brief description of the object in question.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
lowerLimit	Limit	0..1	attr	<p>This specifies the lower limit of the scale.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=40</p>
mask	PositiveInteger	0..1	attr	<p>In difference to all the other computational methods every COMPU-SCALE will be applied including the bit MASK. Therefore it is allowed for this type of COMPU-METHOD, that COMPU-SCALES overlap.</p> <p>To calculate the string reverse to a value, the string has to be split and the according value for each substring has to be summed up. The sum is finally transmitted.</p> <p>The processing has to be done in order of the COMPU-SCALE elements.</p> <p><b>Tags:</b>xml.sequenceOffset=35</p>
shortLabel	Identifier	0..1	attr	<p>This element specifies a short name for the particular scale. The name can for example be used to derive a programming language identifier.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
symbol	CIdentifier	0..1	attr	<p>The symbol, if provided, is used by code generators to get a C identifier for the CompuScale. The name will be used as is for the code generation, therefore it needs to be unique within the generation context.</p> <p><b>Tags:</b>xml.sequenceOffset=25</p>
upperLimit	Limit	0..1	attr	<p>This specifies the upper limit of a of the scale.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=50</p>

Table A.176: CompuScale

Class	CompuScaleConstantContents			
Package	M2::MSR::AsamHdo::ComputationMethod			
Note	This meta-class represents the fact that a particular scale of the computation method is constant.			
Base	ARObject, CompuScaleContents			
Attribute	Type	Mult.	Kind	Note
compuConst	CompuConst	0..1	aggr	<p>This represents the fact that the scale is a constant. The use case is mainly a non interpolated scale. It is a simplification of the fact that a constant scale can also be expressed as rational function of order 0.</p> <p><b>Tags:</b>xml.sequenceOffset=90</p>

Table A.177: CompuScaleConstantContents

<b>Class</b>	<b>CompuScales</b>			
<b>Package</b>	M2::MSR::AsamHdo::ComputationMethod			
<b>Note</b>	This meta-class represents the ability to stepwise express a computation method.			
<b>Base</b>	ARObject, CompuContent			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
compuScale (ordered)	CompuScale	*	aggr	<p>This represents one scale within the compu method. Note that it contains a Variationpoint in order to support blueprints of enumerations.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b>  vh.latestBindingTime=blueprintDerivationTime  xml.roleElement=true  xml.roleWrapperElement=true  xml.sequenceOffset=40  xml.typeElement=false  xml.typeWrapperElement=false</p>

Table A.178: CompuScales

<b>Class</b>	<b>ConcreteClassTailoring</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::DataFormatTailoring			
<b>Note</b>	Tailoring of concrete meta classes.			
<b>Base</b>	ARObject, <a href="#">ClassTailoring</a> , <a href="#">DataFormatElementReference</a> , <a href="#">DataFormatElementScope</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">SpecElementReference</a> , <a href="#">SpecElementScope</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
validationRoot	Boolean	0..1	attr	<p>Specification if this concrete Meta-Class is a root element for validation. I.e.: The validation starts at an object of this concrete Meta-Class and continues by following all aggregations and references that are in scope of this Data Exchange Point.</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>

Table A.179: ConcreteClassTailoring

<b>Class</b>	<b>ConcretePatternEventTriggering</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingConstraint::EventTriggeringConstraint			
<b>Note</b>	The ConcretePatternEventTriggering describes the behavior of an event, which occurs following a precisely known pattern.			
<b>Base</b>	ARObject, <a href="#">EventTriggeringConstraint</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TimingConstraint</a> , <a href="#">Traceable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
offset	MultidimensionalTime	1..*	aggr	<p>The offset for each occurrence of the event in the specified time interval.</p> <p><b>Tags:</b>  xml.name=TIME-VALUE  xml.roleElement=true  xml.sequenceOffset=10  xml.typeElement=false</p>





Class	ConcretePatternEventTriggering			
patternJitter	MultidimensionalTime	0..1	aggr	The optional parameter "Pattern Jitter" specifies the deviation of the time interval's starting point from the beginning of the given period. This parameter is only applicable in conjunction with the parameter "Pattern Period".
patternLength	MultidimensionalTime	1	aggr	The length of the observed time interval. <b>Tags:</b> xml.sequenceOffset=20
patternPeriod	MultidimensionalTime	0..1	aggr	The optional parameter "Pattern Period" specifies the time distance between the beginnings of subsequent repetitions of the given concrete pattern.

**Table A.180: ConcretePatternEventTriggering**

Class	<<atpMixedString>> ConditionByFormula			
Package	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
Note	<p>This class represents a condition which is computed based on system constants according to the specified expression. The expected result is considered as boolean value.</p> <p>The result of the expression is interpreted as a condition.</p> <ul style="list-style-type: none"> <li>• "0" represents "false";</li> <li>• a value other than zero is considered "true"</li> </ul>			
Base	ARObject, FormulaExpression, SwSystemconstDependentFormula			
Attribute	Type	Mult.	Kind	Note
bindingTime	BindingTimeEnum	1	attr	<p>This attribute specifies the point in time when condition may be evaluated at earliest. At this point in time all referenced system constants shall have a value.</p> <p><b>Tags:</b>xml.attribute=true</p>

**Table A.181: ConditionByFormula**

Class	ConsistencyNeeds			
Package	M2::AUTOSARTemplates::SWComponentTemplate::ImplicitCommunicationBehavior			
Note	This meta-class represents the ability to define requirements on the implicit communication behavior.			
Base	ARObject, <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
dpgDoesNotRequireCoherency	DataPrototypeGroup	*	aggr	<p>This group of VariableDataPrototypes does not require coherency with respect to the implicit communication behavior.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=dpgDoesNotRequireCoherency.shortName,  dpgDoesNotRequireCoherency.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>





Class	ConsistencyNeeds			
dpgRequiresCoherency	DataPrototypeGroup	*	aggr	<p>This group of VariableDataPrototypes requires coherency with respect to the implicit communication behavior, i.e. all read and write access to VariableDataPrototypes in the DataPrototypeGroup by the RunnableEntities of the RunnableEntityGroup need to be handled in a coherent manner.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=dpgRequiresCoherency.shortName, dpgRequiresCoherency.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
regDoesNotRequireStability	RunnableEntityGroup	*	aggr	<p>This group of RunnableEntities does not require stability with respect to the implicit communication behavior.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=regDoesNotRequireStability.shortName, regDoesNotRequireStability.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
regRequiresStability	RunnableEntityGroup	*	aggr	<p>This group of RunnableEntities requires stability with respect to the implicit communication behavior, i.e. all read and write access to VariableDataPrototypes in the DataPrototypeGroup by the RunnableEntities of the RunnableEntityGroup need to be handled in a stable manner.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=regRequiresStability.shortName, regRequiresStability.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>

Table A.182: ConsistencyNeeds

Class	ConstantReference			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	Instead of defining this value inline, a constant is referenced.			
Base	ARObject, <a href="#">ValueSpecification</a>			
Attribute	Type	Mult.	Kind	Note
constant	<a href="#">ConstantSpecification</a>	0..1	ref	The referenced constant.

Table A.183: ConstantReference

Class	ConstantSpecification			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	Specification of a constant that can be part of a package, i.e. it can be defined stand-alone. <b>Tags:</b> atp.recommendedPackage=ConstantSpecifications			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
valueSpec	<a href="#">ValueSpecification</a>	0..1	aggr	Specification of an expression leading to a value for this constant.

Table A.184: ConstantSpecification

<b>Class</b>	<b>ConstantSpecificationMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Constants			
<b>Note</b>	<p>This meta-class is used to create an association of two ConstantSpecifications. One Constant Specification is supposed to be defined in the application domain while the other should be defined in the implementation domain.</p> <p>Hence the ConstantSpecificationMapping needs to be used where a ConstantSpecification defined in one domain needs to be associated to a ConstantSpecification in the other domain.</p> <p>This information is crucial for the RTE generator.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
applConstant	<a href="#">ConstantSpecification</a>	0..1	ref	A ConstantSpecification defined in the application domain.
implConstant	<a href="#">ConstantSpecification</a>	0..1	ref	A ConstantSpecification defined in the implementation domain.

**Table A.185: ConstantSpecificationMapping**

<b>Class</b>	<b>ConsumedEventGroup</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
<b>Note</b>	This element represents an event-group to which the service consumer wants to subscribe.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
application Endpoint	<a href="#">ApplicationEndpoint</a>	0..1	ref	<p>Defines the application endpoint where the events of the event group are received in case of multicast reception.</p> <p><b>Tags:</b>atp.Status=obsolete</p>
autoRequire	Boolean	0..1	attr	<p>Defines that this ConsumedEventGroup shall be requested (subscribed) as soon as the corresponding ConsumedServiceInstance is requested. This could be at ECU start, if ConsumedServiceInstance.autoRequire is set to TRUE or as soon as the ConsumedServiceInstance is requested by the application, if ConsumedServiceInstance.autoRequire is set to FALSE.</p>
eventGroup Identifier	PositiveInteger	0..1	attr	<p>EventGroup ID. Shall be unique within one system to allow service discovery.</p>
eventMulticast Address	<a href="#">ApplicationEndpoint</a>	*	ref	<p>This reference defines the multicast address or a multicast address resource where the events of the event group are received.</p> <p>If the multicast address is determined via configuration and not at runtime via service discovery this reference points to the multicast address over which the events will be received.</p> <p>If the multicast address is determined at runtime via service discovery this reference shall be used to define the necessary local multicast address resources, i.e. RAM space in the TcpIp module in which the multicast address is stored at runtime. Please note that in this case the referenced address may be defined as ANY UDP port and ANY IP address since the multicast address will be received at runtime. If several multicast addresses are considered to be used the ConsumedEventGroup shall</p>







Class	ConsumedEventGroup			
				<p>point to different ApplicationEndpoint objects to reserve the necessary resources in the configuration.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=postBuild</p>
pduActivationRoutingGroup	PduActivationRoutingGroup	*	aggr	The ServiceDiscovery module is able to activate and deactivate the PDU routing for receiving events.
priority	PositiveInteger	0..1	attr	Defines the frame priority where values from 0 (best effort) to 7 (highest) are allowed.
routingGroup	SoAdRoutingGroup	*	ref	<p>The ServiceDiscovery module is able to activate and deactivate the PDU routing for receiving events.</p> <p><b>Tags:</b> atp.Status=obsolete</p>
sdClientConfig	SdClientConfig	0..1	aggr	<p>The readiness to receive events is defined by the Service Discovery of the ConsumedEventGroup. The Event Handler shall know about this announcement to decide about the submission of events. Therefore the Event Handler may be configured with Service-Discovery Client attributes.</p> <p><b>Tags:</b> atp.Status=obsolete</p>
sdClientTimerConfig	SomeipSdClientEventGroupTimingConfig	0..1	ref	<p>Client Timing configuration settings that are EventGroup specific.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=postBuild</p>

Table A.186: ConsumedEventGroup

Class	ConsumedServiceInstance			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
Note	Service instances that are consumed by the ECU that is connected via the ApplicationEndpoint to a CommunicationConnector.			
Base	ARObject, AbstractServiceInstance, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mult.	Kind	Note
autoRequire	Boolean	0..1	attr	Defines that this ConsumedServiceInstance shall be required (searched for) by the service discovery at ECU start.
blacklistedVersion	SomeipServiceVersion	*	aggr	<p>Collection of blacklisted versions.</p> <p><b>Tags:</b> atp.Status=draft</p>
consumedEventGroup	ConsumedEventGroup	*	aggr	<p>Selection of event-groups the consumer wants to subscribe for.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=postBuild</p>
eventMulticastSubscriptionAddress	ApplicationEndpoint	0..1	ref	<p>Multicast Address that is used by the client to subscribe to the server: This enables the multicast subscription feature.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=postBuild</p>
instanceIdentifier	AnyServiceInstanceId	0..1	attr	This attribute represents the ability to describe the required service instance ID.





Class	ConsumedServiceInstance			
localUnicastAddress	<a href="#">ApplicationEndpoint</a>	0..2	ref	The local address over which the CSI is consumed (udp, tcp or both). <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
minorVersion	AnyVersionString	0..1	attr	Minor Version of the ServiceInterface. Value can be set to a number that represents the Minor Version of the searched service or to ANY.
providedServiceInstance	<a href="#">ProvidedServiceInstance</a>	0..1	ref	Reference to a providedServiceInstance to get the instanceIdentifier information from the ProvidedServiceInstance. <b>Tags:</b> atp.Status=obsolete
remoteUnicastAddress	<a href="#">ApplicationEndpoint</a>	0..2	ref	This reference defines the remote address where the service provider is located. This reference shall ONLY be used if the remote address is determined from the configuration and not at runtime from the Service Discovery. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
sdClientConfig	SdClientConfig	0..1	aggr	Service Discovery Client configuration. <b>Tags:</b> atp.Status=obsolete
sdClientTimerConfig	SomeipSdClientServiceInstanceConfig	0..1	ref	Client specific configuration settings relevant for the SOME/IP service discovery. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
serviceIdentifier	PositiveInteger	0..1	attr	This attribute represents the ability to describe the SOME/IP service ID that is searched.
versionDrivenFindBehavior	<a href="#">ServiceVersionAcceptanceKindEnum</a>	0..1	attr	Defines the service discovery find behavior. <b>Tags:</b> atp.Status=draft

**Table A.187: ConsumedServiceInstance**

Enumeration	ContainedIPduCollectionSemanticsEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Defines the collection semantics for ContainedIPdus.
Literal	Description
lastIsBest	The ContainedIPdu data will be fetched via TriggerTransmit just before the transmission executes. <b>Tags:</b> atp.EnumerationLiteralIndex=0
queued	The ContainedIPdu data will instantly be stored to the ContainerIPdu in the context of the Transmit API. <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.188: ContainedIPduCollectionSemanticsEnum**

Class	ContainedIPduProps
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Defines the aspects of an IPdu which can be collected inside a ContainerIPdu.
Base	AObject





Class	ContainedIPduProps			
Attribute	Type	Mult.	Kind	Note
collection Semantics	<a href="#">ContainedIPduCollectionSemanticsEnum</a>	1	attr	Defines whether this ContainedIPdu shall be collected using a last-is-best or queued semantics.
containedPdu Triggering	<a href="#">PduTriggering</a>	0..1	ref	Reference to Pdu for which the ContainedIPduProps are valid.
headerIdLong Header	PositiveInteger	0..1	attr	Defines the header id this IPdu shall have in case this IPdu is put inside a ContainerIPdu with headerType = longHeader.
headerIdShort Header	PositiveInteger	0..1	attr	Defines the header id this IPdu shall have in case this IPdu is put inside a ContainerIPdu with headerType = shortHeader.
offset	PositiveInteger	0..1	attr	Byte offset that describes the location of the Contained Pdu in the ContainerPdu if no header is used.
priority	PositiveInteger	0..1	attr	Defines a priority of a ContainedTxPdu. 255 represents the lowest priority and 0 represent the highest priority.
timeout	TimeValue	0..1	attr	Defines a IPdu specific sender timeout which can reduce the ContainerIPdu timer when this containedIPdu is put inside the ContainerIPdu. This attribute is ignored on receiver side.
trigger	<a href="#">PduCollectionTriggerEnum</a>	0..1	attr	Defines whether this IPdu does trigger the sending of the ContainerIPdu. This attribute is ignored on receiver side.
update IndicationBit Position	PositiveInteger	0..1	attr	The updateIndicationBit specifies the bit location of ContainedIPdu Update-Bit in the Container PDU. It indicates to the receivers that the ContainedIPdu in the ContainerIPdu was updated.

**Table A.189: ContainedIPduProps**

Class	ContainerIPdu			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Allows to collect several IPdus in one ContainerIPdu based on the headerType. <b>Tags:</b> atp.recommendedPackage=Pdus			
Base	<a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">IPdu</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Pdu</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
containedIPdu TriggeringProps	<a href="#">ContainedIPduProps</a>	*	aggr	Defines properties for an IPdu that is part of the ContainerIPdu.
containedPdu Triggering	<a href="#">PduTriggering</a>	*	ref	This PduTriggering shall be collected inside the Container IPdu.
container Timeout	TimeValue	0..1	attr	When this timeout expires the ContainerIPdu is sent out. The respective timer is started when the first Ipdu is put into the ContainerIPdu. This attribute is ignored on receiver side.
containerTrigger	<a href="#">ContainerIPduTriggerEnum</a>	0..1	attr	Defines if the transmission of the ContainerIPdu shall be requested right after the first ContainedIPdu was put into it. This attribute shall be ignored on receiver side.
headerType	<a href="#">ContainerIPduHeaderTypeEnum</a>	1	attr	Defines whether and which header type is used (header id and length).
minimumRx Container QueueSize	PositiveInteger	0..1	attr	This attribute defines the minimum queue size for received containers.





Class	ContainerIPdu			
minimumTxContainerQueueSize	PositiveInteger	0..1	attr	This attribute defines the minimum queue size for transmitted containers.
rxAcceptContainedIPdu	<a href="#">RxAcceptContainedIPduEnum</a>	1	attr	Defines whether this ContainerIPdu has a fixed set of containedIPdus assigned for reception.
thresholdSize	PositiveInteger	0..1	attr	Defines the size threshold which, when exceeded, triggers the sending of the ContainerIPdu although the maximum Pdu size has not been reached yet. Unit: byte.
unusedBitPattern	PositiveInteger	0..1	attr	IPduM fills not updated areas of the ContainerPdu with this byte-pattern.

**Table A.190: ContainerIPdu**

Enumeration	ContainerIPduHeaderTypeEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Is used to define the header type and size of ContainerIPdus. The header size includes the header id and the length information.
Literal	Description
longHeader	Header size is 64 bit: <ul style="list-style-type: none"> <li>Header Id 32 bit</li> <li>Dlc 32 bit</li> </ul> Tags:atp.EnumerationLiteralIndex=0
noHeader	No Header is used and the location of each containedPdu in the ContainerPdu is statically configured. Tags:atp.EnumerationLiteralIndex=2
shortHeader	Header size is 32 bit: <ul style="list-style-type: none"> <li>Header Id 24 bit</li> <li>Dlc 8 bit.</li> </ul> Tags:atp.EnumerationLiteralIndex=1

**Table A.191: ContainerIPduHeaderTypeEnum**

Class	CouplingElement			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	A CouplingElement is used to connect EcuInstances to the VLAN of an EthernetCluster. Coupling Elements can reach from a simple hub to a complex managed switch or even devices with functionalities in higher layers. A CouplingElement that is not related to an EcuInstance occurs as a dedicated single device. Tags:atp.recommendedPackage=CouplingElements			
Base	<a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
communicationCluster	<a href="#">EthernetCluster</a>	1	ref	This relationship defines to which cluster the Coupling Element belongs.





Class	CouplingElement			
couplingPort	<a href="#">CouplingPort</a>	*	aggr	Hardware Port of the CouplingElement that is used to connect this CouplingPort to EcuInstances or other CouplingElements.  <b>Stereotypes:</b> atpSplittable; atpVariation <b>Tags:</b> atp.Splitkey=couplingPort.shortName, couplingPort.variationPoint.shortLabel vh.latestBindingTime=postBuild
couplingType	<a href="#">CouplingElementEnum</a>	1	attr	Describes the coupling type of this CouplingElement.
ecuInstance	<a href="#">EcuInstance</a>	0..1	ref	Optional reference to the ECU where the Coupling Element is located.

**Table A.192: CouplingElement**

Enumeration	CouplingElementEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Identifies the Coupling type.
Literal	Description
hub	A device that is used to connect segments of a LAN. In Hubs frames are "broadcasted" to every one of its ports. <b>Tags:</b> atp.EnumerationLiteralIndex=0
router	A device that routes frames between different networks. <b>Tags:</b> atp.EnumerationLiteralIndex=1
switch	A device that filters and forwards frames between different LAN segments. <b>Tags:</b> atp.EnumerationLiteralIndex=2

**Table A.193: CouplingElementEnum**

Class	CouplingPort			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	A CouplingPort is used to connect a CouplingElement with an EcuInstance or two CouplingElements with each other via a CouplingPortConnection. Optionally, the CouplingPort may also have a reference to a macMulticastGroup and a defaultVLAN.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
connectionNegotiationBehavior	<a href="#">EthernetConnectionNegotiationEnum</a>	0..1	attr	Specifies the connection negotiation of the CouplingPort.
couplingPortDetails	<a href="#">CouplingPortDetails</a>	0..1	aggr	Defines more details of a CouplingPort in case a more specific configuration is required.
couplingPortRole	<a href="#">CouplingPortRoleEnum</a>	0..1	attr	Defines the role this CouplingPort takes in the context of the CouplingElement.





Class	CouplingPort			
defaultVlan	<a href="#">EthernetPhysicalChannel</a>	0..1	ref	<p>The vLanIdentifier of the referenced VLAN is the Default-PVID (port VLAN ID). A Port VLAN ID is a default VLAN ID that is assigned to an access CouplingPort to designate the VLAN segment to which this port is connected. Also, if a CouplingPort has not been configured with any VLAN memberships, the virtual switch's Port VLAN ID (pvid) becomes the default VLAN ID for the ports connection.</p> <p>This identifier/tag is added for incoming untagged messages at the port (ingress tagging). For outgoing messages with this identifier, the tag is removed at the port (egress untagging, depending on the Vlan Membership.sendActivity).</p>
macLayerType	<a href="#">EthernetMacLayerTypeEnum</a>	0..1	attr	Specifies the mac layer type of the CouplingPort.
macMulticastAddress	<a href="#">MacMulticastGroup</a>	*	ref	Assigns a set of MAC-Multicast-Addresses which are addressable via this CouplingPort. This is a static pre-configuration and further addresses may be learned during runtime.
physicalLayerType	<a href="#">EthernetPhysicalLayerTypeEnum</a>	0..1	attr	Specifies the physical layer type of the CouplingPort.
plcaProps	<a href="#">PlcaProps</a>	0..1	aggr	Optional properties for configuration of PLCA (Physical Layer Collision Avoidance) in case 10-BASE-T1S Ethernet is used and PLCA is enabled on the Coupling Port (PHY).
pncMapping	<a href="#">PncMappingIdent</a>	*	ref	Reference to the partial networks this CouplingPort participates in.
receiveActivity	<a href="#">EthernetSwitchVlanIngressTagEnum</a>	0..1	attr	Defines the handling of frames at the ingress port.
vlanMembership	<a href="#">VlanMembership</a>	*	aggr	Messages of VLANs that are defined here can be communicated via the CouplingPort.
vlanModifier	<a href="#">EthernetPhysicalChannel</a>	0..1	ref	<p>All incoming messages at this CouplingPort shall be tagged with this VLAN Id. This tagging is performed regardless whether the message already has a VLAN tag or is untagged, an existing VLAN tag will be overwritten.</p> <p>This feature is XOR with CouplingPort.defaultVlan.</p>
wakeupSleepOnDatalineConfig	<a href="#">EthernetWakeupSleepOnDatalineConfig</a>	0..1	ref	Optional reference to EthernetWakeupSleepOnDatalineConfig.

**Table A.194: CouplingPort**

Class	CouplingPortConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Connection between two CouplingPorts (firstPort and secondPort) or between a collection of Ports that are all referenced by the portCollection reference.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
firstPort	<a href="#">CouplingPort</a>	0..1	ref	Reference to the first CouplingPort that is connected via the CouplingPortConnection.





Class	CouplingPortConnection			
nodePort	<a href="#">CouplingPort</a>	*	ref	Reference to a number of CouplingPorts that are connected via the CouplingPortConnection. This reference shall be used to describe a 10BASE-T1S topology architecture where several CouplingPorts of EthernetCommunicationControllers are connected via one CouplingPortConnection.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=nodePort.couplingPort, nodePort.variation Point.shortLabel vh.latestBindingTime=postBuild
plcaLocalNodeCount	PositiveInteger	0..1	attr	Defines the number of communication participants in case 10BASE-T1S and the nodePort reference is used.
plcaTransmitOpportunityTimer	PositiveInteger	0..1	attr	Timer for the transmission in bit time to evaluate if a Transmission Opportunity is yield or not.
secondPort	<a href="#">CouplingPort</a>	0..1	ref	Reference to the second CouplingPort that is connected via the CouplingPortConnection.

**Table A.195: CouplingPortConnection**

Class	CouplingPortDetails			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines details of a CouplingPort. May be used to configure the structures of a switch.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
couplingPortStructuralElement	CouplingPortStructuralElement	1..*	aggr	Collects all the structural parts at which a CouplingPort may be configurable.
ethernetPriorityRegeneration	<a href="#">EthernetPriorityRegeneration</a>	0..8	aggr	Defines a priority regeneration where the ingress priority is replaced by regenerated priority.
ethernetTrafficClassAssignment	<a href="#">CouplingPortTrafficClassAssignment</a>	0..8	aggr	Defines the ingress port to EthernetTrafficClass assignment.
globalTimeProps	GlobalTimeCouplingPortProps	0..1	aggr	Specifies properties for the usage of the CouplingPort in the scope of Global Time Sync.
lastEgressScheduler	CouplingPortScheduler	0..1	ref	Defines which CouplingPortScheduler is the last in the egress port structure.
ratePolicy	CouplingPortRatePolicy	*	aggr	Rate policies to be applied for this CouplingPort.

**Table A.196: CouplingPortDetails**

Enumeration	CouplingPortRoleEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Defines the role a CouplingPort takes in the context of a CouplingElement.
Literal	Description







Enumeration	CouplingPortRoleEnum
hostPort	The hostPort is connected to an ECU (host ecu). The host ECU controls the connected Coupling Element (e.g. Ethernet switch). <b>Tags:</b> atp.EnumerationLiteralIndex=0
standardPort	A CouplingPort can be a standardPort that is used to connect the CouplingElement with Coupling Ports outside the ECU. <b>Tags:</b> atp.EnumerationLiteralIndex=2
upLinkPort	A CouplingPort can be connected to another CouplingPort of a CouplingElement located on the same ECU (CouplingElement.ecuInstance) using the CouplingPortConnection. This is used to model a cascaded switch. <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.197: CouplingPortRoleEnum**

Class	CouplingPortTrafficClassAssignment			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines the assignment of Traffic Class to a frame.			
Base	ARObject, <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
priority	PositiveInteger	0..8	attr	Defines a priority which is mapped onto a Traffic Class.
trafficClass	PositiveInteger	1	attr	Defines the Traffic Class which is assigned. range: 0-7

**Table A.198: CouplingPortTrafficClassAssignment**

Class	CpSoftwareCluster			
Package	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster			
Note	This meta class provides the ability to define a CP Software Cluster. Each CP Software Cluster can be integrated and build individually. It defines the sub-set of hierarchical tree(s) of Software Components belonging to this CP Software Cluster. Resources required or provided by this CP Software Cluster are given in the according mappings. <b>Tags:</b> atp.Status=draft atp.recommendedPackage=CpSoftwareClusters			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
swComponent Assignment	<a href="#">SwComponentPrototypeAssignment</a>	*	aggr	This is the collection of SwComponentPrototype Assignments <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=swComponentAssignment, swComponentAssignment.variationPoint.shortLabel atp.Status=draft vh.latestBindingTime=postBuild





Class	CpSoftwareCluster			
swComposition	<a href="#">CompositionSw ComponentType</a>	*	ref	<p>Software Components in the context of a CompositionSw ComponentType belonging to this CP Software Cluster. This reference can be used to describe the belonging SWCs when the CP Software Cluster is described out of the context of a System, e.g. reusable CP Software Cluster.</p> <p><b>Stereotypes:</b> atpSplittable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=swComposition.compositionSwComponentType, swComposition.variationPoint.shortLabel  atp.Status=draft  vh.latestBindingTime=systemDesignTime</p>

Table A.199: CpSoftwareCluster

Class	CpSoftwareClusterBinaryManifestDescriptor			
Package	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster::BinaryManifest			
Note	<p>This meta-class has the ability to act as a hub for all information related to the binary manifest of a given CP software cluster. The manifest is subject to integrator work and therefore not a part of the definition of the CP software cluster itself.</p> <p><b>Tags:</b>  atp.Status=draft  atp.recommendedPackage=CpSoftwareClusterBinaryManifestDescriptors</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
cpSoftwareCluster	<a href="#">CpSoftwareCluster</a>	0..1	ref	<p>This reference identifies the CpSoftwareCluster to which the enclosing CpSoftwareClusterBinaryManifestDescriptor belongs,</p> <p>The CpSoftwareClusterBinaryManifestDescriptor is defined in an integration phase while the referenced CpSoftwareCluster represents a design element. Therefore, it makes sense to use a reference rather than an aggregation in the relation of the two meta-classes.</p> <p><b>Tags:</b>atp.Status=draft</p>
metaDataField	<a href="#">BinaryManifestMeta DataField</a>	*	aggr	<p>This aggregation identifies the collection of meta-data contained in the enclosing binary manifest.</p> <p><b>Tags:</b>atp.Status=draft</p>
provideResource	<a href="#">BinaryManifestProvide Resource</a>	*	aggr	<p>This aggregation represents the collection of provided resources in the enclosing binary manifest.</p> <p><b>Tags:</b>atp.Status=draft</p>
requireResource	<a href="#">BinaryManifestRequire Resource</a>	*	aggr	<p>This aggregation represents the collection of required resources in the enclosing binary manifest.</p> <p><b>Tags:</b>atp.Status=draft</p>
resourceDefinition	<a href="#">BinaryManifest ResourceDefinition</a>	*	aggr	<p>This aggregation represents the collection of binary manifest resource definitions that belong to the enclosing CpSoftwareClusterBinaryManifestDescriptor.</p> <p><b>Tags:</b>atp.Status=draft</p>





Class	CpSoftwareClusterBinaryManifestDescriptor			
softwareClusterId	PositiveInteger	0..1	attr	<p>This attribute represents the value of the id of the corresponding CP software cluster. This id is only assigned by an integrator and can therefore not be part of the description of the CP software cluster itself.</p> <p><b>Tags:</b>atp.Status=draft</p>

**Table A.200: CpSoftwareClusterBinaryManifestDescriptor**

Class	CpSoftwareClusterCommunicationResource			
Package	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster			
Note	<p>Represents a single resource required or provided by a CP Software Cluster which relates to the port based communication on VFB level.</p> <p><b>Tags:</b>atp.Status=draft</p>			
Base	ARObject, <a href="#">CpSoftwareClusterResource</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
communicationResourceProps	CpSoftwareClusterCommunicationResourceProps	0..1	aggr	<p>This aggregation supports the further qualification of the enclosing CpSoftwareClusterCommunicationResource by means of additional attributes depending on the nature of the CpSoftwareClusterCommunicationResource.</p>

**Table A.201: CpSoftwareClusterCommunicationResource**

Class	CpSoftwareClusterResource (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster			
Note	<p>Represents a single resource required or provided by a CP Software Cluster.</p> <p><b>Tags:</b> atp.Status=draft atp.recommendedPackage=Resources</p>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">CpSoftwareClusterCommunicationResource</a> , <a href="#">CpSoftwareClusterServiceResource</a>			
Attribute	Type	Mult.	Kind	Note
dependentResource	RoleBasedResourceDependency	*	aggr	<p>Link to a resource which depends on this resource to implement them.</p> <p><b>Tags:</b>atp.Status=draft</p>
globalResourceId	PositiveInteger	0..1	attr	<p>A unique identifiers per resource used for the connection process. The identifier is required to be unique in the scope of a single machine. If software clusters are designed to be reused on multiple machines the uniqueness requirements applies for all the intended machines.</p> <p><b>Tags:</b>atp.Status=draft</p>
isMandatory	Boolean	0..1	attr	<p>This attribute indicates, that the resource is mandatory to operate the Software Cluster. If the resource is not provided on the machine the connection process of any Software Cluster requiring this resource gets aborted.</p> <p><b>Tags:</b>atp.Status=draft</p>

**Table A.202: CpSoftwareClusterResource**

<b>Class</b>	<b>CpSoftwareClusterResourceToApplicationPartitionMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster			
<b>Note</b>	This meta class maps a Software Cluster resource to an Application Partition to restrict the usage. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
application Partition	<a href="#">ApplicationPartition</a>	0..1	ref	ApplicationPartition for which the mapping applies. <b>Tags:</b> atp.Status=draft
resource	<a href="#">CpSoftwareClusterResource</a>	0..1	ref	Software Cluster Resource for which the mapping applies. <b>Tags:</b> atp.Status=draft

**Table A.203: CpSoftwareClusterResourceToApplicationPartitionMapping**

<b>Class</b>	<b>CpSoftwareClusterServiceResource</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster			
<b>Note</b>	Represents a single resource required or provided by a CP Software Cluster which relates to the BSW. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, <a href="#">CpSoftwareClusterResource</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
resourceNeeds	<a href="#">EcucContainerValue</a>	*	ref	Reference(s) to one or multiple EcucContainerValue(s) qualifying the characteristics of the resource. <b>Tags:</b> atp.Status=draft

**Table A.204: CpSoftwareClusterServiceResource**

<b>Class</b>	<b>CpSoftwareClusterToEcuInstanceMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster			
<b>Note</b>	This meta class maps a CpSoftwareCluster to a EcuInstance. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
ecuInstance	<a href="#">EcuInstance</a>	0..1	ref	Reference to a specific ECU Instance description. <b>Tags:</b> atp.Status=draft
swCluster	<a href="#">CpSoftwareCluster</a>	*	ref	The mapped CP Software Cluster <b>Tags:</b> atp.Status=draft

**Table A.205: CpSoftwareClusterToEcuInstanceMapping**

<b>Class</b>	<b>CpSoftwareClusterToResourceMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster			





Class	CpSoftwareClusterToResourceMapping			
Note	This meta class maps a service resource to CP Software Clusters. By this mapping it's specified whether the Software Cluster has to provide or to require the resource. <b>Tags:</b> atp.Status=draft			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
provider	<a href="#">CpSoftwareCluster</a>	0..1	ref	CP Software Cluster providing the resource <b>Tags:</b> atp.Status=draft
requester	<a href="#">CpSoftwareCluster</a>	*	ref	CP Software Cluster requesting the resource <b>Tags:</b> atp.Status=draft
service Resource	<a href="#">CpSoftwareCluster</a> <a href="#">ServiceResource</a>	0..1	ref	Service resource for which the mapping applies. <b>Tags:</b> atp.Status=draft

**Table A.206: CpSoftwareClusterToResourceMapping**

Class	CryptoServiceCertificate			
Package	M2::AUTOSARTemplates::SystemTemplate::SecureCommunication			
Note	This meta-class represents the ability to model a cryptographic certificate. <b>Tags:</b> atp.recommendedPackage=CryptoServiceCertificates			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
algorithmFamily	CryptoCertificate AlgorithmFamilyEnum	0..1	attr	This attribute represents a description of the family of crypto algorithm used to generate public key and signature of the cryptographic certificate.
format	CryptoCertificateFormat Enum	0..1	attr	This attribute can be used to provide information about the format used to create the certificate
maximum Length	PositiveInteger	0..1	attr	This attribute represents the ability to define the maximum length of the certificate.
nextHigher Certificate	<a href="#">CryptoServiceCertificate</a>	0..1	ref	The reference identifies the next higher certificate in the certificate chain.
serverName Identification	String	0..1	attr	Server Name Indication (SNI) is needed if the IP address hosts multiple servers (on the same port), each of them using a different certificate.  If the client sends the SNI to the Server in the client hello, the server looks the SNI up in its certificate list and uses the certificate identified by the SNI.

**Table A.207: CryptoServiceCertificate**

Class	CryptoServicePrimitive			
Package	M2::AUTOSARTemplates::SystemTemplate::SecureCommunication			
Note	This meta-class has the ability to represent a crypto primitive. <b>Tags:</b> atp.recommendedPackage=CryptoPrimitives			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note





Class	CryptoServicePrimitive			
algorithmFamily	String	0..1	attr	This attribute represents a description of the family (e.g. AES) of crypto algorithm implemented by the crypto primitive.
algorithmMode	String	0..1	attr	This attribute represents a description of the mode of the crypto algorithm implemented by the crypto primitive.
algorithmSecondaryFamily	String	0..1	attr	This attribute represents a further description of the secondary family of crypto algorithm implemented by the crypto primitive.  The secondary family is needed for the specification of the hash algorithm for a signature check, e.g. using RSA.

**Table A.208: CryptoServicePrimitive**

Class	CryptoServiceQueue			
Package	M2::AUTOSARTemplates::SystemTemplate::SecureCommunication			
Note	This meta-class has the ability to represent a crypto queue. <b>Tags:</b> atp.recommendedPackage=CryptoServiceQueues			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
queueSize	PositiveInteger	0..1	attr	Defines the queue size of the CryptoServiceQueue.

**Table A.209: CryptoServiceQueue**

Class	DataConstr			
Package	M2::MSR::AsamHdo::Constraints::GlobalConstraints			
Note	This meta-class represents the ability to specify constraints on data. <b>Tags:</b> atp.recommendedPackage=DataConstrs			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
dataConstrRule	<a href="#">DataConstrRule</a>	*	aggr	This is one particular rule within the data constraints.  <b>Tags:</b> xml.roleElement=true xml.roleWrapperElement=true xml.sequenceOffset=30 xml.typeElement=false xml.typeWrapperElement=false

**Table A.210: DataConstr**

Class	DataConstrRule			
Package	M2::MSR::AsamHdo::Constraints::GlobalConstraints			
Note	This meta-class represents the ability to express one specific data constraint rule.			
Base	<a href="#">ARObject</a>			





Class	DataConstrRule			
Attribute	Type	Mult.	Kind	Note
constrLevel	Integer	0..1	attr	<p>This attribute describes the category of a constraint. One of its functions is in the area of constraint violation, where it can be used from a certain level, to produce error messages.</p> <p>The lower the level, the more stringent the check.</p> <p>Used to distinguish hard or soft limits.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
internalConstrs	InternalConstrs	0..1	aggr	<p>Describes the limitations applicable on the internal domain (as opposed to the physical domain).</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>
physConstrs	PhysConstrs	0..1	aggr	<p>Describes the limitations applicable on the physical domain (as opposed to the internal domain).</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>

**Table A.211: DataConstrRule**

Class	DataFilter			
Package	M2::AUTOSARTemplates::CommonStructure::Filter			
Note	Base class for data filters. The type of the filter is specified in attribute dataFilterType. Some of the filter types require additional arguments which are specified as attributes of this class.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
dataFilterType	DataFilterTypeEnum	0..1	attr	This attribute specifies the type of the filter.
mask	UnlimitedInteger	0..1	attr	Mask for old and new value.
max	UnlimitedInteger	0..1	attr	Value to specify the upper boundary
min	UnlimitedInteger	0..1	attr	Value to specify the lower boundary
offset	PositiveInteger	0..1	attr	Specifies the initial number of messages to occur before the first message is passed
period	PositiveInteger	0..1	attr	Specifies number of messages to occur before the message is passed again
x	UnlimitedInteger	0..1	attr	Value to compare with

**Table A.212: DataFilter**

Enumeration	DataFilterTypeEnum
Package	M2::AUTOSARTemplates::CommonStructure::Filter
Note	This enum specifies the supported DataFilterTypes.
Literal	Description
always	<p>No filtering is performed so that the message always passes.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=0</p>







Enumeration	DataFilterTypeEnum
maskedNewDiffers MaskedOld	Pass messages where the masked value has changed. (new_value&mask) !=(old_value&mask) new_value: current value of the message old_value: last value of the message (initialized with the initial value of the message, updated with new_value if the new message value is not filtered out) <b>Tags:</b> atp.EnumerationLiteralIndex=1
maskedNewDiffers X	Pass messages whose masked value is not equal to a specific value x (new_value&mask) != x new_value: current value of the message <b>Tags:</b> atp.EnumerationLiteralIndex=2
maskedNewEquals X	Pass messages whose masked value is equal to a specific value x (new_value&mask) == x new_value: current value of the message <b>Tags:</b> atp.EnumerationLiteralIndex=3
never	The filter removes all messages. <b>Tags:</b> atp.EnumerationLiteralIndex=4
newIsOutside	Pass a message if its value is outside a predefined boundary. (min > new_value) OR (new_value > max) <b>Tags:</b> atp.EnumerationLiteralIndex=5
newIsWithin	Pass a message if its value is within a predefined boundary. min <= new_value <= max <b>Tags:</b> atp.EnumerationLiteralIndex=6
oneEveryN	Pass a message once every N message occurrences. Algorithm: occurrence % period == offset Start: occurrence = 0. Each time the message is received or transmitted, occurrence is incremented by 1 after filtering. Length of occurrence is 8 bit (minimum). <b>Tags:</b> atp.EnumerationLiteralIndex=7

**Table A.213: DataFilterTypeEnum**

Enumeration	DataIdModeEnum
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Transformer
<b>Note</b>	Supported inclusion modes to include the implicit two-byte Data ID in the one-byte CRC.
<b>Literal</b>	<b>Description</b>
all16Bit	Two bytes are included in the CRC (double ID configuration). <b>Tags:</b> atp.EnumerationLiteralIndex=0
alternating8Bit	One of the two bytes byte is included, alternating high and low byte, depending on parity of the counter (alternating ID configuration). For even counter low byte is included; For odd counters the high byte is included. <b>Tags:</b> atp.EnumerationLiteralIndex=1





Enumeration	DataIdModeEnum
lower12Bit	The low byte is included in the implicit CRC calculation, the low nibble of the high byte is transmitted along with the data (i.e. it is explicitly included), the high nibble of the high byte is not used. This is applicable for the IDs up to 12 bits. <b>Tags:</b> atp.EnumerationLiteralIndex=2
lower8Bit	Only low byte is included, high byte is never used. This is applicable if the IDs in a particular system are 8 bits. <b>Tags:</b> atp.EnumerationLiteralIndex=3

**Table A.214: DataIdModeEnum**

Class	DataInterface (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	The purpose of this meta-class is to act as an abstract base class for subclasses that share the semantics of being concerned about data (as opposed to e.g. operations).			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">PortInterface</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">NvDataInterface</a> , <a href="#">ParameterInterface</a> , <a href="#">SenderReceiverInterface</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.215: DataInterface**

Class	DataMapping (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Mapping of port elements (data elements and parameters) to frames and signals.			
Base	<a href="#">ARObject</a>			
Subclasses	<a href="#">ClientServerToSignalMapping</a> , <a href="#">SenderReceiverCompositeElementToSignalMapping</a> , <a href="#">SenderReceiverToSignalGroupMapping</a> , <a href="#">SenderReceiverToSignalMapping</a> , <a href="#">TriggerToSignalMapping</a>			
Attribute	Type	Mult.	Kind	Note
introduction	<a href="#">DocumentationBlock</a>	0..1	aggr	This represents introductory documentation about the data mapping.

**Table A.216: DataMapping**

Class	DataPrototype (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
Note	Base class for prototypical roles of any data type.			
Base	<a href="#">ARObject</a> , <a href="#">AtpFeature</a> , <a href="#">AtpPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">ApplicationCompositeElementDataPrototype</a> , <a href="#">AutosarDataPrototype</a>			
Attribute	Type	Mult.	Kind	Note
swDataDef Props	<a href="#">SwDataDefProps</a>	0..1	aggr	This property allows to specify data definition properties which apply on data prototype level.

**Table A.217: DataPrototype**

<b>Class</b>	<b>DataPrototypeInSenderReceiverInterfaceInstanceRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Transformer::InstanceRef			
<b>Note</b>				
<b>Base</b>	ARObject, <a href="#">AtpInstanceRef</a> , <a href="#">DataPrototypeInPortInterfaceInstanceRef</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
base	<a href="#">SenderReceiverInterface</a>	0..1	ref	<b>Stereotypes:</b> atpDerived
contextDataPrototypeInSr (ordered)	<a href="#">ApplicationCompositeElementDataPrototype</a>	*	ref	<b>Tags:</b> xml.sequenceOffset=20
rootDataPrototypeInSr	<a href="#">AutosarDataPrototype</a>	0..1	ref	<b>Tags:</b> xml.sequenceOffset=10
targetDataPrototypeInSr	<a href="#">DataPrototype</a>	1	ref	<b>Tags:</b> xml.sequenceOffset=30

**Table A.218: DataPrototypeInSenderReceiverInterfaceInstanceRef**

<b>Class</b>	<b>DataPrototypeMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	<p>Defines the mapping of two particular VariableDataPrototypes, ParameterDataPrototypes or ArgumentDataPrototypes with non-equal shortNames, non-equal structure (specific condition is described by [constr_1187]), and/or non-equal semantic (resolution or range) in context of two different SenderReceiverInterface, NvDataInterface or ParameterInterface or Operations.</p> <p>If the semantic is unequal, the following rules apply: The textTableMapping is only applicable if the referred DataPrototypes are typed by AutosarDataType referring to CompuMethods of category TEXTTABLE, SCALE_LINEAR_AND_TEXTTABLE or BITFIELD_TEXTTABLE.</p> <p>In the case that the DataPrototypes are typed by AutosarDataType either referring to CompuMethods of category LINEAR, IDENTICAL or referring to no CompuMethod (which is similar as IDENTICAL) the linear conversion factor is calculated out of the factorSiToUnit and offsetSiToUnit attributes of the referred Units and the CompuRationalCoeffs of a compuInternalToPhys of the referred CompuMethods.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
firstDataPrototype	<a href="#">AutosarDataPrototype</a>	0..1	ref	First to be mapped DataPrototype in context of a SenderReceiverInterface, NvDataInterface, ParameterInterface or Operation.
firstToSecondDataTransformation	<a href="#">DataTransformation</a>	0..1	ref	<p>This reference defines the need to execute the Data Transformation &lt;Mip&gt;_&lt;transformerId&gt; functions of the transformation chain when communicating from the DataPrototypeMapping.firstDataPrototype to the DataPrototypeMapping.secondDataPrototype.</p> <p>This reference also specifies the reverse Data Transformation &lt;Mip&gt;_Inv_&lt;transformerId&gt; functions of the transformation chain (i.e. from the DataPrototypeMapping.secondDataPrototype to the DataPrototypeMapping.firstDataPrototype) if the referenced DataTransformation is symmetric, i.e. attribute DataTransformation.dataTransformationKind is set to symmetric.</p>
secondDataPrototype	<a href="#">AutosarDataPrototype</a>	0..1	ref	Second to be mapped DataPrototype in context of a SenderReceiverInterface, NvDataInterface, ParameterInterface or Operation.





Class	DataPrototypeMapping			
secondToFirst Data Transformation	<a href="#">DataTransformation</a>	0..1	ref	This defines the need to execute the reverse Data Transformation <Mip>_Inv_<transformerId> functions of the transformation chain when communicating from the DataPrototypeMapping.secondDataPrototype to the DataPrototypeMapping.firstDataPrototype.
subElement Mapping	<a href="#">SubElementMapping</a>	*	aggr	This represents the owned SubelementMapping.
textTable Mapping	<a href="#">TextTableMapping</a>	0..2	aggr	Applied TextTableMapping(s)

**Table A.219: DataPrototypeMapping**

Class	DataPrototypeReference (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	This meta-class provides the ability to reference a DataPrototype.			
Base	ARObject			
Subclasses	DataPrototypeInPortInterfaceRef, <a href="#">ImplementationDataTypeElementInPortInterfaceRef</a>			
Attribute	Type	Mult.	Kind	Note
tagId	PositiveInteger	0..1	attr	This attribute represents the ability to specify a tag-id for the serialization of a specific DataPrototype in the context of a (potentially deeply-nested) composite data structure.

**Table A.220: DataPrototypeReference**

Class	DataPrototypeTransformationProps			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	DataPrototypeTransformationProps allows to set the attributes for the different Transformation Technologies that are DataPrototype specific.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
dataPrototypeInPortInterfaceRef	<a href="#">DataPrototypeReference</a>	0..1	aggr	Reference to a DataPrototype that is transported in the serialized ISignal.
network Representation Props	<a href="#">SwDataDefProps</a>	0..1	aggr	Specification of the actual network representation for the referenced primitive DataPrototype. If a network representation is provided then the baseType shall be used by the Transformer as input for the serialization/ deserialiaization.
transformation Props	TransformationProps	0..1	ref	Collection of AutosarDataPrototype related configuration settings for a transformer.

**Table A.221: DataPrototypeTransformationProps**

Class	DataReceiveErrorEvent			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	This event is raised when the Com layer detects and notifies an error concerning the reception of the referenced VariableDataPrototype.			





Class	DataReceiveErrorEvent			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
data	<a href="#">VariableDataPrototype</a>	0..1	iref	The referenced VariableDataPrototype raises this DataReceiveErrorEvent when there was an error during the reception.  <b>InstanceRef implemented by:</b> RVariableInAtomicSwc InstanceRef

**Table A.222: DataReceiveErrorEvent**

Class	DataReceivedEvent			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	This event is raised when the referenced data element is received.			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
data	<a href="#">VariableDataPrototype</a>	0..1	iref	The referenced VariableDataPrototype raises this DataReceivedEvent when the data has been received.  <b>InstanceRef implemented by:</b> RVariableInAtomicSwc InstanceRef

**Table A.223: DataReceivedEvent**

Class	DataSendCompletedEvent			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	This event is raised when the referenced explicit data element has been sent or an error occurred.			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
eventSource	<a href="#">VariableAccess</a>	0..1	ref	The referenced VariableAccess raises this DataSendCompletedEvent when the explicit write access was successful or an error occurred.

**Table A.224: DataSendCompletedEvent**

Class	DataTransformation			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	A DataTransformation represents a transformer chain. It is an ordered list of transformers.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
data Transformation Kind	<a href="#">DataTransformationKind Enum</a>	0..1	attr	This attribute controls the kind of DataTransformation to be applied.
executeDespite Data Unavailability	Boolean	1	attr	Specifies whether the transformer chain is executed even if no input data are available.





Class	DataTransformation			
transformer Chain (ordered)	<a href="#">Transformation Technology</a>	1..*	ref	This attribute represents the definition of a chain of transformers that are supposed to be executed according to the order of being referenced from DataTransformation.

**Table A.225: DataTransformation**

Enumeration	DataTransformationKindEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer
Note	This enumeration contributes to the definition of the scope of the DataTransformation.
Literal	Description
asymmetricFrom ByteArray	The DataTransformation shall only be applied to the receiving end only, i.e. transform from byte array to data type. <b>Tags:</b> atp.EnumerationLiteralIndex=0
asymmetricToByte Array	The DataTransformation shall be applied to the sending end only, i.e. from data type to byte array. <b>Tags:</b> atp.EnumerationLiteralIndex=1
symmetric	The DataTransformation shall be applied at both the sending and the receiving end of the communication. <b>Tags:</b> atp.EnumerationLiteralIndex=2

**Table A.226: DataTransformationKindEnum**

Class	DataTypeMap			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	This class represents the relationship between ApplicationDataType and its implementing Abstract ImplementationDataType.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
applicationData Type	<a href="#">ApplicationDataType</a>	0..1	ref	This is the corresponding ApplicationDataType
implementation DataType	<a href="#">AbstractImplementation DataType</a>	0..1	ref	This is the corresponding AbstractImplementationData Type.

**Table A.227: DataTypeMap**

Class	DataTypeMappingSet			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	This class represents a list of mappings between ApplicationDataTypes and ImplementationDataTypes. In addition, it can contain mappings between ImplementationDataTypes and ModeDeclarationGroups. <b>Tags:</b> atp.recommendedPackage=DataTypeMappingSets			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage Referrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
dataTypeMap	<a href="#">DataTypeMap</a>	*	aggr	This is one particular association between an Application DataType and its AbstractImplementationDataType.





Class	DataTypeMappingSet			
modeRequestTypeMap	<a href="#">ModeRequestTypeMap</a>	*	aggr	This is one particular association between an Mode DeclarationGroup and its AbstractImplementationData Type.

**Table A.228: DataTypeMappingSet**

Enumeration	DataTypePolicyEnum
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping
Note	This class lists the supported DataTypePolicies.
Literal	Description
legacy	In case the System Description doesn't use a complete Software Component Description (VFB View) this value can be chosen. This supports the inclusion of legacy signals.  The aggregation of SwDataDefProps shall be used to configure the "ComSignalDataInvalidValue" and the Data Semantics. <b>Tags:</b> atp.EnumerationLiteralIndex=0
networkRepresentationFromComSpec	Ignore any networkRepresentationProps of this ISignal and use the networkRepresentation from the ComSpec.  Please note that the usage does not imply the existence of the SwDataDefProps in the role networkRepresentation aggregated by the SenderComSpec or ReceiverComSpec if an ImplementationData Type is defined. <b>Tags:</b> atp.EnumerationLiteralIndex=1
override	If this value is chosen the requirements specified in the ComSpec (networkRepresentationFromComSpec) are not fulfilled by the aggregated SwDataDefProps. In this case the networkRepresentation is specified by the aggregated swDataDefProps. <b>Tags:</b> atp.EnumerationLiteralIndex=2
transformingISignal	This literal indicates that a transformer chain shall be used to communicate the ISignal as UINT8_N over the bus. <b>Tags:</b> atp.EnumerationLiteralIndex=4

**Table A.229: DataTypePolicyEnum**

Class	DataWriteCompletedEvent			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	This event is raised when an implicit write access was successful or an error occurred.			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
eventSource	<a href="#">VariableAccess</a>	0..1	ref	The referenced VariableAccess raises this DataWriteCompletedEvent when the implicit write access was successful or an error occurred.

**Table A.230: DataWriteCompletedEvent**

<b>Class</b>	<b>DcmIPdu</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Represents the IPdus handled by Dcm. <b>Tags:</b> atp.recommendedPackage=Pdus			
<b>Base</b>	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
diagPduType	DiagPduType	1	attr	Attribute is used to distinguish a request from a response.

**Table A.231: DcmIPdu**

<b>Class</b>	<b>DelegatedPortAnnotation</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::ApplicationAttributes			
<b>Note</b>	Annotation to a "delegated port" to specify the Signal Fan In or Signal Fan Out inside the CompositionSw ComponentType.			
<b>Base</b>	ARObject, GeneralAnnotation			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
signalFan	SignalFanEnum	0..1	attr	Specifies the Signal Fan In or Signal Fan Out inside the Composition Type.

**Table A.232: DelegatedPortAnnotation**

<b>Class</b>	<b>DelegationSwConnector</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
<b>Note</b>	A delegation connector delegates one inner PortPrototype (a port of a component that is used inside the composition) to a outer PortPrototype of compatible type that belongs directly to the composition (a port that is owned by the composition).			
<b>Base</b>	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable, SwConnector			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
innerPort	PortPrototype	0..1	iref	The port that belongs to the ComponentPrototype in the composition <b>Tags:</b> xml.typeElement=true <b>InstanceRef implemented by:</b> PortInCompositionType InstanceRef
outerPort	PortPrototype	0..1	ref	The port that is located on the outside of the Composition Type

**Table A.233: DelegationSwConnector**

<b>Class</b>	<b>DependencyOnArtifact</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Implementation			
<b>Note</b>	Dependency on the existence of another artifact, e.g. a library.			
<b>Base</b>	ARObject, Identifiable, MultilanguageReferrable, Referrable			







Class	DependencyOnArtifact			
Attribute	Type	Mult.	Kind	Note
artifact Descriptor	AutosarEngineering Object	0..1	aggr	The specified artifact needs to exist.
usage	DependencyUsage Enum	1..*	attr	Specification for which process step(s) this dependency is required.

**Table A.234: DependencyOnArtifact**

Class	Dhcpv6Props			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	This meta-class specifies the configuration options for DHCPv6.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
tcpIpDhcp V6CnfDelayMax	TimeValue	0..1	attr	Maximum delay in seconds before sending the first Confirm message. If this value is bigger than the previous minimum delay value a random delay will be chosen from the interval.
tcpIpDhcp V6CnfDelayMin	TimeValue	0..1	attr	Minimum delay in seconds before the first Confirm message will be sent.
tcpIpDhcpV6Inf DelayMax	TimeValue	0..1	attr	Maximum delay in seconds before sending the first Information Request message. If this value is bigger than the previous minimum delay value a random delay will be chosen from the interval.
tcpIpDhcpV6Inf DelayMin	TimeValue	0..1	attr	Minimum delay (s) before the first Information Request message will be sent.
tcpIpDhcpV6Sol DelayMax	TimeValue	0..1	attr	Maximum delay in seconds before sending the first Solicit message. If this value is bigger than the previous minimum delay value a random delay will be chosen from the interval.
tcpIpDhcpV6Sol DelayMin	TimeValue	0..1	attr	Minimum delay (s) before the first Solicit message will be sent.

**Table A.235: Dhcpv6Props**

Class	DiagEventDebounceAlgorithm (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	<p>This class represents the ability to specify the pre-debounce algorithm which is selected and/or required by the particular monitor.</p> <p>This class inherits from Identifiable in order to allow further documentation of the expected or implemented debouncing and to use the category for the identification of the expected / implemented debouncing.</p>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">DiagEventDebounceCounterBased</a> , <a href="#">DiagEventDebounceMonitorInternal</a> , <a href="#">DiagEventDebounceTime Based</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.236: DiagEventDebounceAlgorithm**

<b>Class</b>	<b>DiagEventDebounceCounterBased</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	<p>This meta-class represents the ability to indicate that the counter-based debounce algorithm shall be used by the DEM for this diagnostic monitor.</p> <p>This is related to set the ECUC choice container DemDebounceAlgorithmClass to DemDebounceCounterBased.</p>			
<b>Base</b>	ARObject, <a href="#">DiagEventDebounceAlgorithm</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
counterBasedFdcThresholdStorageValue	Integer	0..1	attr	Threshold to allocate an event memory entry and to capture the Freeze Frame.
counterDecrementStepSize	Integer	0..1	attr	<p>This value shall be taken to decrement the internal debounce counter.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
counterFailedThreshold	Integer	0..1	attr	<p>This value defines the event-specific limit that indicates the "failed" counter status.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
counterIncrementStepSize	Integer	0..1	attr	<p>This value shall be taken to increment the internal debounce counter.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
counterJumpDown	Boolean	0..1	attr	<p>This value activates or deactivates the counter jump-down behavior.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
counterJumpDownValue	Integer	0..1	attr	<p>This value represents the initial value of the internal debounce counter if the counting direction changes from incrementing to decrementing.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
counterJumpUp	Boolean	0..1	attr	<p>This value activates or deactivates the counter jump-up behavior.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
counterJumpUpValue	Integer	0..1	attr	<p>This value represents the initial value of the internal debounce counter if the counting direction changes from decrementing to incrementing.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
counterPassedThreshold	Integer	0..1	attr	<p>This value defines the event-specific limit that indicates the "passed" counter status.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>

**Table A.237: DiagEventDebounceCounterBased**

<b>Class</b>	<b>DiagEventDebounceMonitorInternal</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	"This meta-class represents the ability to indicate that no Dem pre-debounce algorithm shall be used for this diagnostic monitor. The SWC might implement an internal debouncing algorithm and report qualified (debounced) results to the Dem/DM."			
<b>Base</b>	ARObject, <a href="#">DiagEventDebounceAlgorithm</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.238: DiagEventDebounceMonitorInternal**

<b>Class</b>	<b>DiagEventDebounceTimeBased</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	<p>This meta-class represents the ability to indicate that the time-based pre-debounce algorithm shall be used by the Dem for this diagnostic monitor.</p> <p>This is related to set the EcuC choice container DemDebounceAlgorithmClass to DemDebounceTimeBase.</p>			
<b>Base</b>	ARObject, <a href="#">DiagEventDebounceAlgorithm</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
timeBasedFdc Threshold StorageValue	TimeValue	0..1	attr	<p>Threshold to allocate an event memory entry and to capture the Freeze Frame.</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
timeFailed Threshold	TimeValue	0..1	attr	<p>This value represents the event-specific delay indicating the "failed" status.</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
timePassed Threshold	TimeValue	0..1	attr	<p>This value represents the event-specific delay indicating the "passed" status.</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>

**Table A.239: DiagEventDebounceTimeBased**

<b>Class</b>	<b>DiagnosticAbstractDataIdentifier</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
<b>Note</b>	This meta-class represents an abstract base class for the modeling of a diagnostic data identifier (DID).			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">DiagnosticDataIdentifier</a> , <a href="#">DiagnosticDynamicDataIdentifier</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
id	PositiveInteger	0..1	attr	<p>This is the numerical identifier used to identify the DiagnosticAbstractDataIdentifier in the scope of diagnostic workflow</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>

**Table A.240: DiagnosticAbstractDataIdentifier**

<b>Class</b>	<b>DiagnosticAccessPermission</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm			
<b>Note</b>	<p>This represents the specification of whether a given service can be accessed according to the existence of meta-classes referenced by a particular DiagnosticAccessPermission.</p> <p>In other words, this meta-class acts as a mapping element between several (otherwise unrelated) pieces of information that are put into context for the purpose of checking for access rights.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticAccessPermissions</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
authenticationRole	DiagnosticAuthRole	*	ref	This reference identifies the authenticationRole applicable for the enclosing DiagnosticMemoryDestinationUser Defined.
diagnosticSession	<a href="#">DiagnosticSession</a>	*	ref	This represents the associated DiagnosticSessions
environmentalCondition	<a href="#">DiagnosticEnvironmentalCondition</a>	0..1	ref	This represents the environmental conditions associated with the access permission.
securityLevel	<a href="#">DiagnosticSecurityLevel</a>	*	ref	This represents the associated DiagnosticSecurityLevels

**Table A.241: DiagnosticAccessPermission**

<b>Class</b>	<b>DiagnosticAging</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticAging			
<b>Note</b>	<p>Defines the aging algorithm.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticAgings</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
agingCycle	<a href="#">DiagnosticOperationCycle</a>	0..1	ref	<p>This represents the applicable aging cycle.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=agingCycle.diagnosticOperationCycle, agingCycle.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
threshold	PositiveInteger	0..1	attr	<p>Number of aging cycles needed to unlearn/delete the event.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b>vh.latestBindingTime=preCompileTime</p>

**Table A.242: DiagnosticAging**

<b>Class</b>	<b>DiagnosticAuthentication</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::Authentication			
<b>Note</b>	This meta-class represents the ability to configure the usage of the UDS service Authentication in the Diagnostic extract.			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			





<b>Class</b>	<b>DiagnosticAuthentication</b> (abstract)			
<b>Subclasses</b>	<a href="#">DiagnosticAuthenticationConfiguration</a> , <a href="#">DiagnosticDeAuthentication</a> , <a href="#">DiagnosticProofOfOwnership</a> , <a href="#">DiagnosticVerifyCertificateBidirectional</a> , <a href="#">DiagnosticVerifyCertificateUnidirectional</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
authentication Class	Diagnostic AuthenticationClass	0..1	ref	This represents the corresponding "class", i.e. this meta-class provides properties that are shared among all instances of applicable sub-classes of DiagnosticService Instance.  The subclasses that affected by this pattern implement references to the applicable "class"-role that substantiate this abstract reference.
authentication Timeout	TimeValue	0..1	attr	This attribute defines the time that the authentication state is maintained in default-session if there is no communication from the authenticated client.

**Table A.243: DiagnosticAuthentication**

<b>Class</b>	<b>DiagnosticAuthenticationConfiguration</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::Authentication			
<b>Note</b>	This meta-class represents the subfunction to configure the authentication.  <b>Tags:</b> atp.recommendedPackage=DiagnosticAuthentications			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticAuthentication</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.244: DiagnosticAuthenticationConfiguration**

<b>Class</b>	<b>DiagnosticClearResetEmissionRelatedInfo</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::ObdService::Mode_0x04_ClearResetEmission RelatedInfo			
<b>Note</b>	This meta-class represents the ability to model an instance of the OBD mode 0x04 service.  <b>Tags:</b> atp.recommendedPackage=DiagnosticClearResetEmissionRelatedInfos			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
clearReset Emission Related DiagnosticInfo Class	DiagnosticClearReset EmissionRelatedInfo Class	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticClearReste EmissionRelatedInfo in the given context.

**Table A.245: DiagnosticClearResetEmissionRelatedInfo**

<b>Class</b>	<b>DiagnosticComControl</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::CommunicationControl			





<b>Class</b>	<b>DiagnosticComControl</b>			
<b>Note</b>	This represents an instance of the "Communication Control" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticCommunicationControls			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
comControl Class	DiagnosticComControl Class	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticComControl in the given context.
customSub Function Number	PositiveInteger	0..1	attr	This attribute shall be used to define a custom sub-function number if none of the standardized values of category shall be used.

**Table A.246: DiagnosticComControl**

<b>Class</b>	<b>DiagnosticComControlSpecificChannel</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::CommunicationControl			
<b>Note</b>	This represents the ability to add further attributes to the definition of a specific channel that is subject to the diagnostic service "communication control".			
<b>Base</b>	<a href="#">ARObject</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
specificChannel	<a href="#">CommunicationCluster</a>	0..1	ref	This represents the affected CommunicationClusters in the role specificChannel
subnetNumber	PositiveInteger	0..1	attr	This represents the applicable subnet number (which is an arbitrary number ranging from 1..14)

**Table A.247: DiagnosticComControlSpecificChannel**

<b>Class</b>	<b>DiagnosticComControlSubNodeChannel</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::CommunicationControl			
<b>Note</b>	This represents the ability to add further attributes to the definition of a specific sub-node channel that is subject to the diagnostic service "communication control".			
<b>Base</b>	<a href="#">ARObject</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
subNode Channel	<a href="#">CommunicationCluster</a>	0..1	ref	This represents the affected CommunicationClusters in the role subNodeChannel
subNode Number	PositiveInteger	0..1	attr	This represents the applicable subNode number. The value corresponds to the request message parameter nodeIdentificationNumber of diagnostic service CommunicationControl (0x28).

**Table A.248: DiagnosticComControlSubNodeChannel**

<b>Class</b>	<b>DiagnosticCommonElement</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
<b>Note</b>	This meta-class represents a common base class for all diagnostic elements. It does not contribute any specific functionality other than the ability to become the target of a reference.			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">DiagnosticAbstractAliasEvent</a> , <a href="#">DiagnosticAbstractDataIdentifier</a> , <a href="#">DiagnosticAccessPermission</a> , <a href="#">DiagnosticAging</a> , <a href="#">DiagnosticAuthRole</a> , <a href="#">DiagnosticCondition</a> , <a href="#">DiagnosticConditionGroup</a> , <a href="#">DiagnosticCustomServiceClass</a> , <a href="#">DiagnosticDataIdentifierSet</a> , <a href="#">DiagnosticEcuInstanceProps</a> , <a href="#">DiagnosticEnvironmentalCondition</a> , <a href="#">DiagnosticEvent</a> , <a href="#">DiagnosticExtendedDataRecord</a> , <a href="#">DiagnosticFimEventGroup</a> , <a href="#">DiagnosticFreezeFrame</a> , <a href="#">DiagnosticFunctionIdentifier</a> , <a href="#">DiagnosticFunctionIdentifierInhibit</a> , <a href="#">DiagnosticIndicator</a> , <a href="#">DiagnosticInfoType</a> , <a href="#">DiagnosticLumpr</a> , <a href="#">DiagnosticLumprDenominatorGroup</a> , <a href="#">DiagnosticLumprGroup</a> , <a href="#">DiagnosticJ1939ExpandedFreezeFrame</a> , <a href="#">DiagnosticJ1939FreezeFrame</a> , <a href="#">DiagnosticJ1939Node</a> , <a href="#">DiagnosticJ1939Spn</a> , <a href="#">DiagnosticJ1939SwMapping</a> , <a href="#">DiagnosticMapping</a> , <a href="#">DiagnosticMasterToSlaveEventMapping</a> , <a href="#">DiagnosticMeasurementIdentifier</a> , <a href="#">DiagnosticMemoryDestination</a> , <a href="#">DiagnosticMemoryIdentifier</a> , <a href="#">DiagnosticOperationCycle</a> , <a href="#">DiagnosticParameterIdentifier</a> , <a href="#">DiagnosticPowertrainFreezeFrame</a> , <a href="#">DiagnosticProtocol</a> , <a href="#">DiagnosticRoutine</a> , <a href="#">DiagnosticSecurityLevel</a> , <a href="#">DiagnosticServiceClass</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">DiagnosticServiceTable</a> , <a href="#">DiagnosticSession</a> , <a href="#">DiagnosticTestResult</a> , <a href="#">DiagnosticTestRoutineIdentifier</a> , <a href="#">DiagnosticTroubleCode</a> , <a href="#">DiagnosticTroubleCodeGroup</a> , <a href="#">DiagnosticTroubleCodeProps</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.249: DiagnosticCommonElement**

<b>Class</b>	<<atpVariation>> <b>DiagnosticCommonProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticCommonProps			
<b>Note</b>	This meta-class aggregates a number of common properties that are shared among a diagnostic extract. <b>Tags:</b> vh.latestBindingTime=codeGenerationTime			
<b>Base</b>	<a href="#">ARObject</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
debounce AlgorithmProps	<a href="#">DiagnosticDebounceAlgorithmProps</a>	*	aggr	Defines the used debounce algorithms relevant in the context of the enclosing DiagnosticCommonProps. Usually, there is a variety of debouncing algorithms to take into account and therefore the multiplicity of this aggregation is set to 0..*.
default Endianness	<a href="#">ByteOrderEnum</a>	0..1	attr	Defines the default endianness of the data belonging to a DID or RID which is applicable if the DiagnosticDataElement does not define the endianness via the swDataDefProps.baseType attribute.
event Combination Reporting Behavior	<a href="#">DiagnosticEventCombinationReportingBehaviorEnum</a>	0..1	attr	In case of EventCombination on Retrieval, this attribute specifies if a specific order of reporting is to be maintained.
maxNumberOf Request Correctly Received Response Pending	PositiveInteger	0..1	attr	Maximum number of negative responses with response code 0x78 (requestCorrectlyReceived-ResponsePending) allowed per request. DCM will send a negative response with response code 0x10 (generalReject), in case the limit value gets reached. Value 0xFF means that no limit number of NRC 0x78 response apply.
occurrence Counter Processing	<a href="#">DiagnosticOccurrenceCounterProcessingEnum</a>	0..1	attr	This attribute defines the consideration of the fault confirmation process for the occurrence counter.





Class	<<atpVariation>> DiagnosticCommonProps			
resetConfirmedBitOnOverflow	Boolean	0..1	attr	This attribute defines, whether the confirmed bit is reset or not while an event memory entry will be displaced.
responseOnAllRequestSids	Boolean	0..1	attr	If set to FALSE the DCM will not respond to diagnostic request that contains a service ID which is in the range from 0x40 to 0x7F or in the range from 0xC0 to 0xFF (Response IDs).
responseOnSecondDeclinedRequest	Boolean	0..1	attr	Defines the reaction upon a second request (ClientB) that can not be processed (e.g. due to priority assessment). TRUE: when the second request (Client B) can not be processed, it shall be answered with NRC21 BusyRepeat Request. FALSE: when the second request (Client B) can not be processed, it shall not be responded.
typeOfEventCombinationSupported	<a href="#">DiagnosticEventCombinationBehaviorEnum</a>	0..1	attr	Select type of Event Combination support.

**Table A.250: DiagnosticCommonProps**

Enumeration	DiagnosticCompareTypeEnum
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EnvironmentalCondition
Note	Enumeration for the type of a comparison of values usually expressed by the following operators: ==, !=, <, <=, >, >=
Literal	Description
isEqual	equal <b>Tags:</b> atp.EnumerationLiteralIndex=0
isGreaterOrEqual	greater than or equal <b>Tags:</b> atp.EnumerationLiteralIndex=5
isGreaterThan	greater than <b>Tags:</b> atp.EnumerationLiteralIndex=4
isLessOrEqual	less than or equal <b>Tags:</b> atp.EnumerationLiteralIndex=3
isLessThan	less than <b>Tags:</b> atp.EnumerationLiteralIndex=2
isNotEqual	not equal <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.251: DiagnosticCompareTypeEnum**

Class	<b>DiagnosticCondition</b> (abstract)			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticCondition			
Note	Abstract element for StorageConditions and EnableConditions.			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">DiagnosticEnableCondition</a> , <a href="#">DiagnosticStorageCondition</a>			
Attribute	Type	Mult.	Kind	Note







Class	DiagnosticCondition (abstract)			
initValue	Boolean	0..1	attr	<p>Defines the initial status for enable or disable of acceptance/storage of event reports of a diagnostic event. The value is the initialization after power up (before this condition is reported the first time).</p> <p>true: acceptance/storage of a diagnostic event enabled false: acceptance/storage of a diagnostic event disabled</p>

**Table A.252: DiagnosticCondition**

Class	DiagnosticConnectedIndicator			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticEvent			
Note	Description of indicators that are defined per DiagnosticEvent.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
behavior	DiagnosticConnectedIndicatorBehaviorEnum	0..1	attr	Behavior of the linked indicator.
healingCycle	<a href="#">DiagnosticOperationCycle</a>	0..1	ref	The deactivation of indicators per event is defined as healing of a diagnostic event. The operation cycle in which the warning indicator will be switched off is defined here.
healingCycleCounterThreshold	PositiveInteger	0..1	attr	<p>This attribute defines the number of healing cycles for the WarningIndicatorOffCriteria</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>
indicator	<a href="#">DiagnosticIndicator</a>	0..1	ref	Reference to the used indicator.

**Table A.253: DiagnosticConnectedIndicator**

Class	DiagnosticConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::DiagnosticConnection			
Note	<p>DiagnosticConncection that is used to describe the relationship between several TP connections.</p> <p><b>Tags:</b> atp.recommendedPackage=DiagnosticConnections</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
functionalRequest	<a href="#">TpConnectionIdent</a>	*	ref	Reference to functional request messages.
periodicResponseUdt	<a href="#">PduTriggering</a>	*	ref	Reference to UUDT responses.
physicalRequest	<a href="#">TpConnectionIdent</a>	0..1	ref	Reference to a physical request message.
response	<a href="#">TpConnectionIdent</a>	0..1	ref	In the vast majority of cases a response is required. However, there are also cases where providing the response is not possible and/or not allowed.
responseOnEvent	<a href="#">TpConnectionIdent</a>	0..1	ref	Reference to a ROE message.

**Table A.254: DiagnosticConnection**

<b>Class</b>	<b>DiagnosticContributionSet</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticContribution			
<b>Note</b>	<p>This meta-class represents a root node of a diagnostic extract. It bundles a given set of diagnostic model elements. The granularity of the DiagnosticContributionSet is arbitrary in order to support the aspect of decentralized configuration, i.e. different contributors can come up with an own DiagnosticContribution Set.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticContributionSets</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
common Properties	<a href="#">DiagnosticCommonProps</a>	0..1	aggr	<p>This attribute represents a collection of diagnostic properties that are shared among the entire DiagnosticContributionSet.</p> <p><b>Stereotypes:</b> atp.Splittable  <b>Tags:</b>atp.Splitkey=commonProperties</p>
element	<a href="#">DiagnosticCommonElement</a>	*	ref	<p>This represents a DiagnosticCommonElement considered in the context of the DiagnosticContributionSet</p> <p><b>Stereotypes:</b> atp.Splittable; atp.Variation  <b>Tags:</b>  atp.Splitkey=element.diagnosticCommonElement,  element.variationPoint.shortLabel  vh.latestBindingTime=postBuild</p>
serviceTable	<a href="#">DiagnosticServiceTable</a>	*	ref	<p>This represents the collection of DiagnosticServiceTables to be considered in the scope of this DiagnosticContributionSet.</p> <p><b>Stereotypes:</b> atp.Splittable; atp.Variation  <b>Tags:</b>  atp.Splitkey=serviceTable.diagnosticServiceTable, serviceTable.variationPoint.shortLabel  vh.latestBindingTime=postBuild</p>

Table A.255: DiagnosticContributionSet

<b>Class</b>	<b>DiagnosticControlEnableMaskBit</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::IOControl			
<b>Note</b>	This meta-class has the ability to represent one bit in the control enable mask record.			
<b>Base</b>	<a href="#">ARObject</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bitNumber	PositiveInteger	0..1	attr	<p>This attribute represents the bit number of the bit in the control mask record. Bit number 0 is the most significant bit (MSB) in the first byte of the CEMR in the network presentation.</p>
controlledData Element	<a href="#">DiagnosticDataElement</a>	*	ref	<p>This reference represents the collection of DiagnosticDataElements that are controlled by this bit of the control mask record.</p>

Table A.256: DiagnosticControlEnableMaskBit

<b>Class</b>	<b>DiagnosticCustomServiceClass</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::CommonService			
<b>Note</b>	<p>This represents the ability to define a custom diagnostic service class and assign an ID to it. Further configuration is not foreseen from the point of view of the diagnostic extract and consequently needs to be done on the level of ECUC.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticCustomServiceClasses</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceClass</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
customServiceId	PositiveInteger	0..1	attr	This attribute may only be used for the definition of custom services. The values shall not overlap with existing standardized service IDs.

**Table A.257: DiagnosticCustomServiceClass**

<b>Class</b>	<b>DiagnosticDataByIdentifier</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::DataByIdentifier			
<b>Note</b>	This represents an abstract base class for all diagnostic services that access data by identifier.			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">DiagnosticReadDataByIdentifier</a> , <a href="#">DiagnosticReadScalingDataByIdentifier</a> , <a href="#">DiagnosticWriteDataByIdentifier</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataIdentifier	<a href="#">DiagnosticAbstractDataIdentifier</a>	0..1	ref	This represents the linked DiagnosticDataIdentifier.

**Table A.258: DiagnosticDataByIdentifier**

<b>Class</b>	<b>DiagnosticDataElement</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
<b>Note</b>	This meta-class represents the ability to describe a concrete piece of data to be taken into account for diagnostic purposes.			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
arraySizeSemantics	<a href="#">ArraySizeSemanticsEnum</a>	0..1	attr	This attribute controls the meaning of the value of the array size.
maxNumberOfElements	PositiveInteger	0..1	attr	The existence of this attribute turns the data instance into an array of data. The attribute determines the size of the array in terms of how many elements the array can take.
scalingInfoSize	PositiveInteger	0..1	attr	Size in bytes of scaling information for the DiagnosticDataElement if used with DiagnosticReadScalingDataByIdentifier
swDataDefProps	<a href="#">SwDataDefProps</a>	0..1	aggr	This property allows to specify data definition properties in order to support the definition of e.g. computation formulae and data constraints.

**Table A.259: DiagnosticDataElement**

<b>Class</b>	<b>DiagnosticDataIdentifier</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
<b>Note</b>	<p>This meta-class represents the ability to model a diagnostic data identifier (DID) that is fully specified regarding the payload at configuration-time.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticDataIdentifiers</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticAbstractDataIdentifier</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataElement	<a href="#">DiagnosticParameter</a>	*	aggr	<p>This is the dataElement associated with the Diagnostic DataIdentifier.</p> <p><b>Stereotypes:</b> atpSplittable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=dataElement.bitOffset, dataElement.variation  Point.shortLabel  vh.latestBindingTime=postBuild</p>
didSize	PositiveInteger	0..1	attr	This attribute indicates the size in bytes of the Diagnostic DataIdentifier.
representsVin	Boolean	0..1	attr	This attributes indicates whether the specific Diagnostic DataIdentifier represents the vehicle identification.
supportInfoByte	DiagnosticSupportInfo Byte	0..1	aggr	This attribute represents the supported information associated with the DiagnosticDataIdentifier.

**Table A.260: DiagnosticDataIdentifier**

<b>Class</b>	<b>DiagnosticDataIdentifierSet</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
<b>Note</b>	<p>This represents the ability to define a list of DiagnosticDataIdentifiers that can be reused in different contexts.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticDataIdentifierSets</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataIdentifier (ordered)	<a href="#">DiagnosticDataIdentifier</a>	*	ref	Reference to an ordered list of Data Identifiers.

**Table A.261: DiagnosticDataIdentifierSet**

<b>Class</b>	<b>DiagnosticDeAuthentication</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::Authentication			
<b>Note</b>	<p>This meta-class represents the subfunction to remove the authentication</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticAuthentications</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticAuthentication</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.262: DiagnosticDeAuthentication**

<b>Class</b>	<b>DiagnosticDebounceAlgorithmProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticDebouncingAlgorithm			
<b>Note</b>	Defines properties for the debounce algorithm class.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
debounce Algorithm	<a href="#">DiagEventDebounceAlgorithm</a>	0..1	aggr	This represents the actual debounce algorithm.
debounce Behavior	DiagnosticDebounceBehaviorEnum	0..1	attr	This attribute defines how the event debounce algorithm will behave, if a related enable condition is not fulfilled or ControlDTCSetting of the related event is disabled.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
debounce CounterStorage	Boolean	0..1	attr	Switch to store the debounce counter value non-volatile or not.  true: debounce counter value shall be stored non-volatile false: debounce counter value is volatile  Please note that this attribute is not relevant for the adaptive platform.

**Table A.263: DiagnosticDebounceAlgorithmProps**

<b>Class</b>	<b>DiagnosticDemProvidedDataMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping::ServiceMapping			
<b>Note</b>	This represents the ability to define the nature of a data access for a DiagnosticDataElement in the Dem. <b>Tags:</b> atp.recommendedPackage=DiagnosticServiceMappings			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataElement	<a href="#">DiagnosticDataElement</a>	0..1	ref	This represents the DiagnosticDataElement for which the access is further qualified by the DiagnosticDemProvidedDataMapping.
dataProvider	NameToken	0..1	attr	This represents the ability to further specify the access within the Dem.

**Table A.264: DiagnosticDemProvidedDataMapping**

<b>Class</b>	<b>DiagnosticDynamicDataIdentifier</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
<b>Note</b>	This meta-class represents the ability to define a diagnostic data identifier (DID) at run-time. <b>Tags:</b> atp.recommendedPackage=DiagnosticDataIdentifiers			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, <a href="#">CollectableElement</a> , <a href="#">DiagnosticAbstractDataIdentifier</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.265: DiagnosticDynamicDataIdentifier**

<b>Class</b>	<b>DiagnosticDynamicallyDefineDataIdentifier</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::DynamicallyDefineDataIdentifier			
<b>Note</b>	This represents an instance of the "Dynamically Define Data Identifier" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticDynamicallyDefineDataIdentifiers			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataIdentifier	<a href="#">DiagnosticDynamicDataIdentifier</a>	0..1	ref	This represents the applicable DiagnosticDynamicData Identifier.
dynamically DefineData IdentifierClass	<a href="#">DiagnosticDynamically DefineDataIdentifier Class</a>	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class. Thereby, the reference represents the ability to access shared attributes among all DiagnosticDynamicallyDefineDataIdentifier in the given context.
maxSource Element	PositiveInteger	0..1	attr	This represents the maximum number of source elements of the dynamically created DID.

**Table A.266: DiagnosticDynamicallyDefineDataIdentifier**

<b>Class</b>	<b>DiagnosticDynamicallyDefineDataIdentifierClass</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::DynamicallyDefineDataIdentifier			
<b>Note</b>	This meta-class contains attributes shared by all instances of the "Dynamically Define Data Identifier" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticDynamicallyDefineDataIdentifiers			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceClass</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
checkPer SourceId	Boolean	0..1	attr	If set to TRUE, the Dcm module shall check the session, security and mode dependencies per source DIDs with a ReadDataByIdentifier (0x22) with DID in the range 0x F200 to 0xF3FF.  If set to FALSE, the Dcm module shall not check the session, security and mode dependencies per source DIDs with a ReadDataByIdentifier (0x22) with DID in the range 0xF200 to 0xF3FF.
configuration Handling	DiagnosticHandleDDDI ConfigurationEnum	0..1	attr	This configuration switch defines whether DDDID definition is handled as non-volatile information or not.
subfunction	<a href="#">DiagnosticDynamically DefineDataIdentifier SubfunctionEnum</a>	*	attr	This attribute contains a list of applicable subfunctions for all DiagnosticDynamicallyDefineDataIdentifier that reference the DiagnosticDynamicallyDefineDataIdentifier Class.

**Table A.267: DiagnosticDynamicallyDefineDataIdentifierClass**

<b>Enumeration</b>	<b>DiagnosticDynamicallyDefineDataIdentifierSubfunctionEnum</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::DynamicallyDefineData Identifier			
<b>Note</b>	This meta-class contains a list of possible subfunctions for the UDS service 0x2C.			





Enumeration	DiagnosticDynamicallyDefineDataIdentifierSubfunctionEnum
Literal	Description
clearDynamicallyDefineDataIdentifier	Clear the specified dynamic data identifier. <b>Tags:</b> atp.EnumerationLiteralIndex=0
defineByIdentifier	The definition of dynamic data identifier shall be done via a reference to a diagnostic data identifier. <b>Tags:</b> atp.EnumerationLiteralIndex=1
defineByMemoryAddress	The definition of dynamic data identifier shall be done via a reference to a memory address. <b>Tags:</b> atp.EnumerationLiteralIndex=2

**Table A.268: DiagnosticDynamicallyDefineDataIdentifierSubfunctionEnum**

Class	DiagnosticEcuInstanceProps			
Package	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticContribution			
Note	<p>This meta-class represents the ability to model properties that are specific for a given EcuInstance but on the other hand represent purely diagnostic-related information.</p> <p>In the spirit of decentralized configuration it is therefore possible to specify the diagnostic-related information related to a given EcuInstance even if the EcuInstance does not yet exist.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticEcuInstancePropss</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
ecuInstance	<a href="#">EcuInstance</a>	*	ref	<p>This represents the actual EcuInstance to which the information contained in the DiagnosticEcuInstance contribute.</p> <p><b>Stereotypes:</b> atpSplitable <b>Tags:</b>atp.Splitkey=ecuInstance</p>
obdSupport	DiagnosticObdSupport Enum	0..1	attr	This attribute is used to specify the role (if applicable) in which the DiagnosticEcuInstance supports OBD.

**Table A.269: DiagnosticEcuInstanceProps**

Class	DiagnosticEcuReset			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EcuReset			
Note	<p>This represents an instance of the "ECU Reset" diagnostic service.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticEcuResets</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
customSubFunctionNumber	PositiveInteger	0..1	attr	This attribute shall be used to define a custom sub-function number if none of the standardized values of category shall be used.
ecuResetClass	DiagnosticEcuReset Class	0..1	ref	<p>This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.</p> <p>Thereby, the reference represents the ability to access shared attributes among all DiagnosticEcuReset in the given context.</p>

**Table A.270: DiagnosticEcuReset**

<b>Class</b>	<b>DiagnosticEnableCondition</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticCondition			
<b>Note</b>	Specification of an enable condition. <b>Tags:</b> atp.recommendedPackage=DiagnosticConditions			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticCondition</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.271: DiagnosticEnableCondition**

<b>Class</b>	<b>DiagnosticEnableConditionGroup</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticConditionGroup			
<b>Note</b>	Enable condition group which includes one or several enable conditions. <b>Tags:</b> atp.recommendedPackage=DiagnosticConditions			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticConditionGroup</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
enableCondition	<a href="#">DiagnosticEnableCondition</a>	1..*	ref	Reference to enableConditions that are part of the Enable ConditionGroup.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=enableCondition.diagnosticEnableCondition, enableCondition.variationPoint.shortLabel vh.latestBindingTime=postBuild

**Table A.272: DiagnosticEnableConditionGroup**

<b>Class</b>	<b>DiagnosticEnableConditionPortMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
<b>Note</b>	Defines to which SWC service ports with DiagnosticEnableConditionNeeds the DiagnosticEnable Condition is mapped. <b>Tags:</b> atp.recommendedPackage=DiagnosticMappings			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">DiagnosticSwMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
enableCondition	<a href="#">DiagnosticEnableCondition</a>	0..1	ref	Reference to the EnableCondition which is mapped to a SWC service port with DiagnosticEnableConditionNeeds.
swcFlatServiceDependency	<a href="#">SwcServiceDependency</a>	0..1	ref	Reference to a SwcServiceDependencyType that links ServiceNeeds to SWC service ports. This reference can be used in early stages of the development in order to identify the SwcServiceDependency without a full System Context.







Class	DiagnosticEnableConditionPortMapping			
swcService DependencyIn System	<a href="#">SwcService Dependency</a>	0..1	iref	Instance reference to a SwcServiceDependency that links ServiceNeeds to SWC service ports.  <b>InstanceRef implemented by:</b> SwcServiceDependency InSystemInstanceRef

**Table A.273: DiagnosticEnableConditionPortMapping**

Class	DiagnosticEnvBswModeElement			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EnvironmentalCondition			
Note	This meta-class represents the ability to refer to a specific ModeDeclaration in the scope of a BswModule Description.			
Base	ARObject, <a href="#">DiagnosticEnvModeElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
mode	<a href="#">ModeDeclaration</a>	1	iref	This reference identifies both the ModeDeclarationGroup Prototype and the ModeDeclaration for the specific mode comparison.  <b>InstanceRef implemented by:</b> ModeInBswModule DescriptionInstanceRef

**Table A.274: DiagnosticEnvBswModeElement**

Class	DiagnosticEnvCompareCondition (abstract)			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EnvironmentalCondition			
Note	DiagnosticCompareConditions are atomic conditions. They are based on the idea of a comparison at runtime of some variable data with something constant. The type of the comparison (==, !=, <, <=, ...) is specified in DiagnosticCompareCondition.compareType.			
Base	ARObject, <a href="#">DiagnosticEnvConditionFormulaPart</a>			
Subclasses	<a href="#">DiagnosticEnvDataCondition</a> , <a href="#">DiagnosticEnvModeCondition</a>			
Attribute	Type	Mult.	Kind	Note
compareType	<a href="#">DiagnosticCompare TypeEnum</a>	1	attr	This attributes represents the concrete type of the comparison.

**Table A.275: DiagnosticEnvCompareCondition**

Class	DiagnosticEnvConditionFormula			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EnvironmentalCondition			
Note	<p>A DiagnosticEnvConditionFormula embodies the computation instruction that is to be evaluated at runtime to determine if the DiagnosticEnvironmentalCondition is currently present (i.e. the formula is evaluated to true) or not (otherwise). The formula itself consists of parts which are combined by the logical operations specified by DiagnosticEnvConditionFormula.op.</p> <p>If a diagnostic functionality cannot be executed because an environmental condition fails then the diagnostic stack shall send a negative response code (NRC) back to the client. The value of the NRC is directly related to the specific formula and is therefore formalized in the attribute DiagnosticEnvCondition Formula.nrcValue.</p>			
Base	ARObject, <a href="#">DiagnosticEnvConditionFormulaPart</a>			
Attribute	Type	Mult.	Kind	Note





Class	DiagnosticEnvConditionFormula			
nrcValue	PositiveInteger	0..1	attr	This attribute represents the concrete NRC value that shall be returned if the condition fails.
op	DiagnosticLogicalOperatorEnum	0..1	attr	This attribute represents the concrete operator (supported operators: and, or) of the condition formula.
part (ordered)	DiagnosticEnvConditionFormulaPart	*	aggr	This aggregation represents the collection of formula parts that can be combined by logical operators.

**Table A.276: DiagnosticEnvConditionFormula**

Class	DiagnosticEnvDataCondition			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EnvironmentalCondition			
Note	A DiagnosticEnvDataCondition is an atomic condition that compares the current value of the referenced DiagnosticDataElement with a constant value defined by the ValueSpecification. All compareTypes are supported.			
Base	ARObject, <a href="#">DiagnosticEnvCompareCondition</a> , <a href="#">DiagnosticEnvConditionFormulaPart</a>			
Attribute	Type	Mult.	Kind	Note
compareValue	<a href="#">ValueSpecification</a>	0..1	aggr	This attribute represents a fixed compare value taken to evaluate the compare condition.
dataElement	<a href="#">DiagnosticDataElement</a>	0..1	ref	This reference represents the related diagnostic data element.

**Table A.277: DiagnosticEnvDataCondition**

Class	DiagnosticEnvModeCondition			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EnvironmentalCondition			
Note	<p>DiagnosticEnvModeCondition are atomic condition based on the comparison of the active Mode Declaration in a ModeDeclarationGroupPrototype with the constant value of a ModeDeclaration.</p> <p>The formulation of this condition uses only one DiagnosticEnvElement, which contains enough information to deduce the variable part (i.e. the part that changes at runtime) as well as the constant part of the comparison.</p> <p>Only DiagnosticCompareTypeEnum.isEqual or DiagnosticCompareTypeEnum.isNotEqual are eligible values for DiagnosticAtomicCondition.compareType.</p>			
Base	ARObject, <a href="#">DiagnosticEnvCompareCondition</a> , <a href="#">DiagnosticEnvConditionFormulaPart</a>			
Attribute	Type	Mult.	Kind	Note
modeElement	<a href="#">DiagnosticEnvModeElement</a>	0..1	ref	This reference represents both the ModeDeclaration GroupPrototype and the ModeDeclaration relevant for the mode comparison.

**Table A.278: DiagnosticEnvModeCondition**

Class	<a href="#">DiagnosticEnvModeElement</a> (abstract)
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EnvironmentalCondition





<b>Class</b>	<b>DiagnosticEnvModeElement</b> (abstract)			
<b>Note</b>	<p>All ModeDeclarations that are referenced in a DiagnosticEnvModeCondition shall be defined as a DiagnosticEnvModeElement of this DiagnosticEnvironmentalCondition.</p> <p>This concept keeps the ARXML clean: It avoids that the DiagnosticEnvConditionFormula is cluttered by lengthy InstanceRef definitions.</p> <p>Furthermore, it allows that an InstanceRef only needs to be defined once and can be used multiple times in the different DiagnosticEnvModeConditions.</p>			
<b>Base</b>	ARObject, <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">DiagnosticEnvBswModeElement</a> , <a href="#">DiagnosticEnvSwcModeElement</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.279: DiagnosticEnvModeElement**

<b>Class</b>	<b>DiagnosticEnvSwcModeElement</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EnvironmentalCondition			
<b>Note</b>	This meta-class represents the ability to refer to a ModeDeclaration in a concrete System context.			
<b>Base</b>	ARObject, <a href="#">DiagnosticEnvModeElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
mode	<a href="#">ModeDeclaration</a>	0..1	iref	<p>This reference identifies both the ModeDeclarationGroup Prototype and the ModeDeclaration for the specific mode comparison.</p> <p><b>InstanceRef implemented by:</b> PModeInSystemInstanceRef</p>

**Table A.280: DiagnosticEnvSwcModeElement**

<b>Class</b>	<b>DiagnosticEnvironmentalCondition</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::EnvironmentalCondition			
<b>Note</b>	<p>The meta-class DiagnosticEnvironmentalCondition formalizes the idea of a condition which is evaluated during runtime of the ECU by looking at "environmental" states (e.g. one such condition is that the vehicle is not driving, i.e. vehicle speed == 0).</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticEnvironmentalConditions</p>			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
formula	<a href="#">DiagnosticEnvConditionFormula</a>	0..1	aggr	This attribute represents the formula part of the DiagnosticEnvironmentalCondition.
modeElement	<a href="#">DiagnosticEnvModeElement</a>	*	aggr	This aggregation contains a representation of Mode Declarations in the context of a DiagnosticEnvironmentalCondition.

**Table A.281: DiagnosticEnvironmentalCondition**

<b>Class</b>	<b>DiagnosticEvent</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticEvent			
<b>Note</b>	This element is used to configure DiagnosticEvents. <b>Tags:</b> atp.recommendedPackage=DiagnosticEvents			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage</a> , <a href="#">Referrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
associated Event Identification	PositiveInteger	0..1	attr	This attribute represents the identification number that is associated with the enclosing DiagnosticEvent and allows to identify it when placed into a snapshot record or extended data record storage.  This value can be reported as internal data element in snapshot records or extended data records.
clearEvent Allowed Behavior	DiagnosticClearEvent AllowedBehaviorEnum	0..1	attr	This attribute defines the resulting UDS status byte for the related event, which shall not be cleared according to the ClearEventAllowed callback
confirmation Threshold	PositiveInteger	0..1	attr	This attribute defines the number of operation cycles with a failed result before a confirmed DTC is set to 1. The semantic of this attribute is a by "1" increased value compared to the confirmation threshold of the "trip counter" mentioned in ISO 14229-1 in figure D.4. A value of "1" defines the immediate confirmation of the DTC along with the first reported failed. This is also sometimes called "zero trip DTC". A value of "2" defines a DTC confirmation in the operation cycle after the first occurred failed. A value of "2" is typically used in the US for OBD DTC confirmation.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
connected Indicator	<a href="#">DiagnosticConnected Indicator</a>	*	aggr	Event specific description of Indicators.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=connectedIndicator.shortName, connectedIndicator.variationPoint.shortLabel vh.latestBindingTime=postBuild
eventClear Allowed	DiagnosticEventClear AllowedEnum	0..1	attr	This attribute defines whether the Dem has access to a "ClearEventAllowed" callback.
eventKind	DiagnosticEventKind Enum	0..1	attr	This attribute is used to distinguish between SWC and BSW events.
prestorage FreezeFrame	Boolean	0..1	attr	This attribute describes whether the Prestorage of Freeze Frames is supported by the assigned event or not.  True: Prestorage of FreezeFrames is supported False: Prestorage of FreezeFrames is not supported
prestored FreezeFrame StoredInNvm	Boolean	0..1	attr	If the Event uses a prestored freeze-frame (using the operations PrestoreFreezeFrame and ClearPrestored FreezeFrame of the service interface DiagnosticMonitor) this attribute indicates if the Event requires the data to be stored in non-volatile memory. TRUE = Dem shall store the prestored data in non-volatile memory, FALSE = Data can be lost at shutdown (not stored in Nvm)
recoverableIn SameOperation Cycle	Boolean	0..1	attr	If the attribute is set to true then reporting PASSED will reset the indication of a failed test in the current operation cycle. If the attribute is set to false then reporting PASSED will be ignored and not lead to a reset of the indication of a failed test.

**Table A.282: DiagnosticEvent**

Enumeration	DiagnosticEventCombinationBehaviorEnum
Package	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticCommonProps
Note	Select type of Event Combination support
Literal	Description
eventCombinationOnRetrieval	Event combination on retrieval is used to combine events. For each event an individual event memory entry is created, while reporting the data via UDS, the data is combined. <b>Tags:</b> atp.EnumerationLiteralIndex=1
eventCombinationOnStorage	Event combination on storage is used to combine events. Only one memory entry exists for each DTC which is also reported via UDS. <b>Tags:</b> atp.EnumerationLiteralIndex=0

**Table A.283: DiagnosticEventCombinationBehaviorEnum**

Enumeration	DiagnosticEventCombinationReportingBehaviorEnum
Package	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticCommonProps
Note	Select reporting format of events. Applicable only for Event Combination on Retrieval.
Literal	Description
reportingInChronologicalOrderOldestFirst	The reporting order for event combination on retrieval is the chronological storage order of the events <b>Tags:</b> atp.EnumerationLiteralIndex=0

**Table A.284: DiagnosticEventCombinationReportingBehaviorEnum**

Class	DiagnosticEventNeeds			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	Specifies the abstract needs on the configuration of the Diagnostic Event Manager for one diagnostic event. Its shortName can be regarded as a symbol identifying the diagnostic event from the viewpoint of the component or module which owns this element.  In case the diagnostic event specifies a production error, the shortName shall be the name of the production error.			
Base	ARObject, DiagnosticCapabilityElement, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
Attribute	Type	Mult.	Kind	Note
deferringFid	<a href="#">FunctionInhibitionNeeds</a>	*	ref	This reference contains the link to a function identifier within the FiM which is used by the monitor before delivering a result.
diagEventDebounceAlgorithm	<a href="#">DiagEventDebounceAlgorithm</a>	0..1	aggr	Specifies the abstract need on the Debounce Algorithm applied by the Diagnostic Event Manager.
prestoredFreezeFrameStoredInNvm	Boolean	0..1	attr	If the Event uses a prestored freeze-frame (using the operations PrestoreFreezeFrame and ClearPrestoredFreezeFrame of the service interface DiagnosticMonitor) this attribute indicates if the Event requires the data to be stored in non-volatile memory. TRUE = Dem shall store the prestored data in non-volatile memory, FALSE = Data can be lost at shutdown (not stored in Nvm).
usesMonitorData	Boolean	0..1	attr	This attribute defines whether additional monitor data shall be added to the reporting of events.

**Table A.285: DiagnosticEventNeeds**

<b>Class</b>	<b>DiagnosticEventPortMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
<b>Note</b>	Defines to which SWC service ports with DiagnosticEventInfoNeeds the DiagnosticEvent is mapped. <b>Tags:</b> atp.recommendedPackage=DiagnosticMappings			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">DiagnosticSwMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bswServiceDependency	<a href="#">BswServiceDependencyIdent</a>	0..1	ref	Reference to a BswServiceDependency that links ServiceNeeds to BswModuleEntries.
diagnosticEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	Reference to the DiagnosticEvent that is assigned to SWC service ports with DiagnosticEventInfoNeeds.
swcFlatServiceDependency	<a href="#">SwcServiceDependency</a>	0..1	ref	Reference to a SwcServiceDependencyType that links ServiceNeeds to SWC service ports.
swcServiceDependencyInSystem	<a href="#">SwcServiceDependency</a>	0..1	iref	Instance reference to a SwcServiceDependency that links ServiceNeeds to SWC service ports. <b>InstanceRef implemented by:</b> SwcServiceDependencyInSystemInstanceRef

**Table A.286: DiagnosticEventPortMapping**

<b>Class</b>	<b>DiagnosticEventToDebounceAlgorithmMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
<b>Note</b>	Defines which Debounce Algorithm is applicable for a DiagnosticEvent. <b>Tags:</b> atp.recommendedPackage=DiagnosticMappings			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
debounceAlgorithm	<a href="#">DiagnosticDebounceAlgorithmProps</a>	0..1	ref	Reference to a DebounceAlgorithm assigned to a DiagnosticEvent.
diagnosticEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	Reference to a DiagnosticEvent to which a Debounce Algorithm is assigned.

**Table A.287: DiagnosticEventToDebounceAlgorithmMapping**

<b>Class</b>	<b>DiagnosticEventToEnableConditionGroupMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
<b>Note</b>	Defines which EnableConditionGroup is applicable for a DiagnosticEvent. <b>Tags:</b> atp.recommendedPackage=DiagnosticMappings			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
diagnosticEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	Reference to a DiagnosticEvent to which an EnableConditionGroup is assigned.
enableConditionGroup	<a href="#">DiagnosticEnableConditionGroup</a>	0..1	ref	Reference to an EnableConditionGroup assigned to a DiagnosticEvent.

**Table A.288: DiagnosticEventToEnableConditionGroupMapping**

<b>Class</b>	<b>DiagnosticEventToSecurityEventMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
<b>Note</b>	<p>This meta-class represents the ability to map a security event that is defined in the context of the Security Extract to a diagnostic event defined on the context of the DiagnosticExtract.</p> <p><b>Tags:</b>  atp.Status=draft  atp.recommendedPackage=DiagnosticMappings</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
diagnosticEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	<p>This reference identifies the applicable diagnostic event.</p> <p><b>Tags:</b>atp.Status=draft</p>
securityEvent Props	<a href="#">SecurityEventContext Props</a>	0..1	ref	<p>This reference identifies the qualification of the applicable security event</p> <p><b>Tags:</b>atp.Status=draft</p>

**Table A.289: DiagnosticEventToSecurityEventMapping**

<b>Class</b>	<b>DiagnosticEventToStorageConditionGroupMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
<b>Note</b>	<p>Defines which StorageConditionGroup is applicable for a DiagnosticEvent.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticMappings</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
diagnosticEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	<p>Reference to a DiagnosticEvent to which a Storage ConditionGroup is assigned.</p>
storage ConditionGroup	<a href="#">DiagnosticStorage ConditionGroup</a>	0..1	ref	<p>Reference to a StorageConditionGroup assigned to a DiagnosticEvent.</p>

**Table A.290: DiagnosticEventToStorageConditionGroupMapping**

<b>Class</b>	<b>DiagnosticEventToTroubleCodeJ1939Mapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::J1939			
<b>Note</b>	<p>By means of this meta-class it is possible to associate a DiagnosticEvent to a DiagnosticTroubleCode J1939.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticMappings</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
diagnosticEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	<p>Reference to a DiagnosticEvent to which a J1939 Diagnostic Trouble Code is assigned.</p>
troubleCode J1939	<a href="#">DiagnosticTroubleCode J1939</a>	0..1	ref	<p>Reference to a J1939 Diagnostic Trouble Code to which a DiagnosticEvent is assigned.</p>

**Table A.291: DiagnosticEventToTroubleCodeJ1939Mapping**



<b>Class</b>	<b>DiagnosticEventToTroubleCodeUdsMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
<b>Note</b>	Defines which UDS Diagnostic Trouble Code is applicable for a DiagnosticEvent. <b>Tags:</b> atp.recommendedPackage=DiagnosticMappings			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
diagnosticEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	Reference to a DiagnosticEvent to which a UDS Diagnostic Trouble Code is assigned.
troubleCodeUds	<a href="#">DiagnosticTroubleCodeUds</a>	0..1	ref	Reference to an UDS Diagnostic Trouble Code assigned to a DiagnosticEvent.

**Table A.292: DiagnosticEventToTroubleCodeUdsMapping**

<b>Class</b>	<b>DiagnosticExtendedDataRecord</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticExtendedDataRecord			
<b>Note</b>	Description of an extended data record. <b>Tags:</b> atp.recommendedPackage=DiagnosticExtendedDataRecords			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
customTrigger	String	0..1	attr	This attribute shall be taken to verbally describe the nature of the custom trigger.
recordElement	<a href="#">DiagnosticParameter</a>	*	aggr	Defined DataElements in the extended record element.
recordNumber	PositiveInteger	0..1	attr	This attribute specifies an unique identifier for an extended data record.
trigger	<a href="#">DiagnosticRecordTriggerEnum</a>	0..1	attr	This attribute specifies the primary trigger to allocate an event memory entry.
update	Boolean	0..1	attr	This attribute defines when an extended data record is captured.  True: This extended data record is captured every time.  False: This extended data record is only captured for new event memory entries.

**Table A.293: DiagnosticExtendedDataRecord**

<b>Class</b>	<b>DiagnosticFimAliasEventGroupMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Fim			
<b>Note</b>	This meta-class represents the ability to map a DiagnosticFimEventGroup to a DiagnosticFimAliasEvent Group. By this means the "preliminary" modeling by way of a DiagnosticFimAliasEventGroup is further substantiated. <b>Tags:</b> atp.recommendedPackage=DiagnosticFimAliasEventGroupMappings			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>







Class	DiagnosticFimAliasEventGroupMapping			
actualEvent	DiagnosticFimEvent Group	0..1	ref	This represents the reference to the actual summary event.
aliasEvent	DiagnosticFimAlias EventGroup	0..1	ref	This represents the reference to the alias summary event.

**Table A.294: DiagnosticFimAliasEventGroupMapping**

Class	DiagnosticFimAliasEventMapping			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticEvent			
Note	<p>This meta-class represents the ability to model the mapping of a DiagnosticEvent to a DiagnosticAlias Event. By this means the "preliminary" modeling by way of a DiagnosticAliasEvent is further substantiated.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticFimEventMappings</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
actualEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	This represents the reference to the actual diagnostic event.
aliasEvent	DiagnosticFimAlias Event	0..1	ref	This represents the reference to the alias event.

**Table A.295: DiagnosticFimAliasEventMapping**

Class	DiagnosticFimFunctionMapping			
Package	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping::ServiceMapping			
Note	<p>This meta-class represents the ability to define a mapping between a function identifier (FID) and the corresponding SwcServiceDependency in the application software resp. basic software.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticFimFunctionMappings</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">DiagnosticSwMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
mappedBsw Service Dependency	<a href="#">BswService DependencyIdent</a>	0..1	ref	This is supposed to represent a reference to a Bsw ServiceDependency. the latter is not derived from Referrable and therefore this detour needs to be implemented to still let BswServiceDependency become the target of a reference.
mappedFlatSwc Service Dependency	<a href="#">SwcService Dependency</a>	0..1	ref	This represents the ability to refer to an AtomicSw ComponentType that is available without the definition of how it will be embedded into the component hierarchy.
mapped Function	DiagnosticFunction Identifier	0..1	ref	This represents the mapped FID.
mappedSwc Service Dependency	<a href="#">SwcService Dependency</a>	0..1	iref	<p>This represents the ability to point into the component hierarchy (under possible consideration of the root SoftwareComposition).</p> <p><b>InstanceRef implemented by:</b>SwcServiceDependency InSystemInstanceRef</p>

**Table A.296: DiagnosticFimFunctionMapping**

<b>Class</b>	<b>DiagnosticFreezeFrame</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticFreezeFrame			
<b>Note</b>	This element describes combinations of DIDs for a non OBD relevant freeze frame. <b>Tags:</b> atp.recommendedPackage=DiagnosticFreezeFrames			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
customTrigger	String	0..1	attr	This attribute shall be taken to verbally describe the nature of the custom trigger.
recordNumber	PositiveInteger	0..1	attr	This attribute defines a record number for a freeze frame record. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
trigger	<a href="#">DiagnosticRecordTriggerEnum</a>	0..1	attr	This attribute defines the primary trigger to allocate an event memory entry.
update	Boolean	0..1	attr	This attribute defines the approach when the freeze frame record is stored/updated. True: FreezeFrame record is captured every time. False: FreezeFrame record is only captured for new event memory entries.

Table A.297: DiagnosticFreezeFrame

<b>Class</b>	<b>DiagnosticFunctionIdentifierInhibit</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Fim			
<b>Note</b>	This meta-class represents the ability to define the inhibition of a specific function identifier within the Fim configuration. <b>Tags:</b> atp.recommendedPackage=DiagnosticFunctionIdentifierInhibits			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
functionIdentifier	DiagnosticFunctionIdentifier	0..1	ref	This represents the corresponding function identifier.
inhibitionMask	DiagnosticInhibitionMaskEnum	0..1	attr	This represents the value of the inhibition mask behavior.
inhibitSource	<a href="#">DiagnosticFunctionInhibitSource</a>	*	aggr	This represents a collection of DiagnosticFunctionInhibitSource that contribute to the configuration of the enclosing DiagnosticFunctionIdentifierInhibit.

Table A.298: DiagnosticFunctionIdentifierInhibit

<b>Class</b>	<b>DiagnosticFunctionInhibitSource</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Fim			
<b>Note</b>	This meta-class represents the ability to define an inhibition source in the context of the Fim configuration.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	DiagnosticFunctionInhibitSource			
event	DiagnosticFimAlias Event	0..1	ref	This represents the alias event applicable for the referencing inhibition source.
eventGroup	DiagnosticFimAlias EventGroup	0..1	ref	This represents the event group applicable for the referencing inhibition source.

**Table A.299: DiagnosticFunctionInhibitSource**

Class	DiagnosticIOControl			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::IOControl			
Note	This represents an instance of the "I/O Control" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticIoControls			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
controlEnableMaskBit	<a href="#">DiagnosticControlEnableMaskBit</a>	*	aggr	This aggregation represents the control mask record consisting of single bits.
dataIdentifier	<a href="#">DiagnosticDataIdentifier</a>	0..1	ref	This represents the corresponding DiagnosticData Identifier
freezeCurrentState	Boolean	0..1	attr	Setting this attribute to true represents the ability of the Dcm to execute a freezeCurrentState.
ioControlClass	DiagnosticIoControl Class	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticIOControl in the given context.
resetToDefault	Boolean	0..1	attr	Setting this attribute to true represents the ability of the Dcm to execute a resetToDefault.
shortTermAdjustment	Boolean	0..1	attr	Setting this attribute to true represents the ability of the Dcm to execute a shortTermAdjustment.

**Table A.300: DiagnosticIOControl**

Class	DiagnosticIndicator			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticIndicator			
Note	Definition of an indicator. <b>Tags:</b> atp.recommendedPackage=DiagnosticIndicators			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
type	DiagnosticIndicatorType Enum	0..1	attr	Defines the type of the indicator.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.301: DiagnosticIndicator**

<b>Class</b>	<b>DiagnosticInfoType</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
<b>Note</b>	This meta-class represents the ability to model an OBD info type. <b>Tags:</b> atp.recommendedPackage=DiagnosticInfoTypes			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataElement	<a href="#">DiagnosticParameter</a>	*	aggr	This represents the data associated with the enclosing DiagnosticInfoType.  <b>Stereotypes:</b> atp.Splittable <b>Tags:</b> atp.Splitkey=dataElement.bitOffset, dataElement.variationPoint.shortLabel
id	PositiveInteger	0..1	attr	This attribute represents the value of InfoType (see SAE J1979-DA).

**Table A.302: DiagnosticInfoType**

<b>Class</b>	<b>DiagnosticIoControlNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	Specifies the general needs on the configuration of the Diagnostic Communication Manager (DCM) which are not related to a particular item (e.g. a PID). The main use case is the mapping of service ports to the Dcm which are not related to a particular item.			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">DiagnosticCapabilityElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
currentValue	<a href="#">DiagnosticValueNeeds</a>	0..1	ref	Reference to the DiagnosticValueNeeds indicating the access to the current value via signalBasedDiagnostics.
freezeCurrentStateSupported	Boolean	0..1	attr	This attribute determines, if the referenced port supports temporary freezing of I/O value.
resetToDefaultSupported	Boolean	0..1	attr	This represents a flag for the existence of the ResetToDefault operation in the service interface.
shortTermAdjustmentSupported	Boolean	0..1	attr	This attribute determines, if the referenced port supports temporarily setting of I/O value to a specific value provided by the diagnostic tester.

**Table A.303: DiagnosticIoControlNeeds**

<b>Class</b>	<b>DiagnosticIumprGroup</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticEvent			
<b>Note</b>	This meta-class represents the ability to model a IUMPR groups. <b>Tags:</b> atp.recommendedPackage=DiagnosticIumprGroups			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
iumpr	DiagnosticIumpr	*	ref	This reference collects DiagnosticIumpr to a DiagnosticIumprGroup.





Class	DiagnosticlumpGroup			
iumpGroup Identifier	<a href="#">DiagnosticlumpGroup Identifier</a>	0..1	aggr	<p>This aggregation allows for the variant modeling of the groupIdentifier.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b> atp.Splitkey=iumpGroupIdentifier.groupId, iumpGroupIdentifier.variationPoint.shortLabel vh.latestBindingTime=postBuild</p>

Table A.304: DiagnosticlumpGroup

Class	DiagnosticlumpGroupIdentifier			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticEvent			
Note	This meta-class provides the ability to the define the group identifier for an lumpGroup.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
groupId	NameToken	0..1	attr	<p>This attribute shall be taken to define an identifier for the IUMPR group. Please note that the value of this identifier is driven by regulations outside the scope of AUTOSAR and can therefore not be limited to the set of characters suitable for a shortName.</p> <p><b>Stereotypes:</b> atpIdentityContributor</p>

Table A.305: DiagnosticlumpGroupIdentifier

Class	DiagnosticlumpToFunctionIdentifierMapping			
Package	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
Note	<p>This meta-class represents the ability to associate a DiagnosticFunctionIdentifier with a Diagnosticlump.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticMappings</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
function Identifier	DiagnosticFunction Identifier	0..1	ref	This reference identifies the applicable Diagnostic FunctionIdentifier.
iump	Diagnosticlump	0..1	ref	This reference identifies the applicable Diagnosticlump.

Table A.306: DiagnosticlumpToFunctionIdentifierMapping

Class	DiagnosticJ1939Node			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::J1939			
Note	<p>This meta-class represents the diagnostic configuration of a J1939 Nm node, which in turn represents a "virtual Ecu" on the J1939 communication bus.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticJ1939Nodes</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note





Class	DiagnosticJ1939Node			
nmNode	<a href="#">J1939NmNode</a>	0..1	ref	This represents the reference to the "virtual Ecu" to which the enclosing DiagnosticJ1939Node is associated.

**Table A.307: DiagnosticJ1939Node**

Class	DiagnosticJ1939Spn			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::J1939			
Note	This meta-class represents the ability to model a J1939 Suspect Parameter Number (SPN). <b>Tags:</b> atp.recommendedPackage=DiagnosticJ1939Spns			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
spn	PositiveInteger	0..1	attr	This attribute represents the concrete numerical identification for the enclosing SPN.

**Table A.308: DiagnosticJ1939Spn**

Class	DiagnosticMasterToSlaveEventMapping			
Package	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
Note	This meta-class provides the ability to map a master diagnostic event with a slave diagnostic event such that reporting of the master event with a given value also reports the slave event with the same value <b>Tags:</b> atp.recommendedPackage=DiagnosticMappings			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
masterEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	This represents the master diagnostic event.
slaveEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	This represents the slave diagnostic event.

**Table A.309: DiagnosticMasterToSlaveEventMapping**

Class	<a href="#">DiagnosticMemoryAddressableRangeAccess</a> (abstract)			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::MemoryByAddress			
Note	This abstract base class			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMemoryByAddress</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">DiagnosticReadMemoryByAddress</a> , <a href="#">DiagnosticRequestDownload</a> , <a href="#">DiagnosticRequestUpload</a> , <a href="#">DiagnosticWriteMemoryByAddress</a>			
Attribute	Type	Mult.	Kind	Note
memoryRange	<a href="#">DiagnosticMemoryIdentifier</a>	*	ref	This represents the formal description of the memory segment to which the <a href="#">DiagnosticMemoryByAddress</a> applies.

**Table A.310: DiagnosticMemoryAddressableRangeAccess**

<b>Class</b>	<b>DiagnosticMemoryDestination</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
<b>Note</b>	This abstract meta-class represents a possible memory destination for a diagnostic event.			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">DiagnosticMemoryDestinationPrimary</a> , <a href="#">DiagnosticMemoryDestinationUserDefined</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
agingRequiresTestedCycle	Boolean	0..1	attr	Defines whether the aging cycle counter is processed every aging cycles or else only tested aging cycle are considered.  If the attribute is set to TRUE: only tested aging cycle are considered for aging cycle counter.  If the attribute is set to FALSE: aging cycle counter is processed every aging cycle.
clearDtcLimitation	DiagnosticClearDtcLimitationEnum	0..1	attr	Defines the scope of the DEM_ClearDTC Api.
dtcStatusAvailabilityMask	PositiveInteger	0..1	attr	Mask for the supported DTC status bits by the Dem.
eventDisplacementStrategy	DiagnosticEventDisplacementStrategyEnum	0..1	attr	This attribute defines, whether support for event displacement is enabled or not, and which displacement strategy is followed.
maxNumberOfEventEntries	PositiveInteger	0..1	attr	This attribute fixes the maximum number of event entries in the fault memory.
memoryEntryStorageTrigger	DiagnosticMemoryEntryStorageTriggerEnum	0..1	attr	Describes the trigger to allocate an event memory entry.
statusBitHandlingTestFailedSinceLastClear	DiagnosticStatusBitHandlingTestFailedSinceLastClearEnum	0..1	attr	This attribute defines, whether the aging and displacement mechanism shall be applied to the "TestFailedSinceLastClear" status bits.
statusBitStorageTestFailed	Boolean	0..1	attr	This parameter is used to activate/deactivate the permanent storage of the "TestFailed" status bits.  true: storage activated false: storage deactivated
typeOfFreezeFrameRecordNumeration	DiagnosticTypeOfFreezeFrameRecordNumerationEnum	0..1	attr	This attribute defines the type of assigning freeze frame record numbers for event-specific freeze frame records.

**Table A.311: DiagnosticMemoryDestination**

<b>Class</b>	<b>DiagnosticMemoryDestinationPrimary</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
<b>Note</b>	This represents a primary memory for a diagnostic event.  <b>Tags:</b> atp.recommendedPackage=DiagnosticMemoryDestinations			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMemoryDestination</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
typeOfDtcSupported	DiagnosticTypeOfDtcSupportedEnum	0..1	attr	This attribute defines the format returned by Dem_DcmGetTranslationType and does not relate to/influence the supported Dem functionality.

**Table A.312: DiagnosticMemoryDestinationPrimary**

<b>Class</b>	<b>DiagnosticMemoryDestinationUserDefined</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
<b>Note</b>	This represents a user-defined memory for a diagnostic event. <b>Tags:</b> atp.recommendedPackage=DiagnosticMemoryDestinations			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMemoryDestination</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
authentication Role	DiagnosticAuthRole	0..1	ref	This reference identifies the authenticationRole applicable for the enclosing DiagnosticMemoryDestinationUser Defined.
memoryId	PositiveInteger	0..1	attr	This represents the identifier of the user-defined memory.

**Table A.313: DiagnosticMemoryDestinationUserDefined**

<b>Class</b>	<b>DiagnosticMemoryIdentifier</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::MemoryByAddress			
<b>Note</b>	This meta-class represents the ability to define memory properties from the diagnostics point of view. <b>Tags:</b> atp.recommendedPackage=DiagnosticMemoryByAdresss			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
access Permission	<a href="#">DiagnosticAccessPermission</a>	0..1	ref	This represents that access permission defined for the specific DiagnosticMemoryIdentifier.
id	PositiveInteger	0..1	attr	This represents the identification of the memory segment.
memoryHigh Address	PositiveInteger	0..1	attr	This represents the upper bound for addresses of the memory segment.
memoryHigh AddressLabel	String	0..1	attr	This represents a symbolic label for the upper bound for addresses of the memory segment.
memoryLow Address	PositiveInteger	0..1	attr	This represents the lower bound for addresses of the memory segment.
memoryLow AddressLabel	String	0..1	attr	This represents a symbolic label for the lower bound for addresses of the memory segment.

**Table A.314: DiagnosticMemoryIdentifier**

<b>Class</b>	<b>DiagnosticOperationCycle</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticOperationCycle			
<b>Note</b>	Definition of an operation cycle that is the base of the event qualifying and for Dem scheduling. <b>Tags:</b> atp.recommendedPackage=DiagnosticOperationCycles			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>







Class	DiagnosticOperationCycle			
cycleStatus Storage	Boolean	0..1	attr	<p>Defines if the operation cycle state is available over the power cycle (stored non-volatile) or not.</p> <ul style="list-style-type: none"> <li>• true: the operation cycle state is stored non-volatile</li> <li>• false: the operation cycle state is only stored volatile</li> </ul> <p>This attribute is only relevant for the AUTOSAR adaptive platform. It no longer has a meaning on the AUTOSAR classic platform.</p>
type	DiagnosticOperation CycleTypeEnum	0..1	attr	Operation cycles types for the Dem.

**Table A.315: DiagnosticOperationCycle**

Class	DiagnosticOperationCyclePortMapping			
Package	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
Note	<p>Defines to which SWC service ports with DiagnosticOperationCycleNeeds the DiagnosticOperationCycle is mapped.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticMappings</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">DiagnosticSwMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
operationCycle	<a href="#">DiagnosticOperation Cycle</a>	0..1	ref	Reference to the DiagnosticOperationCycle that is assigned to SWC service ports with DiagnosticOperation CycleNeeds.
swcFlatService Dependency	<a href="#">SwcService Dependency</a>	0..1	ref	Reference to a SwcServiceDependencyType that links ServiceNeeds to SWC service ports.
swcService DependencyIn System	<a href="#">SwcService Dependency</a>	0..1	iref	<p>Instance reference to a SwcServiceDependency that links ServiceNeeds to SWC service ports.</p> <p><b>InstanceRef implemented by:</b>SwcServiceDependency InSystemInstanceRef</p>

**Table A.316: DiagnosticOperationCyclePortMapping**

Class	DiagnosticParameter			
Package	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
Note	This meta-class represents the ability to describe information relevant for the execution of a specific diagnostic service, i.e. it can be taken to parameterize the service.			
Base	<a href="#">ARObject</a>			
Attribute	Type	Mult.	Kind	Note
bitOffset	PositiveInteger	0..1	attr	<p>This represents the bitOffset of the DiagnosticParameter</p> <p><b>Stereotypes:</b> atpIdentityContributor</p>





Class	DiagnosticParameter			
dataElement	<a href="#">DiagnosticDataElement</a>	0..1	aggr	This represents the related dataElement of the Diagnostic Parameter  <b>Stereotypes:</b> atpSplittable; atpVariation <b>Tags:</b> atp.Splitkey=dataElement.shortName, dataElement.variationPoint.shortLabel vh.latestBindingTime=postBuild
supportInfo	DiagnosticParameterSupportInfo	0..1	aggr	This attribute represents the ability to define which bit of the support info byte is representing this part of the PID.

**Table A.317: DiagnosticParameter**

Class	DiagnosticParameterIdentifier			
Package	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
Note	This meta-class represents the ability to model a diagnostic parameter identifier (PID) for the purpose of executing on-board diagnostics (OBD).  <b>Tags:</b> atp.recommendedPackage=DiagnosticParameterIdentifiers			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
dataElement	<a href="#">DiagnosticParameter</a>	*	aggr	This represents the data carried by the Diagnostic ParameterIdentifier.  <b>Stereotypes:</b> atpSplittable; atpVariation <b>Tags:</b> atp.Splitkey=dataElement.bitOffset, dataElement.variationPoint.shortLabel vh.latestBindingTime=postBuild
id	PositiveInteger	0..1	attr	This is the numerical identifier used to identify the DiagnosticParameterIdentifier in the scope of diagnostic workflow (see SAE J1979-DA).
pidSize	PositiveInteger	0..1	attr	The size of the entire PID can be greater than the sum of the data elements because padding might be applied. Unit: byte.
supportInfoByte	DiagnosticSupportInfoByte	0..1	aggr	This represents the supported information associated with the DiagnosticParameterIdentifier.

**Table A.318: DiagnosticParameterIdentifier**

Class	DiagnosticPeriodicRate			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::ReadDataByPeriodicID			
Note	This represents the ability to define a periodic rate for the specification of the "read data by periodic ID" diagnostic service.			
Base	<a href="#">ARObject</a>			
Attribute	Type	Mult.	Kind	Note
period	TimeValue	0..1	attr	This represents the period of the DiagnosticPeriodicRate in seconds.
periodicRateCategory	DiagnosticPeriodicRateCategoryEnum	0..1	attr	This attribute represents the category of the periodic rate.

**Table A.319: DiagnosticPeriodicRate**

<b>Class</b>	<b>DiagnosticProofOfOwnership</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::Authentication			
<b>Note</b>	This meta-class represents the subfunction to provide proof of ownership. <b>Tags:</b> atp.recommendedPackage=DiagnosticAuthentications			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticAuthentication</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.320: DiagnosticProofOfOwnership**

<b>Class</b>	<b>DiagnosticProtocol</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticContribution			
<b>Note</b>	This meta-class represents the ability to define a diagnostic protocol. <b>Tags:</b> atp.recommendedPackage=DiagnosticProtocols			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
diagnostic Connection	<a href="#">DiagnosticConnection</a>	*	ref	This represents the collection of applicable Diagnostic Connections for this DiagnosticProtocol.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=diagnosticConnection.diagnosticConnection, diagnosticConnection.variationPoint.shortLabel vh.latestBindingTime=postBuild
priority	PositiveInteger	0..1	attr	This represents the priority of the diagnostic protocol in comparison to other diagnostic protocols. Lower numeric values represent higher protocol priority: <ul style="list-style-type: none"> <li>0 - Highest protocol priority</li> <li>255 - Lowest protocol priority</li> </ul> <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
protocolKind	NameToken	0..1	attr	This identifies the applicable protocol.
sendRespPend OnTransToBoot	Boolean	0..1	attr	The purpose of this attribute is to define whether or not the ECU should send a NRC 0x78 (response pending) before transitioning to the bootloader (in this case the attribute shall be set to "true") or if the transition shall be initiated without sending NRC 0x78 (in this case the attribute shall be set to "false").  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
serviceTable	<a href="#">DiagnosticServiceTable</a>	0..1	ref	This represents the service table applicable for the given diagnostic protocol.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=serviceTable.diagnosticServiceTable, serviceTable.variationPoint.shortLabel vh.latestBindingTime=postBuild

**Table A.321: DiagnosticProtocol**

<b>Class</b>	<b>DiagnosticReadDataByIdentifier</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::DataByIdentifier			
<b>Note</b>	This represents an instance of the "Read Data by Identifier" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticDataByIdentifiers			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticDataByIdentifier</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
readClass	DiagnosticReadDataByIdentifierClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticReadDataByIdentifier in the given context.

**Table A.322: DiagnosticReadDataByIdentifier**

<b>Class</b>	<b>DiagnosticReadDataByPeriodicIDClass</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::ReadDataByPeriodicID			
<b>Note</b>	This meta-class contains attributes shared by all instances of the "Read Data by periodic Identifier" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticReadDataByPeriodicIds			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceClass</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
maxPeriodicDidToRead	PositiveInteger	0..1	attr	This represents the maximum number of data identifiers that can be included in one request.
periodicRate	<a href="#">DiagnosticPeriodicRate</a>	*	aggr	This represents the description of a collection of periodic rates in which the service can be executed.
schedulerMaxNumber	PositiveInteger	0..1	attr	This represents the maximum number of periodic data identifiers that can be scheduled in parallel.

**Table A.323: DiagnosticReadDataByPeriodicIDClass**

<b>Class</b>	<b>DiagnosticReadScalingDataByIdentifier</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::DataByIdentifier			
<b>Note</b>	This represents an instance of the "Read Scaling Data by Identifier" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticDataByIdentifiers			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticDataByIdentifier</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
readScalingDataClass	DiagnosticReadScalingDataByIdentifierClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticReadScalingDataByIdentifier in the given context.

**Table A.324: DiagnosticReadScalingDataByIdentifier**

<b>Enumeration</b>	<b>DiagnosticRecordTriggerEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticFreezeFrame
<b>Note</b>	Triggers to allocate an event memory entry.
<b>Literal</b>	<b>Description</b>
confirmed	capture on "Confirmed" <b>Tags:</b> atp.EnumerationLiteralIndex=0
custom	implement custom capture <b>Tags:</b> atp.EnumerationLiteralIndex=4
fdcThreshold	capture on "FDC Threshold" <b>Tags:</b> atp.EnumerationLiteralIndex=1
pending	capture on "Pending" <b>Tags:</b> atp.EnumerationLiteralIndex=2
testFailed	capture on "Test Failed" <b>Tags:</b> atp.EnumerationLiteralIndex=3
testFailedThis OperationCycle	Test Failed This Operation Cycle. <b>Tags:</b> atp.EnumerationLiteralIndex=5

**Table A.325: DiagnosticRecordTriggerEnum**

<b>Class</b>	<b>DiagnosticRequestControlOfOnBoardDevice</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::ObdService::Mode_0x08_RequestControlOfOnBoardDevice			
<b>Note</b>	This meta-class represents the ability to model an instance of the OBD mode 0x08 service. <b>Tags:</b> atp.recommendedPackage=DiagnosticRequestControlOfOnBoardDevices			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
requestControlOfOnBoardDeviceClass	DiagnosticRequestControlOfOnBoardDeviceClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticRequestControlOfOnBoardDevice in the given context.
testId	<a href="#">DiagnosticTestRoutineIdentifier</a>	0..1	ref	This represents the test Id for the mode 0x08.

**Table A.326: DiagnosticRequestControlOfOnBoardDevice**

<b>Class</b>	<b>DiagnosticRequestCurrentPowertrainData</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::ObdService::Mode_0x01_RequestCurrentPowertrainDiagnosticData			
<b>Note</b>	This meta-class represents the ability to model an instance of the OBD mode 0x01 service. <b>Tags:</b> atp.recommendedPackage=DiagnosticRequestCurrentPowertrainDatas			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			





Class	DiagnosticRequestCurrentPowertrainData			
Attribute	Type	Mult.	Kind	Note
pid	<a href="#">DiagnosticParameterIdentifier</a>	0..1	ref	This represents the PID associated with this instance of the OBD mode 0x01 service.
requestCurrentPowertrainDiagnosticDataClass	DiagnosticRequestCurrentPowertrainDataClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class. Thereby, the reference represents the ability to access shared attributes among all DiagnosticRequestCurrentPowertrainData in the given context.

**Table A.327: DiagnosticRequestCurrentPowertrainData**

Class	DiagnosticRequestDownload			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::MemoryByAddress			
Note	This represents an instance of the "Request Download" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticMemoryByAdresss			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMemoryAddressableRangeAccess</a> , <a href="#">DiagnosticMemoryByAddress</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
requestDownloadClass	DiagnosticRequestDownloadClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class. Thereby, the reference represents the ability to access shared attributes among all DiagnosticRequestDownload in the given context.

**Table A.328: DiagnosticRequestDownload**

Class	DiagnosticRequestEmissionRelatedDTC			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::ObdService::Mode_0x03_0x07_RequestEmissionRelatedDTC			
Note	This meta-class represents the ability to model an instance of the OBD mode 0x03/0x07 service. <b>Tags:</b> atp.recommendedPackage=DiagnosticRequestEmissionRelatedDTCs			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
requestEmissionRelatedDtcClass	DiagnosticRequestEmissionRelatedDTCClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class. Thereby, the reference represents the ability to access shared attributes among all DiagnosticRequestEmissionRelatedDTC in the given context.

**Table A.329: DiagnosticRequestEmissionRelatedDTC**

Class	DiagnosticRequestEmissionRelatedDTCPermanentStatus			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::ObdService::Mode_0x0A_RequestEmissionRelatedDTCPermanentStatus			





Class	DiagnosticRequestEmissionRelatedDTCPermanentStatus			
Note	This meta-class represents the ability to model an instance of the OBD mode 0x0A service. <b>Tags:</b> atp.recommendedPackage=DiagnosticRequestEmissionRelatedDTCPermanentStatus			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
requestEmissionRelatedDtcPermanentStatus	DiagnosticRequestEmissionRelatedDTCPermanentStatusClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticRequestEmissionRelatedDTCPermanentStatus in the given context.

**Table A.330: DiagnosticRequestEmissionRelatedDTCPermanentStatus**

Class	DiagnosticRequestOnBoardMonitoringTestResults			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::ObdService::Mode_0x06_RequestOnBoardMonitoringTestResults			
Note	This meta-class represents the ability to model an instance of the OBD mode 0x06 service. <b>Tags:</b> atp.recommendedPackage=DiagnosticRequestOnBoardMonitoringTestResults			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
diagnosticTestResult	<a href="#">DiagnosticTestResult</a>	*	ref	This reference identifies the applicable collection of test identifiers for setting up a request message for mode 0x06.
requestOnBoardMonitoringTestResultsClass	DiagnosticRequestOnBoardMonitoringTestResultsClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticRequestOnBoardMonitoringTestResults in the given context.

**Table A.331: DiagnosticRequestOnBoardMonitoringTestResults**

Class	DiagnosticRequestPowertrainFreezeFrameData			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::ObdService::Mode_0x02_RequestPowertrainFreezeFrameData			
Note	This meta-class represents the ability to model an instance of the OBD mode 0x02 service. <b>Tags:</b> atp.recommendedPackage=DiagnosticPowertrainFreezeFrames			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
freezeFrame	DiagnosticPowertrainFreezeFrame	0..1	ref	This represents the associated freeze-frame.
requestPowertrainFreezeFrameData	DiagnosticRequestPowertrainFreezeFrameDataClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticRequestPowertrainFreezeFrameData in the given context.

**Table A.332: DiagnosticRequestPowertrainFreezeFrameData**

<b>Class</b>	<b>DiagnosticRequestRoutineResults</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
<b>Note</b>	This meta-class represents the ability to define the result of a diagnostic routine execution.			
<b>Base</b>	ARObject, DiagnosticRoutineSubfunction, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
request	<a href="#">DiagnosticParameter</a>	*	aggr	This represents the request parameters.
response	<a href="#">DiagnosticParameter</a>	*	aggr	This represents the response parameters.

**Table A.333: DiagnosticRequestRoutineResults**

<b>Class</b>	<b>DiagnosticRequestUpload</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::MemoryByAddress			
<b>Note</b>	This represents an instance of the "Request Upload" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticMemoryByAdresss			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, CollectableElement, <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMemoryAddressableRangeAccess</a> , <a href="#">DiagnosticMemoryByAddress</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
requestUpload Class	DiagnosticRequest UploadClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticRequestUpload in the given context.

**Table A.334: DiagnosticRequestUpload**

<b>Class</b>	<b>DiagnosticRequestVehicleInfo</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::ObdService::Mode_0x09_RequestVehicleInformation			
<b>Note</b>	This meta-class represents the ability to model an instance of the OBD mode 0x09 service. <b>Tags:</b> atp.recommendedPackage=DiagnosticRequestVehicleInfos			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, CollectableElement, <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
infoType	<a href="#">DiagnosticInfoType</a>	0..1	ref	This represents the info type associated with the mode 0x09 service.
requestVehicle Information Class	DiagnosticRequest VehicleInfoClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticRequesVehicleInfo in the given context.

**Table A.335: DiagnosticRequestVehicleInfo**



<b>Class</b>	<b>DiagnosticRoutine</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
<b>Note</b>	This meta-class represents the ability to define a diagnostic routine. <b>Tags:</b> atp.recommendedPackage=DiagnosticRoutines			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
id	PositiveInteger	0..1	attr	This is the numerical identifier used to identify the DiagnosticRoutine in the scope of diagnostic workflow <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
requestResult	<a href="#">DiagnosticRequestRoutineResults</a>	0..1	aggr	This represents the ability to request the result of a running routine.
routineInfo	PositiveInteger	0..1	attr	This represents the routine info byte. The info byte contains a manufacturer-specific value (for the identification of record identifiers) that is reported to the tester.  Other use cases for this attribute are mentioned in ISO 27145 and ISO 26021.
start	<a href="#">DiagnosticStartRoutine</a>	0..1	aggr	This represents the ability to start a routine
stop	<a href="#">DiagnosticStopRoutine</a>	0..1	aggr	This represents the ability to stop a running routine.

**Table A.336: DiagnosticRoutine**

<b>Class</b>	<b>DiagnosticRoutineControl</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::RoutineControl			
<b>Note</b>	This represents an instance of the "Routine Control" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticRoutineControls			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
routine	<a href="#">DiagnosticRoutine</a>	1	ref	This refers to the applicable DiagnosticRoutine.
routineControlClass	DiagnosticRoutineControlClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticRoutineControl in the given context.

**Table A.337: DiagnosticRoutineControl**

<b>Class</b>	<b>DiagnosticRoutineNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	Specifies the general needs on the configuration of the Diagnostic Communication Manager (Dcm) which are not related to a particular item (e.g. a PID). The main use case is the mapping of service ports to the Dcm which are not related to a particular item.			





Class	DiagnosticRoutineNeeds			
Base	ARObject, DiagnosticCapabilityElement, Identifiable, MultilanguageReferrable, Referrable, ServiceNeeds			
Attribute	Type	Mult.	Kind	Note
diagRoutineType	DiagnosticRoutineTypeEnum	0..1	attr	This denotes the type of diagnostic routine which is implemented by the referenced server port.

**Table A.338: DiagnosticRoutineNeeds**

Enumeration	DiagnosticRoutineTypeEnum
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds
Note	This enumerator specifies the different types of diagnostic routines.
Literal	Description
asynchronous	This indicates that the diagnostic server is not blocked while the diagnostic routine is running. <b>Tags:</b> atp.EnumerationLiteralIndex=0
synchronous	This indicates that the diagnostic routine blocks the diagnostic server in the ECU while the routine is running. <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.339: DiagnosticRoutineTypeEnum**

Class	DiagnosticSecurityAccess			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::SecurityAccess			
Note	This represents an instance of the "Security Access" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticSecurityAccess			
Base	ARElement, ARObject, CollectableElement, DiagnosticCommonElement, DiagnosticServiceInstance, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mult.	Kind	Note
requestSeedId	PositiveInteger	0..1	attr	This would be 0x01, 0x03, 0x05, ... The sendKey id can be computed by adding 1 to the requestSeedId
securityAccessClass	DiagnosticSecurityAccessClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class. Thereby, the reference represents the ability to access shared attributes among all DiagnosticSecurityAccess in the given context.
securityDelayTimeOnBoot	TimeValue	0..1	attr	Start delay timer on power on in seconds. This delay indicates the time at ECU boot power-on time where the Dcm remains in the default session and does not accept a security access.
securityLevel	DiagnosticSecurityLevel	0..1	ref	This reference identifies the applicable security level for the security access. <b>Stereotypes:</b> atp.Splitable <b>Tags:</b> atp.Splitkey=securityLevel

**Table A.340: DiagnosticSecurityAccess**

<b>Class</b>	<b>DiagnosticSecurityAccessClass</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::SecurityAccess			
<b>Note</b>	This meta-class contains attributes shared by all instances of the "Security Access" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticSecurityAccess			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceClass</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.341: DiagnosticSecurityAccessClass**

<b>Class</b>	<b>DiagnosticSecurityEventReportingModeMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping::ServiceMapping			
<b>Note</b>	This meta-class represents the ability to associate a location in a DID with a security event. The purpose of this mapping is that the location in the DID contains the setting of the reporting mode for the specific security event. This means that the reporting mode of the security event can be set via the diagnostic service WriteDataByIdentifier. <b>Tags:</b> atp.Status=draft atp.recommendedPackage=DiagnosticMappings			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataElement	<a href="#">DiagnosticDataElement</a>	0..1	ref	This reference identifies the data element that carries the information about the reporting mode. <b>Tags:</b> atp.Status=draft
securityEvent	<a href="#">SecurityEventContext Props</a>	0..1	ref	This reference identifies the mapped security event. <b>Tags:</b> atp.Status=draft

**Table A.342: DiagnosticSecurityEventReportingModeMapping**

<b>Class</b>	<b>DiagnosticSecurityLevel</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm			
<b>Note</b>	This meta-class represents the ability to define a security level considered for diagnostic purposes. <b>Tags:</b> atp.recommendedPackage=DiagnosticSecurityLevels			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
accessDataRecordSize	PositiveInteger	0..1	attr	This represents the size of the AccessDataRecord used in GetSeed. Unit:byte.
keySize	PositiveInteger	0..1	attr	This represents the size of the security key. Unit: byte.
numFailedSecurityAccess	PositiveInteger	0..1	attr	This represents the number of failed security accesses after which the delay time is activated.
securityDelayTime	TimeValue	0..1	attr	This represents the delay time after a failed security access. Unit: second.





Class	DiagnosticSecurityLevel			
seedSize	PositiveInteger	0..1	attr	This represents the size of the security seed. Unit: byte.

**Table A.343: DiagnosticSecurityLevel**

Class	DiagnosticServiceClass (abstract)			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::CommonService			
Note	This meta-class provides the ability to define common properties that are shared among all instances of sub-classes of DiagnosticServiceInstance.			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Subclasses	DiagnosticAuthenticationClass, DiagnosticClearDiagnosticInformationClass, DiagnosticClearResetEmissionRelatedInfoClass, DiagnosticComControlClass, DiagnosticControlDTCSettingClass, <a href="#">DiagnosticCustomServiceClass</a> , DiagnosticDataTransferClass, <a href="#">DiagnosticDynamicallyDefineDataIdentifierClass</a> , DiagnosticEcuResetClass, DiagnosticIoControlClass, DiagnosticReadDTCInformationClass, DiagnosticReadDataByIdentifierClass, <a href="#">DiagnosticReadDataByPeriodicIDClass</a> , DiagnosticReadMemoryByAddressClass, DiagnosticReadScalingDataByIdentifierClass, DiagnosticRequestControlOfOnBoardDeviceClass, DiagnosticRequestCurrentPowertrainDataClass, DiagnosticRequestDownloadClass, DiagnosticRequestEmissionRelatedDTCClass, DiagnosticRequestEmissionRelatedDTCPermanentStatusClass, DiagnosticRequestFileTransferClass, DiagnosticRequestOnBoardMonitoringTestResultsClass, DiagnosticRequestPowertrainFreezeFrameDataClass, DiagnosticRequestUploadClass, DiagnosticRequestVehicleInfoClass, DiagnosticResponseOnEventClass, DiagnosticRoutineControlClass, <a href="#">DiagnosticSecurityAccessClass</a> , DiagnosticSessionControlClass, DiagnosticTransferExitClass, DiagnosticWriteDataByIdentifierClass, DiagnosticWriteMemoryByAddressClass			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.344: DiagnosticServiceClass**

Class	DiagnosticServiceDataMapping			
Package	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping::ServiceMapping			
Note	This represents the ability to define a mapping of a diagnostic service to a software-component.  This kind of service mapping is applicable for the usage of SenderReceiverInterfaces or event/notifier semantics in ServiceInterfaces on the adaptive platform.  <b>Tags:</b> atp.recommendedPackage=DiagnosticServiceMappings			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
diagnosticDataElement	<a href="#">DiagnosticDataElement</a>	0..1	ref	This represents the applicable payload that corresponds to the referenced DataPrototype in the role mappedDataElement or (in case of a usage on the adaptive platform) mappedApDataElement.
mappedDataElement	<a href="#">DataPrototype</a>	0..1	iref	This represents the dataElement in the application software that is accessed for diagnostic purpose. This role is applicable on the classic platform.  <b>InstanceRef implemented by:</b> DataPrototypeInSystemInstanceRef

**Table A.345: DiagnosticServiceDataMapping**

<b>Class</b>	<b>DiagnosticServiceInstance</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::CommonService			
<b>Note</b>	This represents a concrete instance of a diagnostic service.			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">DiagnosticAuthentication</a> , <a href="#">DiagnosticClearDiagnosticInformation</a> , <a href="#">DiagnosticClearResetEmissionRelatedInfo</a> , <a href="#">DiagnosticComControl</a> , <a href="#">DiagnosticControlDTCSetting</a> , <a href="#">DiagnosticCustomServiceInstance</a> , <a href="#">DiagnosticDataByIdentifier</a> , <a href="#">DiagnosticDynamicallyDefineDataIdentifier</a> , <a href="#">DiagnosticEcuReset</a> , <a href="#">DiagnosticIOControl</a> , <a href="#">DiagnosticMemoryByAddress</a> , <a href="#">DiagnosticReadDTCInformation</a> , <a href="#">DiagnosticReadDataByPeriodicID</a> , <a href="#">DiagnosticRequestControlOfOnBoardDevice</a> , <a href="#">DiagnosticRequestCurrentPowertrainData</a> , <a href="#">DiagnosticRequestEmissionRelatedDTC</a> , <a href="#">DiagnosticRequestEmissionRelatedDTCPermanentStatus</a> , <a href="#">DiagnosticRequestFileTransfer</a> , <a href="#">DiagnosticRequestOnBoardMonitoringTestResults</a> , <a href="#">DiagnosticRequestPowertrainFreezeFrameData</a> , <a href="#">DiagnosticRequestVehicleInfo</a> , <a href="#">DiagnosticResponseOnEvent</a> , <a href="#">DiagnosticRoutineControl</a> , <a href="#">DiagnosticSecurityAccess</a> , <a href="#">DiagnosticSessionControl</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
access Permission	<a href="#">DiagnosticAccessPermission</a>	0..1	ref	This represents the collection of DiagnosticAccess Permissions that allow for the execution of the referencing DiagnosticServiceInstance..
serviceClass	<a href="#">DiagnosticServiceClass</a>	0..1	ref	This represents the corresponding "class", i.e. this meta-class provides properties that are shared among all instances of applicable sub-classes of DiagnosticService Instance.  The subclasses that affected by this pattern implement references to the applicable "class"-role that substantiate this abstract reference.  <b>Stereotypes:</b> atpAbstract

**Table A.346: DiagnosticServiceInstance**

<b>Class</b>	<b>DiagnosticServiceSwMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping::ServiceMapping			
<b>Note</b>	This represents the ability to define a mapping of a diagnostic service to a software-component or a basic-software module. If the former is used then this kind of service mapping is applicable for the usage of ClientServerInterfaces.  <b>Tags:</b> atp.recommendedPackage=DiagnosticServiceMappings			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">DiagnosticSwMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
diagnosticData Element	<a href="#">DiagnosticDataElement</a>	0..1	ref	This represents a DiagnosticDataElement required to execute the respective diagnostic service in the context of the diagnostic service mapping,
mappedBsw Service Dependency	<a href="#">BswServiceDependencyIdent</a>	0..1	ref	This is supposed to represent a reference to a Bsw ServiceDependency. the latter is not derived from Referrable and therefore this detour needs to be implemented to still let BswServiceDependency become the target of a reference.
mappedFlatSwc Service Dependency	<a href="#">SwcServiceDependency</a>	0..1	ref	This represents the ability to refer to an AtomicSw ComponentType that is available without the definition of how it will be embedded into the component hierarchy.





Class	DiagnosticServiceSwMapping			
mappedSwcServiceDependencyInSystem	<a href="#">SwcServiceDependency</a>	0..1	iref	This represents the ability to point into the component hierarchy (under possible consideration of the root SoftwareComposition)  <b>InstanceRef implemented by:</b> SwcServiceDependencyInSystemInstanceRef
serviceInstance	<a href="#">DiagnosticServiceInstance</a>	0..1	ref	This represents the service instance that needs to be considered in this diagnostics service mapping.

**Table A.347: DiagnosticServiceSwMapping**

Class	DiagnosticServiceTable			
Package	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticContribution			
Note	This meta-class represents a model of a diagnostic service table, i.e. the UDS services applicable for a given ECU.  <b>Tags:</b> atp.recommendedPackage=DiagnosticServiceTables			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
diagnosticConnection	<a href="#">DiagnosticConnection</a>	*	ref	This represents the DiagnosticConnection that is taken for handling the data transmission for the enclosing DiagnosticServiceTable.  It is possible to refer to more than one diagnostic Connections in order to support more than one diagnostic tester.  <b>Stereotypes:</b> atp.Splitable; atp.Variation <b>Tags:</b> atp.Splitkey=diagnosticConnection.diagnosticConnection, diagnosticConnection.variationPoint.shortLabel vh.latestBindingTime=postBuild
ecuInstance	<a href="#">EcuInstance</a>	0..1	ref	This represents the applicable EcuInstance for this DiagnosticServiceTable.
protocolKind	NameToken	0..1	attr	This identifies the applicable protocol.
serviceInstance	<a href="#">DiagnosticServiceInstance</a>	*	ref	This represents the collection of DiagnosticService Instances to be considered in the scope of this Diagnostic ServiceTable,

**Table A.348: DiagnosticServiceTable**

Class	DiagnosticSession			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm			
Note	This meta-class represents the ability to define a diagnostic session.  <b>Tags:</b> atp.recommendedPackage=DiagnosticSessions			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
id	PositiveInteger	0..1	attr	This is the numerical identifier used to identify the DiagnosticSession in the scope of diagnostic workflow





Class	DiagnosticSession			
jumpToBootLoader	DiagnosticJumpToBootLoaderEnum	0..1	attr	This attribute represents the ability to define whether this diagnostic session allows to jump to Bootloader (OEM Bootloader or System Supplier Bootloader).  If this diagnostic session doesn't allow to jump to Bootloader the value JumpToBootLoaderEnum.noBoot shall be chosen.
p2ServerMax	TimeValue	0..1	attr	This is the session value for P2ServerMax in seconds (per Session Control).  The AUTOSAR configuration standard is to use SI units, so this parameter is defined as a float value in seconds.
p2StarServerMax	TimeValue	0..1	attr	This is the session value for P2*ServerMax in seconds (per Session Control).  The AUTOSAR configuration standard is to use SI units, so this parameter is defined as a float value in seconds.

**Table A.349: DiagnosticSession**

Class	DiagnosticSessionControl			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::SessionControl			
Note	This represents an instance of the "Session Control" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticSessionControls			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
diagnosticSession	<a href="#">DiagnosticSession</a>	0..1	ref	This represents the applicable DiagnosticSessions
sessionControlClass	DiagnosticSessionControlClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticSessionControl in the given context.

**Table A.350: DiagnosticSessionControl**

Class	DiagnosticStartRoutine			
Package	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
Note	This represents the ability to start a diagnostic routine.			
Base	<a href="#">ARObject</a> , <a href="#">DiagnosticRoutineSubfunction</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
request	<a href="#">DiagnosticParameter</a>	*	aggr	This represents the request parameters.
response	<a href="#">DiagnosticParameter</a>	*	aggr	This represents the response parameters.

**Table A.351: DiagnosticStartRoutine**

<b>Class</b>	<b>DiagnosticStopRoutine</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::CommonDiagnostics			
<b>Note</b>	This represents the ability to stop a diagnostic routine.			
<b>Base</b>	ARObject, DiagnosticRoutineSubfunction, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
request	<a href="#">DiagnosticParameter</a>	*	aggr	This represents the request parameters.
response	<a href="#">DiagnosticParameter</a>	*	aggr	This represents the response parameters.

**Table A.352: DiagnosticStopRoutine**

<b>Class</b>	<b>DiagnosticStorageCondition</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticCondition			
<b>Note</b>	Specification of a storage condition. <b>Tags:</b> atp.recommendedPackage=DiagnosticConditions			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, CollectableElement, <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticCondition</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.353: DiagnosticStorageCondition**

<b>Class</b>	<b>DiagnosticStorageConditionGroup</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticConditionGroup			
<b>Note</b>	Storage condition group which includes one or several storage conditions. <b>Tags:</b> atp.recommendedPackage=DiagnosticConditions			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, CollectableElement, <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticConditionGroup</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
storage Condition	<a href="#">DiagnosticStorageCondition</a>	1..*	ref	Reference to storageConditions that are part of the StorageConditionGroup.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=storageCondition.diagnosticStorageCondition, storageCondition.variationPoint.shortLabel vh.latestBindingTime=postBuild

**Table A.354: DiagnosticStorageConditionGroup**

<b>Class</b>	<b>DiagnosticStorageConditionPortMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::DiagnosticMapping			
<b>Note</b>	Defines to which SWC service ports with DiagnosticStorageConditionNeeds the DiagnosticStorageCondition is mapped. <b>Tags:</b> atp.recommendedPackage=DiagnosticMappings			







Class	DiagnosticStorageConditionPortMapping			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticMapping</a> , <a href="#">DiagnosticSwMapping</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
diagnosticStorageCondition	<a href="#">DiagnosticStorageCondition</a>	0..1	ref	Reference to the StorageCondition which is mapped to a SWC service port with DiagnosticStorageCondition Needs.
swcFlatServiceDependency	<a href="#">SwcServiceDependency</a>	0..1	ref	Reference to a SwcServiceDependencyType that links ServiceNeeds to SWC service ports.
swcServiceDependencyInSystem	<a href="#">SwcServiceDependency</a>	0..1	iref	Instance reference to a SwcServiceDependency that links ServiceNeeds to SWC service ports.  <b>InstanceRef implemented by:</b> SwcServiceDependencyInSystemInstanceRef

**Table A.355: DiagnosticStorageConditionPortMapping**

Class	DiagnosticTestIdentifier			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTestResult			
Note	This meta-class represents the ability to create a diagnostic test identifier.			
Base	<a href="#">ARObject</a>			
Attribute	Type	Mult.	Kind	Note
id	PositiveInteger	1	attr	This represents the numerical id associated with the diagnostic test identifier.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
uasId	PositiveInteger	1	attr	This represents the unit and scaling Id of the diagnostic test result.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.356: DiagnosticTestIdentifier**

Class	DiagnosticTestResult			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTestResult			
Note	This meta-class represents the ability to define diagnostic test results.  <b>Tags:</b> atp.recommendedPackage=DiagnosticTestResults			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
diagnosticEvent	<a href="#">DiagnosticEvent</a>	0..1	ref	This attribute represents the diagnostic event that is related to the diagnostic test result.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
monitoredIdentifier	DiagnosticMeasurementIdentifier	0..1	ref	This attribute represents the related diagnostic monitored identifier.
testIdentifier	<a href="#">DiagnosticTestIdentifier</a>	0..1	aggr	This attribute represents the applicable test identifier.





Class	DiagnosticTestResult			
updateKind	DiagnosticTestResultUpdateEnum	0..1	attr	This attribute controls the update behavior of the enclosing DiagnosticTestResult. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.357: DiagnosticTestResult**

Class	DiagnosticTestRoutineIdentifier			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::ObdService::Mode_0x08_RequestControlOfOnBoardDevice			
Note	This represents the test id of the DiagnosticTestIdentifier. <b>Tags:</b> atp.recommendedPackage=DiagnosticTestRoutineIdentifier			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
id	PositiveInteger	1	attr	This represents the numerical id of the DiagnosticTestIdentifier (see SAE J1979-DA).
requestDataSize	PositiveInteger	1	attr	This represents the specified data size for the request message. Unit: byte.
responseDataSize	PositiveInteger	1	attr	This represents the specified data size for the response message. Unit: byte.

**Table A.358: DiagnosticTestRoutineIdentifier**

Class	DiagnosticTroubleCodeGroup			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
Note	The diagnostic trouble code group defines the DTCs belonging together and thereby forming a group. <b>Tags:</b> atp.recommendedPackage=DiagnosticTroubleCodes			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
dtc	DiagnosticTroubleCode	*	ref	This represents the collection of DiagnosticTroubleCodes defined by this DiagnosticTroubleCodeGroup. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=dtc.diagnosticTroubleCode, dtc.variationPoint.shortLabel vh.latestBindingTime=postBuild
groupNumber	PositiveInteger	0..1	attr	This represents the base number of the DTC group. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.359: DiagnosticTroubleCodeGroup**

<b>Class</b>	<b>DiagnosticTroubleCodeJ1939</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
<b>Note</b>	This meta-class represents the ability to model specific trouble-code related properties for J1939. <b>Tags:</b> atp.recommendedPackage=DiagnosticTroubleCodes			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticTroubleCode</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dtcProps	<a href="#">DiagnosticTroubleCodeProps</a>	0..1	ref	Defined properties associated with the J1939 DTC.
fmi	PositiveInteger	0..1	attr	This attribute represents the behavior of the Failure Mode Indicator.
kind	<a href="#">DiagnosticTroubleCodeJ1939DtcKindEnum</a>	0..1	attr	This attribute further specifies the DTC in terms of its semantics.
node	<a href="#">DiagnosticJ1939Node</a>	0..1	ref	This represents the related DiagnosticJ1939Node.
spn	<a href="#">DiagnosticJ1939Spn</a>	0..1	ref	This represents the related SPN.

**Table A.360: DiagnosticTroubleCodeJ1939**

<b>Enumeration</b>	<b>DiagnosticTroubleCodeJ1939DtcKindEnum</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
<b>Note</b>	This meta-class represents the ability to further specify a J1939 DTC in terms of its semantics.			
<b>Literal</b>	<b>Description</b>			
serviceOnly	this represents a DTC that is only relevant for service in a garage, reported by e.g. DM53. <b>Tags:</b> atp.EnumerationLiteralIndex=0			
standard	This represents a non-specific DTC reported by e.g. DM1. <b>Tags:</b> atp.EnumerationLiteralIndex=1			

**Table A.361: DiagnosticTroubleCodeJ1939DtcKindEnum**

<b>Class</b>	<b>DiagnosticTroubleCodeObd</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
<b>Note</b>	This element is used to define OBD-relevant DTCs. <b>Tags:</b> atp.recommendedPackage=DiagnosticTroubleCodes			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticTroubleCode</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
considerPtoStatus	Boolean	0..1	attr	This attribute describes the affection of the event by the Dem PTO handling.  True: the event is affected by the Dem PTO handling. False: the event is not affected by the Dem PTO handling. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
dtcProps	<a href="#">DiagnosticTroubleCodeProps</a>	0..1	ref	Defined properties associated with the DemDTC.





Class	DiagnosticTroubleCodeObd			
eventReadinessGroup	EventObdReadinessGroup	0..1	aggr	This aggregation allows for the variant definition of the attribute eventObdReadinessGroup. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=eventReadinessGroup.eventObdReadinessGroup, eventReadinessGroup.variationPoint.shortLabel vh.latestBindingTime=postBuild
obdDTCValue	PositiveInteger	0..1	attr	Unique Diagnostic Trouble Code value for OBD. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
obdDTCValue3Byte	PositiveInteger	0..1	attr	3 Byte OBD DTC value based on the definition from SAE J2012. The existence of this attribute is only required if separated UDS and OBD DTC values are used for SAE J1979-2. If this attribute does not exist, then UDS DTC values are used with J1979-2. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

Table A.362: DiagnosticTroubleCodeObd

Class	DiagnosticTroubleCodeProps			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
Note	This element defines common Dtc properties that can be reused by different non OBD-relevant DTCs. <b>Tags:</b> atp.recommendedPackage=DiagnosticTroubleCodePropss			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
aging	<a href="#">DiagnosticAging</a>	0..1	ref	Reference to an aging algorithm in case that an aging/unlearning of the event is allowed.
diagnosticMemory	<a href="#">DiagnosticMemoryDestination</a>	0..1	ref	Reference to the applicable DiagnosticMemory Destination.
extendedDataRecord	<a href="#">DiagnosticExtendedDataRecord</a>	*	ref	Defines the links to an extended data class sampler. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=extendedDataRecord.diagnosticExtendedDataRecord, extendedDataRecord.variationPoint.shortLabel vh.latestBindingTime=preCompileTime
freezeFrame	<a href="#">DiagnosticFreezeFrame</a>	*	ref	Define the links to a freeze frame class sampler. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=freezeFrame.diagnosticFreezeFrame, freezeFrame.variationPoint.shortLabel vh.latestBindingTime=preCompileTime
immediateNvDataStorage	Boolean	0..1	attr	Switch to enable immediate storage triggering of an according event memory entry persistently to NVRAM. true: immediate non-volatile storage triggering enabled false: immediate non-volatile storage triggering disabled





Class	DiagnosticTroubleCodeProps			
legislated FreezeFrame ContentUdsObd	<a href="#">DiagnosticDataIdentifier Set</a>	0..1	ref	This reference identifies the layout of legislated freeze frames used for emission related diagnostics over the UDS protocol such as OBDOnUDS or WWH-OBD.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
maxNumber FreezeFrame Records	PositiveInteger	0..1	attr	This attribute defines the number of according freeze frame records, which can maximal be stored for this event. Therefore all these freeze frame records have the same freeze frame class.
priority	PositiveInteger	0..1	attr	Priority of the event, in view of full event buffer. A lower value means higher priority.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
significance	DiagnosticSignificance Enum	0..1	attr	Significance of the event, which indicates additional information concerning fault classification and resolution.
snapshot RecordContent	<a href="#">DiagnosticDataIdentifier Set</a>	0..1	ref	This represents the freeze frame layout as a set of DIDs.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.363: DiagnosticTroubleCodeProps**

Class	DiagnosticTroubleCodeUds			
Package	M2::AUTOSARTemplates::DiagnosticExtract::Dem::DiagnosticTroubleCode			
Note	This element is used to describe non OBD-relevant DTCs. <b>Tags:</b> atp.recommendedPackage=DiagnosticTroubleCodes			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticTroubleCode</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
considerPto Status	Boolean	0..1	attr	This attribute describes the affection of the event by the Dem PTO handling.  True: the event is affected by the Dem PTO handling. False: the event is not affected by the Dem PTO handling.
dtcProps	<a href="#">DiagnosticTroubleCode Props</a>	0..1	ref	Defined properties associated with the DemDTC.
eventObd Readiness Group	NameToken	0..1	attr	This attribute specifies the Event OBD Readiness group for PID \$01 and PID \$41 computation. This attribute is only applicable for emission-related ECUs.
functionalUnit	PositiveInteger	0..1	attr	This attribute specifies a 1-byte value which identifies the corresponding basic vehicle / system function which reports the DTC. This parameter is necessary for the report of severity information.
severity	DiagnosticUdsSeverity Enum	0..1	attr	DTC severity according to ISO 14229-1.
udsDtcValue	PositiveInteger	0..1	attr	Unique Diagnostic Trouble Code value for UDS.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
wwhObdDtc Class	DiagnosticWwhObdDtc ClassEnum	0..1	attr	This attribute is used to identify (if applicable) the corresponding severity class of an WWH-OBD DTC.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.364: DiagnosticTroubleCodeUds**

<b>Class</b>	<b>DiagnosticValueNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	<p>Specifies the general needs on the configuration of the Diagnostic Communication Manager (DCM) which are not related to a particular item (e.g. a PID). The main use case is the mapping of service ports to the DCM which are not related to a particular item.</p> <p>In the case of using a sender receiver communicated value, the related value shall be taken via assigned Data in the role "signalBasedDiagnostics".</p> <p>In case of using a client/server communicated value, the related value shall be communicated via the port referenced by assignedPort. The details of this communication (e.g. appropriate naming conventions) are specified in the related software specifications (SWS).</p>			
<b>Base</b>	ARObject, DiagnosticCapabilityElement, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataLength	PositiveInteger	0..1	attr	<p>This attribute is applicable only if the DiagnosticValueNeeds is aggregated within a BswModuleDependency.</p> <p>This attribute represents the length of data (in bytes) provided for this particular PID signal.</p>
diagnosticValueAccess	DiagnosticValueAccessEnum	0..1	attr	<p>This attribute is applicable only if the DiagnosticValueNeeds is aggregated within a BswModuleDependency.</p> <p>This attribute controls whether the data can be read and written or whether it is to be handled read-only.</p>
fixedLength	Boolean	0..1	attr	<p>This attribute is applicable only if the DiagnosticValueNeeds is aggregated within a BswModuleDependency.</p> <p>This attribute controls whether the data length of the data is fixed.</p>
processingStyle	DiagnosticProcessingStyleEnum	0..1	attr	<p>This attribute controls whether interaction requires the software-component to react synchronously on a request or whether it processes the request in background but still the DCM has to issue the call again to eventually obtain the result of the request.</p>

**Table A.365: DiagnosticValueNeeds**

<b>Class</b>	<b>DiagnosticVerifyCertificateBidirectional</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::Authentication			
<b>Note</b>	<p>This meta-class represents the subfunction to do a bidirectional verification of the certificate.</p> <p><b>Tags:</b>atp.recommendedPackage=DiagnosticAuthentications</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticAuthentication</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.366: DiagnosticVerifyCertificateBidirectional**

<b>Class</b>	<b>DiagnosticVerifyCertificateUnidirectional</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::Authentication			





<b>Class</b>	<b>DiagnosticVerifyCertificateUnidirectional</b>			
<b>Note</b>	This meta-class represents the subfunction to do a unidirectional verification of the certificate. <b>Tags:</b> atp.recommendedPackage=DiagnosticAuthentications			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticAuthentication</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.367: DiagnosticVerifyCertificateUnidirectional**

<b>Class</b>	<b>DiagnosticWriteDataByIdentifier</b>			
<b>Package</b>	M2::AUTOSARTemplates::DiagnosticExtract::Dcm::DiagnosticService::DataByIdentifier			
<b>Note</b>	This represents an instance of the "Write Data by Identifier" diagnostic service. <b>Tags:</b> atp.recommendedPackage=DiagnosticDataByIdentifiers			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">DiagnosticCommonElement</a> , <a href="#">DiagnosticDataByIdentifier</a> , <a href="#">DiagnosticServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
writeClass	DiagnosticWriteDataByIdentifierClass	0..1	ref	This reference substantiates that abstract reference in the role serviceClass for this specific concrete class.  Thereby, the reference represents the ability to access shared attributes among all DiagnosticWriteDataByIdentifier in the given context.

**Table A.368: DiagnosticWriteDataByIdentifier**

<b>Class</b>	<b>DltConfig</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Dlt			
<b>Note</b>	This element defines a Dlt configuration for a specific Ecu.			
<b>Base</b>	<a href="#">ARObject</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dltEcu	DltEcu	0..1	ref	Reference to the Ecu representation in the Log And Trace Extract.
dltLogChannel	<a href="#">DltLogChannel</a>	*	aggr	Describes the DltLogChannels that are configured for the log/trace message output
sessionIdSupport	Boolean	0..1	attr	This attribute defines whether the sessionId is used or not.
timestampSupport	Boolean	0..1	attr	This attribute defines whether a timestamp shall be added to the Dlt messages or not.

**Table A.369: DltConfig**

<b>Class</b>	<b>DltLogChannel</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Dlt			
<b>Note</b>	This element contains the settings for the log/trace message output for a tuple of ApplicationId and ContextId (verbose mode) or a SessionId (non-verbose mode).			





Class	DltLogChannel			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
application Context	DltContext	*	ref	Reference to the Swc that produces the log or trace message. Please note that this reference shall not be set in case that the Bsw module produces the associated log or trace messages.
defaultTrace State	DltDefaultTraceState Enum	0..1	attr	This attributes defines the default trace status.
dltMessage	DltMessage	*	ref	Reference to DltMessages that can be transported over the DltLogChannel in the DltPdu.
logChannelId	String	0..1	attr	This attribute identifies the Channel for usage within the Log And Trace protocol.
logTraceDefault LogThreshold	LogTraceDefaultLog LevelEnum	0..1	attr	This attribute allows to set a log level Threshold for Log Level filtering.
nonVerbose Mode	Boolean	0..1	attr	This attribute defines whether this channel supports non-Verbose Dlt messages. If disabled only verbose mode messages shall be used.
rxPduTriggering	<a href="#">PduTriggering</a>	0..1	ref	Reference to DltPdu that is received by the DltLog Channel
txPduTriggering	<a href="#">PduTriggering</a>	0..1	ref	Reference to DltPdu that is transmitted by the DltLog Channel.

**Table A.370: DltLogChannel**

Class	DolpActivationLineNeeds			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	A DoIP entity needs to be informed when an external tester is attached or activated. The DolpActivation ServiceNeeds specifies the trigger for such an event. Examples would be a Pdu via a regular communication bus, a PWM signal, or an I/O. For details please refer to the ISO 13400.			
Base	ARObject, <a href="#">DolpServiceNeeds</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.371: DolpActivationLineNeeds**

Class	DolpGidNeeds			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	The DolpGidNeeds indicates that the software-component owning this ServiceNeeds is providing the GID number either after a GID Synchronisation or by other means like e.g. flashed EEPROM parameter. This need can be used independent from DolpGidSynchronizationNeeds and is necessary if the GID can not be provided out of the DoIP configuration options.			
Base	ARObject, <a href="#">DolpServiceNeeds</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.372: DolpGidNeeds**



<b>Class</b>	<b>DolpGidSynchronizationNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	The DolpGidSynchronizationNeeds indicates that the software-component owning this ServiceNeeds is triggered by the DoIP entity to start a synchronization of the GID (Group Identification) on the DoIP service 0x0001, 0x0002, 0x0003 or before announcement via service 0x0004 according to ISO 13400-2:2012 if necessary. Note that this need is only relevant for DoIP synchronization masters.			
<b>Base</b>	ARObject, <a href="#">DolpServiceNeeds</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.373: DolpGidSynchronizationNeeds**

<b>Class</b>	<b>DolpPowerModeStatusNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	The DolpPowerModeStatusNeeds indicates that the software-component owning this ServiceNeeds is providing the PowerModeStatus for the DoIP service 0x4003 according to ISO 13400-2:2012.			
<b>Base</b>	ARObject, <a href="#">DolpServiceNeeds</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.374: DolpPowerModeStatusNeeds**

<b>Class</b>	<b>DolpServiceNeeds</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	This represents an abstract base class for ServiceNeeds related to DoIP.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
<b>Subclasses</b>	<a href="#">DolpActivationLineNeeds</a> , <a href="#">DolpGidNeeds</a> , <a href="#">DolpGidSynchronizationNeeds</a> , <a href="#">DolpPowerModeStatusNeeds</a> , <a href="#">DolpRoutingActivationAuthenticationNeeds</a> , <a href="#">DolpRoutingActivationConfirmationNeeds</a> , <a href="#">FurtherActionByteNeeds</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.375: DolpServiceNeeds**

<b>Class</b>	<b>DolpTpConnection</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::DiagnosticConnection			
<b>Note</b>	A connection identifies the sender and the receiver of this particular communication. The Dolp module routes a tpSdu through this connection.			
<b>Base</b>	ARObject, <a href="#">TpConnection</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dolpSource Address	DolpLogicAddress	1	ref	Reference to the address of the sender of the tpSdu.
dolpTarget Address	DolpLogicAddress	1	ref	Reference to the address of the receiver of the tpSdu.





Class	DolpTpConnection			
tpSdu	<a href="#">PduTriggering</a>	1	ref	This reference is used to describe the data exchange between Dolp and the PduR.

**Table A.376: DolpTpConnection**

Class	Documentation			
Package	M2::AUTOSARTemplates::GenericStructure::DocumentationOnM1			
Note	<p>This meta-class represents the ability to handle a so called standalone documentation. Standalone means, that such a documentation is not embedded in another ARElement or identifiable object. The standalone documentation is an entity of its own which denotes its context by reference to other objects and instances.</p> <p><b>Tags:</b>atp.recommendedPackage=Documentations</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
context	<a href="#">DocumentationContext</a>	*	aggr	This is the context of the particular documentation.
documentation Content	PredefinedChapter	0..1	aggr	<p>This is the content of the documentation related to the specified contexts.</p> <p><b>Tags:</b>xml.sequenceOffset=200</p>

**Table A.377: Documentation**

Class	<<atpMixed>> DocumentationBlock			
Package	M2::MSR::Documentation::BlockElements			
Note	This class represents a documentation block. It is made of basic text structure elements which can be displayed in a table cell.			
Base	<a href="#">ARObject</a>			
Attribute	Type	Mult.	Kind	Note
defList	DefList	0..1	aggr	<p>This represents a definition list in the documentation block.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=40</p>
figure	MIFigure	0..1	aggr	<p>This represents a figure in the documentation block.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=70</p>
formula	MIFormula	0..1	aggr	<p>This is a formula in the definition block.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=60</p>
labeledList	LabeledList	0..1	aggr	<p>This represents a labeled list.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=50</p>





Class	<<atpMixed>> DocumentationBlock			
list	List	0..1	aggr	This represents numbered or unnumbered list. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=30
msrQueryP2	MsrQueryP2	0..1	aggr	This represents automatically contributed contents provided by an msrquery in the context of Documentation Block.
note	Note	0..1	aggr	This represents a note in the text flow. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=80
p	MultiLanguage Paragraph	0..1	aggr	This is one particular paragraph. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=10
structuredReq	StructuredReq	0..1	aggr	This aggregation supports structured requirements embedded in a documentation block. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=100
trace	<a href="#">TraceableText</a>	0..1	aggr	This represents traceable text in the documentation block. This allows to specify requirements/constraints in any documentation block. The kind of the trace is specified in the category. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=90
verbatim	MultiLanguageVerbatim	0..1	aggr	This represents one particular verbatim text. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild xml.sequenceOffset=20

Table A.378: DocumentationBlock

Class	DocumentationContext			
Package	M2::AUTOSARTemplates::GenericStructure::DocumentationOnM1			
Note	This class represents the ability to denote a context of a so called standalone documentation. Note that this is an <<atpMixed>>. The contents needs to be considered as ordered.			
Base	ARObject, <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
feature	AtpFeature	0..1	iref	This refers to a particular feature (instance in the M0 model) to which is the context of the documentation. <b>InstanceRef implemented by:</b> <a href="#">AnyInstanceRef</a>
identifiable	<a href="#">Identifiable</a>	0..1	ref	This is an identifiable object which is part of the context of the documentation.

Table A.379: DocumentationContext

<b>Class</b>	<b>DynamicPart</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Dynamic part of a multiplexed I-Pdu. Reserved space which is used to transport varying SignalIPdus at the same position, controlled by the corresponding selectorFieldCode.			
<b>Base</b>	ARObject, MultiplexedPart			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dynamicPart Alternative	<a href="#">DynamicPartAlternative</a>	1..*	aggr	Com IPdu alternatives that are transmitted in the Dynamic Part of the MultiplexedIPdu.

**Table A.380: DynamicPart**

<b>Class</b>	<b>DynamicPartAlternative</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	One of the Com IPdu alternatives that are transmitted in the Dynamic Part of the MultiplexedIPdu. The selectorFieldCode specifies which Com IPdu is contained in the DynamicPart within a certain transmission of a multiplexed PDU.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
initialDynamic Part	Boolean	1	attr	Dynamic part that shall be used to initialize this multiplexed IPdu.  Constraint: Only one "DynamicPartAlternative" in a "DynamicPart" shall be the initialDynamicPart.
iPdu	<a href="#">ISignalIPdu</a>	1	ref	Reference to a Com IPdu which is routed to the IPduM module and is combined to a multiplexedPdu.
selectorField Code	Integer	1	attr	The selector field is part of a multiplexed IPdu. It consists of contiguous bits. The value of the selector field selects the layout of the multiplexed part of the IPdu.

**Table A.381: DynamicPartAlternative**

<b>Class</b>	<b>E2EProfileCompatibilityProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Transformer			
<b>Note</b>	This meta-class collects settings for configuration of the E2E state machine. <b>Tags:</b> atp.recommendedPackage=E2EProfileCompatibilityPropsCollection			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, CollectableElement, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
transitToInvalid Extended	Boolean	0..1	attr	E2E State machine behavior concerning transition from NODATA/INIT to INVALID  value=0 (false): no direct transition from NODATA to INVALID, no transition from INIT to INVALID due to counter-related faults (Autosar R19-11 or former behavior)  value=1 (true): direct transition from NODATA to INVALID covered, transition from INIT to INVALID due to counter-related faults covered (state machine extended)

**Table A.382: E2EProfileCompatibilityProps**

<b>Class</b>	<b>ECUMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::ECUResourceMapping			
<b>Note</b>	ECUMapping allows to assign an ECU hardware type (defined in the ECU Resource Template) to an ECUInstance used in a physical topology.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
commControllerMapping	<a href="#">CommunicationControllerMapping</a>	1..*	aggr	The ECUMapping contains the mapping of all CommunicationControllers of the ECU.
ecu	<a href="#">HwElement</a>	1	ref	Reference to a HwElement of category ECU in the ECU Resource Template.
ecuInstance	<a href="#">EcuInstance</a>	1	ref	Reference to the EcuInstance in the System Template
hwPortMapping	<a href="#">HwPortMapping</a>	1..*	aggr	The ECUMapping contains the mapping of all HW Communication Ports of the ECU.

**Table A.383: ECUMapping**

<b>Class</b>	<b>EOCEventRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingConstraint::ExecutionOrderConstraint			
<b>Note</b>	This is used to define a reference to an RTE or BSW Event.			
<b>Base</b>	ARObject, <a href="#">EOCExecutableEntityRefAbstract</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bswModuleInstance	<a href="#">BswImplementation</a>	0..1	ref	Specifies the BSW module instance the BSW event is related to.
component	<a href="#">SwComponentPrototype</a>	0..1	iref	This association references the specific instance of the SW-C prototype. <b>InstanceRef implemented by:</b> ComponentInCompositionInstanceRef
event	<a href="#">AbstractEvent</a>	0..1	ref	The AbstractEvent (event) whose execution order is restricted by the constraint.
successor	<a href="#">EOCExecutableEntityRefAbstract</a>	*	ref	The logical successor of an executable entity or a group of executable entities.

**Table A.384: EOCEventRef**

<b>Class</b>	<b>EOCExecutableEntityRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingConstraint::ExecutionOrderConstraint			
<b>Note</b>	This is used to define a reference to an ExecutableEntity If the ExecutionOrderConstraint is defined on VFB, System or ECU level, a reference to the Sw ComponentPrototype, via the ComponentInCompositionInstanceRef, the referenced ExecutableEntity belongs to, shall be provided as context information.			
<b>Base</b>	ARObject, <a href="#">EOCExecutableEntityRefAbstract</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bswModuleInstance	<a href="#">BswImplementation</a>	0..1	ref	Specifies the BSW module instance the BSW module entity belongs to.





Class	EOCExecutableEntityRef			
component	<a href="#">SwComponent</a> <a href="#">Prototype</a>	0..1	iref	This association references the specific instance of the SW-C prototype. <b>InstanceRef implemented by:</b> ComponentInComposition InstanceRef
executable	<a href="#">ExecutableEntity</a>	0..1	ref	The ExecutableEntity whose execution order is restricted by the constraint.
successor	<a href="#">EOCExecutableEntity</a> <a href="#">RefAbstract</a>	*	ref	The logical successor of an executable entity or a group of executable entities.

**Table A.385: EOCExecutableEntityRef**

Class	EOCExecutableEntityRefAbstract (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::Timing::TimingConstraint::ExecutionOrderConstraint			
Note	This is the abstractions for Execution Order Constraint Executable Entity References (leaves) and Execution Order Constraint Executable Entity Reference Groups (composites).			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">EOCEventRef</a> , <a href="#">EOCExecutableEntityRef</a> , <a href="#">EOCExecutableEntityRefGroup</a>			
Attribute	Type	Mult.	Kind	Note
directSuccessor	<a href="#">EOCExecutableEntity</a> <a href="#">RefAbstract</a>	*	ref	The direct successor of an executable entity or a group of executable entities.

**Table A.386: EOCExecutableEntityRefAbstract**

Class	EOCExecutableEntityRefGroup			
Package	M2::AUTOSARTemplates::CommonStructure::Timing::TimingConstraint::ExecutionOrderConstraint			
Note	This is used to specify a group (composite) consisting of Execution Order Constraint Executable Entity References (leaves) and/or further Execution Order Constraint Executable Entity Reference Groups (composite).			
Base	ARObject, <a href="#">EOCExecutableEntityRefAbstract</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
letInterval	<a href="#">TimingDescriptionEvent</a> <a href="#">Chain</a>	*	ref	This association references the TimingDescriptionEvent Chain that plays the role of a LET interval the executable entities in the group are assigned to.
maxCycles	Integer	0..1	attr	In case of a Repetitive Execution Order Constraint this attribute specifies the number of cycles the Execution Order Constraint is considering.
maxSlots	Integer	0..1	attr	In case of a Repetitive Execution Order Constraint this attribute specifies the number of slots every cycle of the Execution Order Constraint is consisting of.
nestedElement (ordered)	<a href="#">EOCExecutableEntity</a> <a href="#">RefAbstract</a>	1..*	ref	This association is used to establish hierarchies of EOCEER Groups and References.
successor	<a href="#">EOCExecutableEntity</a> <a href="#">RefAbstract</a>	*	ref	The logical successor of an executable entity or a group of executable entities.
triggeringEvent	<a href="#">TimingDescriptionEvent</a>	0..1	ref	In case of a Repetitive Execution Order Constraint this association references the timing description event triggering every cycle.

**Table A.387: EOCExecutableEntityRefGroup**

<b>Class</b>	<b>EcuAbstractionSwComponentType</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Components			
<b>Note</b>	<p>The ECUAbstraction is a special AtomicSwComponentType that resides between a software-component that wants to access ECU periphery and the Microcontroller Abstraction. The EcuAbstractionSwComponentType introduces the possibility to link from the software representation to its hardware description provided by the ECU Resource Template.</p> <p><b>Tags:</b>atp.recommendedPackage=SwComponentTypes</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtomicSwComponentType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
hardware Element	<a href="#">HwDescriptionEntity</a>	*	ref	Reference from the EcuAbstractionComponentType to the description of the used HwElements.

**Table A.388: EcuAbstractionSwComponentType**

<b>Class</b>	<b>EcuInstance</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
<b>Note</b>	<p>ECUInstances are used to define the ECUs used in the topology. The type of the ECU is defined by a reference to an ECU specified with the ECU resource description.</p> <p><b>Tags:</b>atp.recommendedPackage=EcuInstances</p>			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
associatedComIPduGroup	<a href="#">ISignalIPduGroup</a>	*	ref	<p>With this reference it is possible to identify which ISignalIPduGroups are applicable for which Communication Connector/ ECU.</p> <p>Only top level ISignalIPduGroups shall be referenced by an EcuInstance. If an ISignalIPduGroup contains other ISignalIPduGroups than these contained ISignalIPduGroups shall not be referenced by the EcuInstance. Contained ISignalIPduGroups are associated to an Ecu Instance via the top level ISignalIPduGroup.</p>
associatedConsumedProvidedServiceInstanceGroup	ConsumedProvidedServiceInstanceGroup	*	ref	<p>With this reference it is possible to identify which ConsumedProvidedServiceInstanceGroups are applicable for which ECUInstance.</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b>vh.latestBindingTime=postBuild</p>
associatedPdurIPduGroup	PdurIPduGroup	*	ref	With this reference it is possible to identify which PdurIPdu Groups are applicable for which Communication Connector/ ECU.
clientIdRange	<a href="#">ClientIdRange</a>	0..1	aggr	Restriction of the Client Identifier for this Ecu to an allowed range of numerical values. The Client Identifier of the transaction handle is generated by the client RTE for inter-Ecu Client/Server communication.
com Configuration GwTimeBase	TimeValue	0..1	attr	The period between successive calls to Com_Main FunctionRouteSignals of the AUTOSAR COM module in seconds.
com ConfigurationRxTimeBase	TimeValue	0..1	attr	The period between successive calls to Com_Main FunctionRx of the AUTOSAR COM module in seconds.





Class	EcuInstance			
com ConfigurationTx TimeBase	TimeValue	0..1	attr	The period between successive calls to Com_Main FunctionTx of the AUTOSAR COM module in seconds.
comEnable MDTForCyclic Transmission	Boolean	0..1	attr	Enables for the Com module of this EcuInstance the minimum delay time monitoring for cyclic and repeated transmissions (TransmissionModeTiming has cyclic Timing assigned or eventControlledTiming with numberOfRepetitions > 0).
commController	Communication Controller	1..*	aggr	CommunicationControllers of the ECU. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
connector	Communication Connector	*	aggr	All channels controlled by a single controller. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
dltConfig	DltConfig	0..1	aggr	Describes the Dlt configuration on this EcuInstance.
dolpConfig	DolpConfig	0..1	aggr	Dolp configuration on this EcuInstance. <b>Tags:</b> atp.Status=draft
ecuTaskProxy	OsTaskProxy	*	ref	Reference to OsTaskProxies assigned to the Ecu Instance. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=ecuTaskProxy
ethSwitchPort Group Derivation	Boolean	0..1	attr	Defines whether the derivation of SwitchPortGroups based on VLAN and/or CouplingPort.pncMapping shall be performed for this EcuInstance. If not defined the derivation shall not be done.
partition	EcuPartition	*	aggr	Optional definition of Partitions within an Ecu.
pncPrepare SleepTimer	TimeValue	0..1	attr	Time in seconds the PNC state machine shall wait in PNC_PREPARE_SLEEP.
pnc Synchronous Wakeup	Boolean	0..1	attr	If this parameter is available and set to true then all available PNCs will be woken up as soon as a channel wakeup occurs. This is ensured by adding all PNCs to all channel wakeup sources during upstream mapping.
pnResetTime	TimeValue	0..1	attr	Specifies the runtime of the reset timer in seconds. This reset time is valid for the reset of PN requests in the EIRA and in the ERA.
sleepMode Supported	Boolean	1	attr	Specifies whether the ECU instance may be put to a "low power mode" <ul style="list-style-type: none"> <li>• true: sleep mode is supported</li> <li>• false: sleep mode is not supported</li> </ul> Note: This flag may only be set to "true" if the feature is supported by both hardware and basic software.
tcpIpIcmpProps	EthTcpIpIcmpProps	0..1	ref	EcuInstance specific ICMP (Internet Control Message Protocol) attributes
tcpIpProps	EthTcpIpProps	0..1	ref	EcuInstance specific TcpIp Stack attributes.
v2xSupported	V2xSupportEnum	0..1	attr	This attribute is used to control the existence of the V2X stack on the given EcuInstance.
wakeUpOver BusSupported	Boolean	1	attr	Driver support for wakeup over Bus.

Table A.389: EcuInstance



<b>Class</b>	<b>EcuPartition</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
<b>Note</b>	Partitions are used as error containment regions. They permit the grouping of SWCs and resources and allow to describe recovery policies individually for each partition. Partitions can be terminated or restarted during run-time as a result of a detected error.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
execInUser Mode	Boolean	1	attr	A partition can execute either in CPU user mode (execInUser Mode = TRUE) or supervisor mode (execInUser Mode = FALSE). In user mode, the partition has a limited access to memory, to memory mapped hardware and to CPU. In user mode, the partition is mapped to a non-trusted OS-Application.

**Table A.390: EcuPartition**

<b>Class</b>	<b>EcuResourceEstimation</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
<b>Note</b>	Resource estimations for RTE and BSW of a single ECU instance.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bswResource Estimation	ResourceConsumption	0..1	aggr	Estimation for the resource consumption of the basic software.
ecuInstance	<a href="#">EcuInstance</a>	1	ref	Reference to the ECU this estimation is done for.
introduction	<a href="#">DocumentationBlock</a>	0..1	aggr	This represents introductory documentation about the ecu resource estimation <b>Tags:</b> xml.sequenceOffset=-10
rteResource Estimation	ResourceConsumption	0..1	aggr	Estimation for the resource consumption of the run time environment.
swCompToEcu Mapping	<a href="#">SwcToEcuMapping</a>	*	ref	References to SwcToEcuMappings that have been taken into account for the resource estimations. This way it is possible to define different EcuResourceEstimations with different mappings, e.g. before and after mapping an additional SW component.

**Table A.391: EcuResourceEstimation**

<b>Class</b>	<b>EcucAbstractConfigurationClass</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Specifies the ValueConfigurationClass of a parameter/reference or the MultiplicityConfigurationClass of a parameter/reference or a container for each ConfigurationVariant of the EcucModuleDef.			
<b>Base</b>	ARObject			
<b>Subclasses</b>	<a href="#">EcucMultiplicityConfigurationClass</a> , <a href="#">EcucValueConfigurationClass</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
configClass	<a href="#">EcucConfigurationClass</a> <a href="#">Enum</a>	0..1	attr	Specifies the ConfigurationClass for the given ConfigurationVariant.





<b>Class</b>	<b><i>EcucAbstractConfigurationClass</i></b> (abstract)			
configVariant	<a href="#">EcucConfigurationVariantEnum</a>	0..1	attr	Specifies the ConfigurationVariant the ConfigurationClass is specified for.

**Table A.392: EcucAbstractConfigurationClass**

<b>Class</b>	<b><i>EcucAbstractInternalReferenceDef</i></b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Common abstract class to gather attributes for internal references (where the destination is located in the Ecu Configuration Description).			
<b>Base</b>	<i>ARObject</i> , <i>AtpDefinition</i> , <a href="#">EcucAbstractReferenceDef</a> , <a href="#">EcucCommonAttributes</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">EcucChoiceReferenceDef</a> , <a href="#">EcucReferenceDef</a> , <a href="#">EcucUriReferenceDef</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
requiresSymbolicNameValue	Boolean	0..1	attr	If this attribute is set to true the implementation of the reference is done using a Symbolic Name defined by the referenced container according to TPS_ECUC_02108.

**Table A.393: EcucAbstractInternalReferenceDef**

<b>Class</b>	<b><i>EcucAbstractReferenceDef</i></b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Common class to gather the attributes for the definition of references.			
<b>Base</b>	<i>ARObject</i> , <i>AtpDefinition</i> , <a href="#">EcucCommonAttributes</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">EcucAbstractExternalReferenceDef</a> , <a href="#">EcucAbstractInternalReferenceDef</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
withAuto	Boolean	0..1	attr	Specifies whether it shall be allowed on the value side to specify this reference value as "AUTO".  If withAuto is "true" it shall be possible to set the "isAutoValue" attribute of the respective reference to "true". This means that the actual value will not be considered during ECU Configuration but will be (re-)calculated by the code generator and stored in the value attribute afterwards. These implicit updated values might require a re-generation of other modules which reference these values.  If withAuto is "false" it shall not be possible to set the "isAutoValue" attribute of the respective reference to "true".  If withAuto is not present the default is "false".

**Table A.394: EcucAbstractReferenceDef**

<b>Class</b>	<b><i>EcucAbstractReferenceValue</i></b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
<b>Note</b>	Abstract class to be used as common parent for all reference values in the ECU Configuration Description.			





<b>Class</b>	<b>EcucAbstractReferenceValue</b> (abstract)			
<b>Base</b>	ARObject, EcucIndexableValue			
<b>Subclasses</b>	EcucInstanceReferenceValue, EcucReferenceValue			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
annotation	Annotation	*	aggr	Possibility to provide additional notes while defining a model element (e.g. the ECU Configuration Parameter Values). These are not intended as documentation but are mere design notes.
definition	<a href="#">EcucAbstractReferenceDef</a>	0..1	ref	Reference to the definition of this EcucAbstractReferenceValue subclasses in the ECU Configuration Parameter Definition.  <b>Stereotypes:</b> atpIdentityContributor <b>Tags:</b> xml.sequenceOffset=-10
isAutoValue	Boolean	0..1	attr	If withAuto is set to "true" for this parameter definition the isAutoValue can be set to "true".  If isAutoValue is set to "true" the actual value will not be considered during ECU Configuration but will be (re-)calculated by the code generator and stored in the value attribute afterwards. These implicit updated values might require a re-generation of other modules which reference these values.  If isAutoValue is not present the default is "false".

**Table A.395: EcucAbstractReferenceValue**

<b>Class</b>	<b>EcucAddInfoParamValue</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
<b>Note</b>	This parameter corresponds to EcucAddInfoParamDef.			
<b>Base</b>	ARObject, EcucIndexableValue, <a href="#">EcucParameterValue</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
value	<a href="#">DocumentationBlock</a>	0..1	aggr	Holds the content of the formatted text.

**Table A.396: EcucAddInfoParamValue**

<b>Class</b>	<b>EcucChoiceContainerDef</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Used to define configuration containers that provide a choice between several EcucParamConfContainerDef. But in the actual ECU Configuration Values only one instance from the choice list will be present.			
<b>Base</b>	ARObject, AtpDefinition, <a href="#">EcucContainerDef</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage</a> , <a href="#">Referrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
choice	<a href="#">EcucParamConfContainerDef</a>	*	aggr	The choices available in a EcucChoiceContainerDef.  <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=choice.shortName

**Table A.397: EcucChoiceContainerDef**

<b>Class</b>	<b><i>EcucCommonAttributes</i></b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Attributes used by Configuration Parameters as well as References.			
<b>Base</b>	ARObject, AtpDefinition, <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">EcucAbstractReferenceDef</a> , <a href="#">EcucParameterDef</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
multiplicity ConfigClass	<a href="#">EcucMultiplicity ConfigurationClass</a>	*	aggr	Specifies in which MultiplicityConfigurationClass this parameter or reference is available in a particular ConfigurationVariant. This aggregation is optional if the surrounding EcucModuleDef has the Category STANDARDIZED_MODULE_DEFINITION. If the category attribute of the EcucModuleDef is set to VENDOR_SPECIFIC_MODULE_DEFINITION, then this aggregation is mandatory.  <b>Tags:</b> xml.name Plural=MULTIPLICITY-CONFIG-CLASSES
origin	String	0..1	attr	String specifying if this configuration parameter is an AUTOSAR standardized configuration parameter or if the parameter is hardware- or vendor-specific.
postBuildVariant Multiplicity	Boolean	0..1	attr	Indicates if a parameter or a reference may have different number of instances in different post-build variants (previously known as post-build selectable configuration sets). TRUE means yes, FALSE means no.
postBuildVariant Value	Boolean	0..1	attr	Indicates if a parameter or a reference may have different value in different post-build variants (previously known as post-build selectable configuration sets). TRUE means yes, FALSE means no.
requiresIndex	Boolean	0..1	attr	Used to define whether the value element for this definition shall be provided with an index.
valueConfig Class	<a href="#">EcucValueConfiguration Class</a>	*	aggr	Specifies in which ValueConfigurationClass this parameter or reference is available in a particular ConfigurationVariant. This aggregation is optional if the surrounding EcucModuleDef has the Category STANDARDIZED_MODULE_DEFINITION. If the category attribute of the EcucModuleDef is set to VENDOR_SPECIFIC_MODULE_DEFINITION, then this aggregation is mandatory.  <b>Tags:</b> xml.namePlural=VALUE-CONFIG-CLASSES

**Table A.398: EcucCommonAttributes**

<b>Class</b>	<<atpMixedString>> <b><i>EcucConditionFormula</i></b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	This formula shall yield a boolean expression depending on ecuc queries. Note that the EcucCondition Formula is a mixed string. Therefore, the properties have the upper multiplicity 1.			
<b>Base</b>	ARObject, FormulaExpression			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
ecucQuery	<a href="#">EcucQuery</a>	0..1	ref	The EcucQuery serves as a argument for the formula.
ecucQuery String	<a href="#">EcucQuery</a>	0..1	ref	This indicates that the referenced query shall return a string.

**Table A.399: EcucConditionFormula**

<b>Enumeration</b>	<b>EcucConfigurationClassEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate
<b>Note</b>	Possible configuration classes for the AUTOSAR configuration parameters.
<b>Literal</b>	<b>Description</b>
Link	Link Time: parts of configuration are delivered from another object code file <b>Tags:</b> atp.EnumerationLiteralIndex=0
PostBuild	PostBuildTime: after compilation a configuration parameter can be changed. <b>Tags:</b> atp.EnumerationLiteralIndex=1
PreCompile	PreCompile Time: after compilation a configuration parameter can not be changed any more. <b>Tags:</b> atp.EnumerationLiteralIndex=2
Published Information	PublishedInformation is used to specify the fact that certain information is fixed even before the pre-compile stage. <b>Tags:</b> atp.EnumerationLiteralIndex=3

**Table A.400: EcucConfigurationClassEnum**

<b>Enumeration</b>	<b>EcucConfigurationVariantEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate
<b>Note</b>	Specifies the possible Configuration Variants used for AUTOSAR BSW Modules.
<b>Literal</b>	<b>Description</b>
Preconfigured Configuration	Preconfigured (i.e. fixed) configuration which cannot be changed. <b>Tags:</b> atp.EnumerationLiteralIndex=0
Recommended Configuration	Recommended configuration for a module. <b>Tags:</b> atp.EnumerationLiteralIndex=1
VariantLinkTime	Specifies that the BSW Module implementation may use PreCompileTime and LinkTime configuration parameters. <b>Tags:</b> atp.EnumerationLiteralIndex=2
VariantPostBuild	Specifies that the BSW Module implementation may use PreCompileTime, LinkTime and PostBuild configuration parameters. <b>Tags:</b> atp.EnumerationLiteralIndex=3
VariantPreCompile	Specifies that the BSW Module implementation uses only PreCompileTime configuration parameters. <b>Tags:</b> atp.EnumerationLiteralIndex=6

**Table A.401: EcucConfigurationVariantEnum**

<b>Class</b>	<b>EcucContainerDef</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Base class used to gather common attributes of configuration container definitions.			
<b>Base</b>	ARObject, AtpDefinition, <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">EcucChoiceContainerDef</a> , <a href="#">EcucParamConfContainerDef</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	<b>EcucContainerDef</b> (abstract)			
destinationUri	<a href="#">EcucDestinationUriDef</a>	*	ref	Several destinationUris can be defined for an Ecuc ContainerDef. With such destinationUris an Ecuc ContainerDef is applicable for several EcucUriReference Defs. <b>Stereotypes:</b> atpUriDef
multiplicity ConfigClass	<a href="#">EcucMultiplicity ConfigurationClass</a>	*	aggr	Specifies which MultiplicityConfigurationClass this container is available for which ConfigurationVariant. This aggregation is optional if the surrounding EcucModuleDef has the Category STANDARDIZED_MODULE_DEFINITION. If the category attribute of the EcucModule Def is set to VENDOR_SPECIFIC_MODULE_DEFINITION and if the upperMultiplicity is greater than the lowerMultiplicity then this aggregation is mandatory. <b>Tags:</b> xml.name Plural=MULTIPLICITY-CONFIG-CLASSES
postBuildVariant Multiplicity	Boolean	0..1	attr	Indicates if a container may have different number of instances in different post-build variants (previously known as post-build selectable configuration sets). TRUE means yes, FALSE means no.
requiresIndex	Boolean	0..1	attr	Used to define whether the value element for this definition shall be provided with an index.

**Table A.402: EcucContainerDef**

Class	<b>EcucContainerValue</b>			
Package	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
Note	Represents a Container definition in the ECU Configuration Description.			
Base	<i>ARObject</i> , <i>EcucIndexableValue</i> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
definition	<a href="#">EcucContainerDef</a>	0..1	ref	Reference to the definition of this Container in the ECU Configuration Parameter Definition. <b>Stereotypes:</b> atpIdentityContributor <b>Tags:</b> xml.sequenceOffset=-10
parameterValue	<a href="#">EcucParameterValue</a>	*	aggr	Aggregates all ECU Configuration Values within this Container. atpVariation: [RS_ECUC_00079] <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=parameterValue.definition, parameter Value.variationPoint.shortLabel vh.latestBindingTime=postBuild
referenceValue	<a href="#">EcucAbstractReference Value</a>	*	aggr	Aggregates all References with this container. atpVariation: [RS_ECUC_00079] <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=referenceValue.definition, reference Value.variationPoint.shortLabel vh.latestBindingTime=postBuild





Class	EcucContainerValue			
subContainer	<a href="#">EcucContainerValue</a>	*	aggr	Aggregates all sub-containers within this container. atpVariation: [RS_ECUC_00078] <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=subContainer.shortName, subContainer.definition, subContainer.variationPoint.shortLabel vh.latestBindingTime=postBuild

**Table A.403: EcucContainerValue**

Class	EcucDefinitionElement (abstract)			
Package	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
Note	Common class used to express the commonalities of configuration parameters, references and containers. If not stated otherwise the default multiplicity is exactly one mandatory occurrence of the specified element.			
Base	ARObject, AtpDefinition, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">EcucCommonAttributes</a> , <a href="#">EcucContainerDef</a> , <a href="#">EcucModuleDef</a>			
Attribute	Type	Mult.	Kind	Note
ecucCond	EcucCondition Specification	0..1	aggr	If it evaluates to true the Ecu Parameter definition shall be processed as specified. Otherwise the parameter definition shall be ignored. <b>Tags:</b> xml.sequenceOffset=100
ecucValidation Cond	<a href="#">EcucValidation Condition</a>	*	aggr	Collection of validation conditions which all need to evaluate to true in order to indicate a valid validation condition of the EcucDefinitionElement.
lowerMultiplicity	PositiveInteger	0..1	attr	The lower multiplicity of the specified element. 0: optional 1: at least one occurrence n: at least n occurrences atpVariation: [RS_ECUC_00082] <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=codeGenerationTime xml.sequenceOffset=110
relatedTrace Item	<a href="#">Traceable</a>	0..1	ref	This contains a sloppy reference to the Autosar compatible identifier of the element (EcucId). <b>Stereotypes:</b> atpUriDef <b>Tags:</b> xml.sequenceOffset=-10
scope	EcucScopeEnum	0..1	attr	Specifies the scope of this configuration element. <b>Tags:</b> xml.sequenceOffset=150





Class	<i>EcucDefinitionElement</i> (abstract)			
upperMultiplicity	PositiveInteger	0..1	attr	<p>The upper multiplicity of the specified element.</p> <p>0: no occurrence (used for VSMD)</p> <p>1: at most one occurrence</p> <p>m: at most m occurrences</p> <p>If upperMultiplicity is set than upperMultiplicityInfinite shall not be used.</p> <p>atpVariation: [RS_ECUC_00082]</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b></p> <p>vh.latestBindingTime=codeGenerationTime</p> <p>xml.sequenceOffset=120</p>
upperMultiplicityInfinite	Boolean	0..1	attr	<p>To express an infinite number of occurrences of this element this attribute has to be set to true.</p> <p>If upperMultiplicityInfinite is set than upperMultiplicity shall not be used.</p> <p>atpVariation: [RS_ECUC_00082]</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b></p> <p>vh.latestBindingTime=codeGenerationTime</p> <p>xml.sequenceOffset=130</p>

**Table A.404: EcucDefinitionElement**

Class	<i>EcucDestinationUriDef</i>			
Package	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
Note	Description of an EcucDestinationUriDef that is used as target of EcucUriReferenceDefs.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
destinationUriPolicy	<a href="#">EcucDestinationUriPolicy</a>	0..1	aggr	Description of the targeted EcucContainerDef.

**Table A.405: EcucDestinationUriDef**

Class	<i>EcucDestinationUriDefSet</i>			
Package	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
Note	<p>This class represents a list of EcucDestinationUriDefs.</p> <p><b>Tags:</b>atp.recommendedPackage=EcucDestinationUriDefSets</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
destinationUriDef	<a href="#">EcucDestinationUriDef</a>	*	aggr	This is one particular EcucDestinationUriDef.

**Table A.406: EcucDestinationUriDefSet**



<b>Enumeration</b>	<b>EcucDestinationUriNestingContractEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate
<b>Note</b>	EcucDestinationUriNestingContractEnum is used to determine what is qualified by the Ecuc DestinationUriPolicy.
<b>Literal</b>	<b>Description</b>
leafOfTarget Container	EcucDestinationUriPolicy describes elements (subContainers, Parameters, References) that are directly owned by the target container. <b>Tags:</b> atp.EnumerationLiteralIndex=0
targetContainer	EcucDestinationUriPolicy describes the target container of EcucUriReferenceDef. <b>Tags:</b> atp.EnumerationLiteralIndex=1
vertexOfTarget Container	EcucDestinationUriPolicy describes elements (subContainers, Parameters, References) of the target container which can be defined in arbitrary nested subContainer structure. <b>Tags:</b> atp.EnumerationLiteralIndex=2

**Table A.407: EcucDestinationUriNestingContractEnum**

<b>Class</b>	<b>EcucDestinationUriPolicy</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	The EcucDestinationUriPolicy describes the EcucContainerDef that will be targeted by EcucUriReference Defs. The type of the description is dependent of the destinationUriNestingContract attribute.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
container	<a href="#">EcucContainerDef</a>	*	aggr	Description of the targetContainer in case that the destinationUriNestingPolicy is set to targetContainer. In all other cases the subContainers of the target container are defined here.
destinationUri NestingContract	<a href="#">EcucDestinationUri NestingContractEnum</a>	0..1	attr	This attribute defines how the referenced target Ecuc ContainerDef is described.
parameter	<a href="#">EcucParameterDef</a>	*	aggr	Description of parameters that are contained in the target container.
reference	<a href="#">EcucAbstractReference Def</a>	*	aggr	Description of references that are contained in the target container.

**Table A.408: EcucDestinationUriPolicy**

<b>Class</b>	<b>EcucEnumerationLiteralDef</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Configuration parameter type for enumeration literals definition.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
ecucCond	EcucCondition Specification	0..1	aggr	If it evaluates to true the literal definition shall be processed as specified. Otherwise the literal definition shall be ignored.
origin	String	0..1	attr	String specifying if this literal is an AUTOSAR standardized literal or if the literal is vendor-specific.

**Table A.409: EcucEnumerationLiteralDef**

<b>Class</b>	<b>EcucForeignReferenceDef</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Specify a reference to an XML description of an entity described in another AUTOSAR template.			
<b>Base</b>	ARObject, AtpDefinition, EcucAbstractExternalReferenceDef, <a href="#">EcucAbstractReferenceDef</a> , <a href="#">EcucCommonAttributes</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
destinationType	String	0..1	attr	The type in the AUTOSAR Metamodel to which instance this reference is allowed to point to.

**Table A.410: EcucForeignReferenceDef**

<b>Class</b>	<<atpVariation>> <b>EcucFunctionNameDef</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Configuration parameter type for Function Names like those used to specify callback functions.			
<b>Base</b>	ARObject, AtpDefinition, EcucAbstractStringParamDef, <a href="#">EcucCommonAttributes</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">EcucParameterDef</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.411: EcucFunctionNameDef**

<b>Class</b>	<b>EcucInstanceReferenceDef</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Specify a reference to an XML description of an entity described in another AUTOSAR template using the INSTANCE REFERENCE semantics.			
<b>Base</b>	ARObject, AtpDefinition, EcucAbstractExternalReferenceDef, <a href="#">EcucAbstractReferenceDef</a> , <a href="#">EcucCommonAttributes</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
destinationContext	String	0..1	attr	The context in the AUTOSAR Metamodel to which' this reference is allowed to point to.
destinationType	String	0..1	attr	The type in the AUTOSAR Metamodel to which' instance this reference is allowed to point to.

**Table A.412: EcucInstanceReferenceDef**

<b>Class</b>	<b>EcucInstanceReferenceValue</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
<b>Note</b>	InstanceReference representation in the ECU Configuration.			
<b>Base</b>	ARObject, <a href="#">EcucAbstractReferenceValue</a> , <a href="#">EcucIndexableValue</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
value	AtpFeature	0..1	iref	InstanceReference representation in the ECU Configuration. <b>InstanceRef implemented by:</b> <a href="#">AnyInstanceRef</a>

**Table A.413: EcucInstanceReferenceValue**

<b>Class</b>	<b>EcucModuleConfigurationValues</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
<b>Note</b>	<p>Head of the configuration of one Module. A Module can be a BSW module as well as the RTE and ECU Infrastructure.</p> <p>As part of the BSW module description, the EcucModuleConfigurationValues element has two different roles:</p> <p>The recommendedConfiguration contains parameter values recommended by the BSW module vendor.</p> <p>The preconfiguredConfiguration contains values for those parameters which are fixed by the implementation and cannot be changed.</p> <p>These two EcucModuleConfigurationValues are used when the base EcucModuleConfigurationValues (as part of the base ECU configuration) is created to fill parameters with initial values.</p> <p><b>Tags:</b>atp.recommendedPackage=EcucModuleConfigurationValues</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
container	<a href="#">EcucContainerValue</a>	*	aggr	<p>Aggregates all containers that belong to this module configuration.</p> <p>atpVariation: [RS_ECUC_00078]</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=container.shortName, container.definition,  container.variationPoint.shortLabel  vh.latestBindingTime=postBuild  xml.sequenceOffset=10</p>
definition	<a href="#">EcucModuleDef</a>	0..1	ref	<p>Reference to the definition of this EcucModule ConfigurationValues element. Typically, this is a vendor specific module configuration.</p> <p><b>Stereotypes:</b> atpIdentityContributor</p> <p><b>Tags:</b>xml.sequenceOffset=-10</p>
ecucDefEdition	RevisionLabelString	0..1	attr	<p>This is the version info of the ModuleDef ECUC Parameter definition to which this values conform to / are based on.</p> <p>For the Definition of ModuleDef ECUC Parameters the AdminData shall be used to express the semantic changes. The compatibility rules between the definition and value revision labels is up to the module's vendor.</p>
implementation ConfigVariant	<a href="#">EcucConfigurationVariantEnum</a>	0..1	attr	<p>Specifies the kind of deliverable this EcucModule ConfigurationValues element provides. If this element is not used in a particular role (e.g. preconfigured Configuration or recommendedConfiguration) then the value shall be one of VariantPreCompile, VariantLink Time, VariantPostBuild.</p>
module Description	<a href="#">BswImplementation</a>	0..1	ref	<p>Referencing the BSW module description, which this EcucModuleConfigurationValues element is configuring. This is optional because the EcucModuleConfiguration Values element is also used to configure the ECU infrastructure (memory map) or Application SW-Cs. However in case the EcucModuleConfigurationValues are used to configure the module, the reference is mandatory in order to fetch module specific "common" published information.</p>





Class	EcucModuleConfigurationValues			
postBuildVariantUsed	Boolean	0..1	attr	Indicates whether a module implementation has or plans to have (i.e., introduced at link or post-build time) new post-build variation points. TRUE means yes, FALSE means no. If the attribute is not defined, FALSE semantics shall be assumed.

**Table A.414: EcucModuleConfigurationValues**

Class	EcucModuleDef			
Package	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
Note	Used as the top-level element for configuration definition for Software Modules, including BSW and RTE as well as ECU Infrastructure. <b>Tags:</b> atp.recommendedPackage=EcucModuleDefs			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpDefinition</a> , <a href="#">CollectableElement</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
apiServicePrefix	CIdentifier	0..1	attr	For CDD modules this attribute holds the apiServicePrefix.  The shortName of the module definition of a Complex Driver is always "Cdd". Therefore for CDD modules the module apiServicePrefix is described with this attribute.
container	<a href="#">EcucContainerDef</a>	*	aggr	Aggregates the top-level container definitions of this specific module definition.  <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=container.shortName xml.sequenceOffset=11
postBuildVariantSupport	Boolean	0..1	attr	Indicates if a module supports different post-build variants (previously known as post-build selectable configuration sets). TRUE means yes, FALSE means no.
refinedModuleDef	<a href="#">EcucModuleDef</a>	0..1	ref	Optional reference from the Vendor Specific Module Definition to the Standardized Module Definition it refines. In case this EcucModuleDef has the category STANDARDIZED_MODULE_DEFINITION this reference shall not be provided. In case this EcucModuleDef has the category VENDOR_SPECIFIC_MODULE_DEFINITION this reference is mandatory.  <b>Stereotypes:</b> atpUriDef
supportedConfigVariant	<a href="#">EcucConfigurationVariantEnum</a>	*	attr	Specifies which ConfigurationVariants are supported by this software module. This attribute is optional if the EcucModuleDef has the category STANDARDIZED_MODULE_DEFINITION. If the category attribute of the EcucModuleDef is set to VENDOR_SPECIFIC_MODULE_DEFINITION then this attribute is mandatory.

**Table A.415: EcucModuleDef**

Class	EcucMultiplicityConfigurationClass			
Package	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
Note	Specifies the MultiplicityConfigurationClass of a parameter/reference or a container for each ConfigurationVariant of the EcucModuleDef.			





<b>Class</b>	<b>EcucMultiplicityConfigurationClass</b>			
<b>Base</b>	ARObject, <a href="#">EcucAbstractConfigurationClass</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.416: EcucMultiplicityConfigurationClass**

<b>Class</b>	<b>EcucNumericalParamValue</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
<b>Note</b>	Holding the value which is subject to variant handling.			
<b>Base</b>	ARObject, <a href="#">EcucIndexableValue</a> , <a href="#">EcucParameterValue</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
value	<a href="#">Numerical</a>	0..1	attr	Value which is subject to variant handling. atpVariation: [RS_ECUC_00080] <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.417: EcucNumericalParamValue**

<b>Class</b>	<b>EcucParamConfContainerDef</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Used to define configuration containers that can hierarchically contain other containers and/or parameter definitions.			
<b>Base</b>	ARObject, <a href="#">AtpDefinition</a> , <a href="#">EcucContainerDef</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage</a> , <a href="#">Referrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
parameter	<a href="#">EcucParameterDef</a>	*	aggr	The parameters defined within the EcucParamConf ContainerDef. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=parameter.shortName
reference	<a href="#">EcucAbstractReferenceDef</a>	*	aggr	The references defined within the EcucParamConf ContainerDef. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=reference.shortName
subContainer	<a href="#">EcucContainerDef</a>	*	aggr	The containers defined within the EcucParamConf ContainerDef. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=subContainer.shortName

**Table A.418: EcucParamConfContainerDef**

<b>Class</b>	<b>EcucParameterDef</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Abstract class used to define the similarities of all ECU Configuration Parameter types defined as subclasses.			





<b>Class</b>	<b>EcucParameterDef</b> (abstract)			
<b>Base</b>	ARObject, AtpDefinition, <a href="#">EcucCommonAttributes</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage</a> , <a href="#">Referrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	EcucAbstractStringParamDef, EcucAddInfoParamDef, EcucBooleanParamDef, EcucEnumerationParamDef, EcucFloatParamDef, EcucIntegerParamDef			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
derivation	EcucDerivationSpecification	0..1	aggr	A derivation of a Configuration Parameter value can be specified by an informal Calculation Formula or by a formal language that can be used to specify the computational rules.
symbolicNameValue	Boolean	0..1	attr	Specifies that this parameter's value is used, together with the aggregating container, to derive a symbolic name definition. See chapter "Representation of Symbolic Names" in Ecuc specification for more details.
withAuto	Boolean	0..1	attr	<p>Specifies whether it shall be allowed on the value side to specify this parameter value as "AUTO".</p> <p>If withAuto is "true" it shall be possible to set the "isAutoValue" attribute of the respective parameter to "true". This means that the actual value will not be considered during ECU Configuration but will be (re-)calculated by the code generator and stored in the value attribute afterwards. These implicit updated values might require a re-generation of other modules which reference these values.</p> <p>If withAuto is "false" it shall not be possible to set the "isAutoValue" attribute of the respective parameter to "true".</p> <p>If withAuto is not present the default is "false".</p>

**Table A.419: EcucParameterDef**

<b>Class</b>	<b>EcucParameterValue</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
<b>Note</b>	Common class to all types of configuration values.			
<b>Base</b>	ARObject, EcucIndexableValue			
<b>Subclasses</b>	<a href="#">EcucAddInfoParamValue</a> , <a href="#">EcucNumericalParamValue</a> , <a href="#">EcucTextualParamValue</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
annotation	Annotation	*	aggr	<p>Possibility to provide additional notes while defining the ECU Configuration Parameter Values. These are not intended as documentation but are mere design notes.</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>
definition	<a href="#">EcucParameterDef</a>	0..1	ref	<p>Reference to the definition of this EcucParameterValue subclasses in the ECU Configuration Parameter Definition.</p> <p><b>Stereotypes:</b> atpIdentityContributor</p> <p><b>Tags:</b>xml.sequenceOffset=-10</p>





Class	<i>EcucParameterValue</i> (abstract)			
isAutoValue	Boolean	0..1	attr	<p>If withAuto is set to "true" for this parameter definition the isAutoValue can be set to "true". If isAutoValue is set to "true" the actual value will not be considered during ECU Configuration but will be (re-)calculated by the code generator and stored in the value attribute afterwards. These implicit updated values might require a re-generation of other modules which reference these values.</p> <p>If isAutoValue is not present the default is "false".</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>

**Table A.420: EcucParameterValue**

Class	<i>EcucQuery</i>			
Package	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
Note	Defines a query to the ECUC Description.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
ecucQuery Expression	<a href="#">EcucQueryExpression</a>	0..1	aggr	This is the EcucQuery used in the calculation formula or the condition formula.

**Table A.421: EcucQuery**

Class	<<atpMixedString>> <i>EcucQueryExpression</i>			
Package	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
Note	Defines a query expression to the ECUC Description and output the result as an numerical value. Due to the "mixedString" nature of the formula there can be several EcuQueryExpressions used.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
configElement DefGlobal	<a href="#">EcucDefinitionElement</a>	0..1	ref	<p>The EcucQueryExpression points to an EcucDefinition Element that is used to find an element in the Ecuc Description. In order to find the right element in the Ecuc Description a search is necessary. If the complete Ecuc Description needs to be searched this global reference shall be used. Due to the "mixedString" nature of the EcucQueryExpression several references to Ecuc DefintionElements can be used in one EcucQuery Expression.</p> <p><b>Stereotypes:</b> atpUriDef</p>
configElement DefLocal	<a href="#">EcucDefinitionElement</a>	0..1	ref	<p>The EcucQueryExpression points to an EcucDefinition Element that is used to find an element in the Ecuc Description. In order to find the right element in the Ecuc Description a search is necessary. If the search is executed inside of the same module that contains the EcucQuery this local reference shall be used. Due to the "mixedString" nature of the EcucQueryExpression several references to EcucDefintionElements can be used in one EcucQueryExpression.</p> <p><b>Stereotypes:</b> atpUriDef</p>

**Table A.422: EcucQueryExpression**

<b>Class</b>	<b>EcucReferenceDef</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Specify references within the ECU Configuration Description between parameter containers.			
<b>Base</b>	ARObject, AtpDefinition, <a href="#">EcucAbstractInternalReferenceDef</a> , <a href="#">EcucAbstractReferenceDef</a> , <a href="#">EcucCommonAttributes</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
destination	<a href="#">EcucContainerDef</a>	0..1	ref	Exactly one reference to a parameter container is allowed as destination.  <b>Stereotypes:</b> atpUriDef

**Table A.423: EcucReferenceDef**

<b>Class</b>	<b>EcucReferenceValue</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
<b>Note</b>	Used to represent a configuration value that has a parameter definition of type EcucAbstractReferenceDef (used for all of its specializations excluding EcucInstanceReferenceDef).			
<b>Base</b>	ARObject, <a href="#">EcucAbstractReferenceValue</a> , <a href="#">EcucIndexableValue</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
value	<a href="#">Referrable</a>	0..1	ref	Specifies the destination of the reference.

**Table A.424: EcucReferenceValue**

<b>Class</b>	<b>EcucTextualParamValue</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
<b>Note</b>	Holding a value which is not subject to variation.			
<b>Base</b>	ARObject, <a href="#">EcucIndexableValue</a> , <a href="#">EcucParameterValue</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
value	VerbatimString	0..1	attr	Value of the parameter, not subject to variant handling.

**Table A.425: EcucTextualParamValue**

<b>Class</b>	<b>EcucUriReferenceDef</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Definition of reference with a destination that is specified via a destinationUri. With such a reference it is possible to define a reference to a EcucContainerDef in a different module independent from the concrete definition of the target container.			
<b>Base</b>	ARObject, AtpDefinition, <a href="#">EcucAbstractInternalReferenceDef</a> , <a href="#">EcucAbstractReferenceDef</a> , <a href="#">EcucCommonAttributes</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
destinationUri	<a href="#">EcucDestinationUriDef</a>	0..1	ref	Any EcucContainerDef with a destinationUri that is identical to the destinationUri that is referenced here defines a valid target.  <b>Stereotypes:</b> atpUriDef

**Table A.426: EcucUriReferenceDef**



<b>Class</b>	<b>EcucValidationCondition</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Validation condition to perform a formula calculation based on EcucQueries.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
ecucQuery	<a href="#">EcucQuery</a>	*	aggr	Query to the ECU Configuration Description.
validation Formula	<a href="#">EcucConditionFormula</a>	0..1	aggr	Definition of the formula used to define validation condition.

**Table A.427: EcucValidationCondition**

<b>Class</b>	<b>EcucValueCollection</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
<b>Note</b>	This represents the anchor point of the ECU configuration description. <b>Tags:</b> atp.recommendedPackage=EcucValueCollections			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
ecucValue	<a href="#">EcucModuleConfigurationValues</a>	*	ref	References to the configuration of individual software modules that are present on this ECU. atpVariation: [RS_ECUC_00079] <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
ecuExtract	<a href="#">System</a>	0..1	ref	Represents the extract of the System Configuration that is relevant for the ECU configured with that ECU Configuration Description.

**Table A.428: EcucValueCollection**

<b>Class</b>	<b>EcucValueConfigurationClass</b>			
<b>Package</b>	M2::AUTOSARTemplates::ECUCParameterDefTemplate			
<b>Note</b>	Specifies the ValueConfigurationClass of a parameter/reference for each ConfigurationVariant of the EcucModuleDef.			
<b>Base</b>	ARObject, <a href="#">EcucAbstractConfigurationClass</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
—	—	—	—	—

**Table A.429: EcucValueConfigurationClass**

<b>Class</b>	<b>EndToEndDescription</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::EndToEndProtection			
<b>Note</b>	This meta-class contains information about end-to-end protection. The set of applicable attributes depends on the actual value of the category attribute of EndToEndProtection.			
<b>Base</b>	ARObject			





Class	EndToEndDescription			
Attribute	Type	Mult.	Kind	Note
category	NameToken	0..1	attr	<p>The category represents the identification of the concrete E2E profile. The applicable values are specified in a semantic constraint and determine the applicable attributes of EndToEndDescription.</p> <p><b>Tags:</b>xml.sequenceOffset=-100</p>
counterOffset	PositiveInteger	0..1	attr	<p>Bit offset of Counter from the beginning of the Array representation of the Signal Group/VariableDataPrototype (MSB order, bit numbering: bit 0 is the least important). The offset shall be a multiplicity of 4 and it should be 8 whenever possible. For example, offset 8 means that the counter will take the low nibble of the byte 1, i.e. bits 8 .. 11. If counterOffset is not present the value is defined by the selected profile.</p> <p><b>Tags:</b>xml.sequenceOffset=-50</p>
crcOffset	PositiveInteger	0..1	attr	<p>Bit offset of CRC from the beginning of the Array representation of the Signal Group/VariableDataPrototype (MSB order, bit numbering: bit 0 is the least important). The offset shall be a multiplicity of 8 and it should be 0 whenever possible. For example, offset 8 means that the CRC will take the byte 1, i.e. bits 8..15. If crcOffset is not present the value is defined by the selected profile.</p> <p><b>Tags:</b>xml.sequenceOffset=-60</p>
dataId (ordered)	PositiveInteger	*	attr	<p>This represents a unique numerical identifier.</p> <p>Note: ID is used for protection against masquerading. The details concerning the maximum number of values (this information is specific for each E2E profile) applicable for this attribute are controlled by a semantic constraint that depends on the category of the EndToEnd Protection.</p> <p><b>Tags:</b>xml.sequenceOffset=-90</p>
dataIdMode	PositiveInteger	0..1	attr	<p>There are three inclusion modes how the implicit two-byte Data ID is included in the one-byte CRC:</p> <ul style="list-style-type: none"> <li>• dataIdMode = 0: Two bytes are included in the CRC (double ID configuration) This is used in variant 1A.</li> <li>• dataIdMode = 1: One of the two bytes byte is included, alternating high and low byte, depending on parity of the counter (alternating ID configuration). For even counter low byte is included; For odd counters the high byte is included. This is used in variant 1B.</li> <li>• dataIdMode = 2: Only low byte is included, high byte is never used. This is applicable if the IDs in a particular system are 8 bits.</li> <li>• dataIdMode = 3: The low byte is included in the implicit CRC calculation, the low nibble of the high byte is transmitted along with the data (i.e. it is explicitly included), the high nibble of the high byte is not used. This is applicable for the IDs up to 12 bits.</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=-85</p>
dataIdNibble Offset	PositiveInteger	0..1	attr	<p>Bit offset of the low nibble of the high byte of Data ID. The applicability of this attribute is controlled by <a href="#">[constr_1261]</a>.</p> <p><b>Tags:</b>xml.sequenceOffset=-25</p>





Class	EndToEndDescription			
dataLength	PositiveInteger	0..1	attr	This attribute represents the length of the Array representation of the Signal Group/VariableDataPrototype including CRC and Counter in bits. <b>Tags:</b> xml.sequenceOffset=-80
maxDeltaCounterInit	PositiveInteger	0..1	attr	Initial maximum allowed gap between two counter values of two consecutively received valid Data, i.e. how many subsequent lost data is accepted. For example, if the receiver gets Data with counter 1 and MaxDeltaCounter Init is 1, then at the next reception the receiver can accept Counters with values 2 and 3, but not 4.  Note that if the receiver does not receive new Data at a consecutive read, then the receiver increments the tolerance by 1. <b>Tags:</b> xml.sequenceOffset=-70
maxNoNewOrRepeatedData	PositiveInteger	0..1	attr	The maximum amount of missing or repeated Data which the receiver does not expect to exceed under normal communication conditions. <b>Tags:</b> xml.sequenceOffset=-40
syncCounterInit	PositiveInteger	0..1	attr	Number of Data required for validating the consistency of the counter that shall be received with a valid counter (i.e. counter within the allowed lock-in range) after the detection of an unexpected behavior of a received counter. <b>Tags:</b> xml.sequenceOffset=-30

**Table A.430: EndToEndDescription**

Enumeration	EndToEndProfileBehaviorEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer
Note	Behavior of the check functionality
Literal	Description
PRE_R4_2	Check has the legacy behavior, before AUTOSAR Release 4.2. <b>Tags:</b> atp.EnumerationLiteralIndex=0
R4_2	Check behaves like new P4/P5/P6 profiles introduced in AUTOSAR Release 4.2. <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.431: EndToEndProfileBehaviorEnum**

Class	EndToEndProtection			
Package	M2::AUTOSARTemplates::SWComponentTemplate::EndToEndProtection			
Note	This meta-class represents the ability to describe a particular end to end protection.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
endToEndProfile	<a href="#">EndToEndDescription</a>	0..1	aggr	This represents the particular EndToEndDescription. <b>Stereotypes:</b> atp.Splitable <b>Tags:</b> atp.Splitkey=endToEndProfile





Class	EndToEndProtection			
endToEndProtectionISignalPdu	EndToEndProtectionISignalPdu	*	aggr	<p>Defines to which ISignalPdu - ISignalGroup pair this EndToEndProtection shall apply.</p> <p>In case several ISignalGroups are used to transport the data (e.g. fan-out in the RTE) there may exist several EndToEndProtectionISignalPdu definitions.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=endToEndProtectionISignalPdu, endToEndProtectionISignalPdu.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
endToEndProtectionVariablePrototype	EndToEndProtectionVariablePrototype	*	aggr	<p>Defines to which VariableDataPrototypes in the roles of one sender and one or more receivers this EndToEndProtection applies.</p> <p>It shall be possible to aggregate several EndToEndProtectionVariablePrototype in case additional hierarchical decompositions are introduced subsequently. In this case one particular PortPrototype is split into multiple PortPrototypes and connectors, all representing the same data entity.</p> <p>Caveat: The E2E wrapper approach involves technologies that are not subjected to the AUTOSAR standard and is superseded by the superior E2E transformer approach (which is fully standardized by AUTOSAR). Hence, new projects (without legacy constraints due to carry-over parts) shall use the fully standardized E2E transformer approach.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=endToEndProtectionVariablePrototype.shortLabel, endToEndProtectionVariablePrototype.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>

Table A.432: EndToEndProtection

Class	EndToEndProtectionVariablePrototype			
Package	M2::AUTOSARTemplates::SWComponentTemplate::EndToEndProtection			
Note	<p>It is possible to protect the data exchanged between software components. For this purpose, for each communication to be protected, the user defines a separate EndToEndProtection (specifying a set of protection settings) and refers to a variableDataPrototype in the role of sender and to one or many variableDataPrototypes in the role of receiver. For details, see EndToEnd Library.</p> <p>Caveat: The E2E wrapper approach involves technologies that are not subjected to the AUTOSAR standard and is superseded by the superior E2E transformer approach (which is fully standardized by AUTOSAR). Hence, new projects (without legacy constraints due to carry-over parts) shall use the fully standardized E2E transformer approach.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
receiver	VariableDataPrototype	*	iref	<p>This represents the receiver. Note that 1:n communication is supported for this use case.</p> <p><b>InstanceRef implemented by:</b> VariableDataPrototypeInSystemInstanceRef</p>





Class	EndToEndProtectionVariablePrototype			
sender	<a href="#">VariableDataPrototype</a>	0..1	iref	<p>This represents the sender.</p> <p>Can be optional if an ecu extract is provided and the sender is part of the extract.</p> <p><b>InstanceRef implemented by:</b> <a href="#">VariableDataPrototypeInSystemInstanceRef</a></p>
shortLabel	<a href="#">Identifier</a>	0..1	attr	<p>This serves as part of the split key in case of more than one EndToEndProtectionVariablePrototype is aggregated in the bound model.</p> <p><b>Stereotypes:</b> atpIdentityContributor</p>

**Table A.433: EndToEndProtectionVariablePrototype**

Class	EndToEndTransformationComSpecProps			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The class EndToEndTransformationComSpecProps specifies port specific configuration properties for EndToEnd transformer attributes.			
Base	ARObject, Describable, TransformationComSpecProps			
Attribute	Type	Mult.	Kind	Note
clearFromValidToInvalid	Boolean	0..1	attr	Clear monitoring window on transition from state Valid to state Invalid.
disableEndToEndCheck	Boolean	0..1	attr	Disables/Enables the E2E check. The E2Eheader is removed from the payload independent from the setting of this attribute.
disableEndToEndStateMachine	Boolean	0..1	attr	Disables the E2EStateMachine (only E2E check functionality is performed)
e2eProfileCompatibilityProps	<a href="#">E2EProfileCompatibilityProps</a>	0..1	ref	Reference to additional settings for the E2E state machine.
maxDeltaCounter	PositiveInteger	0..1	attr	Maximum allowed difference between two counter values of two consecutively received valid messages. For example, if the receiver gets data with counter 1 and Max DeltaCounter is 3, then at the next reception the receiver can accept Counters with values 2, 3 or 4.
maxErrorStateInit	PositiveInteger	0..1	attr	<p>Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last Window Size checks, for the state E2E_SM_INIT.</p> <p>The minimum value is 0.</p>
maxErrorStateInvalid	PositiveInteger	0..1	attr	<p>Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last Window Size checks, for the state E2E_SM_INVALID.</p> <p>The minimum value is 0.</p>
maxErrorStateValid	PositiveInteger	0..1	attr	<p>Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last Window Size checks, for the state E2E_SM_VALID.</p> <p>The minimum value is 0.</p>
maxNoNewOrRepeatedData	PositiveInteger	0..1	attr	EndToEndTransformationDescription holds these attributes which are profile specific and have the same value for all E2E transformers.





Class	EndToEndTransformationComSpecProps			
minOkStateInit	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_INIT.  The minimum value is 1.
minOkStateInvalid	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_INVALID.  The minimum value is 1.
minOkStateValid	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_VALID.  The minimum value is 1.
syncCounterInit	PositiveInteger	0..1	attr	EndToEndTransformationDescription holds these attributes which are profile specific and have the same value for all E2E transformers.
windowSizeInit	PositiveInteger	0..1	attr	Size of the monitoring window of state Init for the E2E state machine.
windowSizeInvalid	PositiveInteger	0..1	attr	Size of the monitoring window of state Invalid for the E2E state machine.
windowSizeValid	PositiveInteger	0..1	attr	Size of the monitoring window of state Valid for the E2E state machine.

**Table A.434: EndToEndTransformationComSpecProps**

Class	EndToEndTransformationDescription			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	EndToEndTransformationDescription holds these attributes which are profile specific and have the same value for all E2E transformers.			
Base	ARObject, Describable, <a href="#">TransformationDescription</a>			
Attribute	Type	Mult.	Kind	Note
clearFromValidToInvalid	Boolean	0..1	attr	Clear monitoring window on transition from state Valid to state Invalid.
counterOffset	PositiveInteger	0..1	attr	Offset of the counter in the Data[] array in bits.
crcOffset	PositiveInteger	0..1	attr	Offset of the CRC in the Data[] array in bits.
dataIdMode	<a href="#">DataIdModeEnum</a>	0..1	attr	This attribute describes the inclusion mode that is used to include the implicit two-byte Data ID in the one-byte CRC.
dataIdNibbleOffset	PositiveInteger	0..1	attr	Offset of the Data ID nibble in the Data[] array in bits.
e2eProfileCompatibilityProps	<a href="#">E2EProfileCompatibilityProps</a>	0..1	ref	Reference to additional settings for the E2E state machine.
maxDeltaCounter	PositiveInteger	0..1	attr	Maximum allowed difference between two counter values of two consecutively received valid messages. For example, if the receiver gets data with counter 1 and Max DeltaCounter is 3, then at the next reception the receiver can accept Counters with values 2, 3 or 4.
maxErrorStateInit	PositiveInteger	0..1	attr	Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last Window Size checks, for the state E2E_SM_INIT.
maxErrorStateInvalid	PositiveInteger	0..1	attr	Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last Window Size checks, for the state E2E_SM_INVALID.





Class	EndToEndTransformationDescription			
maxErrorStateValid	PositiveInteger	0..1	attr	Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last WindowSize checks, for the state E2E_SM_VALID.
maxNoNewOrRepeatedData	PositiveInteger	0..1	attr	The maximum allowed amount of consecutive failed counter checks.
minOkStateInit	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_INIT.
minOkStateInvalid	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_INVALID.
minOkStateValid	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_VALID.
offset	PositiveInteger	0..1	attr	Offset of the E2E header in the Data[] array in bits.
profileBehavior	<a href="#">EndToEndProfileBehaviorEnum</a>	0..1	attr	Behavior of the check functionality
profileName	NameToken	1	attr	Definition of the E2E profile.
syncCounterInit	PositiveInteger	0..1	attr	Number of checks required for validating the consistency of the counter that shall be received with a valid counter (i.e. counter within the allowed lock-in range) after the detection of an unexpected behavior of a received counter.
upperHeaderBitsToShift	PositiveInteger	0..1	attr	<p>This attribute describes the number of upper-header bits to be shifted.</p> <p>value = 0 or not present: shift of upper header is NOT performed.</p> <p>value &gt; 0: the E2E Transformer on the protect-side, takes the first upperHeaderBitsToShift bits from the upper buffer (e.g. SOME/IP header part generated by SOME/IP transformer) and shifts them towards the lower bytes and bits within the Data[] for the length of the E2E header (e.g. 12 bytes in case of E2E Profile 4). This means the shift distance is fixed - it depends on the E2E header size - what is configured here is the number of bits that are to be shifted. This option is defined because the Some/IP header generated by SOME/IP transformer shall be, due to compatibility between non-protected and E2E-protected communication, at the same position, which is before E2E header.</p>
windowSizeInit	PositiveInteger	0..1	attr	Size of the monitoring window of state Init for the E2E state machine.
windowSizeInvalid	PositiveInteger	0..1	attr	Size of the monitoring window of state Invalid for the E2E state machine.
windowSizeValid	PositiveInteger	0..1	attr	Size of the monitoring window of state Valid for the E2E state machine.

**Table A.435: EndToEndTransformationDescription**

Class	<<atpVariation>> <b>EndToEndTransformationISignalProps</b>
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer
Note	Holds all the ISignal specific attributes for the EndToEndTransformer.
Base	ARObject, Describable, <a href="#">TransformationISignalProps</a>





Class	<<atpVariation>> EndToEndTransformationSignalProps			
Attribute	Type	Mult.	Kind	Note
dataId (ordered)	PositiveInteger	*	attr	This represents a unique numerical identifier.  Note: ID is used for protection against masquerading. The details concerning the maximum number of values (this information is specific for each E2E profile) applicable for this attribute are controlled by a semantic constraint that depends on the category of the EndToEnd Protection.
dataLength	PositiveInteger	0..1	attr	Length of payload and E2E header in bits.
maxDataLength	PositiveInteger	0..1	attr	Maximum length of payload and E2E header in bits.
minDataLength	PositiveInteger	0..1	attr	Minimum length of payload and E2E header in bits.
sourceId	PositiveInteger	0..1	attr	This attribute represents a unique numerical identifier identifying the source of a certain transmission. In case of C/S communication, this ID uniquely identifies the client.  Note: ID is used for protection against masquerading. The details concerning the maximum number of values (this information is specific for each E2E profile) applicable for this attribute are controlled by a semantic constraint that depends on the category of the EndToEnd Protection.

**Table A.436: EndToEndTransformationSignalProps**

Class	<i>EngineeringObject</i> (abstract)			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::EngineeringObject			
Note	This class specifies an engineering object. Usually such an object is represented by a file artifact. The properties of engineering object are such that the artifact can be found by querying an ASAM catalog file.  The engineering object is uniquely identified by domain+category+shortLabel+revisionLabel.			
Base	<i>ARObject</i>			
Subclasses	AutosarEngineeringObject, BuildEngineeringObject, Graphic			
Attribute	Type	Mult.	Kind	Note
category	NameToken	1	attr	This denotes the role of the engineering object in the development cycle. Categories are such as <ul style="list-style-type: none"> <li>• SWSRC for source code</li> <li>• SWOBJ for object code</li> <li>• SWHDR for a C-header file</li> </ul> Further roles need to be defined via Methodology. <b>Tags:</b> xml.sequenceOffset=20
domain	NameToken	0..1	attr	This denotes the domain in which the engineering object is stored. This allows to indicate various segments in the repository keeping the engineering objects. The domain may segregate companies, as well as automotive domains. Details need to be defined by the Methodology.  Attribute is optional to support a default domain. <b>Tags:</b> xml.sequenceOffset=40
revisionLabel	RevisionLabelString	*	attr	This is a revision label denoting a particular version of the engineering object. <b>Tags:</b> xml.sequenceOffset=30







Class	<i>EngineeringObject</i> (abstract)			
shortLabel	NameToken	1	attr	<p>This is the short name of the engineering object. Note that it is modeled as NameToken and not as Identifier since in ASAM-CC it is also a NameToken.</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>

**Table A.437: EngineeringObject**

Class	EnumerationMappingTable			
Package	M2::AUTOSARTemplates::GenericStructure::VariantHandling::AttributeValueVariationPoints			
Note	<p>This class represents an attribute value variation point for Enumeration attributes.</p> <p>Note that this class might be used in the extended meta-model only.</p> <p><b>Tags:</b>atp.recommendedPackage=EnumerationMappingTables</p>			
Base	ARObject, CollectableElement, <i>Identifiable</i> , <i>MultilanguageReferrable</i> , <i>PackageableElement</i> , <i>Referrable</i>			
Attribute	Type	Mult.	Kind	Note
entry	EnumerationMappingEntry	*	aggr	<p>Key-value pair mapping enumeration values to unique integers.</p> <p><b>Tags:</b>  xml.roleElement=true  xml.roleWrapperElement=true  xml.typeElement=false  xml.typeWrapperElement=false</p>

**Table A.438: EnumerationMappingTable**

Class	ErrorTracerNeeds			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	Specifies the need to report failures to the error tracer.			
Base	ARObject, <i>Identifiable</i> , <i>MultilanguageReferrable</i> , <i>Referrable</i> , <i>ServiceNeeds</i>			
Attribute	Type	Mult.	Kind	Note
tracedFailure	TracedFailure	*	aggr	<p>list of traced failures</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>

**Table A.439: ErrorTracerNeeds**

Class	EthGlobalTimeDomainProps			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::ETH			
Note	Enables the definition of Ethernet Global Time specific properties.			
Base	ARObject, AbstractGlobalTimeDomainProps			
Attribute	Type	Mult.	Kind	Note
crcFlags	EthTSynCrcFlags	0..1	aggr	Defines the fields of the message which shall be taken into account for CRC calculation and verification.
destination Physical Address	MacAddressString	0..1	attr	Defines the MAC multicast address the Ethernet time sync messages are communicated on.





Class	EthGlobalTimeDomainProps			
fupDataIDList (ordered)	PositiveInteger	0..16	attr	The DataIDList for FUP messages to calculate CRC.
managedCouplingPort	EthGlobalTimeManagedCouplingPort	*	aggr	Collection of CouplingPorts which are managed in the scope of this Ethernet GlobalTimeDomain.
messageCompliance	EthGlobalTimeMessageFormatEnum	1	attr	Defines the compliance of the Ethernet time sync messages to specific standards.
vlanPriority	PositiveInteger	0..1	attr	Defines which VLAN priority shall be assigned to a time sync message in case the message is sent using a VLAN tag.

**Table A.440: EthGlobalTimeDomainProps**

Class	<<atpVariation>> EthernetCluster			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Ethernet-specific cluster attributes. <b>Tags:</b> atp.recommendedPackage=CommunicationClusters			
Base	ARObject, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mult.	Kind	Note
couplingPortConnection	CouplingPortConnection	*	aggr	Specification of connections between CouplingElements and EcuInstances.  Note: This atpSplitable property has no atp.Splitkey due to atpVariation (PropertySetPattern).  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
couplingPortStartupActiveTime	TimeValue	0..1	attr	The attribute specifies the time in second a coupling port is switched on to enable the host ECU (ECU that maintains an Ethernet switch) to listen to the network for potential network management requests.
couplingPortSwitchoffDelay	TimeValue	0..1	attr	Switch off delay for CouplingPorts in seconds. It denotes the delay of switching off couplingPorts after the request to switch off a couplingPort was issued. (e.g. switch off of Ethernet switch ports).
macMulticastGroup	MacMulticastGroup	*	aggr	MacMulticastGroup that is defined for the Subnet (EthernetCluster).

**Table A.441: EthernetCluster**

Class	EthernetCommunicationConnector			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Ethernet specific attributes to the CommunicationConnector.			
Base	ARObject, CommunicationConnector, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mult.	Kind	Note
ethIpProps	EthIpProps	0..1	ref	EcuInstance specific IP attributes.
maximumTransmissionUnit	PositiveInteger	0..1	attr	This attribute specifies the maximum transmission unit in bytes.





Class	EthernetCommunicationConnector			
neighborCacheSize	PositiveInteger	0..1	attr	This attribute specifies the size of neighbor cache or ARP table in units of entries.
pathMtuEnabled	Boolean	0..1	attr	If enabled the IPv4/IPv6 processes incoming ICMP "Packet Too Big" messages and stores a MTU value for each destination address.
pathMtuTimeout	TimeValue	0..1	attr	If this value is >0 the IPv4/IPv6 will reset the MTU value stored for each destination after n seconds.
pncFilterDataMask	PositiveUnlimitedInteger	0..1	attr	Bit mask for Ethernet Payload used to configure the NM filter mask for the Network Management. <b>Tags:</b> atp.Status=obsolete

**Table A.442: EthernetCommunicationConnector**

Class	<<atpVariation>> EthernetCommunicationController			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Ethernet specific communication port attributes.			
Base	ARObject, <a href="#">CommunicationController</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
couplingPort	<a href="#">CouplingPort</a>	*	aggr	Optional CouplingPort that can be used to connect the ECU to a CouplingElement (e.g. a switch).
macLayerType	<a href="#">EthernetMacLayerTypeEnum</a>	0..1	attr	Specifies the mac layer type of the ethernet controller.
macUnicastAddress	MacAddressString	0..1	attr	Media Access Control address (MAC address) that uniquely identifies each EthernetCommunicationController in the network.
maximumReceiveBufferLength	Integer	0..1	attr	Determines the maximum receive buffer length (frame length) in bytes.
maximumTransmitBufferLength	Integer	0..1	attr	Determines the maximum transmit buffer length (frame length) in bytes.
slaveActAsPassiveCommunicationSlave	Boolean	0..1	attr	This attribute specifies if the EcuInstance is acting as a passive communication slave on the connected Physical Channel. This is used for EthernetCommunicationControllers that use Ethernet hardware which supports wake-up and sleep on the network (e.g. Open Alliance TC10 compliant Ethernet hardware). <b>Tags:</b> atp.Status=draft
slaveQualifiedUnexpectedLinkDownTime	TimeValue	0..1	attr	This attribute specifies time when an unexpected link down is evaluated as link down and indicated to the AUTOSAR communication stack. <b>Tags:</b> atp.Status=draft

**Table A.443: EthernetCommunicationController**

Enumeration	EthernetConnectionNegotiationEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Specifies connection negotiation types of Ethernet transceiver links.
Literal	Description





Enumeration	EthernetConnectionNegotiationEnum
auto	Automatic Negotiation <b>Tags:</b> atp.EnumerationLiteralIndex=0
master	Master <b>Tags:</b> atp.EnumerationLiteralIndex=1
slave	Slave <b>Tags:</b> atp.EnumerationLiteralIndex=2

**Table A.444: EthernetConnectionNegotiationEnum**

Enumeration	EthernetMacLayerTypeEnum
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
<b>Note</b>	Specifies MAC (Media Access Control) Layer types.
<b>Literal</b>	<b>Description</b>
xGMII	Mac layer interface (data) bandwidth class 1Gbit/s (e.g. GMII, RGMII, SGMII, RvGMII, USGMII) <b>Tags:</b> atp.EnumerationLiteralIndex=1 xml.name=XG-MII
xMII	Mac layer interface (data) bandwidth class 100Mbit/s and 10Mbit/s (e.g. RMII, RvMII, SMII, RvMII) <b>Tags:</b> atp.EnumerationLiteralIndex=0 xml.name=X-MII
xXGMII	Mac layer interface (data) bandwidth class 10Gbit/s <b>Tags:</b> atp.EnumerationLiteralIndex=2 xml.name=XXG-MII

**Table A.445: EthernetMacLayerTypeEnum**

Class	EthernetPhysicalChannel			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	The EthernetPhysicalChannel represents a VLAN or an untagged channel. An untagged channel is modeled as an EthernetPhysicalChannel without an aggregated VLAN.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PhysicalChannel</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
network Endpoint	<a href="#">NetworkEndpoint</a>	*	aggr	Collection of NetworkEndpoints that are used in the VLAN. <b>Stereotypes:</b> atp.Splittable <b>Tags:</b> atp.Splitkey=networkEndpoint.shortName
soAdConfig	<a href="#">SoAdConfig</a>	0..1	aggr	SoAd Configuration for one specific Physical Channel.
vlan	<a href="#">VlanConfig</a>	0..1	aggr	VLAN Configuration.

**Table A.446: EthernetPhysicalChannel**

<b>Enumeration</b>	<b>EthernetPhysicalLayerTypeEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
<b>Note</b>	Specifies physical layer types of Ethernet transceiver links.
<b>Literal</b>	<b>Description</b>
_1000BASE_T	Ethernet Standard (IEEE 802.3ab) to support 1Gbit/s over 4 twisted pairs.  <b>Tags:</b> atp.EnumerationLiteralIndex=6 xml.name=1000BASE-T
_1000BASE_T1	Ethernet Standard (IEEE 802.3bp) to support 1Gbit/s over a single twisted pair cable.  <b>Tags:</b> atp.EnumerationLiteralIndex=8 xml.name=1000BASE-T1
_100BASE_T1	Ethernet Standard (IEEE 802.3bw) to support 100Mbit/s over a single twisted pair cable. 100BASE-T1 is the IEEE Standardized version of BroadRReach.  <b>Tags:</b> atp.EnumerationLiteralIndex=7 xml.name=100BASE-T1
_100BASE_TX	Ethernet Standard (IEEE 802.3u) to support 100Mbit/s over two twisted pairs.  <b>Tags:</b> atp.EnumerationLiteralIndex=5 xml.name=100BASE-TX
_10BASE_T1S	Physical layer interface 10BASE-T1S (10Mbit/s, 2 pairs). Used for automotive.  <b>Tags:</b> atp.EnumerationLiteralIndex=10 atp.Status=draft xml.name=10BASE-T1S
IEEE802_11P	Ethernet Standard (IEEE 802.11p) to support wireless communication in vehicular environments.  <b>Tags:</b> atp.EnumerationLiteralIndex=9 xml.name=IEEE802-11P

**Table A.447: EthernetPhysicalLayerTypeEnum**

<b>Class</b>	<b>EthernetPriorityRegeneration</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	Defines a priority regeneration where the ingressPriority is replaced by regeneratedPriority. The ethernetPriorityRegeneration is optional in case no priority regeneration shall be performed. In case a ethernetPriorityRegeneration is defined it shall have 8 mappings, one for each priority.			
<b>Base</b>	ARObject, <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
ingressPriority	PositiveInteger	1	attr	Message priority of the incoming message. range: 0-7
regenerated Priority	PositiveInteger	1	attr	Regenerated message priority. range: 0-7

**Table A.448: EthernetPriorityRegeneration**

<b>Class</b>	<b>EthernetWakeupSleepOnDatalineConfig</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	<p>EthernetWakeupSleepOnDatalineConfigSet is the main element that aggregates different config set regarding the wakeup and sleep on data line.</p> <p>An EthernetWakeupSleepOnDatalineConfigSet could aggregate multiple different configurations regarding the wakeup and sleep on dataline (EthernetWakeupSleepOnDatalineConfig).</p>			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
sleepMode ExecutionDelay	TimeValue	0..1	attr	Delay in seconds to perform a sleep request if the Ethernet hardware (PHY) detect a pending wake-up. This is used to avoid the race condition, if a sleep was requested while a wake-up of a neighboring PHY was received via a local wake-up connection (e.g. I/O pin).
sleepRepetition DelayOfSleep Request	TimeValue	0..1	attr	Delay in seconds for a repetition of a sleep request. This is used to retry a synchronized shutdown of the connected Ethernet hardware (PHY) of the link partner.
sleep RepetitionsOf SleepRequest	PositiveInteger	0..1	attr	Count of repetitions for a sleep on dataline. If a sleep is rejected by the linked communication partner, the sleep is repeated until the count of repetitions exceed. If count of repetitions exceed, the Ethernet hardware (PHY) transit to sleep without acknowledgement of the connected link partner.
wakeupForward LocalEnabled	Boolean	0..1	attr	If enabled, then a remote wake-up received on the physical dataline (e.g. 100BASE-T1) is forwarded as local wake-up (e.g. via an I/O pin). If disabled, then a remote wake-up is not forwarded as local wake-up.
wakeupForward RemoteEnabled	Boolean	0..1	attr	If enabled, then a local wake-up is forwarded to the physical dataline (e.g. 100BASE-T1). If disabled, then a local wake-up is not forwarded to the physical dataline.
wakeupLocal DetectionTime	TimeValue	0..1	attr	Specify the detection time if a local wake-up in seconds is present on the local wake-up connection (e.g. I/O pin). A local wake-up has to be present at least for wakeupLocal DetectionTime to be detected a valid local wake-up.
wakeupLocal DurationTime	TimeValue	0..1	attr	Specify the duration of a local wake-up in seconds to be present on the local wake-up connection (e.g. I/O pin).
wakeupLocal Enabled	Boolean	0..1	attr	If enabled, then a local wake-up received via a local connection (e.g. I/O pin) shall be detected by the Ethernet hardware (PHY). If disabled, Ethernet hardware is not reacting on a local wake-up.
wakeupRemote Enabled	Boolean	0..1	attr	If enabled, then a remote wake-up received via the physical dataline (e.g. 100BASE-T1) shall be detected by the Ethernet hardware (PHY). If disabled, Ethernet hardware is not reaction on a remote wake-up.
wakeup RepetitionDelay OfWakeup Request	TimeValue	0..1	attr	Delay in seconds for a repetition of a wake-up. This is used to increase the reliability in the network, such that an ECU which initiates the wake-up does repeat the wake-up and increase the probability that affected ECUs receive the wake-up.
wakeup RepetitionsOf Wakeup Request	PositiveInteger	0..1	attr	Count of repetitions for a wake-up. This is used to increase the reliability in the network, such that an ECU which initiates the wake-up does repeat the wake-up and increase the probability that affected ECUs receive the wake-up.

**Table A.449: EthernetWakeupSleepOnDatalineConfig**

<b>Class</b>	<b>EvaluatedVariantSet</b>			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
<b>Note</b>	<p>This meta class represents the ability to express if a set of ARElements is able to support one or more particular variants.</p> <p>In other words, for a given set of evaluatedElements this meta class represents a table of evaluated variants, where each PredefinedVariant represents one column. In this column each descendant sw SystemconstantValue resp. postbuildVariantCriterionValue represents one entry.</p> <p>In a graphical representation each swSystemconstantValueSet / postBuildVariantCriterionValueSet could be used as an intermediate headline in the table column.</p> <p>If the approvalStatus is "APPROVED" it expresses that the collection of CollectableElements is known be valid for the given evaluatedVariants.</p> <p>Note that the EvaluatedVariantSet is a CollectableElement. This allows to establish a hierarchy of EvaluatedVariantSets.</p> <p><b>Tags:</b>atp.recommendedPackage=EvaluatedVariantSets</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
approvalStatus	NameToken	1	attr	<p>Defines the approval status of a predefined variant. Two values are predefined: "APPROVED" and "REJECTED":</p> <ul style="list-style-type: none"> <li>• Approved variants are known to work.</li> <li>• Rejected variants are known NOT to work.</li> </ul> <p>Further values can be approved on a per-company basis; within AUTOSAR only "APPROVED" and "REJECTED" should be recognized.</p>
evaluated Element	CollectableElement	*	ref	<p>This represents a particular element which is evaluated in context of the EvaluatedVariants. The approvalStatus applies to this element (and all of its descendants). In other words, the referenced elements are those that were considered when the predefined variant was evaluated.</p>
evaluated Variant	<a href="#">PredefinedVariant</a>	*	ref	<p>This metaclass represents one particular variant which was evaluated. LowerMultiplicity is set to 0 to support a stepwise approach.</p>

**Table A.450: EvaluatedVariantSet**

<b>Enumeration</b>	<b>EventGroupControlTypeEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances
<b>Note</b>	Types of a RoutingGroups for the event communication.
<b>Literal</b>	<b>Description</b>
activationAnd TriggerUnicast	<p>Activate the data path for unicast events and triggered unicast events that are sent out after a client got subscribed.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=0</p>
activationMulticast	<p>Activate the data path for multicast events of an EventGroup.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=1</p>
activationUnicast	<p>Activate the data path for unicast events of an EventGroup.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=2</p>





Enumeration	EventGroupControlTypeEnum
triggerUnicast	Activate the data path for triggered unicast events that are sent out after a client got subscribed. <b>Tags:</b> atp.EnumerationLiteralIndex=3

**Table A.451: EventGroupControlTypeEnum**

Class	EventHandler			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
Note	This element represents an event group as part of the Provided Service Instance.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
consumedEventGroup	<a href="#">ConsumedEventGroup</a>	*	ref	All consumers of the event are referenced here. <b>Tags:</b> atp.Status=obsolete
eventGroupIdentifier	PositiveInteger	0..1	attr	Unique Identifier that identifies the EventGroup in SOME/IP. This Identifier is sent as Eventgroup ID in SOME/IP Service Discovery messages.
eventMulticastAddress	<a href="#">ApplicationEndpoint</a>	0..1	ref	Multicast Address that is used for event communication in the IP-Multicast case. It is the destination address to which the server sends the multicast event messages if the multicastThreshold is exceeded.  This address is transmitted in the SD-SubscribeEventGroupAck Message to client (answer to SD-SubscribeEventGroup).  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
multicastThreshold	PositiveInteger	0..1	attr	Specifies the number of subscribed clients that trigger the server to change the transmission of events to multicast.  If configured to 0 only unicast will be used. If configured to 1 the first client will be already served by multicast. If configured to 2 the first client will be server with unicast and as soon as the second client arrives both will be served by multicast.  This does not influence the handling of initial events, which are served using unicast only.
pduActivationRoutingGroup	<a href="#">PduActivationRoutingGroup</a>	*	aggr	The ServiceDiscovery module is able to activate and deactivate the PDU routing for events.
routingGroup	SoAdRoutingGroup	*	ref	The ServiceDiscovery module is able to activate and deactivate the PDU routing for events. <b>Tags:</b> atp.Status=obsolete
sdServerConfig	SdServerConfig	0..1	aggr	Server configuration parameter for Service-Discovery. <b>Tags:</b> atp.Status=obsolete
sdServerEgTimingConfig	SomeipSdServerEventGroupTimingConfig	0..1	ref	Server Timing configuration settings that are EventGroup specific. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild

**Table A.452: EventHandler**



<b>Class</b>	<b>ExclusiveArea</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::InternalBehavior			
<b>Note</b>	Prevents an executable entity running in the area from being preempted.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.453: ExclusiveArea**

<b>Class</b>	<b>ExecutableEntity</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::InternalBehavior			
<b>Note</b>	Abstraction of executable code.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">BswModuleEntity</a> , <a href="#">RunnableEntity</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
activation Reason	<a href="#">ExecutableEntity</a> <a href="#">ActivationReason</a>	*	aggr	If the ExecutableEntity provides at least one activation Reason element the RTE resp. BSW Scheduler shall provide means to read the activation vector of this executable entity execution.  If no activationReason element is provided the feature of being able to determine the activating RTEEvent is disabled for this ExecutableEntity.
canEnter	<a href="#">ExclusiveArea</a>	*	ref	This means that the executable entity can enter/leave the referenced exclusive area through explicit API calls.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
canEnter ExclusiveArea	<a href="#">ExclusiveArea</a>	*	ref	This means that the executable entity can enter/leave the referenced exclusive area through explicit API calls.  <b>Tags:</b> atp.Status=obsolete
exclusiveArea NestingOrder	ExclusiveAreaNesting Order	*	ref	This represents the set of ExclusiveAreaNestingOrders recognized by this ExecutableEntity.
minimumStart Interval	TimeValue	0..1	attr	Specifies the time in seconds by which two consecutive starts of an ExecutableEntity are guaranteed to be separated.
reentrancyLevel	<a href="#">ReentrancyLevelEnum</a>	0..1	attr	The reentrancy level of this ExecutableEntity. See the documentation of the enumeration type ReentrancyLevel Enum for details.  Please note that nonReentrant interfaces can have also reentrant or multicoreReentrant implementations, and reentrant interfaces can also have multicoreReentrant implementations.
runsInside	<a href="#">ExclusiveArea</a>	*	ref	The executable entity runs completely inside the referenced exclusive area.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
runsInside ExclusiveArea	<a href="#">ExclusiveArea</a>	*	ref	The executable entity runs completely inside the referenced exclusive area.  <b>Tags:</b> atp.Status=obsolete





Class	ExecutableEntity (abstract)			
swAddrMethod	<a href="#">SwAddrMethod</a>	0..1	ref	Addressing method related to this code entity. Via an association to the same SwAddrMethod, it can be specified that several code entities (even of different modules or components) shall be located in the same memory without already specifying the memory section itself.

**Table A.454: ExecutableEntity**

Class	ExecutableEntityActivationReason			
Package	M2::AUTOSARTemplates::CommonStructure::InternalBehavior			
Note	This meta-class represents the ability to define the reason for the activation of the enclosing Executable Entity.			
Base	ARObject, <a href="#">ImplementationProps</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
bitPosition	PositiveInteger	0..1	attr	This attribute allows for defining the position of the enclosing ExecutableEntityActivationReason in the activation vector.

**Table A.455: ExecutableEntityActivationReason**

Class	ExecutionOrderConstraint			
Package	M2::AUTOSARTemplates::CommonStructure::Timing::TimingConstraint::ExecutionOrderConstraint			
Note	<p>This constraint is used to restrict the order of execution for a set of ExecutableEntities. The ExecutionOrderConstraint can be used in any timing view.</p> <p>The various scopes for ExecutionOrderConstraint are described below. Generally, each ExecutionOrderConstraint has a scope of software components and can reference all executable entities available in the corresponding internal behavior (RunnableEntity and BswModuleEntity) either directly or by the events activating respectively starting them (RteEvent and BswEvent).</p> <p>On VFB level an ExecutionOrderConstraint can be specified for RunnableEntities part of the composition hierarchy referenced by the VfbTiming. The ExecutionOrderConstraint is aggregated by the VfbTiming.</p> <p>On SW-C level an ExecutionOrderConstraint can be specified for RunnableEntities part of the Internal Behavior referenced by the SwcTiming. The ExecutionOrderConstraint is aggregated by the SwcTiming.</p> <p>On System level an ExecutionOrderConstraint can be specified for RunnableEntities part of the composition hierarchy of the system referenced by the SystemTiming. The ExecutionOrderConstraint is aggregated by the SystemTiming.</p> <p>On BSW Module level, an ExecutionOrderConstraint can be specified for BswModuleEntities part of an BswInternalBehavior referenced by the BswModuleTiming. The ExecutionOrderConstraint is aggregated by the BswModuleTiming.</p> <p>On ECU level an ExecutionOrderConstraint can be specified for all ExecutableEntities and Events available via the EcucValueCollection, covering ECU Extract and BSW Module Configuration, referenced by the EcuTiming. The ExecutionOrderConstraint is aggregated by the EcuTiming.</p>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TimingConstraint</a> , <a href="#">Traceable</a>			
Attribute	Type	Mult.	Kind	Note
base Composition	<a href="#">CompositionSw ComponentType</a>	0..1	ref	Specifies the composition SW-C type playing the role of a SW-C containing further SW-Cs and represents the scope of the Execution Order Constraint.
executionOrder ConstraintType	ExecutionOrder ConstraintTypeEnum	0..1	attr	Specifies the specific type of ExecutionOrderConstraint.





Class	ExecutionOrderConstraint			
ignoreOrderAllowed	Boolean	0..1	attr	Controls whether the order of execution specified by this constraint can be intentionally ignored (TRUE), or shall be respected (FALSE).
isEvent	Boolean	0..1	attr	Indicates whether the ExecutionOrderConstraint is only referring to Executable Entities (FALSE) or only to RTE and/or BSW Events (TRUE).
orderedElement	<a href="#">EOExecutableEntity</a> <a href="#">RefAbstract</a>	1..*	aggr	This aggregation represents an unordered collection of references to RunnableEntities which shall be considered in the ExecutionOrderConstraint. The role does not imply that the collection of references itself shall be ordered.
permitMultipleReferencesToEE	Boolean	0..1	attr	Indicates that the ExecutionOrderConstraints permits that an Executable Entity is referenced multiple times (TRUE) or only once (FALSE) in the constraint.

**Table A.456: ExecutionOrderConstraint**

Class	ExternalTriggerOccurredEvent			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	This event is raised when the referenced Trigger has occurred.			
Base	<a href="#">ARObject</a> , <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage</a> , <a href="#">Referrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
trigger	<a href="#">Trigger</a>	0..1	iref	The referenced Trigger raises this ExternalTriggerOccurredEvent.  <b>InstanceRef implemented by:</b> <a href="#">RTriggerInAtomicSwc</a> <a href="#">InstanceRef</a>

**Table A.457: ExternalTriggerOccurredEvent**

Class	ExternalTriggeringPoint			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::Trigger			
Note	If a RunnableEntity owns an ExternalTriggeringPoint it is entitled to raise an ExternalTriggerOccurred Event.			
Base	<a href="#">ARObject</a>			
Attribute	Type	Mult.	Kind	Note
ident	ExternalTriggeringPoint Ident	0..1	aggr	The aggregation in the role ident provides the ability to make the ExternalTriggeringPoint identifiable.  From the semantical point of view, the ExternalTriggering Point is considered a first-class Identifiable and therefore the aggregation in the role ident shall always exist (until it may be possible to let ModeAccessPoint directly inherit from Identifiable).  <b>Stereotypes:</b> <a href="#">atpIdentityContributor</a> <b>Tags:</b> <a href="#">xml.sequenceOffset=-100</a>





Class	ExternalTriggeringPoint			
trigger	<a href="#">Trigger</a>	0..1	iref	<p>The trigger taken for the ExternalTriggeringPoint.</p> <p><b>Tags:</b>  xml.namePlural=TRIGGER-IREF  xml.roleElement=false  xml.roleWrapperElement=true  xml.typeElement=true  xml.typeWrapperElement=false  <b>InstanceRef implemented by:</b>PTriggerInAtomicSwcType  InstanceRef</p>

Table A.458: ExternalTriggeringPoint

Class	FibexElement (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore			
Note	ASAM FIBEX elements specifying Communication and Topology.			
Base	ARObject, CollectableElement, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">BusMirrorChannelMapping</a> , <a href="#">CommunicationCluster</a> , ConsumedProvidedServiceInstanceGroup, <a href="#">CouplingElement</a> , <a href="#">EcuInstance</a> , EthernetWakeupSleepOnDataLineConfigSet, <a href="#">Frame</a> , Gateway, <a href="#">GlobalTimeDomain</a> , <a href="#">ISignal</a> , <a href="#">ISignalGroup</a> , <a href="#">ISignalIPduGroup</a> , <a href="#">NmConfig</a> , <a href="#">Pdu</a> , <a href="#">PduIPduGroup</a> , SecureCommunicationPropsSet, ServiceInstanceCollectionSet, SoAdRoutingGroup, SocketConnectionIpduIdentifierSet, <a href="#">TpConfig</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

Table A.459: FibexElement

Class	FlatInstanceDescriptor			
Package	M2::AUTOSARTemplates::CommonStructure::FlatMap			
Note	<p>Represents exactly one node (e.g. a component instance or data element) of the instance tree of a software system. The purpose of this element is to map the various nested representations of this instance to a flat representation and assign a unique name (shortName) to it.</p> <p>Use cases:</p> <ul style="list-style-type: none"> <li>Specify unique names of measurable data to be used by MCD tools</li> <li>Specify unique names of calibration data to be used by MCD tool</li> <li>Specify a unique name for an instance of a component prototype in the ECU extract of the system description</li> </ul> <p>Note that in addition it is possible to assign alias names via AliasNameAssignment.</p>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note





Class	FlatInstanceDescriptor			
ecuExtract Reference	AtpFeature	0..1	iref	<p>Refers to the instance in the ECU extract. This is valid only, if the FlatMap is used in the context of an ECU extract.</p> <p>The reference shall be such that it uniquely defines the object instance. For example, if a data prototype is declared as a role within an SwcInternalBehavior, it is not enough to state the SwcInternalBehavior as context and the aggregated data prototype as target. In addition, the reference shall also include the complete path identifying instance of the component prototype and the Atomic SoftwareComponentType, which is referred by the particular SwcInternalBehavior.</p> <p><b>Tags:</b>xml.sequenceOffset=40  <b>InstanceRef implemented by:</b><a href="#">AnyInstanceRef</a></p>
role	<a href="#">Identifier</a>	0..1	attr	<p>The role denotes the particular role of the downstream memory location described by this FlatInstanceDescriptor.</p> <p>It applies to use case where one upstream object results in multiple downstream objects, e.g. ModeDeclaration GroupPrototypes which are measurable. In this case the RTE will provide locations for current mode, previous mode and next mode.</p>
rtePluginProps	<a href="#">RtePluginProps</a>	0..1	aggr	<p>The properties of a communication graph with respect to the utilization of RTE Implementation Plug-in.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b>atp.Splitkey=rtePluginProps</p>
swDataDef Props	<a href="#">SwDataDefProps</a>	0..1	aggr	<p>The properties of this FlatInstanceDescriptor.</p>
upstream Reference	AtpFeature	0..1	iref	<p>Refers to the instance in the context of an "upstream" descriptions, which could be the system or system extract description, the basic software module description or (if a flat map is used in preliminary context) a description of an atomic component or composition. This reference is optional in case the flat map is used in ECU context.</p> <p>The reference shall be such that it uniquely defines the object instance in the given context. For example, if a data prototype is declared as a role within an SwcInternalBehavior, it is not enough to state the SwcInternalBehavior as context and the aggregated data prototype as target. In addition, the reference shall also include the complete path identifying the instance of the component prototype that contains the particular instance of Swc InternalBehavior.</p> <p><b>Tags:</b>xml.sequenceOffset=20  <b>InstanceRef implemented by:</b><a href="#">AnyInstanceRef</a></p>

**Table A.460: FlatInstanceDescriptor**

Class	FlexrayArTpChannel
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols
Note	<p>A channel is a group of connections sharing several properties.</p> <p>The FlexRay AutosarTransport Layer supports several channels. These channels can work concurrently, thus each of them requires its own state machine and management data structures and its own PDU-IDs.</p>
Base	ARObject





Class	FlexrayArTpChannel			
Attribute	Type	Mult.	Kind	Note
ackType	FrArTpAckType	1	attr	Type of Acknowledgement.
cancellation	Boolean	0..1	attr	With this switch Tx and Rx Cancellation can be turned on or off.
extended Addressing	Boolean	1	attr	Addressing Type of this connection: true: Two Bytes false: One Byte
maxAr	Integer	0..1	attr	This attribute defines the maximum number of trying to send a frame when a TIMEOUT AR occurs (depending on whether retry is configured).
maxAs	Integer	0..1	attr	This attribute defines the maximum number of trying to send a frame when a TIMEOUT AS occurs (depending on whether retry is configured).
maxBs	Integer	0..1	attr	This attribute defines the number of consecutive CFs between two FCs (block size). Valid values are 1 .. 16 when retry is activated, and 0 .. 255 otherwise.
maxFcWait	PositiveInteger	0..1	attr	This attribute defines the maximal number of wait frames to be sent for a pending connection. Range is 0..255.
maximum MessageLength	MaximumMessageLengthType	1	attr	This specifies the maximum message length for the particular channel.
maxRetries	Integer	0..1	attr	This attribute defines the maximum number of retries (if retry is configured for the particular channel).
minimum Multicast SeperationTime	TimeValue	0..1	attr	<p>This attribute defines the minimum amount of time between two succeeding CFs of a 1:n segmented transmission in seconds. Valid values are 0, 100µs, 200µs ... 900µs, 1ms, 2ms .. 127ms. The value can be changed at runtime using the FrArTp_ChangeParameter interface.</p> <p>minimumMulticastSeparationTime shall be an integer multiple of the cycle length multiplied with the multiplexing factor, i.e. <math>\text{minimumMulticastSeparationTime} = n * \text{cycle} * m</math>, where n is an integer <math>\geq 0</math>, cycle is Flexray Cluster.cycle, and m is the cycle multiplexor of those cycles where PDUs of the PDU pool are scheduled. Please note: Due to the scheduling strategies of FrTp, minimumMulticastSeparationTime can only be kept to a degree defined by the maximum temporal distance of the PDUs of a PDU pool within one FlexRay cycle.</p> <p>Range: 0 .. 0.127</p>
minimum SeparationTime	TimeValue	1	attr	<p>This attribute defines the minimum amount of time between two succeeding CFs of a 1:1 segmented transmission in seconds. Valid values are 0, 100µs, 200µs .. 900µs, 1ms, 2ms .. 127ms. The value can be changed at runtime using the FrArTp_ChangeParameter interface.</p> <p>The minimumSeparationTime shall be an integer multiple of the cycle length multiplied with the multiplexing factor, i.e. <math>\text{minimumSeparationTime} = n * \text{cycle} * m</math>, where n is an integer <math>\geq 0</math>, cycle is FlexrayCluster.cycle, and m is the cycle multiplexor of those cycles where PDUs of the PDU pool are scheduled.</p> <p>Please note: Due to the scheduling strategies of FrTp, minimumSeparationTime can only be kept to a degree defined by the maximum temporal distance of the PDUs of a PDU pool within one FlexRay cycle.</p> <p>Range: 0 .. 0.127</p>





Class	FlexrayArTpChannel			
multicast Segmentation	Boolean	1	attr	This attribute defines whether segmentation within a 1:n connection is allowed or not.
nPdu	NPdu	*	ref	A FlexRayTpChannel references a set of NPdus. These NPdus are logically assembled into a pool of Rx NPdus and another pool of Tx NPdus. It shall be ensured that a second channel either references all NPdus of such a pool, or none.
timeBr	TimeValue	0..1	attr	This attribute defines the time in seconds between receiving the last CF of a block or an FF-x (or SF-x) and sending out an FC or AF.
timeCs	TimeValue	0..1	attr	This attribute defines the time in seconds between the sending of two consecutive frames or between a consecutive frame and a flow control (for Transmit Cancellation) or between reception of a flow control or Acknowledgement Frame and sending of the next consecutive frame or a flow control (for Transmit Cancellation).
timeoutAr	TimeValue	0..1	attr	This attribute states the timeout in seconds between the PDU transmit request of the Transport Layer to the Flex Ray Interface and the corresponding confirmation of the FlexRay Interface on the receiver side (for FC or AF).
timeoutAs	TimeValue	0..1	attr	This attribute states the timeout in seconds between the PDU transmit request for the first PDU of the group used in the current connection of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface (when having sent the last PDU of the group used in this connection) on the sender side (SF-x, FF-x, CF).
timeoutBs	TimeValue	0..1	attr	This attribute defines the timeout in seconds for waiting for an FC or AF on the sender side in a 1:1 connection.
timeoutCr	TimeValue	0..1	attr	This attribute defines the timeout value in seconds for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side.
tpConnection	FlexrayArTpConnection	1..*	aggr	Group of connections that can be used in this channel.

**Table A.461: FlexrayArTpChannel**

Class	FlexrayArTpConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A connection within a channel identifies the sender and the receiver of this particular communication. The FlexRay Autosar Tp module routes a Pdu through this connection.			
Base	ARObject, TpConnection			
Attribute	Type	Mult.	Kind	Note
connectionPrio Pdus	Integer	0..1	attr	This parameter defines the number of PDUs that shall be reserved for this connection when it is active. The range is 1-255.
directTpSdu	IPdu	1	ref	Reference to the IPdu that is segmented by the Transport Protocol.  The source address of the transmitted NPdu is determined by the configured source Communication Connector. The target address of the transmitted NPdu is determined by the configured target Communication Connector.





Class	FlexrayArTpConnection			
multicast	TpAddress	0..1	ref	TP address for 1:n connections.
reversedTpSdu	IPdu	0..1	ref	Reference to the IPdu that is segmented by the Transport Protocol. If support of both sending and receiving is used, this association references the IPdu used for the additional second direction.  The source address of the transmitted NPdu is determined by the configured target Communication Connector. The target address of the transmitted NPdu is determined by the configured source Communication Connector.
source	FlexrayArTpNode	1	ref	The source of the TP connection.
target	FlexrayArTpNode	1..*	ref	The target of the TP connection.

**Table A.462: FlexrayArTpConnection**

Class	FlexrayArTpNode			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	TP Node (Sender or Receiver) provides the TP Address and the connection to the Topology description.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
connector	<a href="#">FlexrayCommunicationConnector</a>	*	ref	Association to one or more physical connectors (max number of connectors for FlexRay: 2).  In a System Description this reference is mandatory. In an ECU Extract this reference is optional (references to ECUs that are not part of the ECU Extract shall be avoided).
tpAddress	TpAddress	0..1	ref	Reference to the TP Address that is used by the TpNode. This reference is optional in case that the multicast TP Address is used (reference from TpConnection).

**Table A.463: FlexrayArTpNode**

Enumeration	FlexrayChannelName
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology
Note	Name of the channel.
Literal	Description
channelA	Channel A <b>Tags:</b> atp.EnumerationLiteralIndex=0
channelB	Channel B <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.464: FlexrayChannelName**



<b>Class</b>	<<atpVariation>> <b>FlexrayCluster</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology			
<b>Note</b>	FlexRay specific attributes to the physicalCluster <b>Tags:</b> atp.recommendedPackage=CommunicationClusters			
<b>Base</b>	ARObject, CollectableElement, CommunicationCluster, FibexElement, Identifiable, Multilanguage Referrable, PackageableElement, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
actionPoint Offset	Integer	1	attr	The offset of the action point in networks
bit	TimeValue	1	attr	Nominal bit time (= 1 / fx::SPEED). gdBit = cSamplesPer Bit * gdSampleClockPeriod. Unit: seconds (gdBit)
casRxLowMax	Integer	1	attr	Upper limit of the Collision Avoidance Symbol (CAS) acceptance window. Unit:bitDuration
coldStart Attempts	Integer	1	attr	The maximum number of times that a node in this cluster is permitted to attempt to start the cluster by initiating schedule synchronization
cycle	TimeValue	1	attr	Length of the cycle. Unit: seconds
cycleCountMax	Integer	1	attr	Maximum cycle counter value in a given cluster. Remark: Set to 63 for FlexRay Protocol 2.1 Rev. A compliance.
detectNitError	Boolean	1	attr	Indicates whether NIT error status of each cluster shall be detected or not.
dynamicSlotIdle Phase	Integer	1	attr	The duration of the dynamic slot idle phase in minislots.
ignoreAfterTx	Integer	1	attr	Duration for which the bitstrobing is paused after transmission [gdBit].
listenNoise	Integer	1	attr	Upper limit for the start up and wake up listen timeout in the presence of noise. Expressed as a multiple of the cluster constant pdListenTimeout. Unit microticks
macroPerCycle	Integer	1	attr	The number of macroticks in a communication cycle
macrotick Duration	TimeValue	1	attr	Duration of the cluster wide nominal macrotick, expressed in s.
maxWithout ClockCorrection Fatal	Integer	1	attr	Threshold concerning vClockCorrectionFailedCounter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active or POC:normal passive state into the POC:halt state.
maxWithout ClockCorrection Passive	Integer	1	attr	Threshold concerning vClockCorrectionFailedCounter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active state to the POC:normal passive state.
minislotAction PointOffset	Integer	1	attr	The Offset of the action point within a minislot. Unit: macroticks
minislotDuration	Integer	1	attr	The duration of a minislot (dynamic segment). Unit: macroticks.
networkIdle Time	Integer	1	attr	The duration of the network idle time in macroticks
network Management VectorLength	Integer	1	attr	Length of the Network Management vector in a cluster [bytes]
numberOf Minislots	Integer	1	attr	Number of Minislots in the dynamic segment.
numberOfStatic Slots	Integer	1	attr	The number of static slots in the static segment.





Class	<<atpVariation>> FlexrayCluster			
offsetCorrectionStart	Integer	1	attr	Start of the offset correction phase within the Network Idle Time (NIT), expressed as the number of macroticks from the start of cycle. Unit: macroticks
payloadLengthStatic	Integer	1	attr	Globally configured payload length of a static frame. Unit: 16-bit WORDS.
safetyMargin	Integer	1	attr	Additional timespan in macroticks which takes jitter into account to be able to set the JobListPointer to the next possible job which can be executed in case the FlexRay Job List Execution Function has to be resynchronized.
sampleClockPeriod	TimeValue	0..1	attr	Sample clock period. Unit: seconds
staticSlotDuration	Integer	1	attr	The duration of a slot in the static segment. Unit: macroticks
symbolWindow	Integer	1	attr	The duration of the symbol window. Unit: macroticks
symbolWindowActionPointOffset	Integer	1	attr	Number of macroticks the action point offset is from the beginning of the symbol window [Macroticks].
syncFrameIdCountMax	Integer	1	attr	Maximum number of distinct syncframe identifiers present in a given cluster. This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gSyncNodeMax.
tranceiverStandbyDelay	Float	0..1	attr	The duration of timer t_TrvcStdbbyDelay in seconds. The granularity of this parameter shall be restricted to full Flex Ray cycles (cycle). The tranceiver status setting to STANDBY shall be delayed by this value.  Not specifying a value or a value of 0 shall imply that the timer is not used.
transmissionStartSequenceDuration	Integer	1	attr	Number of bits in the Transmission Start Sequence [gd Bits].
wakeupRxIdle	Integer	1	attr	Number of bits used by the node to test the duration of the 'idle' or HIGH phase of a received wakeup. Unit: bitDuration  Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxIdle.
wakeupRxLow	Integer	1	attr	Number of bits used by the node to test the duration of the LOW phase of a received wakeup. Unit: bitDuration  Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxLow.
wakeupRxWindow	Integer	1	attr	The size of the window used to detect wakeups [gdBit].  Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxWindow.
wakeupTxActive	Integer	1	attr	Number of bits used by the node to transmit the LOW phase of a wakeup symbol and the HIGH and LOW phases of a WUDOP. Unit: bitDuration
wakeupTxIdle	Integer	1	attr	Number of bits used by the node to transmit the 'idle' part of a wakeup symbol. Unit: gDbit

**Table A.465: FlexrayCluster**

Class	FlexrayCommunicationConnector
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology
Note	FlexRay specific attributes to the CommunicationConnector





Class	FlexrayCommunicationConnector			
Base	ARObject, CommunicationConnector, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mult.	Kind	Note
nmReadySleepTime	Float	0..1	attr	The value of this attribute influences the shutdown behavior of the FlexRay NM. FrNm switches to bus sleep mode nmReadySleepTime seconds after the completion of the last repetition cycle containing a NM vote.
pncFilterDataMask	PositiveUnlimitedInteger	0..1	attr	Bit mask for FlexRay Payload used to configure the NM filter mask for the Network Management. <b>Tags:</b> atp.Status=obsolete
wakeUpChannel	Boolean	1	attr	Referenced channel used by the node to send a wakeup pattern. (pWakeupChannel)

**Table A.466: FlexrayCommunicationConnector**

Class	FlexrayFrame			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayCommunication			
Note	FlexRay specific Frame element. <b>Tags:</b> atp.recommendedPackage=Frames			
Base	ARObject, CollectableElement, FibexElement, Frame, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.467: FlexrayFrame**

Class	FlexrayFrameTriggering			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayCommunication			
Note	FlexRay specific attributes to the FrameTriggering			
Base	ARObject, FrameTriggering, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mult.	Kind	Note
absolutelyScheduledTiming	FlexrayAbsolutelyScheduledTiming	*	aggr	Specification of a sending behaviour where the exact time for the frames transmission is guaranteed.
allowDynamicLSduLength	Boolean	1	attr	Allows L-PDU length reduction and indicates that the related CC buffer has to be reconfigured for the actual length and Header-CRC before transmission of the L-PDU.  If this attribute is set to true than the referenced Frame length attribute defines the max. length.
messageId	PositiveInteger	0..1	attr	The first two bytes of the payload segment of the FlexRay frame format for frames transmitted in the dynamic segment can be used as receiver filterable data called the message ID.
payloadPreambleIndicator	Boolean	1	attr	Switching the Payload Preamble bit.

**Table A.468: FlexrayFrameTriggering**

<b>Class</b>	<b>FlexrayNmCluster</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
<b>Note</b>	FlexRay specific NM cluster attributes.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">NmCluster</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
nmCarWakeUpBitPosition	PositiveInteger	0..1	attr	Specifies the bit position of the CarWakeUp within the Nm Pdu.
nmCarWakeUpFilterEnabled	Boolean	0..1	attr	If this attribute is set to true the CareWakeUp filtering is supported. In this case only the CarWakeUp bit within the NmPdu with source node identifier nmCarWakeUpFilterNodeId is considered as CarWakeUp request.
nmCarWakeUpFilterNodeId	PositiveInteger	0..1	attr	Source node identifier for CarWakeUp filtering. If Car WakeUp filtering is supported (nmCarWakeUpFilterEnabled), only the CarWakeUp bit within the NmPdu with source node identifier nmCarWakeUpFilterNodeId is considered as CarWakeUp request.
nmCarWakeUpRxEnabled	Boolean	0..1	attr	If set to true this attribute enables the support of CarWakeUp bit evaluation in received NmPdus.
nmDataCycle	Integer	1	attr	Number of FlexRay Communication Cycles needed to transmit the Nm Data PDUs of all FlexRay Nm Ecus of this FlexRayNmCluster.
nmMainFunctionPeriod	TimeValue	0..1	attr	Defines the processing cycle of the main function of FrNm module.
nmRemoteSleepIndicationTime	TimeValue	1	attr	Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.
nmRepeatMessageTime	TimeValue	1	attr	Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.
nmRepetitionCycle	Integer	1	attr	Number of FlexRay Communication Cycles used to repeat the transmission of the Nm vote Pdus of all Flex Ray NmEcus of this FlexRayNmCluster. This value shall be an integral multiple of nmVotingCycle.
nmVotingCycle	Integer	1	attr	Number of FlexRay CommunicationCycles needed to transmit the Nm vote of Pdus of all FlexRay NmEcus of this FlexRayNmCluster.

**Table A.469: FlexrayNmCluster**

<b>Class</b>	<b>FlexrayPhysicalChannel</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology			
<b>Note</b>	FlexRay specific attributes to the physicalChannel			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PhysicalChannel</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
channelName	<a href="#">FlexrayChannelName</a>	1	attr	Name of the channel (Channel A or Channel B).

**Table A.470: FlexrayPhysicalChannel**

<b>Class</b>	<b>FlexrayTpConnection</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
<b>Note</b>	<p>A connection identifies the sender and the receiver of this particular communication. The FlexRayTp module routes a Pdu through this connection.</p> <p>In a System Description the references to the PduPools are mandatory. In an ECU Extract these references can be optional: On unicast connections these references are always mandatory. On multicast the txPduPool is mandatory on the sender side. The rxPduPool is mandatory on the receiver side. On Gateway ECUs both references are mandatory.</p>			
<b>Base</b>	ARObject, <a href="#">TpConnection</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bandwidthLimitation	Boolean	1	attr	Specifies whether the connection requires a bandwidth limitation or not.
directTpSdu	<a href="#">IPdu</a>	1	ref	Reference to the IPdu that is segmented by the Transport Protocol.
multicast	TpAddress	0..1	ref	TP address for 1:n connections.
receiver	FlexrayTpNode	1..*	ref	The target of the TP connection.
reversedTpSdu	<a href="#">IPdu</a>	0..1	ref	Reference to the IPdu that is segmented by the Transport Protocol. If support of both sending and receiving is used, this association references the IPdu used for the additional second direction.
rxPduPool	FlexrayTpPduPool	0..1	ref	<p>A connection has a reference to a set of NPdus (FrTpRx PduPool) which are defined for receiving data via this particular connection.</p> <p>The following constraint is valid only for the System Extract/ECU Extract: In case this connection is applied to the transmitter the rxPduPool holds the actually received NPdus. In case this connection is applied to the receiver the rxPduPool holds the actually sent NPdus.</p>
tpConnectionControl	FlexrayTpConnectionControl	1	ref	Reference to the connection control.
transmitter	FlexrayTpNode	1	ref	The source of the TP connection.
txPduPool	FlexrayTpPduPool	0..1	ref	<p>A connection has a reference to a set of NPdus (FrTpTx PduPool) which are defined for sending data via this particular connection.</p> <p>The following constraint is valid only for the System Extract/ECU Extract: In case this connection is applied to the transmitter the txPduPool holds the actually sent NPdus. In case this connection is applied to the receiver the txPduPool holds the actually received NPdus.</p>

**Table A.471: FlexrayTpConnection**

<b>Class</b>	<b>Frame</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Data frame which is sent over a communication medium. This element describes the pure Layout of a frame sent on a channel.			
<b>Base</b>	ARObject, CollectableElement, <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">AbstractEthernetFrame</a> , CanFrame, <a href="#">FlexrayFrame</a> , <a href="#">LinFrame</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	Frame (abstract)			
frameLength	Integer	0..1	attr	The used length (in bytes) of the referencing frame. Should not be confused with a static byte length reserved for each frame by some platforms (e.g. FlexRay).  The frameLength of zero bytes is allowed. Please consider also TPS_SYST_02255.
pduToFrame Mapping	<a href="#">PduToFrameMapping</a>	*	aggr	A frames layout as a sequence of Pdus. atpVariation: The content of a frame can be variable. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild

Table A.472: Frame

Class	FramePid			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Frame_PIDs that are included in the request. The "pid" attribute describes the value and the "index" attribute the position of the frame_PID in the request.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
index	Integer	1	attr	This attribute is used to order the frame_PIDs. The values of index shall be unique within one AssignFrameIdRange.
pid	PositiveInteger	1	attr	Frame_PID value.

Table A.473: FramePid

Class	FramePort			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Connectors reception or send port on the referenced channel referenced by a FrameTriggering.			
Base	ARObject, <a href="#">CommConnectorPort</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

Table A.474: FramePort

Class	FrameTriggering (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The FrameTriggering describes the instance of a frame sent on a channel and defines the manner of triggering (timing information) and identification of a frame on the channel, on which it is sent.  For the same frame, if FrameTriggerings exist on more than one channel of the same cluster the fan-out/in is handled by the Bus interface.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">CanFrameTriggering</a> , <a href="#">EthernetFrameTriggering</a> , <a href="#">FlexrayFrameTriggering</a> , <a href="#">LinFrameTriggering</a>			
Attribute	Type	Mult.	Kind	Note





Class	FrameTriggering (abstract)			
frame	<a href="#">Frame</a>	1	ref	One frame can be triggered several times, e.g. on different channels. If a frame has no frame triggering, it won't be sent at all. A frame triggering has assigned exactly one frame, which it triggers.
framePort	<a href="#">FramePort</a>	*	ref	References to the FramePort on every ECU of the system which sends and/or receives the frame.  References for both the sender and the receiver side shall be included when the system is completely defined.
pduTriggering	<a href="#">PduTriggering</a>	*	ref	This reference provides the relationship to the Pdu Triggerings that are implemented by the FrameTriggering. The reference is optional since no PduTriggering can be defined for NmPdus and XCP Pdus.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild

**Table A.475: FrameTriggering**

Class	FunctionInhibitionNeeds			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	Specifies the abstract needs on the configuration of the Function Inhibition Manager for one Function Identifier (FID). This class currently contains no attributes. Its name can be regarded as a symbol identifying the FID from the viewpoint of the component or module which owns this class.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.476: FunctionInhibitionNeeds**

Class	GeneralPurposeConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::GeneralPurposeConnection			
Note	This meta-class allows to describe the relationship between several PduTriggerings that are defined on the same PhysicalChannel, e.g. to create a link between Rx and Tx Pdu that are used for request/response.  <b>Tags:</b> atp.recommendedPackage=GeneralPurposeConnections			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
pduTriggering	<a href="#">PduTriggering</a>	*	ref	Reference to PduTriggerings that are connected to each other by a GeneralPurposeConnection.

**Table A.477: GeneralPurposeConnection**

Class	GeneralPurposePdu			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			





<b>Class</b>	<b>GeneralPurposeIPdu</b>			
<b>Note</b>	This element is used for AUTOSAR Pdus without attributes that are routed by the PduR. Please note that the category name of such Pdus is standardized in the AUTOSAR System Template. <b>Tags:</b> atp.recommendedPackage=Pdus			
<b>Base</b>	ARObject, CollectableElement, <a href="#">FibexElement</a> , <a href="#">IPdu</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Pdu</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.478: GeneralPurposeIPdu**

<b>Class</b>	<b>GeneralPurposePdu</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	This element is used for AUTOSAR Pdus without additional attributes that are routed by a bus interface. Please note that the category name of such Pdus is standardized in the AUTOSAR System Template. <b>Tags:</b> atp.recommendedPackage=Pdus			
<b>Base</b>	ARObject, CollectableElement, <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Pdu</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.479: GeneralPurposePdu**

<b>Class</b>	<b>GlobalTimeDomain</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
<b>Note</b>	This represents the ability to define a global time domain. <b>Tags:</b> atp.recommendedPackage=GlobalTimeDomains			
<b>Base</b>	ARObject, CollectableElement, <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
debounceTime	TimeValue	0..1	attr	Defines the minimum amount of time between two time sync messages are transmitted.
domainId	PositiveInteger	1	attr	This represents the ID of the GlobalTimeDomain used in the network messages sent on behalf of global time management.
gateway	<a href="#">GlobalTimeGateway</a>	*	aggr	A GlobalTimeGateway may exist in the context of a GlobalTimeDomain to actively update the global time information as it is routed from one GlobalTimeDomain to another. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
globalTimeCorrectionProps	GlobalTimeCorrectionProps	0..1	aggr	Definition of attributes for rate and offset correction.
globalTimeDomainProperty	AbstractGlobalTimeDomainProps	0..1	aggr	Additional properties of the GlobalTimeDomain. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild







Class	GlobalTimeDomain			
globalTimeMaster	<a href="#">GlobalTimeMaster</a>	0..1	aggr	This represents the single master of a GlobalTime Domain. A GlobalTimeDomain may have no GlobalTimeDomain.master, e.g. when it gets its time from a GPS receiver. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
globalTimeSubDomain	<a href="#">GlobalTimeDomain</a>	*	ref	By this means it is possible to create a hierarchy of sub Domains where one global time domain can declare one or more other global time domains as its subDomains. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
networkSegmentId	<a href="#">NetworkSegmentIdentification</a>	0..1	aggr	Defines the numerical identification of a GlobalTime sub domain.
offsetTimeDomain	<a href="#">GlobalTimeDomain</a>	0..1	ref	Reference to a synchronized time domain this offset time domain is based on. The reference source is the offset time domain. The reference target is the synchronized time domain.
pduTriggering	<a href="#">PduTriggering</a>	0..1	ref	This PduTriggering will be taken to transmit the global time information from a GlobalTimeMaster to a the associated GlobalTimeSlaves. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
slave	<a href="#">GlobalTimeSlave</a>	*	aggr	This represents the collections of slaves of the Global TimeDomain. A GlobalTimeDomain may have no Global TimeDomain.slaves, e.g. when it propagates its time directly to sub domains. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
syncLossTimeout	TimeValue	0..1	attr	This attribute describes the timeout for the situation that the time synchronization gets lost in the scope of the time domain.

**Table A.480: GlobalTimeDomain**

Class	GlobalTimeEthMaster			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::ETH			
Note	This represents the specialization of the GlobalTimeMaster for Ethernet communication.			
Base	<a href="#">ARObject</a> , <a href="#">GlobalTimeMaster</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
crcSecured	GlobalTimeCrcSupport Enum	0..1	attr	Definition of whether or not CRC is supported. This is only relevant for selected bus systems.
subTlvConfig	EthTSynSubTlvConfig	0..1	aggr	Defines the subTLV fields which shall be included in the time sync message.

**Table A.481: GlobalTimeEthMaster**

Class	GlobalTimeGateway			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
Note	This represents the ability to define a time gateway for establishing a global time domain over several communication clusters.			





Class	GlobalTimeGateway			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
host	<a href="#">EcuInstance</a>	1	ref	The GlobalTimeGateway is hosted by the referenced Ecu Instance.
master	<a href="#">GlobalTimeMaster</a>	1	ref	This represents the master of the global time gateway.
slave	<a href="#">GlobalTimeSlave</a>	1	ref	This represents the slave of the GlobalTimeGateway.

**Table A.482: GlobalTimeGateway**

Class	GlobalTimeMaster (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
Note	This represents the generic concept of a global time master.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	GlobalTimeCanMaster, <a href="#">GlobalTimeEthMaster</a> , GlobalTimeFrMaster, UserDefinedGlobalTimeMaster			
Attribute	Type	Mult.	Kind	Note
communication Connector	<a href="#">Communication Connector</a>	1	ref	The GlobalTimeMaster is bound to the Communication Connector.
immediate ResumeTime	TimeValue	0..1	attr	Defines the minimum time between an "immediate" message and the next periodic message.
isSystemWide GlobalTime Master	Boolean	1	attr	If set to TRUE, the GlobalTimeMaster is supposed to act as the root of global time information.
syncPeriod	TimeValue	1	attr	This represents the period. Unit: seconds

**Table A.483: GlobalTimeMaster**

Class	GlobalTimeSlave (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
Note	This represents the generic concept of a global time slave.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	GlobalTimeCanSlave, GlobalTimeEthSlave, GlobalTimeFrSlave, UserDefinedGlobalTimeSlave			
Attribute	Type	Mult.	Kind	Note
communication Connector	<a href="#">Communication Connector</a>	1	ref	The GlobalTimeSlave is bound to the Communication Connector.
followUp TimeoutValue	TimeValue	0..1	attr	Rx timeout for the follow-up message.
timeLeapFuture Threshold	TimeValue	0..1	attr	Defines the maximum allowed positive difference between the current Local Time Base value and a newly received Global Time Base value.
timeLeap HealingCounter	PositiveInteger	0..1	attr	Defines the required number of updates to the Time Base where the time difference to the previous received value has to remain within the bounds of timeLeapFuture Threshold and timeLeapPastThreshold until that Time Base is considered healed.
timeLeapPast Threshold	TimeValue	0..1	attr	Defines the maximum allowed negative difference between the current Local Time Base value and a newly received Global Time Base value.

**Table A.484: GlobalTimeSlave**

<b>Enumeration</b>	<b>HandleInvalidEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication
<b>Note</b>	Strategies of handling the reception of invalidValue.
<b>Literal</b>	<b>Description</b>
dontInvalidate	Invalidation is switched off. <b>Tags:</b> atp.EnumerationLiteralIndex=0
external Replacement	Replace a received invalidValue. The replacement value is sourced from the externalReplacement. <b>Tags:</b> atp.EnumerationLiteralIndex=1
keep	The application software is supposed to handle signal invalidation on RTE API level either by Data ReceiveErrorEvent or check of error code on read access. <b>Tags:</b> atp.EnumerationLiteralIndex=2
replace	Replace a received invalidValue. The replacement value is specified by the initValue. <b>Tags:</b> atp.EnumerationLiteralIndex=3

**Table A.485: HandleInvalidEnum**

<b>Enumeration</b>	<b>HandleOutOfRangeEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication
<b>Note</b>	A value of this type is taken for controlling the range checking behavior of the AUTOSAR RTE.
<b>Literal</b>	<b>Description</b>
default	The RTE will use the initValue if the actual value is out of the specified bounds. <b>Tags:</b> atp.EnumerationLiteralIndex=0
external Replacement	This indicates that the value replacement is sourced from the attribute replaceWith. <b>Tags:</b> atp.EnumerationLiteralIndex=1
ignore	The RTE will ignore any attempt to send or receive the corresponding dataElement if the value is out of the specified range. <b>Tags:</b> atp.EnumerationLiteralIndex=2
invalid	The RTE will use the invalidValue if the value is out of the specified bounds. <b>Tags:</b> atp.EnumerationLiteralIndex=3
none	A range check is not required. <b>Tags:</b> atp.EnumerationLiteralIndex=4
saturate	The RTE will saturate the value of the dataElement such that it is limited to the applicable upper bound if it is greater than the upper bound. Consequently, it is limited to the applicable lower bound if the value is less than the lower bound. <b>Tags:</b> atp.EnumerationLiteralIndex=5

**Table A.486: HandleOutOfRangeEnum**

<b>Class</b>	<b>HwAttributeDef</b>
<b>Package</b>	M2::AUTOSARTemplates::EcuResourceTemplate::HwElementCategory
<b>Note</b>	This metaclass represents the ability to define a particular hardware attribute.  The category of this element defines the type of the attributeValue. If the category is Enumeration the hw AttributeEnumerationLiterals specify the available literals.





<b>Class</b>	<b>HwAttributeDef</b>			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
hwAttributeLiteral	HwAttributeLiteralDef	*	aggr	The available EnumerationLiterals of the Enumeration definition. Only applicable if the category of the HwAttributeDef equals Enumeration.
isRequired	Boolean	0..1	attr	This attribute specifies if the defined attribute value is required to be provided.
unit	<a href="#">Unit</a>	0..1	ref	This association specifies the physical unit of the defined hardware attribute. This is optional due to the fact that there are textual attributes.

**Table A.487: HwAttributeDef**

<b>Class</b>	<b>HwAttributeValue</b>			
<b>Package</b>	M2::AUTOSARTemplates::EcuResourceTemplate::HwElementCategory			
<b>Note</b>	This metaclass represents the ability to assign a hardware attribute value. Note that v and vt are mutually exclusive.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
annotation	Annotation	0..1	aggr	Optional annotation that can be added to each HwAttributeValue.
hwAttributeDef	<a href="#">HwAttributeDef</a>	0..1	ref	This association represents the definition of the particular hardware attribute value.
v	<a href="#">Numerical</a>	0..1	attr	This represents a numerical hardware attribute value. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime
vt	VerbatimString	0..1	attr	This represents a textual hardware attribute value.

**Table A.488: HwAttributeValue**

<b>Class</b>	<b>HwDescriptionEntity</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::EcuResourceTemplate			
<b>Note</b>	This meta-class represents the ability to describe a hardware entity.			
<b>Base</b>	ARObject, <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">HwElement</a> , <a href="#">HwPin</a> , <a href="#">HwPinGroup</a> , <a href="#">HwType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
hwAttributeValue	<a href="#">HwAttributeValue</a>	*	aggr	This aggregation represents a particular hardware attribute value. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime xml.sequenceOffset=50
hwCategory	HwCategory	*	ref	One of the associations representing one particular category of the hardware entity. <b>Tags:</b> xml.sequenceOffset=30





Class	HwDescriptionEntity (abstract)			
hwType	<a href="#">HwType</a>	0..1	ref	This association is used to assign an optional HwType which contains the common attribute values for all occurrences of this HwDescriptionEntity. Note that HwTypes can not be redefined and therefore shall not have a hwType reference.

**Table A.489: HwDescriptionEntity**

Class	HwElement			
Package	M2::AUTOSARTemplates::EcuResourceTemplate			
Note	This represents the ability to describe Hardware Elements on an instance level. The particular types of hardware are distinguished by the category. This category determines the applicable attributes. The possible categories and attributes are defined in HwCategory. <b>Tags:</b> atp.recommendedPackage=HwElements			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">HwDescriptionEntity</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
hwElementConnection	<a href="#">HwElementConnector</a>	*	aggr	This represents one particular connection between two hardware elements. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime xml.sequenceOffset=110
hwPinGroup	HwPinGroup	*	aggr	This aggregation is used to describe the connection facilities of a hardware element. Note that hardware element has no pins but only pingroups. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime xml.sequenceOffset=90
nestedElement	<a href="#">HwElement</a>	*	ref	This association is used to establish hierarchies of hw elements. Note that one particular HwElement can be target of this association only once. I.e. multiple instantiation of the same HwElement is not supported (at any hierarchy level). <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime xml.sequenceOffset=70

**Table A.490: HwElement**

Class	HwElementConnector			
Package	M2::AUTOSARTemplates::EcuResourceTemplate			
Note	This meta-class represents the ability to connect two hardware elements. The details of the connection can be refined by hwPinGroupConnection.			
Base	<a href="#">ARObject</a> , <a href="#">Describable</a>			
Attribute	Type	Mult.	Kind	Note
hwElement	<a href="#">HwElement</a>	*	ref	This association connects two hardware elements.





Class	HwElementConnector			
hwPin Connection	<a href="#">HwPinConnector</a>	*	aggr	<p>This represents one particular connection between two hardware pins. This connection shall be used if pin-to-pin-connection is to be described but no description of the connection between the hierarchical composition of HwPinGroups (using HwPinGroupConnector) is required.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>  vh.latestBindingTime=systemDesignTime  xml.sequenceOffset=60</p>
hwPinGroup Connection	<a href="#">HwPinGroupConnector</a>	*	aggr	<p>This represents one particular connection between two hardware pin groups.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>  vh.latestBindingTime=systemDesignTime  xml.sequenceOffset=50</p>

**Table A.491: HwElementConnector**

Class	HwPinConnector			
Package	M2::AUTOSARTemplates::EcuResourceTemplate			
Note	This meta-class represents the ability to connect two pins.			
Base	ARObject, Describable			
Attribute	Type	Mult.	Kind	Note
hwPin	HwPin	*	ref	This association connects two hardware pins.

**Table A.492: HwPinConnector**

Class	HwPinGroupConnector			
Package	M2::AUTOSARTemplates::EcuResourceTemplate			
Note	This meta-class represents the ability to connect two pin groups.			
Base	ARObject, Describable			
Attribute	Type	Mult.	Kind	Note
hwPin Connection	<a href="#">HwPinConnector</a>	*	aggr	<p>This represents one particular connection between two hardware pins. The connected pins shall match the connection provided by the parent hwPinGroup Connection.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=systemDesignTime</p>
hwPinGroup	HwPinGroup	*	ref	This association connects two hardware pin groups.

**Table A.493: HwPinGroupConnector**

Class	HwPortMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::ECUResourceMapping			
Note	HwPortMapping specifies the hwCommunicationPort (defined in the ECU Resource Template) to realize the specified CommunicationConnector in a physical topology.			





Class	HwPortMapping			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
communication Connector	<a href="#">Communication Connector</a>	1	ref	Reference to the CommunicationConnector in the System Template
hw Communication Port	HwPinGroup	1	ref	Reference to the HwPinPortGroup of category CommunicationPort. The connection to the Hw CommunicationController is described in the Ecu Resource Description.

**Table A.494: HwPortMapping**

Class	HwType			
Package	M2::AUTOSARTemplates::EcuResourceTemplate::HwElementCategory			
Note	This represents the ability to describe Hardware types on an abstract level. The particular types of hardware are distinguished by the category. This category determines the applicable attributes. The possible categories and attributes are defined in HwCategory.  Tags:atp.recommendedPackage=HwTypes			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">HwDescriptionEntity</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.495: HwType**

Class	IPSecRule			
Package	M2::AUTOSARTemplates::SystemTemplate::SecureCommunication			
Note	This element defines an IPsec rule that describes communication traffic that is monitored, protected and filtered.			
Base	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
direction	<a href="#">Communication DirectionType</a>	0..1	attr	This attribute defines the direction in which the traffic is monitored. If this attribute is not set a bidirectional traffic monitoring is assumed.
headerType	IPsecHeaderTypeEnum	0..1	attr	Header type specifying the IPsec security mechanism.
ipProtocol	IPsecIpProtocolEnum	0..1	attr	This attribute defines the relevant IP protocol used in the Security Policy Database (SPD) entry.
localCertificate	<a href="#">CryptoService Certificate</a>	*	ref	This reference identifies the applicable certificate used for a local authentication.
localId	String	0..1	attr	This attribute defines how the local participant should be identified for authentication.
localPortRange End	PositiveInteger	0..1	attr	This attribute restricts the traffic monitoring and defines an end value for the local port range.  If this attribute is not set then this rule shall be effective for all local ports.  Please note that port ranges are currently not supported in the AUTOSAR AP's operating system backend. If AP systems are involved, each IPsec rule may only contain a single port.





Class	IPSecRule			
localPortRangeStart	PositiveInteger	0..1	attr	<p>This attribute restricts the traffic monitoring and defines a start value for the local port range.</p> <p>If this attribute is not set then this rule shall be effective for all local ports.</p> <p>Please note that port ranges are currently not supported in the AUTOSAR AP's operating system backend. If AP systems are involved, each IPsec rule may only contain a single port.</p>
mode	IPsecModeEnum	0..1	attr	This attribute defines the type of the connection.
policy	IPsecPolicyEnum	0..1	attr	An IPsec policy defines the rules that determine which type of IP traffic needs to be secured using IPsec and how that traffic is secured.
preSharedKey	CryptoServiceKey	0..1	ref	This reference identifies the applicable cryptographic key used for authentication.
priority	PositiveInteger	0..1	attr	This attribute defines the priority of the IPSecRule (SPD entry). The processing of entries is based on priority, starting with the highest priority "0".
remoteCertificate	<a href="#">CryptoServiceCertificate</a>	*	ref	This reference identifies the applicable certificate used for a remote authentication.
remoteId	String	0..1	attr	This attribute defines how the remote participant should be identified for authentication.
remoteIpAddress	<a href="#">NetworkEndpoint</a>	*	ref	Definition of the remote NetworkEndpoint. With this reference the connection between the local Network Endpoint and the remote NetworkEndpoint is described on which the traffic is monitored.
remotePortRangeEnd	PositiveInteger	0..1	attr	<p>This attribute restricts the traffic monitoring and defines an end value for the remote port range.</p> <p>If this attribute is not set then this rule shall be effective for all local ports.</p> <p>Please note that port ranges are currently not supported in the AUTOSAR AP's operating system backend. If AP systems are involved, each IPsec rule may only contain a single port.</p>
remotePortRangeStart	PositiveInteger	0..1	attr	<p>This attribute restricts the traffic monitoring and defines a start value for the remote port range.</p> <p>If this attribute is not set then this rule shall be effective for all local ports.</p> <p>Please note that port ranges are currently not supported in the AUTOSAR AP's operating system backend. If AP systems are involved, each IPsec rule may only contain a single port.</p>

Table A.496: IPSecRule

Class	IPdu (abstract)
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	The IPdu (Interaction Layer Protocol Data Unit) element is used to sum up all Pdus that are routed by the PduR.
Base	<a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Pdu</a> , <a href="#">Referrable</a>
Subclasses	<a href="#">ContainerIPdu</a> , <a href="#">DcmIPdu</a> , <a href="#">GeneralPurposeIPdu</a> , <a href="#">ISignalIPdu</a> , <a href="#">J1939DcmIPdu</a> , <a href="#">MultiplexedIPdu</a> , <a href="#">NPdu</a> , <a href="#">SecuredIPdu</a> , <a href="#">UserDefinedIPdu</a>







Class	IPdu (abstract)			
Attribute	Type	Mult.	Kind	Note
containedIPdu Props	<a href="#">ContainedIPduProps</a>	0..1	aggr	Defines whether this IPdu may be collected inside a ContainerIPdu.

**Table A.497: IPdu**

Class	IPduMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Multiplatform			
Note	Arranges those IPdus that are transferred by the gateway from one channel to the other in pairs and defines the mapping between them.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
introduction	<a href="#">DocumentationBlock</a>	0..1	aggr	This represents introductory documentation about the IPdu mapping.
pduMaxLength	PositiveInteger	0..1	attr	Define the maximum length in bytes which limits the length of the Pdu during gateway operation if the runtime length of the received Pdu exceeds this limit.
pduTpChunk Size	PositiveInteger	0..1	attr	Optionally defines the to be configured Pdu Router Tp ChunkSize for this routing relation.
sourceIPdu	<a href="#">PduTriggering</a>	1	ref	Source destination of the referencing mapping.
targetIPdu	TargetIPduRef	1	aggr	Target destination of the referencing mapping.

**Table A.498: IPduMapping**

Class	IPduPort			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Connectors reception or send port on the referenced channel referenced by a PduTriggering.			
Base	ARObject, <a href="#">CommConnectorPort</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
iPduSignal Processing	IPduSignalProcessing Enum	0..1	attr	Definition of the two signal processing modes Immediate and Deferred for both Tx and Rx IPdus.
rxSecurity Verification	Boolean	0..1	attr	This attribute defines the bypassing of signature authentication or MAC verification in the receiving ECU. If not defined or set to true the signature authentication or MAC verification shall be performed for the SecuredIPdu. If set to false the signature authentication or MAC verification shall not be performed for the SecuredIPdu.
timestampRx Acceptance Window	TimeValue	0..1	attr	This attribute is used to define the maximum allowed deviation in seconds from the expected timestamp for which a SecuredIPdu is still deemed authentic. Please note that this attribute is for documentation only to allow the configuration of required freshness value manager and no upstream mapping is defined for it.
useAuthData Freshness	Boolean	0..1	attr	This attribute describes whether a part of AuthenticPdu contained in a SecuredIPdu shall be passed on to the SWC that verifies and generates the Freshness. The part of the Authentic-PDU is defined by the authData FreshnessStartPosition and authDataFreshnessLength.

**Table A.499: IPduPort**

<b>Class</b>	<b>IPv6ExtHeaderFilterList</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::IPv6HeaderFilterList			
<b>Note</b>	White list for the filtering of IPv6 extension headers.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
allowedIPv6ExtHeader	PositiveInteger	1..*	attr	IPv6 Extension Header type allowed by this filter.

**Table A.500: IPv6ExtHeaderFilterList**

<b>Class</b>	<b>ISignal</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	<p>Signal of the Interaction Layer. The RTE supports a "signal fan-out" where the same System Signal is sent in different SignalIPdus to multiple receivers.</p> <p>To support the RTE "signal fan-out" each SignalIPdu contains ISignals. If the same System Signal is to be mapped into several SignalIPdus there is one ISignal needed for each ISignalToIPduMapping.</p> <p>ISignals describe the Interface between the Precompile configured RTE and the potentially Postbuild configured Com Stack (see ECUC Parameter Mapping).</p> <p>In case of the SystemSignalGroup an ISignal shall be created for each SystemSignal contained in the SystemSignalGroup.</p> <p><b>Tags:</b>atp.recommendedPackage=ISignals</p>			
<b>Base</b>	ARObject, <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataTransformation	<a href="#">DataTransformation</a>	0..1	ref	<p>Optional reference to a DataTransformation which represents the transformer chain that is used to transform the data that shall be placed inside this ISignal.</p> <p><b>Stereotypes:</b> atp.Splitable; atp.Variation</p> <p><b>Tags:</b>  atp.Splitkey=dataTransformation.dataTransformation,  dataTransformation.variationPoint.shortLabel  vh.latestBindingTime=codeGenerationTime</p>
dataTypePolicy	<a href="#">DataTypePolicyEnum</a>	1	attr	<p>With the aggregation of SwDataDefProps an ISignal specifies how it is represented on the network. This representation follows a particular policy. Note that this causes some redundancy which is intended and can be used to support flexible development methodology as well as subsequent integrity checks.</p> <p>If the policy "networkRepresentationFromComSpec" is chosen the network representation from the ComSpec that is aggregated by the PortPrototype shall be used. If the "override" policy is chosen the requirements specified in the PortInterface and in the ComSpec are not fulfilled by the networkRepresentationProps. In case the System Description doesn't use a complete Software Component Description (VFB View) the "legacy" policy can be chosen.</p>





Class	ISignal			
initValue	<a href="#">ValueSpecification</a>	0..1	aggr	<p>Optional definition of a ISignal's initValue in case the System Description doesn't use a complete Software Component Description (VFB View). This supports the inclusion of legacy system signals.</p> <p>This value can be used to configure the Signal's "Init Value".</p> <p>If a full DataMapping exist for the SystemSignal this information may be available from a configured Sender ComSpec and ReceiverComSpec. In this case the initvalues in SenderComSpec and/or ReceiverComSpec override this optional value specification. Further restrictions apply from the RTE specification.</p>
iSignalProps	ISignalProps	0..1	aggr	<p>Additional optional ISignal properties that may be stored in different files.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b> atp.Splitkey=iSignalProps</p>
iSignalType	<a href="#">ISignalTypeEnum</a>	0..1	attr	<p>This attribute defines whether this iSignal is an array that results in a UINT8_N / UINT8_DYN ComSignalType in the COM configuration or a primitive type.</p>
length	<a href="#">UnlimitedInteger</a>	1	attr	<p>Size of the signal in bits. The size needs to be derived from the mapped VariableDataPrototype according to the mapping of primitive DataTypes to BaseTypes as used in the RTE. Indicates maximum size for dynamic length signals.</p> <p>The ISignal length of zero bits is allowed.</p>
network Representation Props	<a href="#">SwDataDefProps</a>	0..1	aggr	<p>Specification of the actual network representation. The usage of SwDataDefProps for this purpose is restricted to the attributes compuMethod and baseType. The optional baseType attributes "memAlignment" and "byteOrder" shall not be used.</p> <p>The attribute "dataTypePolicy" in the SystemTemplate element defines whether this network representation shall be ignored and the information shall be taken over from the network representation of the ComSpec.</p> <p>If "override" is chosen by the system integrator the network representation can violate against the requirements defined in the PortInterface and in the network representation of the ComSpec.</p> <p>In case that the System Description doesn't use a complete Software Component Description (VFB View) this element is used to configure "ComSignalDataInvalid Value" and the Data Semantics.</p>
systemSignal	<a href="#">SystemSignal</a>	1	ref	<p>Reference to the System Signal that is supposed to be transmitted in the ISignal.</p>
timeout Substitution Value	<a href="#">ValueSpecification</a>	0..1	aggr	<p>Defines and enables the ComTimeoutSubstitution for this ISignal.</p>
transformation ISignalProps	<a href="#">TransformationISignalProps</a>	*	aggr	<p>A transformer chain consists of an ordered list of transformers. The ISignal specific configuration properties for each transformer are defined in the TransformationISignalProps class. The transformer configuration properties that are common for all ISignals are described in the TransformationTechnology class.</p>

Table A.501: ISignal

<b>Class</b>	<b>ISignalGroup</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	<p>SignalGroup of the Interaction Layer. The RTE supports a "signal fan-out" where the same System Signal Group is sent in different SignalIPdus to multiple receivers.</p> <p>An ISignalGroup refers to a set of ISignals that shall always be kept together. A ISignalGroup represents a COM Signal Group.</p> <p>Therefore it is recommended to put the ISignalGroup in the same Package as ISignals (see atp.recommendedPackage)</p> <p><b>Tags:</b>atp.recommendedPackage=ISignalGroup</p>			
<b>Base</b>	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
comBasedSignalGroupTransformation	DataTransformation	0..1	ref	<p>Optional reference to a DataTransformation which represents the transformer chain that is used to transform the data that shall be placed inside this ISignalGroup based on the COMBasedTransformer approach.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b> atp.Splitkey=comBasedSignalGroupTransformation.dataTransformation, comBasedSignalGroupTransformation.variationPoint.shortLabel vh.latestBindingTime=codeGenerationTime</p>
iSignal	ISignal	*	ref	Reference to a set of ISignals that shall always be kept together.
systemSignalGroup	SystemSignalGroup	1	ref	Reference to the SystemSignalGroup that is defined on VFB level and that is supposed to be transmitted in the ISignalGroup.
transformationISignalProps	TransformationISignalProps	*	aggr	A transformer chain consists of an ordered list of transformers. The ISignalGroup specific configuration properties for each transformer are defined in the TransformationISignalProps class. The transformer configuration properties that are common for all ISignal Groups are described in the TransformationTechnology class.

**Table A.502: ISignalGroup**

<b>Class</b>	<b>ISignalIPdu</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	<p>Represents the IPdus handled by Com. The ISignalIPdu assembled and disassembled in AUTOSAR COM consists of one or more signals. In case no multiplexing is performed this IPdu is routed to/from the Interface Layer.</p> <p>A maximum of one dynamic length signal per IPdu is allowed.</p> <p><b>Tags:</b>atp.recommendedPackage=Pdus</p>			
<b>Base</b>	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	ISignalIPdu			
iPduTiming Specification	IPduTiming	0..1	aggr	Timing specification for Com IPdus (Transmission Modes). This information is mandatory for the sender in a System Extract. This information may be omitted on receivers in a System Extract.  atpVariation: The timing of a Pdu can vary.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
iSignalToPdu Mapping	<a href="#">ISignalToIPduMapping</a>	*	aggr	Definition of SignalToIPduMappings included in the Signal IPdu.  atpVariation: The content of a PDU can be variable.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
unusedBit Pattern	Integer	1	attr	AUTOSAR COM and AUTOSAR IPDUM are filling not used areas of an IPDU with this bit-pattern. This attribute is mandatory to avoid undefined behavior. This byte-pattern will be repeated throughout the IPdu.

Table A.503: ISignalIPdu

Class	ISignalIPduGroup			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The AUTOSAR COM Layer is able to start and to stop sending and receiving configurable groups of I-Pdus during runtime. An ISignalIPduGroup contains either ISignalIPdus or ISignalIPduGroups. <b>Tags:</b> atp.recommendedPackage=ISignaliPduGroup			
Base	<a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
communication Direction	<a href="#">CommunicationDirectionType</a>	1	attr	This attribute determines in which direction IPdus that are contained in this IPduGroup will be transmitted (communication direction can be either In or Out).
communication Mode	String	1	attr	This attribute defines the use-case for this ISignalIPdu Group (e.g. diagnostic, debugging etc.). For example, in a diagnostic mode all IPdus - which are not involved in diagnostic - are disabled. The use cases are not limited to a fixed enumeration and can be specified as a string.
contained ISignalIPdu Group	<a href="#">ISignalIPduGroup</a>	*	ref	An I-Pdu group can be included in other I-Pdu groups. Contained I-Pdu groups shall not be referenced by the EcuInstance.
iSignalIPdu	<a href="#">ISignalIPdu</a>	*	ref	Reference to a set of Signal I-Pdus, which are contained in the ISignal I-Pdu Group.  atpVariation: The content of a ISignal I-Pdu group can vary (->vehicle modes).  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
nmPdu	<a href="#">NmPdu</a>	*	ref	Reference to a set of NmPdus with NmUserData, which are contained in the ISignalIPduGroup.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild

Table A.504: ISignalIPduGroup

<b>Class</b>	<b>ISignalMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Multiplatform			
<b>Note</b>	Arranges those signals (or SignalGroups) that are transferred by the gateway from one channel to the other in pairs and defines the mapping between them. Each pair consists in a source and a target referencing to a ISignalTriggering.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
introduction	<a href="#">DocumentationBlock</a>	0..1	aggr	This represents introductory documentation about the ISignal mapping.
sourceSignal	<a href="#">ISignalTriggering</a>	1	ref	Source destination of the referencing mapping.
targetSignal	<a href="#">ISignalTriggering</a>	1	ref	Target destination of the referencing mapping.

**Table A.505: ISignalMapping**

<b>Class</b>	<b>ISignalPort</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Connectors reception or send port on the referenced channel referenced by an ISignalTriggering. If different timeouts or DataFilters for ISignals need to be specified several ISignalPorts may be created.			
<b>Base</b>	ARObject, <a href="#">CommConnectorPort</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataFilter	<a href="#">DataFilter</a>	0..1	aggr	Optional specification of a signal COM filter at the receiver side in case that the System Description doesn't use a complete Software Component Description (VFB View). This supports the inclusion of legacy system signals. If a full DataMapping exist for the SystemSignal this information may be available from a configured ReceiverComSpec. In this case the ReceiverComSpec overrides this optional specification.
firstTimeout	TimeValue	0..1	attr	<ul style="list-style-type: none"> <li>ISignalPort with communicationDirection = in: Optional first timeout value in seconds for the reception of the ISignal.</li> <li>ISignalPort with communicationDirection = out: Optional first timeout value in seconds for transmission deadline monitoring.</li> </ul>
handleInvalid	<a href="#">HandleInvalidEnum</a>	0..1	attr	This attribute defines how invalidation is applied to the ISignals received in the context of this ISignalPort.
timeout	TimeValue	0..1	attr	<ul style="list-style-type: none"> <li>ISignalPort with communicationDirection = in: Optional timeout value in seconds for the reception of the ISignal. The attribute value is used to configure the Com Timeout in the COM module. The RTE ignores this attribute. The timeout can also be specified with the NonqueuedReceiverComSpec.aliveTimeout attribute. If a full DataMapping exists for the SystemSignal and the value is available in the configured ReceiverComSpec, then the timeout value in the ReceiverComSpec overrides this optional timeout specification during the creation of the Base Ecu Configuration of the COM module.</li> <li>ISignalPort with communicationDirection = out: Optional timeout value in seconds for the transmission of the ISignal. The attribute value is used to configure the</li> </ul>





Class	ISignalPort			
				<p>ComTimeout in the COM module. The RTE ignores this attribute. The timeout can also be specified with the ender ComSpec.transmissionAcknowledge.timeout attribute. If a full DataMapping exists for the SystemSignal and the value is available in the configured SenderComSpec, then the timeout value in the SenderComSpec overrides this optional timeout specification during the creation of the Base Ecu Configuration of the COM module.</p> <p>This attribute can be used in the following cases:</p> <ul style="list-style-type: none"> <li>legacy signal where the System Description doesn't use a complete Software Component Description (VFB View) and where the Data Mapping is missing.</li> <li>bus monitoring use cases in which the Data Mapping is ignored.</li> </ul>

**Table A.506: ISignalPort**

Class	ISignalToIPduMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.			
Base	ARObject, <i>Identifiable</i> , <i>MultilanguageReferrable</i> , <i>Referrable</i>			
Attribute	Type	Mult.	Kind	Note
iSignal	<i>ISignal</i>	0..1	ref	<p>Reference to a ISignal that is mapped into the ISignal IPdu.</p> <p>Each ISignal contained in the ISignalGroup shall be mapped into an IPdu by an own ISignalToIPduMapping. The references to the ISignal and to the ISignalGroup in an ISignalToIPduMapping are mutually exclusive.</p>
iSignalGroup	<i>ISignalGroup</i>	0..1	ref	<p>Reference to an ISignalGroup that is mapped into the SignalIPdu. If an ISignalToIPduMapping for an ISignal Group is defined, only the UpdateIndicationBitPosition and the transferProperty is relevant. The startPosition and the packingByteOrder shall be ignored.</p> <p>Each ISignal contained in the ISignalGroup shall be mapped into an IPdu by an own ISignalToIPduMapping. The references to the ISignal and to the ISignalGroup in an ISignalToIPduMapping are mutually exclusive.</p>
packingByte Order	<i>ByteOrderEnum</i>	0..1	attr	<p>This parameter defines the order of the bytes of the signal and the packing into the SignalIPdu. The byte ordering "Little Endian" (MostSignificantByteLast), "Big Endian" (MostSignificantByteFirst) and "Opaque" can be selected. For opaque data endianness conversion shall be configured to Opaque. The value of this attribute impacts the absolute position of the signal into the SignalIPdu (see the startPosition attribute description).</p> <p>For an ISignalGroup the packingByteOrder is irrelevant and shall be ignored.</p>





Class	ISignalToIPduMapping			
startPosition	<a href="#">UnlimitedInteger</a>	0..1	attr	<p>This parameter is necessary to describe the bitposition of a signal within an SignalIPdu. It denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.</p> <p>Please note that the way the bytes will be actually sent on the bus does not impact this representation: they will always be seen by the software as a byte array.</p> <p>If a mapping for the ISignalGroup is defined, this attribute is irrelevant and shall be ignored.</p>
transferProperty	<a href="#">TransferPropertyEnum</a>	0..1	attr	<p>Defines how the referenced ISignal contributes to the send triggering of the ISignalIPdu.</p>
updateIndicationBitPosition	<a href="#">UnlimitedInteger</a>	0..1	attr	<p>The UpdateIndicationBit indicates to the receivers that the signal (or the signal group) was updated by the sender. Length is always one bit. The UpdateIndicationBitPosition attribute describes the position of the update bit within the SignalIPdu. For Signals of a ISignalGroup this attribute is irrelevant and shall be ignored.</p> <p>Note that the exact bit position of the updateIndicationBitPosition is linked to the value of the attribute packingByteOrder because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing ISignalIPdu still undergoes a change.</p> <p>This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.</p>

**Table A.507: ISignalToIPduMapping**

Class	ISignalTriggering			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	A ISignalTriggering allows an assignment of ISignals to physical channels.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
iSignal	<a href="#">ISignal</a>	0..1	ref	<p>This reference shall be used if an ISignal is transported on the PhysicalChannel. This reference forms an XOR relationship with the ISignalTriggering-ISignalGroup reference.</p>
iSignalGroup	<a href="#">ISignalGroup</a>	0..1	ref	<p>This reference shall be used if an ISignalGroup is transported on the PhysicalChannel. This reference forms an XOR relationship with the ISignalTriggering-ISignal reference.</p>







Class	ISignalTriggering			
iSignalPort	<a href="#">ISignalPort</a>	*	ref	References to the ISignalPort on every ECU of the system which sends and/or receives the ISignal.  References for both the sender and the receiver side shall be included when the system is completely defined.

Table A.508: ISignalTriggering

Enumeration	ISignalTypeEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	This enumeration defines ISignal types that are used for derivation of the ComSignalType in the COM configuration.
Literal	Description
array	ISignal shall be interpreted as an array (UINT8_N, UINT8_DYN) <b>Tags:</b> atp.EnumerationLiteralIndex=0
primitive	ISignal shall be interpreted as a primitive type (e.g. UINT_8, SINT_32) <b>Tags:</b> atp.EnumerationLiteralIndex=1

Table A.509: ISignalTypeEnum

Class	Identifiable (abstract)
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::Identifiable
Note	Instances of this class can be referred to by their identifier (within the namespace borders). In addition to this, Identifiables are objects which contribute significantly to the overall structure of an AUTOSAR description. In particular, Identifiables might contain Identifiables.
Base	ARObject, <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>
Subclasses	<a href="#">ARPackage</a> , <a href="#">AbstractDolpLogicAddressProps</a> , <a href="#">AbstractEvent</a> , <a href="#">AbstractImplementationDataTypeElement</a> , <a href="#">AbstractSecurityEventFilter</a> , <a href="#">AbstractSecurityIdsmInstanceFilter</a> , <a href="#">AbstractServiceInstance</a> , AppOsTaskProxyToEcuTaskProxyMapping, <a href="#">ApplicationEndpoint</a> , <a href="#">ApplicationError</a> , <a href="#">ApplicationPartitionToEcuPartitionMapping</a> , <a href="#">AsynchronousServerCallResultPoint</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AutosarOperationArgumentInstance</a> , <a href="#">AutosarVariableInstance</a> , <a href="#">BinaryManifestAddressableObject</a> , <a href="#">BinaryManifestItemDefinition</a> , <a href="#">BinaryManifestResource</a> , <a href="#">BinaryManifestResourceDefinition</a> , BlockState, <a href="#">BswInternalTriggeringPoint</a> , <a href="#">BswModuleDependency</a> , <a href="#">BuildActionEntity</a> , <a href="#">BuildActionEnvironment</a> , CanTpAddress, CanTpChannel, CanTpNode, <a href="#">Chapter</a> , <a href="#">ClassContentConditional</a> , <a href="#">ClientIdDefinition</a> , <a href="#">ClientServerOperation</a> , <a href="#">Code</a> , <a href="#">CollectableElement</a> , <a href="#">ComManagementMapping</a> , <a href="#">CommConnectorPort</a> , <a href="#">CommunicationConnector</a> , <a href="#">CommunicationController</a> , <a href="#">Compiler</a> , <a href="#">ConsistencyNeeds</a> , <a href="#">ConsumedEventGroup</a> , <a href="#">CouplingPort</a> , <a href="#">CouplingPortStructuralElement</a> , <a href="#">CpSoftwareClusterResource</a> , <a href="#">CpSoftwareClusterResourceToApplicationPartitionMapping</a> , <a href="#">CpSoftwareClusterToEcuInstanceMapping</a> , <a href="#">CpSoftwareClusterToResourceMapping</a> , <a href="#">CryptoServiceMapping</a> , <a href="#">DataPrototypeGroup</a> , <a href="#">DataTransformation</a> , <a href="#">DependencyOnArtifact</a> , <a href="#">DiagEventDebounceAlgorithm</a> , <a href="#">DiagnosticConnectedIndicator</a> , <a href="#">DiagnosticDataElement</a> , <a href="#">DiagnosticDebounceAlgorithmProps</a> , <a href="#">DiagnosticFunctionInhibitSource</a> , <a href="#">DiagnosticRoutineSubfunction</a> , <a href="#">DltApplication</a> , <a href="#">DltArgument</a> , <a href="#">DltLogChannel</a> , <a href="#">DltMessage</a> , <a href="#">DolpInterface</a> , <a href="#">DolpLogicAddress</a> , <a href="#">DolpRoutingActivation</a> , <a href="#">ECUMapping</a> , <a href="#">EOCExecutableEntityRefAbstract</a> , <a href="#">EcuPartition</a> , <a href="#">EcuContainerValue</a> , <a href="#">EcucDefinitionElement</a> , <a href="#">EcucDestinationUriDef</a> , <a href="#">EcucEnumerationLiteralDef</a> , <a href="#">EcucQuery</a> , <a href="#">EcucValidationCondition</a> , <a href="#">EndToEndProtection</a> , <a href="#">EthernetWakeupSleepOnDatalineConfig</a> , <a href="#">EventHandler</a> , <a href="#">ExclusiveArea</a> , <a href="#">ExecutableEntity</a> , <a href="#">ExecutionTime</a> , <a href="#">FMAttributeDef</a> , <a href="#">FMFeatureMapAssertion</a> , <a href="#">FMFeatureMapCondition</a> , <a href="#">FMFeatureMapElement</a> , <a href="#">FMFeatureRelation</a> , <a href="#">FMFeatureRestriction</a> , <a href="#">FMFeatureSelection</a> , <a href="#">FlatInstanceDescriptor</a> , <a href="#">FlexrayArTpNode</a> , <a href="#">FlexrayTpConnectionControl</a> , <a href="#">FlexrayTpNode</a> , <a href="#">FlexrayTpPduPool</a> , <a href="#">FrameTriggering</a> , <a href="#">GeneralParameter</a> , <a href="#">GlobalTimeGateway</a> , <a href="#">GlobalTimeMaster</a> , <a href="#">GlobalTimeSlave</a> , <a href="#">HeapUsage</a> , <a href="#">HwAttributeDef</a> , <a href="#">HwAttributeLiteralDef</a> , <a href="#">HwPin</a> , <a href="#">HwPinGroup</a> , <a href="#">IPSecRule</a> , <a href="#">IPv6ExtHeaderFilterList</a> , <a href="#">ISignalToIPduMapping</a> , <a href="#">ISignalTriggering</a> , <a href="#">IdentCaption</a> , <a href="#">InternalTriggeringPoint</a> , <a href="#">J1939SharedAddressCluster</a> , <a href="#">J1939TpNode</a> , <a href="#">Keyword</a> , <a href="#">LifeCycleState</a> , <a href="#">LinScheduleTable</a> , <a href="#">LinTpNode</a> , <a href="#">Linker</a> , <a href="#">MacMulticastGroup</a> , <a href="#">Mc</a>





Class	Identifiable (abstract)			
	<p style="text-align: center;">△</p> <p> <a href="#">DataInstance</a>, <a href="#">MemorySection</a>, <a href="#">ModeDeclaration</a>, <a href="#">ModeDeclarationMapping</a>, <a href="#">ModeSwitchPoint</a>, <a href="#">NetworkEndpoint</a>, <a href="#">NmCluster</a>, <a href="#">NmEcu</a>, <a href="#">NmNode</a>, <a href="#">NvBlockDescriptor</a>, <a href="#">PackageableElement</a>, <a href="#">ParameterAccess</a>, <a href="#">PduActivationRoutingGroup</a>, <a href="#">PduToFrameMapping</a>, <a href="#">PduTriggering</a>, <a href="#">PerInstanceMemory</a>, <a href="#">PhysicalChannel</a>, <a href="#">PortElementToCommunicationResourceMapping</a>, <a href="#">PortGroup</a>, <a href="#">PortInterfaceMapping</a>, <a href="#">PossibleErrorReaction</a>, <a href="#">ResourceConsumption</a>, <a href="#">RootSwCompositionPrototype</a>, <a href="#">RptComponent</a>, <a href="#">RptContainer</a>, <a href="#">RptExecutableEntity</a>, <a href="#">RptExecutableEntityEvent</a>, <a href="#">RptExecutionContext</a>, <a href="#">RptProfile</a>, <a href="#">RptServicePoint</a>, <a href="#">RteEventInCompositionSeparation</a>, <a href="#">RteEventInCompositionToOsTaskProxyMapping</a>, <a href="#">RteEventInSystemSeparation</a>, <a href="#">RteEventInSystemToOsTaskProxyMapping</a>, <a href="#">RunnableEntityGroup</a>, <a href="#">SdgAttribute</a>, <a href="#">SdgClass</a>, <a href="#">SecureCommunicationAuthenticationProps</a>, <a href="#">SecureCommunicationFreshnessProps</a>, <a href="#">SecurityEventContextProps</a>, <a href="#">ServerCallPoint</a>, <a href="#">ServiceNeeds</a>, <a href="#">SignalServiceTranslationElementProps</a>, <a href="#">SignalServiceTranslationEventProps</a>, <a href="#">SignalServiceTranslationProps</a>, <a href="#">SocketAddress</a>, <a href="#">SomeIpTpChannel</a>, <a href="#">SpecElementReference</a>, <a href="#">StackUsage</a>, <a href="#">StaticSocketConnection</a>, <a href="#">StructuredReq</a>, <a href="#">SwGenericAxisParamType</a>, <a href="#">SwServiceArg</a>, <a href="#">SwcServiceDependency</a>, <a href="#">SwcToApplicationPartitionMapping</a>, <a href="#">SwcToEcuMapping</a>, <a href="#">SwcToImplMapping</a>, <a href="#">SystemMapping</a>, <a href="#">TDCpSoftwareClusterMapping</a>, <a href="#">TDCpSoftwareClusterResourceMapping</a>, <a href="#">TcpOptionFilterList</a>, <a href="#">TimingCondition</a>, <a href="#">TimingConstraint</a>, <a href="#">TimingDescription</a>, <a href="#">TimingExtensionResource</a>, <a href="#">TimingModelInstance</a>, <a href="#">TlsCryptoCipherSuite</a>, <a href="#">TlsCryptoCipherSuiteProps</a>, <a href="#">Topic1</a>, <a href="#">TpAddress</a>, <a href="#">TraceableTable</a>, <a href="#">TraceableText</a>, <a href="#">TracedFailure</a>, <a href="#">TransformationProps</a>, <a href="#">TransformationTechnology</a>, <a href="#">Trigger</a>, <a href="#">VariableAccess</a>, <a href="#">VariationPointProxy</a>, <a href="#">ViewMap</a>, <a href="#">VlanConfig</a>, <a href="#">WaitPoint</a> </p>			
Attribute	Type	Mult.	Kind	Note
adminData	<a href="#">AdminData</a>	0..1	aggr	<p>This represents the administrative data for the identifiable object.</p> <p><b>Stereotypes:</b> atpSplittable</p> <p><b>Tags:</b>  atp.Splitkey=adminData  xml.sequenceOffset=-40 </p>
annotation	Annotation	*	aggr	<p>Possibility to provide additional notes while defining a model element (e.g. the ECU Configuration Parameter Values). These are not intended as documentation but are mere design notes.</p> <p><b>Tags:</b>xml.sequenceOffset=-25</p>
category	CategoryString	0..1	attr	<p>The category is a keyword that specializes the semantics of the Identifiable. It affects the expected existence of attributes and the applicability of constraints.</p> <p><b>Tags:</b>xml.sequenceOffset=-50</p>
desc	MultiLanguageOverviewParagraph	0..1	aggr	<p>This represents a general but brief (one paragraph) description what the object in question is about. It is only one paragraph! Desc is intended to be collected into overview tables. This property helps a human reader to identify the object in question.</p> <p>More elaborate documentation, (in particular how the object is built or used) should go to "introduction".</p> <p><b>Tags:</b>xml.sequenceOffset=-60</p>
introduction	<a href="#">DocumentationBlock</a>	0..1	aggr	<p>This represents more information about how the object in question is built or is used. Therefore it is a DocumentationBlock.</p> <p><b>Tags:</b>xml.sequenceOffset=-30</p>
uuid	String	0..1	attr	<p>The purpose of this attribute is to provide a globally unique identifier for an instance of a meta-class. The values of this attribute should be globally unique strings prefixed by the type of identifier. For example, to include a DCE UUID as defined by The Open Group, the UUID would be preceded by "DCE:". The values of this attribute may be used to support merging of different AUTOSAR models. The form of the UUID (Universally Unique Identifier) is taken from a standard defined by the Open Group (was Open Software Foundation). This standard is</p> <p style="text-align: right;">▽</p>





Class	Identifiable (abstract)			
				<p>widely used, including by Microsoft for COM (GUIDs) and by many companies for DCE, which is based on CORBA. The method for generating these 128-bit IDs is published in the standard and the effectiveness and uniqueness of the IDs is not in practice disputed. If the id namespace is omitted, DCE is assumed. An example is "DCE:2fac1234-31f8-11b4-a222-08002b34c003". The uuid attribute has no semantic meaning for an AUTOSAR model and there is no requirement for AUTOSAR tools to manage the timestamp.</p> <p><b>Tags:</b>xml.attribute=true</p>

**Table A.510: Identifiable**

Primitive	Identifier			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes			
Note	<p>An Identifier is a string with a number of constraints on its appearance, satisfying the requirements typical programming languages define for their Identifiers.</p> <p>This datatype represents a string, that can be used as a c-Identifier.</p> <p>It shall start with a letter, may consist of letters, digits and underscores.</p> <p><b>Tags:</b>  xml.xsd.customType=IDENTIFIER  xml.xsd.maxLength=128  xml.xsd.pattern=[a-zA-Z][a-zA-Z0-9_]*  xml.xsd.type=string</p>			
Attribute	Type	Mult.	Kind	Note
blueprintValue	String	0..1	attr	<p>This represents a description that documents how the value shall be defined when deriving objects from the blueprint.</p> <p><b>Tags:</b>  atp.Status=draft  xml.attribute=true</p>
namePattern	String	0..1	attr	<p>This attribute represents a pattern which shall be used to define the value of the identifier if the identifier in question is part of a blueprint.</p> <p>For more details refer to TPS_StandardizationTemplate.</p> <p><b>Tags:</b>xml.attribute=true</p>

**Table A.511: Identifier**

Class	Implementation (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::Implementation			
Note	Description of an implementation a single software component or module.			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">BswImplementation</a> , <a href="#">SwcImplementation</a>			
Attribute	Type	Mult.	Kind	Note
buildActionManifest	BuildActionManifest	0..1	ref	<p>A manifest specifying the intended build actions for the software delivered with this implementation.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=codeGenerationTime</p>





Class	Implementation (abstract)			
codeDescriptor	<a href="#">Code</a>	*	aggr	Specifies the provided implementation code.
compiler	Compiler	*	aggr	Specifies the compiler for which this implementation has been released
generated Artifact	<a href="#">DependencyOnArtifact</a>	*	aggr	<p>Relates to an artifact that will be generated during the integration of this Implementation by an associated generator tool. Note that this is an optional information since it might not always be in the scope of a single module or component to provide this information.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>
hwElement	<a href="#">HwElement</a>	*	ref	The hardware elements (e.g. the processor) required for this implementation.
linker	Linker	*	aggr	Specifies the linker for which this implementation has been released.
mcSupport	<a href="#">McSupportData</a>	0..1	aggr	<p>The measurement &amp; calibration support data belonging to this implementation. The aggregation is &lt;&lt;atpSplitable&gt;&gt; because in case of an already existing BSW Implementation model, this description will be added later in the process, namely at code generation time.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b> atp.Splitkey=mcSupport</p>
programming Language	Programminglanguage Enum	0..1	attr	Programming language the implementation was created in.
requiredArtifact	<a href="#">DependencyOnArtifact</a>	*	aggr	<p>Specifies that this Implementation depends on the existence of another artifact (e.g. a library). This aggregation of DependencyOnArtifact is subject to variability with the purpose to support variability in the implementations. Different algorithms in the implementation might cause different dependencies, e.g. the number of used libraries.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>
required GeneratorTool	<a href="#">DependencyOnArtifact</a>	*	aggr	<p>Relates this Implementation to a generator tool in order to generate additional artifacts during integration.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>
resource Consumption	ResourceConsumption	0..1	aggr	<p>All static and dynamic resources for each implementation are described within the ResourceConsumption class.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b> atp.Splitkey=resourceConsumption.shortName</p>
swcBsw Mapping	<a href="#">SwcBswMapping</a>	0..1	ref	This allows a mapping between an SWC and a BSW behavior to be attached to an implementation description (for AUTOSAR Service, ECU Abstraction and Complex Driver Components). It is up to the methodology to define whether this reference has to be set for the Swc- or Bsw Implementation or for both.
swVersion	RevisionLabelString	0..1	attr	Software version of this implementation. The numbering contains three levels (like major, minor, patch), its values are vendor specific.
usedCode Generator	String	0..1	attr	Optional: code generator used.
vendorId	PositiveInteger	0..1	attr	Vendor ID of this Implementation according to the AUTOSAR vendor list

**Table A.512: Implementation**

<b>Class</b>	<b>ImplementationDataType</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ImplementationDataTypes			
<b>Note</b>	<p>Describes a reusable data type on the implementation level. This will typically correspond to a typedef in C-code.</p> <p><b>Tags:</b>atp.recommendedPackage=ImplementationDataTypes</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AbstractImplementationDataType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">AutosarDataType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dynamicArraySizeProfile	String	0..1	attr	Specifies the profile which the array will follow in case this data type is a variable size array.
isStructWithOptionalElement	Boolean	0..1	attr	<p>This attribute is only valid if the attribute category is set to STRUCTURE.</p> <p>If set to True, this attribute indicates that the ImplementationDataType has been created with the intention to define at least one element of the structure as optional.</p>
subElement (ordered)	<a href="#">ImplementationDataTypeElement</a>	*	aggr	<p>Specifies an element of an array, struct, or union data type.</p> <p>The aggregation of ImplementationDataTypeElement is subject to variability with the purpose to support the conditional existence of elements inside a ImplementationDataType representing a structure.</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
symbolProps	<a href="#">SymbolProps</a>	0..1	aggr	<p>This represents the SymbolProps for the Implementation DataType.</p> <p><b>Stereotypes:</b> atpSplitable <b>Tags:</b>atp.Splitkey=symbolProps.shortName</p>
typeEmitter	NameToken	0..1	attr	This attribute is used to control which part of the AUTOSAR toolchain is supposed to trigger data type definitions.

**Table A.513: ImplementationDataType**

<b>Class</b>	<b>ImplementationDataTypeElement</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ImplementationDataTypes			
<b>Note</b>	<p>Declares a data object which is locally aggregated. Such an element can only be used within the scope where it is aggregated.</p> <p>This element either consists of further subElements or it is further defined via its swDataDefProps.</p> <p>There are several use cases within the system of ImplementationDataTypes for such a local declaration:</p> <ul style="list-style-type: none"> <li>• It can represent the elements of an array, defining the element type and array size</li> <li>• It can represent an element of a struct, defining its type</li> <li>• It can be the local declaration of a debug element.</li> </ul>			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">AbstractImplementationDataTypeElement</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
arrayImplPolicy	ArrayImplPolicyEnum	0..1	attr	This attribute controls the implementation of the payload of an array. It shall only be used if the enclosing ImplementationDataType constitutes an array.





Class	ImplementationDataTypeElement			
arraySize	PositiveInteger	0..1	attr	<p>The existence of this attributes (if bigger than 0) defines the size of an array and declares that this ImplementationDataTypeElement represents the type of each single array element.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>
arraySize Handling	ArraySizeHandling Enum	0..1	attr	The way how the size of the array is handled in case of a variable size array.
arraySize Semantics	ArraySizeSemantics Enum	0..1	attr	This attribute controls the meaning of the value of the array size.
isOptional	Boolean	0..1	attr	<p>This attribute represents the ability to declare the enclosing ImplementationDataTypeElement as optional. This means that, at runtime, the ImplementationDataTypeElement may or may not have a valid value and shall therefore be ignored.</p> <p>The underlying runtime software provides means to set the CppImplementationDataTypeElement as not valid at the sending end of a communication and determine its validity at the receiving end.</p>
subElement (ordered)	ImplementationDataTypeElement	*	aggr	<p>Element of an array, struct, or union in case of a nested declaration (i.e. without using "typedefs").</p> <p>The aggregation of ImplementationDataTypeElement is subject to variability with the purpose to support the conditional existence of elements inside a ImplementationDataType representing a structure.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>
swDataDef Props	SwDataDefProps	0..1	aggr	The properties of this ImplementationDataTypeElement.

**Table A.514: ImplementationDataTypeElement**

Class	ImplementationDataTypeElementInPortInterfaceRef			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer::InstanceRef			
Note	<p>This meta-class represents the ability to refer to the internal structure of an AutosarDataPrototype which is typed by an ImplementationDatatype in the context of a PortInterface.</p> <p>In other words, this meta-class shall not be used to model a reference to the AutosarDataPrototype as a target itself, even if the AutosarDataPrototype is typed by an ImplementationDataType and even if that ImplementationDataType represents a composite data type.</p>			
Base	ARObject, <a href="#">DataPrototypeReference</a>			
Attribute	Type	Mult.	Kind	Note
context Implementation DataElement (ordered)	<a href="#">AbstractImplementationDataTypeElement</a>	*	ref	<p>This is a context in case there are subelements with explicit types. The reference has to be ordered to properly reflect the nested structure.</p> <p><b>Tags:</b> xml.sequenceOffset=20</p>
rootData Prototype	<a href="#">AutosarDataPrototype</a>	0..1	ref	<p>This refers to the AutosarDataPrototype which is typed by the ImplementationDatatype. The targetDataPrototype and all defined contextDataPrototypes can be found within this rootDataPrototype.</p> <p><b>Tags:</b> xml.sequenceOffset=10</p>





Class	ImplementationDataTypeElementInPortInterfaceRef			
target Implementation DataType Element	<a href="#">AbstractImplementation DataTypeElement</a>	0..1	ref	This is a target ImplementationDataTypeElement in case that the rootDataPrototype is composite and the target is a subElement of the rootDataPrototype.  <b>Tags:</b> xml.sequenceOffset=30

Table A.515: ImplementationDataTypeElementInPortInterfaceRef

Class	ImplementationDataTypeSubElementRef			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	This meta-class represents the specialization of SubElementMapping with respect to Implementation DataTypes.			
Base	ARObject, SubElementRef			
Attribute	Type	Mult.	Kind	Note
implementation DataType Element	<a href="#">ArVariableIn ImplementationData InstanceRef</a>	0..1	aggr	This represents the referenced implementationDataType Element.
parameter Implementation DataType Element	<a href="#">ArParameterIn ImplementationData InstanceRef</a>	0..1	aggr	This represents the referenced ImplementationDataType Element.

Table A.516: ImplementationDataTypeSubElementRef

Class	ImplementationElementInParameterInstanceRef			
Package	M2::AUTOSARTemplates::CommonStructure::MeasurementCalibrationSupport			
Note	Describes a reference to a particular ImplementationDataTypeElement instance in the context of a given ParameterDataPrototype. Thus it refers to a particular element in the implementation description of a software data structure.  Use Case: The RTE generator publishes its generated structure of calibration parameters in its BSW module description using the "constantMemory" role of ParameterDataPrototypes. Each ParameterData Prototype describes a group of single calibration parameters. In order to point to these single parameters, this "instance ref" is needed.  Note that this class follows the pattern of an InstanceRef but is not implemented based on the abstract classes because the ImplementationDataType isn't either, especially because ImplementationDataType Element isn't derived from AtpPrototype.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
context	<a href="#">ParameterData Prototype</a>	1	ref	The context for the referred element. <b>Tags:</b> xml.sequenceOffset=20
target	<a href="#">AbstractImplementation DataTypeElement</a>	1	ref	The referred data element. <b>Tags:</b> xml.sequenceOffset=30

Table A.517: ImplementationElementInParameterInstanceRef

Class	ImplementationProps (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::Implementation			
Note	Defines a symbol to be used as (depending on the concrete case) either a complete replacement or a prefix when generating code artifacts.			
Base	ARObject, <a href="#">Referrable</a>			







<b>Class</b>	<b>ImplementationProps</b> (abstract)			
<b>Subclasses</b>	BswSchedulerNamePrefix, <a href="#">ExecutableEntityActivationReason</a> , <a href="#">SectionNamePrefix</a> , <a href="#">SymbolProps</a> , <a href="#">SymbolicNameProps</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
symbol	CIdentifier	0..1	attr	The symbol to be used as (depending on the concrete case) either a complete replacement or a prefix.

**Table A.518: ImplementationProps**

<b>Class</b>	<b>IndexedArrayElement</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
<b>Note</b>	This element represents exactly one indexed element in the array. Either the applicationArrayElement or implementationArrayElement reference shall be used.			
<b>Base</b>	<a href="#">ARObject</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
applicationArrayElement	<a href="#">ApplicationArrayElement</a>	0..1	ref	Reference to an ApplicationArrayElement in an array.
implementationArrayElement	<a href="#">ImplementationDataTypeElement</a>	0..1	ref	Reference to an ImplementationDataTypeElement in an array.
index	Integer	1	attr	Position of an element in an array. Starting position is 0.

**Table A.519: IndexedArrayElement**

<b>Class</b>	<b>InitEvent</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
<b>Note</b>	This RTEEvent is supposed to be used for initialization purposes, i.e. for starting and restarting a partition. It is not guaranteed that all RunnableEntities referenced by this InitEvent are executed before the 'regular' RunnableEntities are executed for the first time. The execution order depends on the task mapping.			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.520: InitEvent**

<b>Class</b>	<b>InstantiationDataDefProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::InstantiationDataDefProps			
<b>Note</b>	<p>This is a general class allowing to apply additional SwDataDefProps to particular instantiations of a Data Prototype.</p> <p>Typically the accessibility and further information like alias names for a particular data is modeled on the level of DataPrototypes (especially VariableDataPrototypes, ParameterDataPrototypes). But due to the recursive structure of the meta-model concerning data types (a composite (data) type consists out of data prototypes) a part of the MCD information is described in the data type (in case of Application CompositeDataType).</p> <p>This is a strong restriction in the reuse of data typed because the data type should be re-used for different VariableDataPrototypes and ParameterDataPrototypes to guarantee type compatibility on C-implementation level (e.g. data of a Port is stored in PIM or a ParameterDataPrototype used as ROM Block and shall be typed by the same data type as NVRAM Block).</p> <p>This class overcomes such a restriction if applied properly.</p>			







Class	InstantiationDataDefProps			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
parameter Instance	<a href="#">AutosarParameterRef</a>	0..1	aggr	This is the particular ParameterDataPrototypes on which the swDataDefProps shall be applied.
swDataDef Props	<a href="#">SwDataDefProps</a>	0..1	aggr	These are the particular data definition properties which shall be applied
variableInstance	<a href="#">AutosarVariableRef</a>	0..1	aggr	This is the particular VariableDataPrototypes on which the swDataDefProps shall be applied.

**Table A.521: InstantiationDataDefProps**

Class	InstantiationRTEEventProps (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	This meta-class represents the ability to refine the properties of RTEEvents for particular instances of a software component.			
Base	ARObject			
Subclasses	<a href="#">InstantiationTimingEventProps</a>			
Attribute	Type	Mult.	Kind	Note
refinedEvent	<a href="#">RTEEvent</a>	0..1	iref	This instance ref denotes the Timing Event for which the period shall be refined on an instance level.  <b>InstanceRef implemented by:</b> InstanceEventInCompositionInstanceRef
shortLabel	<a href="#">Identifier</a>	0..1	attr	The main purpose of the shortLabel is to contribute to the splitkey of aggregations that are <<atpSplittable>>.  <b>Stereotypes:</b> atpIdentityContributor

**Table A.522: InstantiationRTEEventProps**

Class	InstantiationTimingEventProps			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	This meta-class represents the ability to refine a timing event for particular instances of a software component. This approach supports an instance specific timing.			
Base	ARObject, <a href="#">InstantiationRTEEventProps</a>			
Attribute	Type	Mult.	Kind	Note
period	TimeValue	0..1	attr	This attribute represents the value of the refined activation period.

**Table A.523: InstantiationTimingEventProps**

Class	InternalBehavior (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::InternalBehavior			
Note	Common base class (abstract) for the internal behavior of both software components and basic software modules/clusters.			
Base	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">BswInternalBehavior</a> , <a href="#">SwcInternalBehavior</a>			
Attribute	Type	Mult.	Kind	Note





Class	InternalBehavior (abstract)			
constantMemory	<a href="#">ParameterDataPrototype</a>	*	aggr	<p>Describes a read only memory object containing characteristic value(s) implemented by this InternalBehavior.</p> <p>The shortName of ParameterDataPrototype has to be equal to the 'C' identifier of the described constant.</p> <p>The characteristic value(s) might be shared between SwComponentPrototypes of the same SwComponentType.</p> <p>The aggregation of constantMemory is subject to variability with the purpose to support variability in the software component or module implementations. Typically different algorithms in the implementation are requiring different number of memory objects.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=constantMemory.shortName, constantMemory.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
constantValueMapping	ConstantSpecificationMappingSet	*	ref	<p>Reference to the ConstantSpecificationMapping to be applied for the particular InternalBehavior</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b>atp.Splitkey=constantValueMapping</p>
dataTypeMapping	<a href="#">DataTypeMappingSet</a>	*	ref	<p>Reference to the DataTypeMapping to be applied for the particular InternalBehavior</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b>atp.Splitkey=dataTypeMapping</p>
exclusiveArea	<a href="#">ExclusiveArea</a>	*	aggr	<p>This specifies an ExclusiveArea for this InternalBehavior. The exclusiveArea is local to the component resp. module. The aggregation of ExclusiveAreas is subject to variability. Note: the number of ExclusiveAreas might vary due to the conditional existence of RunnableEntities or BswModuleEntities.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=exclusiveArea.shortName, exclusiveArea.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
exclusiveAreaNestingOrder	ExclusiveAreaNestingOrder	*	aggr	<p>This represents the set of ExclusiveAreaNestingOrder owned by the InternalBehavior.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=exclusiveAreaNestingOrder.shortName, exclusiveAreaNestingOrder.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
staticMemory	<a href="#">VariableDataPrototype</a>	*	aggr	<p>Describes a read and writeable static memory object representing measurement variables implemented by this software component. The term "static" is used in the meaning of "non-temporary" and does not necessarily specify a linker encapsulation. This kind of memory is only supported if supportsMultipleInstantiation is FALSE.</p> <p>The shortName of the VariableDataPrototype has to be equal with the 'C' identifier of the described variable.</p> <p>The aggregation of staticMemory is subject to variability with the purpose to support variability in the software component's implementations.</p>





Class	InternalBehavior (abstract)			
				<p>Typically different algorithms in the implementation are requiring different number of memory objects.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=staticMemory.shortName, static  Memory.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>

Table A.524: InternalBehavior

Class	InternalTriggerOccurredEvent			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	This event is raised when the referenced InternalTriggeringPoint has occurred.			
Base	ARObject, AbstractEvent, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, RTEEvent, Referrable			
Attribute	Type	Mult.	Kind	Note
eventSource	InternalTriggeringPoint	0..1	ref	The referenced InternalTriggeringPoint raises this InternalTriggerOccurredEvent.

Table A.525: InternalTriggerOccurredEvent

Class	InternalTriggeringPoint			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::Trigger			
Note	If a RunnableEntity owns an InternalTriggeringPoint it is entitled to trigger the execution of RunnableEntities of the corresponding software-component.			
Base	ARObject, AbstractAccessPoint, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mult.	Kind	Note
swImplPolicy	SwImplPolicyEnum	0..1	attr	This attribute, when set to value queued, allows for a queued processing of Triggers.

Table A.526: InternalTriggeringPoint

Class	InterpolationRoutine			
Package	M2::AUTOSARTemplates::SWComponentTemplate::MeasurementAndCalibration::InterpolationRoutineMappingSet			
Note	This represents an interpolation routine taken to evaluate the contents of a curve or map against a specific input value.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
interpolationRoutine	BswModuleEntry	0..1	ref	This specifies a BswModuleEntry which implements the current interpolation method for the given record layout. <b>Tags:</b> xml.sequenceOffset=30
isDefault	Boolean	0..1	attr	This attribute specifies whether the enclosing InterpolationRoutine is considered the default in the context (defined by the System Template) of a given collection InterpolationRoutineMapping that owns the enclosing InterpolationRoutine. <b>Tags:</b> xml.sequenceOffset=20





Class	InterpolationRoutine			
shortLabel	<a href="#">Identifier</a>	0..1	attr	This is the name of the interpolation method which is implemented by the referenced bswModuleEntry. It corresponds to swInterpolationMethod in SwDataDef Props. <b>Tags:</b> xml.sequenceOffset=10

Table A.527: InterpolationRoutine

Class	InterpolationRoutineMapping			
Package	M2::AUTOSARTemplates::SWComponentTemplate::MeasurementAndCalibration::InterpolationRoutineMappingSet			
Note	<p>This meta-class provides a mapping between one record layout and its matching interpolation routines. This allows to formally specify the semantics of the interpolation routines.</p> <p>The use case is such that the curves/Maps define an interpolation method. This mapping table specifies which interpolation routine implements methods for a particular record layout. Using this information, the implementer of a software-component can select the appropriate interpolation routine.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
interpolation Routine	<a href="#">InterpolationRoutine</a>	*	aggr	This is one particular interpolation routine which is mapped to the record layout.
swRecord Layout	<a href="#">SwRecordLayout</a>	0..1	ref	This refers to the record layout which is mapped to interpolation routines.

Table A.528: InterpolationRoutineMapping

Class	InterpolationRoutineMappingSet			
Package	M2::AUTOSARTemplates::SWComponentTemplate::MeasurementAndCalibration::InterpolationRoutineMappingSet			
Note	<p>This meta-class specifies a set of interpolation routine mappings.</p> <p><b>Tags:</b>atp.recommendedPackage=InterpolationRoutineMappingSets</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
interpolation Routine Mapping	<a href="#">InterpolationRoutineMapping</a>	*	aggr	This specifies one particular mapping of recordlayout and its matching interpolationRoutines.

Table A.529: InterpolationRoutineMappingSet

Class	InvalidationPolicy			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	<p>Specifies whether the component can actively invalidate a particular dataElement.</p> <p>If no invalidationPolicy points to a dataElement this is considered to yield the identical result as if the handleInvalid attribute was set to dontInvalidate.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
dataElement	<a href="#">VariableDataPrototype</a>	0..1	ref	Reference to the dataElement for which the Invalidation Policy applies.





Class	InvalidationPolicy			
handleInvalid	<a href="#">HandleInvalidEnum</a>	0..1	attr	This attribute controls how invalidation is applied to the dataElement.

**Table A.530: InvalidationPolicy**

Class	Ipv4ArpProps			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Specifies the configuration options for the ARP (Address Resolution Protocol).			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
tcplpArpNum GratuitousArp OnStartup	PositiveInteger	0..1	attr	This attribute specifies the number of gratuitous ARP replies which shall be sent on assignment of a new IP address.
tcplpArpPacket QueueEnabled	Boolean	0..1	attr	This attribute enables (TRUE) or disables (FALSE) support of the ARP Packet Queue according to IETF RFC 1122, section 2.3.2.2.
tcplpArp Request Timeout	TimeValue	0..1	attr	This attribute specifies a timeout in seconds for the validity of ARP requests. After the transmission of an ARP request the Tcplp shall skip the transmission of any further ARP requests to the same destination within a duration of tcplpArpRequestTimeout seconds. (IETF RFC 1122, section 2.3.2.1).
tcplpArpTable EntryTimeout	TimeValue	0..1	attr	This attribute specifies the timeout in seconds after which an unused ARP entry is removed.

**Table A.531: Ipv4ArpProps**

Class	Ipv4Configuration			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Internet Protocol version 4 (IPv4) configuration.			
Base	ARObject, NetworkEndpointAddress			
Attribute	Type	Mult.	Kind	Note
assignment Priority	PositiveInteger	0..1	attr	Priority of assignment (1 is highest). If a new address from an assignment method with a higher priority is available, it overwrites the IP address previously assigned by an assignment method with a lower priority.
defaultGateway	Ip4AddressString	0..1	attr	IP address of the default gateway.
dnsServer Address	Ip4AddressString	*	attr	IP addresses of preconfigured DNS servers. <b>Tags:</b> xml.namePlural=DNS-SERVER-ADDRESSES
ipAddressKeep Behavior	IpAddressKeepEnum	0..1	attr	Defines the lifetime of a dynamically fetched IP address.
ipv4Address	Ip4AddressString	0..1	attr	IPv4 Address. Notation: 255.255.255.255. The IP Address shall be declared in case the ipv4AddressSource is FIXED and thus no auto-configuration mechanism is used.
ipv4Address Source	Ipv4AddressSource Enum	0..1	attr	Defines how the node obtains its IP address.
networkMask	Ip4AddressString	0..1	attr	Network mask. Notation 255.255.255.255
ttl	PositiveInteger	0..1	attr	Lifespan of data (0..255). The purpose of the TimeToLive field is to avoid a situation in which an undeliverable datagram keeps circulating on a system.

**Table A.532: Ipv4Configuration**

<b>Class</b>	<b>Ipv4FragmentationProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	Specifies the configuration options for IPv4 packet fragmentation/reassembly.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
tcpIpIp Fragmentation RxEnabled	Boolean	0..1	attr	Enables (TRUE) or disables (FALSE) support for reassembling of incoming datagrams that are fragmented according to IETF RFC 815 (IP Datagram Reassembly Algorithms).
tcpIpIpNum Fragments	PositiveInteger	0..1	attr	Specifies the maximum number of IP fragments per datagram.
tcpIpIpNum ReassDgrams	PositiveInteger	0..1	attr	Specifies the maximum number of fragmented IP datagrams that can be reassembled in parallel.
tcpIpIpReass Timeout	TimeValue	0..1	attr	Specifies the timeout in [s] after which an incomplete datagram gets discarded.

**Table A.533: Ipv4FragmentationProps**

<b>Class</b>	<b>Ipv6Configuration</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	Internet Protocol version 6 (IPv6) configuration.			
<b>Base</b>	ARObject, NetworkEndpointAddress			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
assignment Priority	PositiveInteger	0..1	attr	Priority of assignment (1 is highest). If a new address from an assignment method with a higher priority is available, it overwrites the IP address previously assigned by an assignment method with a lower priority.
defaultRouter	Ip6AddressString	0..1	attr	IP address of the default router.
dnsServer Address	Ip6AddressString	*	attr	IP addresses of pre configured DNS servers. <b>Tags:</b> xml.namePlural=DNS-SERVER-ADDRESSES
enableAnycast	Boolean	0..1	attr	This attribute is used to enable anycast addressing (i.e. to one of multiple receivers).
hopCount	PositiveInteger	0..1	attr	The distance between two hosts. The hop count n means that n gateways separate the source host from the destination host (Range 0..255)
ipAddressKeep Behavior	IpAddressKeepEnum	0..1	attr	Defines the lifetime of a dynamically fetched IP address.
ipAddressPrefix Length	PositiveInteger	0..1	attr	IPv6 prefix length defines the part of the IPv6 address that is the network prefix.
ipv6Address	Ip6AddressString	0..1	attr	IPv6 Address. Notation: FFFF:::FFFF. The IP Address shall be declared in case the ipv6AddressSource is FIXED and thus no auto-configuration mechanism is used.
ipv6Address Source	Ipv6AddressSource Enum	0..1	attr	Defines how the node obtains its IP address.

**Table A.534: Ipv6Configuration**

<b>Class</b>	<b>Ipv6FragmentationProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	This meta-class specifies the configuration options for IPv6 packet fragmentation/reassembly.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
tcpIplp Reassembly BufferCount	PositiveInteger	0..1	attr	Number of buffers that can be used for fragment reassembly. In case of a reassembly error or if not all fragments are received in time this buffer will be blocked until the specified "Fragment Reassembly Timeout" has been exceeded.  A value of 0 disables fragment reassembly.
tcpIplp Reassembly BufferSize	PositiveInteger	0..1	attr	Size of each fragment tx buffer in bytes.
tcpIplp Reassembly SegmentCount	PositiveInteger	0..1	attr	Specifies the maximum number of consecutive data segments that can be managed in each reassembly buffer. If all fragments are received in order, only one segment will be needed.  To deal with fragments received out of order this value should be configured bigger than 1.
tcpIplp Reassembly Timeout	TimeValue	0..1	attr	Specifies the timeout in seconds after which an incomplete datagram gets discarded.
tcpIplpTx FragmentBuffer Count	PositiveInteger	0..1	attr	These buffers will be used if the IPv6 receives packets from the upper layer that do not fit into the MTU and thus must be fragmented.  A value of 0 disables tx fragmentation.
tcpIplpTx FragmentBuffer Size	PositiveInteger	0..1	attr	Size of each fragment tx buffer in bytes.

**Table A.535: Ipv6FragmentationProps**

<b>Class</b>	<b>Ipv6NdpProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	This meta-class specifies the configuration options for the Neighbor Discovery Protocol for IPv6.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
tcpIplpNdpDefault ReachableTime	TimeValue	0..1	attr	Configuration of the ReachableTime (s) specified in [RFC4861 6.3.2. Host Variables].
tcpIplpNdpDefault RetransTimer	TimeValue	1	attr	Configures the default value (s) for the RetransTimer variable specified in [RFC4861 6.3.2. Host Variables].
tcpIplpNdpDefault RouterListSize	PositiveInteger	0..1	attr	Maximum number of default router entries.
tcpIplpNdp Defensive Processing	Boolean	0..1	attr	If enabled the NDP shall only process Neighbor Advertisements which are received in reaction to a previously transmitted Neighbor Solicitation as well as skipping updates to the Neighbor Cache based on received Neighbor Solicitations. If disabled all Neighbor Advertisements and Solicitations shall be processed as specified in RFC4861.
tcpIplpNdpDelay FirstProbeTime	PositiveInteger	0..1	attr	Delay before sending the first NUD probe in (s).





Class	Ipv6NdpProps			
tcpIpNdpDestinationCacheSize	PositiveInteger	0..1	attr	Maximum number of entries in the destination cache.
tcpIpNdpDynamicHopLimitEnabled	Boolean	0..1	attr	If enabled the default hop limit may be reconfigured based on received Router Advertisements.
tcpIpNdpDynamicMtuEnabled	Boolean	0..1	attr	Allow dynamic reconfiguration of link MTU via Router Advertisements.
tcpIpNdpDynamicReachableTimeEnabled	Boolean	0..1	attr	If enabled the default Reachable Time value may be reconfigured based on received Router Advertisements.
tcpIpNdpDynamicRetransTimeEnabled	Boolean	0..1	attr	If enabled the default Retransmit Timer value may be reconfigured based on received Router Advertisements.
tcpIpNdpMaxRandomFactor	PositiveInteger	0..1	attr	Maximum random factor used for randomization
tcpIpNdpMaxRtrSolicitationDelay	TimeValue	0..1	attr	Maximum delay before the first Router Solicitation will be sent after interface initialization in (s).
tcpIpNdpMaxRtrSolicitations	PositiveInteger	0..1	attr	Maximum number of Router Solicitations that will be sent before the first Router Advertisement has been received.
tcpIpNdpMinRandomFactor	PositiveInteger	0..1	attr	Minimum random factor used for randomization
tcpIpNdpNeighborUnreachabilityDetectionEnabled	Boolean	0..1	attr	Neighbor Unreachability Detection is used to remove unused entries from the neighbor cache. This feature is a basic feature of NDP and should be turned on.
tcpIpNdpNumMulticastSolicitations	PositiveInteger	0..1	attr	Maximum number of multicast solicitations that will be sent when performing address resolution.
tcpIpNdpNumUnicastSolicitations	PositiveInteger	0..1	attr	Maximum number of unicast solicitations that will be sent when performing Neighbor Unreachability Detection.
tcpIpNdpPacketQueueEnabled	Boolean	0..1	attr	Enables (TRUE) or disables (FALSE) support of a NDP Packet Queue according to IETF RFC 4861, section 7.2.2.
tcpIpNdpPrefixListSize	PositiveInteger	0..1	attr	Maximum number of entries in the on-link prefix list.
tcpIpNdpRandomReachableTimeEnabled	Boolean	0..1	attr	If enabled the value of ReachableTime will be multiplied with a random value between MIN_RANDOM_FACTOR and MAX_RANDOM_FACTOR in order to prevent multiple nodes from transmitting at exactly the same time.
tcpIpNdpRndRtrSolicitationDelayEnabled	Boolean	0..1	attr	If enabled the first router solicitation will be delayed randomly from [0...MAX_RTR_SOLICITATION_DELAY]. Otherwise the first router solicitation will be sent after exactly MAX_RTR_SOLICITATION_DELAY milliseconds.
tcpIpNdpRtrSolicitationInterval	TimeValue	0..1	attr	Interval between consecutive Router Solicitations in (s).
tcpIpNdpSlaacDadNumberOfTransmissions	PositiveInteger	0..1	attr	Number of Neighbor Solicitations that have to be unanswered in order to set an autoconfigured address to PREFERRED (usable) state.







Class	Ipv6NdpProps			
tcplpNdpSlaacDadRetransmissionDelay	TimeValue	0..1	attr	Sets the maximum value for the address configuration delay (s).
tcplpNdpSlaacDelayEnabled	Boolean	0..1	attr	If enabled transmission of the first DAD Neighbor Solicitation will be delayed by a random value from [0...MAX_DAD_DELAY].
tcplpNdpSlaacOptimisticDadEnabled	Boolean	0..1	attr	Enable Optimistic Duplicate Address Detection (DAD) according to RFC4429.

Table A.536: Ipv6NdpProps

Class	<<atpVariation>> J1939Cluster			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	J1939 specific cluster attributes. <b>Tags:</b> atp.recommendedPackage=CommunicationClusters			
Base	ARObject, AbstractCanCluster, CollectableElement, <a href="#">CommunicationCluster</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
networkId	PositiveInteger	0..1	attr	This represents the network ID for the J1939 cluster.
re-request2Support	Boolean	0..1	attr	Enables support for the Request2 PGN (RQST2).
usesAddressArbitration	Boolean	0..1	attr	Defines whether the nodes attached to this channel use an initial address claim, and whether they react to contending address claims of other nodes.  True: The initial address claim is sent, and the node reacts to address claims of other nodes.  False: The node only sends an address claim upon request, and does not care for contending address claims.

Table A.537: J1939Cluster

Class	J1939ControllerApplication			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	This element represents a J1939 controller application. <b>Tags:</b> atp.recommendedPackage=J1939ControllerApplications			
Base	<a href="#">ARElement</a> , ARObject, CollectableElement, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
functionId	PositiveInteger	1	attr	This attribute represents the numerical function id of the J1939 controller application.
swComponentPrototype	<a href="#">SwComponentPrototype</a>	0..1	iref	This represents the SwComponentPrototype (which is typically typed by a CompositionSwComponentType) that corresponds to the J1939ControllerApplication.  <b>InstanceRef implemented by:</b> ComponentInSystem InstanceRef

Table A.538: J1939ControllerApplication

<b>Class</b>	<b>J1939ControllerApplicationToJ1939NmNodeMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
<b>Note</b>	This meta-class represents the ability to map a J1939ControllerApplication to a J1939NmNode. Note that this is similar but not identical to the mapping of SwComponentPrototypes to EcuInstances; for J1939 the semantics of an EcuInstance itself is basically replaced by a J1939NmNode.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
j1939ControllerApplication	<a href="#">J1939ControllerApplication</a>	0..1	ref	Reference to the J1939 Controller Application that is mapped to the referenced J1939NmNode.
j1939NmNode	<a href="#">J1939NmNode</a>	0..1	ref	J1939NmNode that is the target of the J1939ControllerApplicationToJ1939NmNodeMapping.

**Table A.539: J1939ControllerApplicationToJ1939NmNodeMapping**

<b>Class</b>	<b>J1939DcmIPdu</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Represents the IPdus handled by J1939Dcm. <b>Tags:</b> atp.recommendedPackage=Pdus			
<b>Base</b>	ARObject, CollectableElement, <a href="#">FibexElement</a> , <a href="#">IPdu</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Pdu</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
diagnosticMessageTypes	PositiveInteger	0..1	attr	This attribute is used to identify the actual DMx message, e.g 1 means DM01, etc.

**Table A.540: J1939DcmIPdu**

<b>Class</b>	<b>J1939NmCluster</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
<b>Note</b>	J1939 specific NmCluster attributes			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">NmCluster</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
addressClaimEnabled	Boolean	0..1	attr	This attribute specifies whether the J1939Nm Bsw module is used or not. If this attribute is set to false then the J1939Nm configuration shall not be derived from the system description. But even in this case the nmNodeid might still be necessary for the J1939Rm and J1939Tp.

**Table A.541: J1939NmCluster**

<b>Class</b>	<b>J1939NmNode</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
<b>Note</b>	J1939 specific NM Node attributes.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">NmNode</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
nodeName	<a href="#">J1939NodeName</a>	0..1	aggr	NodeName configuration

**Table A.542: J1939NmNode**

<b>Class</b>	<b>J1939NodeName</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
<b>Note</b>	This element contains attributes to configure the J1939NmNode NAME.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
arbitraryAddressCapable	Boolean	1	attr	Arbitrary Address Capable field of the NAME of this node.
ecuInstance	Integer	1	attr	ECU Instance field of the NAME of this node.
function	Integer	1	attr	Function field of the NAME of this node.
functionInstance	Integer	1	attr	Function Instance field of the NAME of this node.
identityNumber	Integer	1	attr	Identity Number field of the NAME of this node.
industryGroup	Integer	1	attr	Industry Group field of the NAME of this node.
manufacturerCode	Integer	1	attr	Manufacturer Code field of the NAME of this node.
vehicleSystem	Integer	1	attr	Vehicle System field of the NAME of this node.
vehicleSystemInstance	Integer	1	attr	Vehicle System Instance field of the NAME of this node.

**Table A.543: J1939NodeName**

<b>Class</b>	<b>J1939TpPg</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
<b>Note</b>	A J1939TpPg represents one J1939 message (parameter group, PG) identified by the PGN (parameter group number) that can be received or transmitted via J1939Tp.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
directPdu	NPdu	0..1	ref	In case of variable length IPdus (with system signals of variable length), an additional NPdu (with the PGN in the CAN ID) is used for messages with up to 8 bytes.
pgn	Integer	0..1	attr	Parameter group number (PGN) of a J1939 message (parameter group, PG) that can be received or transmitted via J1939Tp. The PGN may be omitted when the a directPdu is referenced and is mapped into a Can FrameTriggering with an identifier.
requestable	Boolean	0..1	attr	Parameter Group can be triggered by the J1939 request message.
sdu	IPdu	*	ref	Reference to IPdus that are segmented by the Transport Protocol. If more than one IPdu is referenced, the IPdus are used when the same PGN is received in parallel via different transport protocols (BAM, CMTD, direct) on the same J1939TpConnection.

**Table A.544: J1939TpPg**

<b>Class</b>	<<atpMixedString>> LParagraph			
<b>Package</b>	M2::MSR::Documentation::TextModel::LanguageDataModel			
<b>Note</b>	This is the text for a paragraph in one particular language. The language is denoted in the attribute l.			
<b>Base</b>	ARObject, LanguageSpecific, MixedContentForParagraph			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





<b>Class</b>	<<atpMixedString>> LParagraph			
–	–	–	–	–

**Table A.545: LParagraph**

<b>Class</b>	<b>LifeCycleInfo</b>			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::LifeCycles			
<b>Note</b>	LifeCycleInfo describes the life cycle state of an element together with additional information like what to use instead			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
lcObject	<a href="#">Referrable</a>	1	ref	Element(s) have the life cycle as described in lcState.
lcState	<a href="#">LifeCycleState</a>	0..1	ref	This denotes the particular state assigned to the object. If no lcState is given then the default life cycle state of LifeCycleInfoSet is assumed.
periodBegin	<a href="#">LifeCyclePeriod</a>	0..1	aggr	Starting point of period in which the element has the denoted life cycle state lcState. If no periodBegin is given then the default period begin of LifeCycleInfoSet is assumed.
periodEnd	<a href="#">LifeCyclePeriod</a>	0..1	aggr	Expiry date, i.e. end point of period the element does not have the denoted life cycle state lcState any more. If no periodEnd is given then the default period begin of LifeCycleInfoSet is assumed.
remark	<a href="#">DocumentationBlock</a>	0..1	aggr	Remark describing for example <ul style="list-style-type: none"> <li>• why the element was given the specified life cycle</li> <li>• the semantics of useInstead</li> </ul>
useInstead	<a href="#">Referrable</a>	*	ref	Element(s) that should be used instead of the one denoted in referrable.  Only relevant in case of life cycle states lcState unlike "valid". In case there are multiple references the exact semantics shall be individually described in the remark.

**Table A.546: LifeCycleInfo**

<b>Class</b>	<b>LifeCycleInfoSet</b>			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::LifeCycles			
<b>Note</b>	This meta class represents the ability to attach a life cycle information to a particular set of elements.  The information can be defined for a particular period. This supports the definition of transition plans.  If no period is specified, the life cycle state applies forever. <b>Tags:</b> atp.recommendedPackage=LifeCycleInfoSets			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
defaultLcState	<a href="#">LifeCycleState</a>	1	ref	This denotes the default life cycle state. To be used in all LifeCycleInfo elements within the LifeCycleInfoSet if no life cycle state is stated there explicitly. I.e. the defaultLcState can be overwritten in LifeCycleInfo elements.
defaultPeriodBegin	<a href="#">LifeCyclePeriod</a>	0..1	aggr	Default starting point of period in which all the specified lifeCycleInfo apply. Note that the default period can be overridden for each lifeCycleInfo individually.





Class	LifeCycleInfoSet			
defaultPeriodEnd	<a href="#">LifeCyclePeriod</a>	0..1	aggr	Default expiry date, i.e. default end point of period for which all specified lifeCycleInfo apply. Note that the default period can be overridden for each lifeCycleInfo individually.
lifeCycleInfo	<a href="#">LifeCycleInfo</a>	*	aggr	This represents one particular life cycle information.
usedLifeCycleStateDefinitionGroup	<a href="#">LifeCycleStateDefinitionGroup</a>	1	ref	This denotes the life cycle states applicable to the current life cycle info set.

**Table A.547: LifeCycleInfoSet**

Class	LifeCyclePeriod			
Package	M2::AUTOSARTemplates::GenericStructure::LifeCycles			
Note	This meta class represents the ability to specify a point of time within a specified period, e.g. the starting or end point, in which a specific life cycle state is valid/applies to.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
arReleaseVersion	RevisionLabelString	0..1	attr	Version of the AUTOSAR Release the element referred to is part of.  The numbering contains three levels (major, minor, revision) which are defined by AUTOSAR. <b>Tags:</b> xml.sequenceOffset=20
date	DateTime	0..1	attr	Date within period. <b>Tags:</b> xml.sequenceOffset=10
productRelease	RevisionLabelString	0..1	attr	Version of the product within the period. <b>Tags:</b> xml.sequenceOffset=30

**Table A.548: LifeCyclePeriod**

Class	LifeCycleState			
Package	M2::AUTOSARTemplates::GenericStructure::LifeCycles			
Note	This meta class represents one particular state in the LifeCycle.			
Base	ARObject, <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.549: LifeCycleState**

Class	LifeCycleStateDefinitionGroup			
Package	M2::AUTOSARTemplates::GenericStructure::LifeCycles			
Note	This meta class represents the ability to define the states and properties of one particular life cycle. <b>Tags:</b> atp.recommendedPackage=LifeCycleStateDefintionGroups			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
lcState	<a href="#">LifeCycleState</a>	*	aggr	Describes a single life cycle state of this life cycle state definition group.

**Table A.550: LifeCycleStateDefinitionGroup**

<b>Primitive</b>	<b>Limit</b>			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes			
<b>Note</b>	<p>This class represents the ability to express a numerical limit. Note that this is in fact a NumericalVariation Point but has the additional attribute intervalType.</p> <p><b>Tags:</b>  xml.xsd.customType=LIMIT-VALUE  xml.xsd.pattern=(0[xX][0-9a-fA-F+]) (0[0-7+]) (0[bB][0-1+]) ([+-]?[1-9][0-9+](\.[0-9+])? [+-]?[0-9](\.[0-9+])?)([eE]([+-]?[0-9+])?)\.[0]INF-INF NaN  xml.xsd.type=string</p>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
intervalType	IntervalTypeEnum	0..1	attr	<p>This specifies the type of the interval. If the attribute is missing the interval shall be considered as "CLOSED".</p> <p><b>Tags:</b>xml.attribute=true</p>

Table A.551: Limit

<b>Class</b>	<b>LinCommunicationConnector</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
<b>Note</b>	LIN bus specific communication connector attributes.			
<b>Base</b>	ARObject, <a href="#">CommunicationConnector</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
initialNad	Integer	0..1	attr	Initial NAD of the LIN slave.
linConfigurableFrame	<a href="#">LinConfigurableFrame</a>	*	aggr	LinConfigurableFrames shall list all frames (unconditional frames, event-triggered frames and sporadic frames) processed by the slave node. This element is necessary for the LIN 2.0 Assign-Frame command.
linOrderedConfigurableFrame	<a href="#">LinOrderedConfigurableFrame</a>	*	aggr	LinOrderedConfigurableFrames shall list all frames (unconditional frames, event-triggered frames and sporadic frames) processed by the slave node. This element is necessary for the LIN 2.1 Assign-Frame-PID-Range command.
scheduleChangeNextTimeBase	Boolean	0..1	attr	This attribute defines the point in time where a schedule table switch is performed. If this attribute is set to false or not present, the schedule table shall be switched after the current entry of the active schedule table is ended. If this attribute is enabled, the schedule table shall be switched when message transmission or reception within an entry has been completed, ensured by status checks for transmission and reception.

Table A.552: LinCommunicationConnector

<b>Class</b>	<b>LinConfigurableFrame</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
<b>Note</b>	Assignment of messageIds to Frames. This element shall be used for the LIN 2.0 Assign-Frame command.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
frame	<a href="#">LinFrame</a>	1	ref	Reference to a Frame that is processed by the slave node.
messageId	PositiveInteger	0..1	attr	MessageId for the referenced frame

Table A.553: LinConfigurableFrame

<b>Class</b>	<b>LinErrorResponse</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
<b>Note</b>	Each slave node shall publish a one bit signal, named response_error, to the master node in one of its transmitted unconditional frames. The response_error signal shall be set whenever a frame (except for event triggered frame responses) that is transmitted or received by the slave node contains an error in the frame response. The response_error signal shall be cleared when the unconditional frame containing the response_error signal is successfully transmitted.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
responseError	ISignalTriggering	0..1	ref	This ISignal shall be taken to transport the responseError bit.

**Table A.554: LinErrorResponse**

<b>Class</b>	<b>LinEventTriggeredFrame</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
<b>Note</b>	<p>An event triggered frame is used as a placeholder to allow multiple slave nodes to provide its response.</p> <p>The header of an event triggered frame is transmitted when a frame slot allocated to the event triggered frame is processed. The publisher of an associated unconditional frame shall only transmit the response if at least one of the signals carried in its unconditional frame is updated. The LIN Master discovers and purges collisions with the collisionResolvingScheduleTable.</p> <p>The event controlled frame shall not contain any Pdus.</p> <p><b>Tags:</b>atp.recommendedPackage=Frames</p>			
<b>Base</b>	ARObject, CollectableElement, FibexElement, Frame, Identifiable, LinFrame, MultilanguageReferrable, PackageableElement, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
collisionResolvingSchedule	LinScheduleTable	0..1	ref	Reference to the schedule table, which resolves a collision.
linUnconditionalFrame	LinUnconditionalFrame	1..*	ref	<p>A list of slaves can respond to the master request if at least one of the signals carried in its unconditional frame is updated. For each response a LinFrameTriggering and a LinUnconditionalFrame shall be defined. Within a channel a LIN Frame shall be referenced by only one FrameTriggering. This allows a derivation of the identifier of a substituted Frame. The identifier is specified in FrameTriggering element. The Unconditional frames associated with an event triggered frame shall:</p> <ul style="list-style-type: none"> <li>• have equal length.</li> <li>• use the same checksum model (i.e. mixing LIN 1.x and LIN 2.x frames is not allowed).</li> <li>• reserve the first data field to its protected identifier (even if the associated unconditional frame is scheduled as a unconditional frame in the same or another schedule table).</li> <li>• be published by different slave nodes.</li> <li>• shall not be included directly in the same schedule table as the event triggered frame is scheduled.</li> </ul>

**Table A.555: LinEventTriggeredFrame**

<b>Class</b>	<b>LinFrame</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
<b>Note</b>	Lin specific Frame element.			
<b>Base</b>	ARObject, CollectableElement, <a href="#">FibexElement</a> , <a href="#">Frame</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">LinEventTriggeredFrame</a> , <a href="#">LinSporadicFrame</a> , <a href="#">LinUnconditionalFrame</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.556: LinFrame**

<b>Class</b>	<b>LinFrameTriggering</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
<b>Note</b>	LIN specific attributes to the FrameTriggering			
<b>Base</b>	ARObject, <a href="#">FrameTriggering</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
identifier	Integer	0..1	attr	To describe a frames identifier on the communication system, usually with a fixed identifierValue. For Lin SporadicFrames the attribute shall be ignored.
linChecksum	LinChecksumType	0..1	attr	Type of checksum that the frame is using. This attribute is optional because in case of sporadic frames it should not be set.

**Table A.557: LinFrameTriggering**

<b>Class</b>	<<atpVariation>> <b>LinMaster</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
<b>Note</b>	Describing the properties of the referring ecu as a LIN master.			
<b>Base</b>	ARObject, <a href="#">CommunicationController</a> , <a href="#">Identifiable</a> , <a href="#">LinCommunicationController</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
linSlave	<a href="#">LinSlaveConfig</a>	*	aggr	LinSlaves that are handled by the LinMaster.
timeBase	TimeValue	0..1	attr	Time base is mandatory for the master. It is not used for slaves.  LIN 2.0 Spec states: "The time_base value specifies the used time base in the master node to generate the maximum allowed frame transfer time."  The time base shall be specified AUTOSAR conform in seconds.
timeBaseJitter	TimeValue	0..1	attr	The attribute timeBaseJitter is a mandatory attribute for the master and not used for slaves.  LIN 2.0 Spec states: "The jitter value specifies the differences between the maximum and minimum delay from time base start point to the frame header sending start point (falling edge of BREAK signal)."  The jitter shall be specified AUTOSAR conform in seconds.

**Table A.558: LinMaster**



<b>Class</b>	<b>LinOrderedConfigurableFrame</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
<b>Note</b>	With the assignment of the index to a frame a mapping of Pids to Frames is possible. This element shall be used for the LIN 2.1 Assign-Frame-PID-Range command.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
frame	<a href="#">LinFrame</a>	1	ref	Reference to a Frame that is processed by the slave node.
index	Integer	1	attr	This attribute is used to order the elements and allows an assignment of Pids to ConfigurableFrames that are defined in the slave.

**Table A.559: LinOrderedConfigurableFrame**

<b>Class</b>	<b>LinPhysicalChannel</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
<b>Note</b>	LIN specific attributes to the physicalChannel			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PhysicalChannel</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
busIdleTimeoutPeriod	TimeValue	0..1	attr	This attribute shall be used to set an idle timeout period for the enclosing LinPhysicalChannel.
scheduleTable	<a href="#">LinScheduleTable</a>	*	aggr	Schedule tables organize the timings of the frames for LIN.  atpVariation: If the transmitted frames are variable, the corresponding ScheduleTables shall be variable, too.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild

**Table A.560: LinPhysicalChannel**

<b>Class</b>	<b>LinScheduleTable</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
<b>Note</b>	The master task (in the master node) transmits frame headers based on a schedule table. The schedule table specifies the identifiers for each header and the interval between the start of a frame and the start of the following frame.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
resumePosition	ResumePosition	0..1	attr	Defines, where a schedule table shall be proceeded in case if it has been interrupted by a run-once table or MRF/SRF.
runMode	RunMode	0..1	attr	The schedule table can be executed in two different modes.
tableEntry	ScheduleTableEntry	1..*	aggr	The scheduling table consists of table entries, which contain Frame slots.

**Table A.561: LinScheduleTable**

<b>Class</b>	<<atpVariation>> <b>LinSlave</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
<b>Note</b>	Describing the properties of the referring ecu as a LIN slave.			





<b>Class</b>	<<atpVariation>> <b>LinSlave</b>			
<b>Base</b>	<i>ARObject</i> , <i>CommunicationController</i> , <i>Identifiable</i> , <i>LinCommunicationController</i> , <i>Multilanguage Referrable</i> , <i>Referrable</i>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
assignNad	Boolean	0..1	attr	This attribute has the ability to control whether the node configuration command 'Assign NAD' is supported.
configuredNad	Integer	1	attr	To distinguish LIN slaves that are used twice or more within the same cluster.
functionId	PositiveInteger	1	attr	LIN function ID
initialNad	Integer	0..1	attr	This attribute represents the initial NAD.
linError Response	<i>LinErrorResponse</i>	1	aggr	Each slave node shall publish one response error in one of its transmitted unconditional frames.
nasTimeout	TimeValue	0..1	attr	Value of the N_AS timeout. Unit: seconds.
supplierId	PositiveInteger	1	attr	LIN Supplier ID
variantId	PositiveInteger	1	attr	Specifies the Variant ID

**Table A.562: LinSlave**

<b>Class</b>	<b>LinSlaveConfig</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
<b>Note</b>	<p>Node attributes of LIN slaves that are handled by the LinMaster.</p> <p>In the System Description LIN slaves may be described in the context of the Lin Master.</p> <p>In an ECU Extract of the LinMaster the LinSlave Ecus shall not be available.</p> <p>The information that is described here is necessary in the ECU Extract for the configuration of the Lin Master.</p> <p>The values of attributes of LinSlaveConfig and the corresponding LinSlave shall be identical (if both are defined in a System Description).</p>			
<b>Base</b>	<i>ARObject</i>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
configuredNad	Integer	1	attr	To distinguish LIN slaves that are used twice or more within the same cluster.
functionId	PositiveInteger	1	attr	LIN function ID.
ident	LinSlaveConfigIdent	0..1	aggr	This adds the ability to become referrable to LinSlave Config.
initialNad	Integer	0..1	attr	Initial NAD of the LIN slave.
linConfigurable Frame	<i>LinConfigurableFrame</i>	*	aggr	List of all frames that are processed by the slave node
linError Response	<i>LinErrorResponse</i>	0..1	aggr	Each slave node shall publish one response error in one of its transmitted unconditional frames.
linOrdered Configurable Frame	<i>LinOrderedConfigurableFrame</i>	*	aggr	List of all frames (unconditional frames, event-triggered frames and sporadic frames) processed by the slave node. This element is necessary for the LIN 2.1 Assign-Frame-PID-Range command.
protocolVersion	String	0..1	attr	Version specifier for a communication protocol. Protocol version of the LinMaster and the LinSlaves may be different.
supplierId	PositiveInteger	1	attr	LIN Supplier ID.
variantId	PositiveInteger	1	attr	Specifies the Variant ID.

**Table A.563: LinSlaveConfig**

<b>Class</b>	<b>LinSporadicFrame</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
<b>Note</b>	<p>A sporadic frame is a group of unconditional frames that share the same frame slot. The sporadic frame shall not contain any Pdus.</p> <p><b>Tags:</b>atp.recommendedPackage=Frames</p>			
<b>Base</b>	<i>ARObject</i> , <i>CollectableElement</i> , <i>FibexElement</i> , <i>Frame</i> , <i>Identifiable</i> , <i>LinFrame</i> , <i>MultilanguageReferrable</i> , <i>PackageableElement</i> , <i>Referrable</i>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
substituted Frame (ordered)	<a href="#">LinUnconditionalFrame</a>	1..*	ref	<p>Reference to a group of unconditional frames that share the same frame slot. In case that more than one of the declared frames needs to be transferred, the one first listed shall be chosen.</p> <p>Within a channel a LIN Frame shall be referenced by only one FrameTriggering. This allows a derivation of the identifier of a substituted Frame. The identifier is specified in FrameTriggering element.</p> <p>A LinUnconditionalFrame associated with a LinSporadic Frame may not be allocated in the same LinSchedule Table as the sporadic frame.</p>

**Table A.564: LinSporadicFrame**

<b>Class</b>	<b>LinUnconditionalFrame</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
<b>Note</b>	<p>Unconditional frames carry signals. The master sends a frame header in a scheduled frame slot and the designated slave node fills the frame with data.</p> <p><b>Tags:</b>atp.recommendedPackage=Frames</p>			
<b>Base</b>	<i>ARObject</i> , <i>CollectableElement</i> , <i>FibexElement</i> , <i>Frame</i> , <i>Identifiable</i> , <i>LinFrame</i> , <i>MultilanguageReferrable</i> , <i>PackageableElement</i> , <i>Referrable</i>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.565: LinUnconditionalFrame**

<b>Class</b>	<b>MacMulticastGroup</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	<p>Per EthernetCluster globally defined MacMulticastGroup. One sender can handle many receivers simultaneously if the receivers have all the same macMulticastAddress. The addresses need to be unique for the particular EthernetCluster.</p>			
<b>Base</b>	<i>ARObject</i> , <i>Identifiable</i> , <i>MultilanguageReferrable</i> , <i>Referrable</i>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
macMulticast Address	MacAddressString	1	attr	A multicast MAC address (Media Access Control address) is a identifier for a group of hosts in a network.

**Table A.566: MacMulticastGroup**

<b>Class</b>	<b>McDataAccessDetails</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::MeasurementCalibrationSupport			





Class	McDataAccessDetails			
Note	<p>This meta-class allows to attach detailed information about the usage of a data buffer by the RTE to a corresponding McDataInstance.</p> <p>Use Case: Direct memory access to RTE internal buffers for rapid prototyping. In case of implicit communication, the various task local buffers need to be identified in relation to RTE events and variable access points.</p> <p>Note that the SwComponentPrototype, the RunnableEntity and the VariableDataPrototype are implicitly given be the referred instances of RTEEvent and VariableAccess.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
rteEvent	RTEEvent	1..*	iref	<p>The RTE event used to receive the data via this buffer.</p> <p><b>InstanceRef implemented by:</b>RteEventInEcuInstanceRef</p>
variableAccess	VariableAccess	1..*	iref	<p>The VariableAccess for which the data buffer is used.</p> <p><b>InstanceRef implemented by:</b>VariableAccessInEcuInstanceRef</p>

**Table A.567: McDataAccessDetails**

Class	McDataInstance			
Package	M2::AUTOSARTemplates::CommonStructure::MeasurementCalibrationSupport			
Note	<p>Describes the specific properties of one data instance in order to support measurement and/or calibration of this data instance.</p> <p>The most important attributes are:</p> <ul style="list-style-type: none"> <li>• Its shortName is copied from the ECU Flat map (if applicable) and will be used as identifier and for display by the MC system.</li> <li>• The category is copied from the corresponding data type (ApplicationDataType if defined, otherwise ImplementationDataType) as far as applicable.</li> <li>• The symbol is the one used in the programming language. It will be used to find out the actual memory address by the final generation tool with the help of linker generated information.</li> </ul> <p>It is assumed that in the M1 model this part and all the aggregated and referred elements (with the exception of the Flat Map and the references from ImplementationElementInParameterInstanceRef and McAccessDetails) are completely generated from "upstream" information. This means, that even if an element like e.g. a CompuMethod is only used via reference here, it will be copied into the M1 artifact which holds the complete McSupportData for a given Implementation.</p>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
arraySize	PositiveInteger	0..1	attr	The existence of this attribute turns the data instance into an array of data. The attribute determines the size of the array in terms of number of elements.
displayIdentifier	McdIdentifier	0..1	attr	An optional attribute to be used to set the ASAM ASAP2 DISPLAY_IDENTIFIER attribute.





Class	McDataInstance			
flatMapEntry	<a href="#">FlatInstanceDescriptor</a>	0..1	ref	<p>Reference to the corresponding entry in the ECU Flat Map. This allows to trace back to the original specification of the generated data instance. This link shall be added by the RTE generator mainly for documentation purposes.</p> <p>The reference is optional because</p> <ul style="list-style-type: none"> <li>• The McDataInstance may represent an array or struct in which only the subElements correspond to FlatMap entries.</li> <li>• The McDataInstance may represent a task local buffer for rapid prototyping access which is different from the "main instance" used for measurement access.</li> </ul>
instanceInMemory	<a href="#">ImplementationElement</a> <a href="#">InParameterInstanceRef</a>	0..1	aggr	Reference to the corresponding data instance in the description of calibration data structures published by the RTE generator. This is used to support emulation methods inside the ECU, it is not required for A2L generation.
mcDataAccessDetails	<a href="#">McDataAccessDetails</a>	0..1	aggr	Refers to "upstream" information on how the RTE uses this data instance. Use Case: Rapid Prototyping
mcDataAssignment	RoleBasedMcDataAssignment	*	aggr	An assignment between McDataInstances. This supports the indication of related McDataElement implementing the of "RP global buffer", "RP global measurement buffer", "RP enabler flag".
resultingProperties	<a href="#">SwDataDefProps</a>	0..1	aggr	These are the generated properties resulting from decisions taken by the RTE generator for the actually implemented data instance. Only those properties are relevant here, which are needed for the measurement and calibration system.
resultingRptSwPrototypingAccess	<a href="#">RptSwPrototypingAccess</a>	0..1	aggr	Describes the implemented accessibility of data and modes by the rapid prototyping tooling.
role	<a href="#">Identifier</a>	0..1	attr	An optional attribute to be used for additional information on the role of this data instance, for example in the context of rapid prototyping.
rptImplPolicy	<a href="#">RptImplPolicy</a>	0..1	aggr	Describes the implemented code preparation for rapid prototyping at data accesses for a hook based bypassing.
subElement (ordered)	<a href="#">McDataInstance</a>	*	aggr	<p>This relation indicates, that the target element is part of a "struct" which is given by the source element. This information will be used by the final generator to set up the correct addressing scheme.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>
symbol	SymbolString	0..1	attr	<p>This String is used to determine the memory address during final generation of the MC configuration data (e.g. "A2L" file) . It shall be the name of the element in the programming language such that it can be identified in linker generated information.</p> <p>In case the McDataInstance is part of composite data in the programming language, the symbol String may include parts denoting the element context, unless the context is given by the symbol attribute of an enclosing McDataInstance. This means in particular for the C language that the "." character shall be used as a separator between the name of a "struct" variable the name of one of its elements.</p> <p>The symbol can differ from the shortName in case of generated C data declarations.</p>





Class	McDataInstance			
				<p>It is an optional attribute since it may be missing in case the instance represents an element (e.g. a single array element) which has no name in the linker map.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b> atp.Splitkey=symbol</p>

**Table A.568: McDataInstance**

Class	McFunction			
Package	M2::AUTOSARTemplates::CommonStructure::MeasurementCalibrationSupport			
Note	<p>Represents a functional element to be used as input to support measurement and calibration. It is used to</p> <ul style="list-style-type: none"> <li>• assign calibration parameters to a logical function</li> <li>• assign measurement variables to a logical function</li> <li>• structure functions hierarchically</li> </ul> <p><b>Tags:</b> atp.recommendedPackage=McFunctions</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
defCalprmSet	<a href="#">McFunctionDataRefSet</a>	0..1	aggr	<p>Refers to the set of adjustable data (= calibration parameters) defined in this function.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b>  atp.Splitkey=defCalprmSet  xml.sequenceOffset=10</p>
inMeasurementSet	<a href="#">McFunctionDataRefSet</a>	0..1	aggr	<p>Refers to the set of measurable input data for this function.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b>  atp.Splitkey=inMeasurementSet  xml.sequenceOffset=30</p>
locMeasurementSet	<a href="#">McFunctionDataRefSet</a>	0..1	aggr	<p>Refers to the set of measurable local data in this function.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b>  atp.Splitkey=locMeasurementSet  xml.sequenceOffset=50</p>
outMeasurementSet	<a href="#">McFunctionDataRefSet</a>	0..1	aggr	<p>Refers to the set of measurable output data from this function.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b>  atp.Splitkey=outMeasurementSet  xml.sequenceOffset=60</p>
refCalprmSet	<a href="#">McFunctionDataRefSet</a>	0..1	aggr	<p>Refers to the set of adjustable data (= calibration parameters) referred by this function.</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b>  atp.Splitkey=refCalprmSet  xml.sequenceOffset=20</p>





Class	McFunction			
subFunction	<a href="#">McFunction</a>	*	ref	<p>A sub-function that is seen as part of the enclosing function.</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b>  atp.Splitkey=subFunction  xml.sequenceOffset=70</p>

Table A.569: McFunction

Class	<<atpVariation>> McFunctionDataRefSet			
Package	M2::AUTOSARTemplates::CommonStructure::MeasurementCalibrationSupport::RptSupport			
Note	<p>Refers to a set of data assigned to an McFunction in a particular role. The data are given</p> <ul style="list-style-type: none"> <li>• either by entries in a FlatMap</li> <li>• or by data instances that are part of MC support data.</li> </ul> <p>These two possibilities are exclusive within a given McFunctionDataRefSet. Which one to use depends on the process and tool environment.</p> <p>The set is subject to variability because the same functional model may be used with various representation of the data.</p> <p><b>Tags:</b>vh.latestBindingTime=preCompileTime</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
flatMapEntry	<a href="#">FlatInstanceDescriptor</a>	*	ref	<p>Refers to an entry in a FlatMap that is part of the set, for example a calibration parameter or measured variable.</p> <p>Note: This atpSplitable property has no atp.Splitkey due to atpVariation (PropertySetPattern).</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>
mcDataInstance	<a href="#">McDataInstance</a>	*	ref	<p>Refers to a data instance within MC support data that is part of the set, i.e. a calibration parameter or measured variable.</p> <p>Note: This atpSplitable property has no atp.Splitkey due to atpVariation (PropertySetPattern).</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>

Table A.570: McFunctionDataRefSet

Class	McGroup			
Package	M2::AUTOSARTemplates::CommonStructure::McGroups			
Note	<p>Represents a group element to be used as input to support measurement and calibration. It is used to provide selection lists (groups) of calibration parameters, measurement variables, and functions in a hierarchical manner (subGroups).</p> <p><b>Tags:</b>atp.recommendedPackage=McFunctions</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note





Class	McGroup			
mcFunction	<a href="#">McFunction</a>	*	ref	A McFunction that is seen as part of the enclosing group. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=mcFunction xml.sequenceOffset=40
refCalprmSet	<a href="#">McGroupDataRefSet</a>	0..1	aggr	Refers to the set of adjustable data (= calibration parameters) referred by this McGroup. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=refCalprmSet xml.sequenceOffset=20
ref Measurement Set	<a href="#">McGroupDataRefSet</a>	0..1	aggr	Refers to the set of measurable belonging to this Mc Group. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=refMeasurementSet xml.sequenceOffset=30
subGroup	<a href="#">McGroup</a>	*	ref	A sub-group that is seen as part of the enclosing group. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=subGroup xml.sequenceOffset=10

Table A.571: McGroup

Class	<<atpVariation>> <b>McGroupDataRefSet</b>			
Package	M2::AUTOSARTemplates::CommonStructure::McGroups			
Note	<p>Refers to a set of data assigned to an McGroup in a particular role. The data are given</p> <ul style="list-style-type: none"> <li>• either by entries in a FlatMap</li> <li>• or by data instances that are part of MC support data.</li> </ul> <p>These two possibilities can be mixed within a given McGroupDataRefSet. Which one to use depends on the process and tool environment.</p> <p>The set is subject to variability because the same functional model may be used with various representation of the data.</p> <p><b>Tags:</b>vh.latestBindingTime=preCompileTime</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
flatMapEntry	<a href="#">FlatInstanceDescriptor</a>	*	ref	<p>Refers to an entry in a FlatMap that is part of the set, for example a calibration parameter or measured variable.</p> <p>Note: This atpSplitable property has no atp.Splitkey due to atpVariation (PropertySetPattern).</p> <p><b>Stereotypes:</b> atpSplitable <b>Tags:</b>xml.sequenceOffset=50</p>
mcDataInstance	<a href="#">McDataInstance</a>	*	ref	<p>Refers to a data instance within MC support data that is part of the set, i.e. a calibration parameter or measured variable.</p> <p>Note: This atpSplitable property has no atp.Splitkey due to atpVariation (PropertySetPattern).</p> <p><b>Stereotypes:</b> atpSplitable <b>Tags:</b>xml.sequenceOffset=60</p>

Table A.572: McGroupDataRefSet



<b>Class</b>	<b>McSupportData</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::MeasurementCalibrationSupport			
<b>Note</b>	Root element for all measurement and calibration support data related to one Implementation artifact on an ECU. There shall be one such element related to the RTE implementation (if it owns MC data) and a separate one for each module or component, which owns private MC data.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
emulation Support	McSwEmulationMethodSupport	*	aggr	Describes the calibration method used by the RTE. This information is not needed for A2L generation, but to setup software emulation in the ECU.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
mcParameter Instance	McDataInstance	*	aggr	A data instance to be used for calibration.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=mcParameterInstance.shortName, mcParameterInstance.variationPoint.shortLabel vh.latestBindingTime=postBuild
mcVariable Instance	McDataInstance	*	aggr	A data instance to be used for measurement.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=mcVariableInstance.shortName, mcVariableInstance.variationPoint.shortLabel vh.latestBindingTime=postBuild
measurable System ConstantValues	SwSystemconstant ValueSet	*	ref	Sets of system constant values to be transferred to the MCD system, because the system constants have been specified with "swCalibrationAccess" = readonly.
rptSupportData	RptSupportData	0..1	aggr	The rapid prototyping support data belonging to this implementation. The aggregation is <<atpSplitable>> because in case of an already existing BSW Implementation model, this description will be added later in the process, namely at code generation time.  <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=rptSupportData

Table A.573: McSupportData

<b>Class</b>	<b>McSwEmulationMethodSupport</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::MeasurementCalibrationSupport			
<b>Note</b>	<p>This denotes the method used by the RTE to handle the calibration data. It is published by the RTE generator and can be used e.g. to generate the corresponding emulation method in a Complex Driver.</p> <p>According to the actual method given by the category attribute, not all attributes are always needed:</p> <ul style="list-style-type: none"> <li>• double pointered method: only baseReference is mandatory</li> <li>• single pointered method: only referenceTable is mandatory</li> <li>• initRam method: only elementGroup(s) are mandatory</li> </ul> <p>Note: For single/double pointered method the group locations are implicitly accessed via the reference table and their location can be found from the initial values in the M1 model of the respective pointers. Therefore, the description of elementGroups is not needed in these cases. Likewise, for double pointered method the reference table description can be accessed via the M1 model under baseReference.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	McSwEmulationMethodSupport			
baseReference	<a href="#">VariableDataPrototype</a>	0..1	ref	Refers to the base pointer in case of the double-pointered method.
category	<a href="#">Identifier</a>	1	attr	Identifies the actual method. The possible names shall correspond to the symbols of the ECU configuration parameter for the calibration method of the RTE, and can include vendor specific methods. <b>Tags:</b> xml.sequenceOffset=-90
elementGroup	McParameterElement Group	*	aggr	Denotes the grouping of calibration parameters in the actual RTE code. Depending on the category, this information maybe required to set up the emulation code.
referenceTable	<a href="#">VariableDataPrototype</a>	0..1	ref	Refers to the pointer table in case of the single-pointered method.
shortLabel	<a href="#">Identifier</a>	1	attr	Assigns a name to this element. <b>Tags:</b> xml.sequenceOffset=-100

**Table A.574: McSwEmulationMethodSupport**

Class	MeasuredExecutionTime			
Package	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::ExecutionTime			
Note	Specifies the ExecutionTime which has been gathered using measurement means.			
Base	<a href="#">ARObject</a> , <a href="#">ExecutionTime</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
maximum ExecutionTime	MultidimensionalTime	1	aggr	The maximum measured execution time.
minimum ExecutionTime	MultidimensionalTime	1	aggr	The minimum measured execution time.
nominal ExecutionTime	MultidimensionalTime	1	aggr	The nominal measured execution time.

**Table A.575: MeasuredExecutionTime**

Class	MeasuredHeapUsage			
Package	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::HeapUsage			
Note	The heap usage has been measured.			
Base	<a href="#">ARObject</a> , <a href="#">HeapUsage</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
averageMemory Consumption	PositiveInteger	1	attr	The average heap usage measured. Unit: byte.
maximum Memory Consumption	PositiveInteger	1	attr	The maximum heap usage measured. Unit: byte.
minimum Memory Consumption	PositiveInteger	0..1	attr	The minimum heap usage measured. Unit: byte.
testPattern	String	0..1	attr	Description of the test pattern used to acquire the measured values.

**Table A.576: MeasuredHeapUsage**

<b>Class</b>	<b>MeasuredStackUsage</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::StackUsage			
<b>Note</b>	The stack usage has been measured.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">StackUsage</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
averageMemoryConsumption	PositiveInteger	1	attr	The average stack usage measured. Unit: byte.
maximumMemoryConsumption	PositiveInteger	1	attr	The maximum stack usage measured. Unit: byte.
minimumMemoryConsumption	PositiveInteger	0..1	attr	The minimum stack usage measured. Unit: byte.
testPattern	String	0..1	attr	Description of the test pattern used to acquire the measured values.

**Table A.577: MeasuredStackUsage**

<b>Enumeration</b>	<b>MemoryAllocationKeywordPolicyType</b>
<b>Package</b>	M2::MSR::DataDictionary::AuxiliaryObjects
<b>Note</b>	Enumeration to specify the name pattern of the Memory Allocation Keyword.
<b>Literal</b>	<b>Description</b>
addrMethodShortName	<p>The MemorySection shortNames of referring MemorySections and therefore the belonging Memory Allocation Keywords in the code are build with the shortName of the SwAddrMethod. This is the default value if the attribute does not exist.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=0</p>
addrMethodShortNameAndAlignment	<p>The MemorySection shortNames of referring MemorySections and therefore the belonging Memory Allocation Keywords in the code are build with the shortName of the SwAddrMethod and a variable alignment postfix.</p> <p>Thereby the alignment postfix needs to be consistent with the alignment attribute of the related MemorySection.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=1</p>

**Table A.578: MemoryAllocationKeywordPolicyType**

<b>Class</b>	<b>MemorySection</b>
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::MemorySectionUsage
<b>Note</b>	<p>Provides a description of an abstract memory section used in the Implementation for code or data. It shall be declared by the Implementation Description of the module or component, which actually allocates the memory in its code. This means in case of data prototypes which are allocated by the RTE, that the generated Implementation Description of the RTE shall contain the corresponding MemorySections.</p> <p>The attribute "symbol" (if symbol is missing: "shortName") defines the module or component specific section name used in the code. For details see the document "Specification of Memory Mapping". Typically the section name is build according the pattern:</p> <p>&lt;SwAddrMethod shortName&gt;[_&lt;further specialization nominator&gt;][_&lt;alignment&gt;]</p> <p>where</p> <ul style="list-style-type: none"> <li>• [<b>&lt;SwAddrMethod shortName&gt;</b>] is the shortName of the referenced SwAddrMethod</li> <li>• [<b>&lt;further specialization nominator&gt;</b>] is an optional infix to indicate the specialization in the case that several MemorySections for different purpose of the same Implementation Description referring to the same or equally named SwAddrMethods.</li> </ul>





Class	MemorySection			
	<p>• [<b>&lt;alignment&gt;</b>] is the alignment attributes value and is only applicable in the case that the memoryAllocationKeywordPolicy value of the referenced SwAddrMethod is set to addrMethod ShortNameAndAlignment</p> <p>MemorySection used to Implement the code of RunnableEntitys and BswSchedulableEntitys shall have a symbol (if missing: shortName) identical to the referred SwAddrMethod to conform to the generated RTE header files.</p> <p>In addition to the section name described above, a prefix is used in the corresponding macro code in order to define a name space. This prefix is by default given by the shortName of the BswModule Description resp. the SwComponentType. It can be superseded by the prefix attribute.</p>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
alignment	AlignmentType	0..1	attr	The attribute describes the typical alignment of objects within this memory section.
executableEntity	<a href="#">ExecutableEntity</a>	*	ref	Reference to the ExecutableEntitites located in this section. This allows to locate different Executable Entities in different sections even if the associated Sw Addrmethod is the same.  This is applicable to code sections only.
memClass Symbol	CIdentifier	0..1	attr	Defines a specific symbol in order to generate the compiler abstraction "memclass" code for this Memory Section. The existence of this attribute supersedes the usage of swAddrmethod.shortName for this purpose.  The complete name of the "memclass" preprocessor symbol is constructed as <prefix>_<memClassSymbol> where prefix is defined in the same way as for the enclosing MemorySection. See also AUTOSAR_SWS_CompilerAbstraction SWS_COMPILER_00040.  <b>Tags:</b> atp.Status=obsolete
option	<a href="#">Identifier</a>	*	attr	This attribute introduces the ability to specify further intended properties of this MemorySection. The following two values are standardized (to be used for code sections only and exclusively to each other): <ul style="list-style-type: none"> <li>• <b>INLINE</b> - The code section is declared with the compiler abstraction macro <b>INLINE</b>.</li> <li>• <b>LOCAL_INLINE</b> - The code section is declared with the compiler abstraction macro <b>LOCAL_INLINE</b></li> </ul> In both cases ( <b>INLINE</b> and <b>LOCAL_INLINE</b> ) the inline expansion depends on the compiler specific implementation of these macros. Depending on this, the code section either corresponds to an actual section in memory or is put into the section of the caller. See AUTOSAR_SWS_CompilerAbstraction for more details.
prefix	<a href="#">SectionNamePrefix</a>	0..1	ref	The prefix used to set the memory section's namespace in the code. The existence of a prefix element supersedes rules for a default prefix (such as the Bsw ModuleDescription's shortName). This allows the user to define several name spaces for memory sections within the scope of one module, cluster or SWC.
size	PositiveInteger	0..1	attr	The size in bytes of the section.
swAddrmethod	<a href="#">SwAddrMethod</a>	0..1	ref	This association indicates that this module specific (abstract) memory section is part of an overall SwAddr Method, referred by the upstream declarations (e.g. calibration parameters, data element prototypes, code entities) which share a common addressing strategy. This





Class	MemorySection			
				<p>can be evaluated for the ECU configuration of the build support.</p> <p>This association shall always be declared by the Implementation description of the module or component, which allocates the memory in its code. This means in case of data prototypes which are allocated by the RTE, that the software components only declare the grouping of its data prototypes to SwAddrMethods, and the generated Implementation Description of the RTE actually sets up this association.</p>
symbol	Identifier	0..1	attr	<p>Defines the section name as explained in the main description. By using this attribute for code generation (instead of the shortName) it is possible to define several different MemorySections having the same name - e.g. symbol = CODE - but using different sectionName Prefixes.</p>

**Table A.579: MemorySection**

Class	MetaDatumItem			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	This meta-class represents a single meta-data item.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
length	PositiveInteger	0..1	attr	This attribute determines the length of the MetaDatumItem at run-time.
metaDatumItem Type	TextValueSpecification	0..1	aggr	This aggregation contributes the specification of the concrete meta-data item type.

**Table A.580: MetaDatumItem**

Class	MetaDatumItemSet			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	This meta-class represents the ability to define a set of meta-data items to be used in SenderReceiver Interfaces.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
dataElement	VariableDataPrototype	*	ref	This reference identifies the dataElement for which the ordered list of meta-data items is defined.
metaDatumItem (ordered)	MetaDatumItem	*	aggr	This aggregation represents the ordered definition of meta-data items.

**Table A.581: MetaDatumItemSet**

Class	<<atpMixedString>> MixedContentForParagraph (abstract)			
Package	M2::MSR::Documentation::TextModel::InlineTextModel			
Note	This mainly represents the text model of a full blown paragraph within a documentation.			
Base	ARObject			
Subclasses	LParagraph, SIParagraph			
Attribute	Type	Mult.	Kind	Note





<b>Class</b>	<<atpMixedString>> <b>MixedContentForParagraph</b> (abstract)			
br	Br	1	aggr	This element is the same as function here as in a HTML document i.e. it forces a line break. <b>Tags:</b> xml.sequenceOffset=40
e	EmphasisText	1	aggr	This is emphasized text. <b>Tags:</b> xml.sequenceOffset=70
ft	SIParagraph	1	aggr	This is a foot note within a paragraph.
ie	IndexEntry	1	aggr	This is an index entry. <b>Tags:</b> xml.sequenceOffset=110
std	<a href="#">Std</a>	1	aggr	This is a reference to a standard. <b>Tags:</b> xml.sequenceOffset=120
sub	Superscript	1	attr	This is subscript text. <b>Tags:</b> xml.sequenceOffset=100
sup	Superscript	1	attr	This is superscript text. <b>Tags:</b> xml.sequenceOffset=90
trace	<a href="#">Traceable</a>	1	ref	This allows to place an arbitrary reference to a traceable object in documentation.
tt	Tt	1	aggr	This is a technical term. <b>Tags:</b> xml.sequenceOffset=30
xdoc	<a href="#">Xdoc</a>	1	aggr	This is a reference to a printable external document. <b>Tags:</b> xml.sequenceOffset=130
xfile	<a href="#">Xfile</a>	1	aggr	This represents a reference to an external file which usually cannot be printed. <b>Tags:</b> xml.sequenceOffset=140
xref	Xref	1	aggr	This is a cross reference. <b>Tags:</b> xml.sequenceOffset=50
xrefTarget	<a href="#">XrefTarget</a>	1	aggr	This element specifies a reference target which can be scattered throughout the text. <b>Tags:</b> xml.sequenceOffset=60

**Table A.582: MixedContentForParagraph**

<b>Enumeration</b>	<b>ModeActivationKind</b>
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration
<b>Note</b>	Kind of mode switch condition used for activation of an event, as further described for each enumeration field.
<b>Literal</b>	<b>Description</b>
onEntry	On entering the referred mode. <b>Tags:</b> atp.EnumerationLiteralIndex=0
onExit	On exiting the referred mode. <b>Tags:</b> atp.EnumerationLiteralIndex=1
onTransition	On transition of the 1st referred mode to the 2nd referred mode. <b>Tags:</b> atp.EnumerationLiteralIndex=2

**Table A.583: ModeActivationKind**

<b>Class</b>	<b>ModeDeclaration</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
<b>Note</b>	Declaration of one Mode. The name and semantics of a specific mode is not defined in the meta-model.			
<b>Base</b>	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
value	PositiveInteger	0..1	attr	The RTE shall take the value of this attribute for generating the source code representation of this Mode Declaration.

**Table A.584: ModeDeclaration**

<b>Class</b>	<b>ModeDeclarationGroup</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
<b>Note</b>	A collection of Mode Declarations. Also, the initial mode is explicitly identified. <b>Tags:</b> atp.recommendedPackage=ModeDeclarationGroups			
<b>Base</b>	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
initialMode	ModeDeclaration	0..1	ref	The initial mode of the ModeDeclarationGroup. This mode is active before any mode switches occurred.
mode Declaration	ModeDeclaration	*	aggr	The ModeDeclarations collected in this ModeDeclaration Group. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=blueprintDerivationTime
modeManager ErrorBehavior	ModeErrorBehavior	0..1	aggr	This represents the ability to define the error behavior expected by the mode manager in case of errors on the mode user side (e.g. terminated mode user).
modeTransition	ModeTransition	*	aggr	This represents the available ModeTransitions of the ModeDeclarationGroup
modeUserError Behavior	ModeErrorBehavior	0..1	aggr	This represents the definition of the error behavior expected by the mode user in case of errors on the mode manager side (e.g. terminated mode manager).
onTransition Value	PositiveInteger	0..1	attr	The value of this attribute shall be taken into account by the RTE generator for programmatically representing a value used for the transition between two statuses.

**Table A.585: ModeDeclarationGroup**

<b>Class</b>	<b>ModeDeclarationGroupPrototype</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
<b>Note</b>	The ModeDeclarationGroupPrototype specifies a set of Modes (ModeDeclarationGroup) which is provided or required in the given context.			
<b>Base</b>	ARObject, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
swCalibration Access	SwCalibrationAccess Enum	0..1	attr	This allows for specifying whether or not the enclosing ModeDeclarationGroupPrototype can be measured at run-time.
type	ModeDeclarationGroup	0..1	trf	The "collection of ModeDeclarations" ( = ModeDeclaration Group) supported by a component <b>Stereotypes:</b> isOfType

**Table A.586: ModeDeclarationGroupPrototype**

<b>Class</b>	<b>ModeDeclarationGroupPrototypeMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
<b>Note</b>	Defines the mapping of two particular ModeDeclarationGroupPrototypes (in the given context) that are unequally named and/or require a reference to a ModeDeclarationMappingSet in order to become compatible by definition of ModeDeclarationMappings.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
firstModeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	0..1	ref	ModeDeclarationGroupPrototype to be mapped.
mode Declaration MappingSet	<a href="#">ModeDeclarationMappingSet</a>	0..1	ref	This represents the available mappings of Mode Declarations in the context of this ModeDeclarationGroup Prototype.
secondMode Group	<a href="#">ModeDeclarationGroupPrototype</a>	0..1	ref	ModeDeclarationGroupPrototype to be mapped.

**Table A.587: ModeDeclarationGroupPrototypeMapping**

<b>Class</b>	<b>ModeDeclarationMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	This meta-class implements a concrete mapping of two ModeDeclarations.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
firstMode	<a href="#">ModeDeclaration</a>	*	ref	This represents the first ModeDeclaration of the Mode DeclarationMapping. This reference has the multiplicity 1 .. * to support use cases where e.g. one mode of the mode user is mapped to several modes of the mode manager.
secondMode	<a href="#">ModeDeclaration</a>	0..1	ref	This represents the second ModeDeclaration of the Mode DeclarationMapping.

**Table A.588: ModeDeclarationMapping**

<b>Class</b>	<b>ModeDeclarationMappingSet</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	This meta-class implements a container for ModeDeclarationGroupMappings <b>Tags:</b> atp.recommendedPackage=PortInterfaceMappingSets			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
mode Declaration Mapping	<a href="#">ModeDeclarationMapping</a>	*	aggr	This represents the collection of ModeDeclaration Mappings owned by the enclosing ModeDeclaration MappingSet.

**Table A.589: ModeDeclarationMappingSet**

<b>Class</b>	<b>ModeErrorBehavior</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
<b>Note</b>	This represents the ability to define the error behavior in the context of mode handling.			







Class	ModeErrorBehavior			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
defaultMode	<a href="#">ModeDeclaration</a>	0..1	ref	This represents the ModeDeclaration that is considered the error mode in the context of the enclosing ModeDeclarationGroup.
errorReactionPolicy	<a href="#">ModeErrorReactionPolicyEnum</a>	0..1	attr	This represents the ability to define the policy in terms of which default model shall apply in case an error occurs.

**Table A.590: ModeErrorBehavior**

Enumeration	ModeErrorReactionPolicyEnum
Package	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration
Note	This represents the ability to specify the reaction on a mode error.
Literal	Description
defaultMode	This represents the ability to switch to the defaultMode in case of a mode error. <b>Tags:</b> atp.EnumerationLiteralIndex=0
lastMode	This represents the ability to keep the last mode in case of a mode error. <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.591: ModeErrorReactionPolicyEnum**

Class	ModelInterfaceMapping			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	Defines the mapping of ModeDeclarationGroupPrototypes in context of two different ModelInterfaces.			
Base	ARObject, <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PortInterfaceMapping</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
modeMapping	<a href="#">ModeDeclarationGroupPrototypeMapping</a>	0..1	aggr	Mapping of two ModeDeclarationGroupPrototypes in two different ModelInterfaces

**Table A.592: ModelInterfaceMapping**

Class	ModePortAnnotation			
Package	M2::AUTOSARTemplates::SWComponentTemplate::ApplicationAttributes			
Note	Annotation to a port used for calibration regarding a certain ModeDeclarationGroupPrototype.			
Base	ARObject, <i>GeneralAnnotation</i>			
Attribute	Type	Mult.	Kind	Note
modeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	0..1	ref	The instance of annotated ModeDeclarationGroupPrototype.

**Table A.593: ModePortAnnotation**

Class	ModeRequestTypeMap			
Package	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
Note	Specifies a mapping between a ModeDeclarationGroup and an ImplementationDataType. This ImplementationDataType shall be used to implement the ModeDeclarationGroup.			





Class	ModeRequestTypeMap			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
implementation DataType	<a href="#">AbstractImplementation DataType</a>	0..1	ref	This is the corresponding AbstractImplementationData Type. It shall be modeled along the idea of an "unsigned integer-like" data type.
modeGroup	<a href="#">ModeDeclarationGroup</a>	0..1	ref	This is the corresponding ModeDeclarationGroup.

**Table A.594: ModeRequestTypeMap**

Class	ModeSwitchEventTriggeredActivity			
Package	M2::AUTOSARTemplates::SWComponentTemplate::NvBlockComponent			
Note	This meta-class defines an activity of the NvBlockSwComponentType for a specific NvBlock which is triggered by a ModeSwitchEvent.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
role	<a href="#">Identifier</a>	0..1	attr	This attribute indicates which service of the NvM for the NvBlock shall be requested.
swcModeSwitch Event	<a href="#">SwcModeSwitchEvent</a>	0..1	ref	This reference identifies the SwcModeSwitchEvent that triggers the activity.

**Table A.595: ModeSwitchEventTriggeredActivity**

Class	ModeSwitchInterface			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	A mode switch interface declares a ModeDeclarationGroupPrototype to be sent and received. <b>Tags:</b> atp.recommendedPackage=PortInterfaces			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">PortInterface</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
modeGroup	<a href="#">ModeDeclarationGroup Prototype</a>	0..1	aggr	The ModeDeclarationGroupPrototype of this mode interface.

**Table A.596: ModeSwitchInterface**

Class	ModeSwitchPoint			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::ModeDeclarationGroup			
Note	A ModeSwitchPoint is required by a RunnableEntity owned a Mode Manager. Its semantics implies the ability to initiate a mode switch.			
Base	<a href="#">ARObject</a> , <a href="#">AbstractAccessPoint</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
modeGroup	<a href="#">ModeDeclarationGroup Prototype</a>	0..1	iref	The mode declaration group that is switched by this runnable.  <b>InstanceRef implemented by:</b> PModeGroupInAtomic SwcInstanceRef

**Table A.597: ModeSwitchPoint**

<b>Class</b>	<b>ModeSwitchReceiverComSpec</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
<b>Note</b>	Communication attributes of RPortPrototypes with respect to mode communication			
<b>Base</b>	ARObject, <a href="#">RPortComSpec</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
enhancedModeApi	Boolean	0..1	attr	This controls the creation of the enhanced mode API that returns information about the previous mode and the next mode. If set to "true" the enhanced mode API is supposed to be generated. For more details please refer to the SWS_RTE.
modeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	0..1	ref	ModeDeclarationGroupPrototype (of the same Port Interface) to which these communication attributes apply.
supportsAsynchronousModeSwitch	Boolean	0..1	attr	This attribute controls the behavior of the corresponding RPortPrototype with respect to the question whether it can deal with asynchronous mode switch requests, i.e. if set to true, the RPortPrototype is able to deal with an asynchronous mode switch request.

**Table A.598: ModeSwitchReceiverComSpec**

<b>Class</b>	<b>ModeSwitchSenderComSpec</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
<b>Note</b>	Communication attributes of PPortPrototypes with respect to mode communication			
<b>Base</b>	ARObject, <a href="#">PPortComSpec</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
enhancedModeApi	Boolean	0..1	attr	This controls the creation of the enhanced mode API that returns information about the previous mode and the next mode. If set to "true" the enhanced mode API is supposed to be generated. For more details please refer to the SWS_RTE.
modeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	0..1	ref	ModeDeclarationGroupPrototype (of the same Port Interface) to which these communication attributes apply.
modeSwitchedAck	<a href="#">ModeSwitchedAckRequest</a>	0..1	aggr	If this aggregation exists an acknowledgement for the successful processing of the mode switch request is required.
queueLength	PositiveInteger	0..1	attr	Length of call queue on the mode user side. The queue is implemented by the RTE. The value shall be greater or equal to 1. Setting the value of queueLength to 1 implies that incoming requests are rejected while another request that arrived earlier is being processed.

**Table A.599: ModeSwitchSenderComSpec**

<b>Class</b>	<b>ModeSwitchedAckEvent</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
<b>Note</b>	This event is raised when the referenced ModeSwitchPoint has been processed or an error occurred.			
<b>Base</b>	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
eventSource	<a href="#">ModeSwitchPoint</a>	0..1	ref	The referenced ModeSwitchPoint raises this Mode SwitchedAckEvent when the ModeSwitchPoint has been processed.

**Table A.600: ModeSwitchedAckEvent**

<b>Class</b>	<b>ModeSwitchedAckRequest</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
<b>Note</b>	Requests acknowledgements that a mode switch has been proceeded successfully			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
timeout	TimeValue	0..1	attr	Number of seconds before an error is reported or in case of allowed redundancy, the value is sent again.

**Table A.601: ModeSwitchedAckRequest**

<b>Class</b>	<b>ModeTransition</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
<b>Note</b>	This meta-class represents the ability to describe possible ModeTransitions in the context of a Mode DeclarationGroup.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
enteredMode	<a href="#">ModeDeclaration</a>	0..1	ref	This represents the entered model of the ModeTransition.
exitedMode	<a href="#">ModeDeclaration</a>	0..1	ref	This represents the exited mode of the ModeTransition

**Table A.602: ModeTransition**

<b>Class</b>	<b>MultilanguageReferrable</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::Identifiable			
<b>Note</b>	Instances of this class can be referred to by their identifier (while adhering to namespace borders). They also may have a longName. But they are not considered to contribute substantially to the overall structure of an AUTOSAR description. In particular it does not contain other Referrables.			
<b>Base</b>	ARObject, <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">Caption</a> , <a href="#">DefItem</a> , <a href="#">DocumentationContext</a> , <a href="#">Identifiable</a> , <a href="#">SdgCaption</a> , <a href="#">TraceReferrable</a> , <a href="#">Traceable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
longName	MultilanguageLong Name	0..1	aggr	This specifies the long name of the object. Long name is targeted to human readers and acts like a headline.

**Table A.603: MultilanguageReferrable**

<b>Class</b>	<b>MultiplexedIPdu</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	<p>A MultiplexedPdu (i.e. NOT a COM I-PDU) contains a DynamicPart, an optional StaticPart and a selector Field. In case of multiplexing this IPdu is routed between the Pdu Multiplexer and the Interface Layer.</p> <p>A multiplexer is used to define variable parts within an IPdu that may carry different signals. The receivers of such a IPdu can determine which signalPdus are transmitted by evaluating the selector field, which carries a unique selector code for each sub-part.</p> <p><b>Tags:</b>atp.recommendedPackage=Pdus</p>			
<b>Base</b>	ARObject, <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">IPdu</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Pdu</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	MultiplexedIPdu			
dynamicPart	<a href="#">DynamicPart</a>	0..1	aggr	<p>According to the value of the selector field some parts of the IPdu have a different layout. In a complete System Description a MultiplexedIPdu shall contain a Dynamic Part. The following use cases support the multiplicity to be 0..1:</p> <ul style="list-style-type: none"> <li>• If a MultiplexedIPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MultiplexedIPdu doesn't need to be described in the System Extract/Ecu Extract.</li> <li>• If a MultiplexedIPdu is received by an ECU which is only interested in the static part of the MultiplexedIPdu then the dynamicPart does not need to be described in the System Extract/Ecu Extract.</li> </ul> <p>atpVariation: Content of a multiplexed PDU can vary.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=postBuild</p>
selectorField ByteOrder	<a href="#">ByteOrderEnum</a>	0..1	attr	<p>This attribute defines the order of the bytes of the selector Field and the packing into the MultiplexedIPdu. Please consider that <a href="#">[constr_3247]</a> and <a href="#">[constr_3223]</a> are restricting the usage of this attribute.</p> <p>In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MultiplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.</p>
selectorField Length	Integer	0..1	attr	<p>The size in bits of the selector field shall be configurable in a range of 1-16 bits. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MultiplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.</p>
selectorField StartPosition	Integer	0..1	attr	<p>This parameter is necessary to describe the position of the selector field within the IPdu.</p> <p>Note that the absolute position of the selectorField in the MultiplexedIPdu is determined by the definition of the selectorFieldByteOrder attribute of the Multiplexed Pdu. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.</p> <p>In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MultiplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.</p>





Class	MultiplexedIPdu			
staticPart	<a href="#">StaticPart</a>	0..1	aggr	The static part of the multiplexed IPdu is the same regardless of the selector field. The static part is optional. atpVariation: Content of a multiplexed PDU can vary. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
triggerMode	TriggerMode	0..1	attr	IPduM can be configured to send a transmission request for the new multiplexed IPdu to the PDU-Router because of the trigger conditions/ modes that are described in the TriggerMode enumeration.  In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MultiplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.
unusedBit Pattern	Integer	0..1	attr	AUTOSAR COM and AUTOSAR IPDUM are filling not used areas of an IPdu with this bit-pattern. This attribute is mandatory to avoid undefined behavior. This byte-pattern will be repeated throughout the IPdu.  In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MultiplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.

**Table A.604: MultiplexedIPdu**

Class	NPdu			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	This is a Pdu of the Transport Layer. The main purpose of the TP Layer is to segment and reassemble IPdus. <b>Tags:</b> atp.recommendedPackage=Pdus			
Base	<a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">IPdu</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Pdu</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
—	—	—	—	—

**Table A.605: NPdu**

Class	NetworkEndpoint			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	The network endpoint defines the network addressing (e.g. IP-Address or MAC multicast address).			
Base	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
fullyQualified DomainName	String	0..1	attr	Defines the fully qualified domain name (FQDN) e.g. some.example.host.
infrastructure Services	InfrastructureServices	0..1	aggr	Defines the network infrastructure services provided or consumed.





Class	NetworkEndpoint			
ipSecConfig	IPSecConfig	0..1	aggr	Optional IPSec configuration that provides security services for IP packets.
network Endpoint Address	NetworkEndpoint Address	1..*	aggr	Definition of a Network Address. <b>Tags:</b> xml.name Plural=NETWORK-ENDPOINT-ADDRESSES
priority	PositiveInteger	0..1	attr	Defines the frame priority where values from 0 (best effort) to 7 (highest) are allowed.

**Table A.606: NetworkEndpoint**

Class	NetworkSegmentIdentification			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
Note	This meta-class represents the ability to identify the PhysicalChannel on a system scope in a numerical way. One possible application of this approach is the Time Validation.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
network SegmentId	PositiveInteger	0..1	attr	This attribute represents the numerical identifier of a PhysicalChannel on system level scope.

**Table A.607: NetworkSegmentIdentification**

Class	NmCluster (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Set of NM nodes coordinated with use of the NM algorithm.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">CanNmCluster</a> , <a href="#">FlexrayNmCluster</a> , <a href="#">J1939NmCluster</a> , <a href="#">UdpNmCluster</a>			
Attribute	Type	Mult.	Kind	Note
communication Cluster	<a href="#">CommunicationCluster</a>	0..1	ref	Association to a CommunicationCluster in the topology description.
nmChannel SleepMaster	Boolean	0..1	attr	This parameter shall be set to indicate if the sleep of this network can be absolutely decided by the local node only and that no other nodes can oppose that decision.
nmNode	<a href="#">NmNode</a>	*	aggr	Collection of NmNodes of the NmCluster. atpVariation: Derived, because NmNode can be variable. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
nmNode Detection Enabled	Boolean	0..1	attr	Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true.
nmNodeId Enabled	Boolean	0..1	attr	Enables the source node identifier.
nmPnc Participation	Boolean	0..1	attr	Defines whether this NmCluster contributes to the partial network mechanism.
nmRepeatMsg IndEnabled	Boolean	0..1	attr	Switch for enabling the Repeat Message Bit Indication.
nm Synchronizing Network	Boolean	0..1	attr	If this parameter is true, then this network is a synchronizing network for the NM coordination cluster which it belongs to. The network is expected to call Nm_SynchronizationPoint() at regular intervals.





Class	NmCluster (abstract)			
pncCluster VectorLength	PositiveInteger	0..1	attr	<p>Optionally defines the length of the PNC Vector per CommunicationCluster (and VLAN in case of UdpNm). If not defined then System.pncVectorLength applies.</p> <p>Should only make the PNC Vector shorter (or same length as defined in System.pncVectorLength).</p> <p><b>Tags:</b>atp.Status=draft</p>

Table A.608: NmCluster

Class	NmConfig			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	<p>Contains the all configuration elements for AUTOSAR Nm.</p> <p><b>Tags:</b>atp.recommendedPackage=NmConfigs</p>			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mult.	Kind	Note
nmCluster	NmCluster	*	aggr	<p>Collection of NM Clusters</p> <p>atpVariation: Derived, because cluster can be variable.</p> <p><b>Stereotypes:</b> atpSplittable; atpVariation</p> <p><b>Tags:</b> atp.Splitkey=nmCluster.shortName, nmCluster.variationPoint.shortLabel vh.latestBindingTime=postBuild</p>
nmClusterCoupling	NmClusterCoupling	*	aggr	<p>Collection of NmClusterCouplings</p> <p>atpVariation: Derived, because NmCluster can vary.</p> <p><b>Stereotypes:</b> atpSplittable; atpVariation</p> <p><b>Tags:</b> atp.Splitkey=nmClusterCoupling, nmClusterCoupling.variationPoint.shortLabel vh.latestBindingTime=postBuild</p>
nmIfEcu	NmEcu	*	aggr	<p>Collection of NM ECUs</p> <p>atpVariation: Derived, because EcuInstance can be variable.</p> <p><b>Stereotypes:</b> atpSplittable; atpVariation</p> <p><b>Tags:</b> atp.Splitkey=nmIfEcu.shortName, nmIfEcu.variationPoint.shortLabel vh.latestBindingTime=preCompileTime</p>

Table A.609: NmConfig

Class	NmEcu			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	ECU on which NM is running.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mult.	Kind	Note
busDependentNmEcu	BusspecificNmEcu	*	aggr	Cluster specific NmEcu attributes
ecuInstance	EcuInstance	1	ref	Association to an ECUInstance in the topology description.







Class	NmEcu			
nmBusSynchronizationEnabled	Boolean	0..1	attr	Enables bus synchronization support.
nmComControlEnabled	Boolean	0..1	attr	Enables the Communication Control support.
nmCoordinator	NmCoordinator	0..1	aggr	Nm ECU may coordinate different clusters.
nmCycleTimeMainFunction	TimeValue	0..1	attr	The period between successive calls to the Main Function of the NM Interface in seconds.
nmPduRxIndicationEnabled	Boolean	0..1	attr	Switch for enabling the PDU Rx Indication.
nmRemoteSleepIndEnabled	Boolean	0..1	attr	Switch for enabling remote sleep indication support.
nmStateChangeIndEnabled	Boolean	0..1	attr	Enables the CAN Network Management state change notification.
nmUserDataEnabled	Boolean	0..1	attr	Switch for enabling user data support.

**Table A.610: NmEcu**

Class	NmNode (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	The linking of NmEcus to NmClusters is realized via the NmNodes.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	CanNmNode, FlexrayNmNode, <a href="#">J1939NmNode</a> , <a href="#">UdpNmNode</a>			
Attribute	Type	Mult.	Kind	Note
controller	<a href="#">CommunicationController</a>	0..1	ref	Association to an CommunicationController in the topology description.
nmCoordCluster	PositiveInteger	0..1	attr	NmCoordinationCluster identification number.
nmCoordinatorRole	NmCoordinatorRole Enum	0..1	attr	This attribute indicates the role the NM Coordinator will have on this channel.
nmIfEcu	<a href="#">NmEcu</a>	0..1	ref	Reference to the NmEcu that contains this NmNode. (CommunicationController that is referenced by the Nm Node shall be contained in the EcuInstance that is referenced by the NmEcu).
nmNodeid	Integer	0..1	attr	Node identifier of local NmNode. Shall be unique in the NmCluster.
nmPassiveModeEnabled	Boolean	0..1	attr	Enables support of the Passive Mode. The passive mode is configurable per channel.
rxNmPdu	<a href="#">NmPdu</a>	*	ref	receive NM Pdu.
txNmPdu	<a href="#">NmPdu</a>	*	ref	transmit NM Pdu

**Table A.611: NmNode**

Class	NmPdu
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Network Management Pdu Tags:atp.recommendedPackage=Pdus





<b>Class</b>	<b>NmPdu</b>			
<b>Base</b>	<i>ARObject</i> , <i>CollectableElement</i> , <i>FibexElement</i> , <i>Identifiable</i> , <i>MultilanguageReferrable</i> , <i>PackageableElement</i> , <i>Pdu</i> , <i>Referrable</i>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
iSignalToIPdu Mapping	<a href="#">ISignalToIPduMapping</a>	*	aggr	This optional aggregation is used to describe NmUser Data that is transmitted in the NmPdu. The counting of the startPosition starts at the beginning of the NmPdu regardless whether Cbv or Nid are used.
nmData Information	Boolean	0..1	attr	Defines if the Pdu contains NM Data. If the NmPdu does not aggregate any ISignalToIPduMappings it still may contain UserData that is set via Nm_SetUserData(). If the ISignalToIPduMapping exists then the nmDataInformation attribute shall be ignored.
nmVote Information	Boolean	0..1	attr	Defines if the Pdu contains NM Vote information.
unusedBit Pattern	Integer	0..1	attr	AUTOSAR COM is filling not used areas of an Pdu with this bit-pattern. This attribute can only be used if the nmDataInformation attribute is set to true.

**Table A.612: NmPdu**

<b>Class</b>	<b>NonqueuedReceiverComSpec</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
<b>Note</b>	Communication attributes specific to non-queued receiving.			
<b>Base</b>	<i>ARObject</i> , <a href="#">RPortComSpec</a> , <a href="#">ReceiverComSpec</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
aliveTimeout	TimeValue	0..1	attr	Specify the amount of time (in seconds) after which the software component (via the RTE) needs to be notified if the corresponding data item have not been received according to the specified timing description.  If the aliveTimeout attribute is 0 no timeout monitoring shall be performed.
enableUpdate	Boolean	0..1	attr	This attribute controls whether application code is entitled to check whether the value of the corresponding VariableDataPrototype has been updated.
filter	<a href="#">DataFilter</a>	0..1	aggr	The applicable filter algorithm for filtering the value of the corresponding dataElement.
handleData Status	Boolean	0..1	attr	If this attribute is set to true, then the Rte_IStatus API shall exist. If the attribute does not exist or is set to false, then the Rte_IStatus API may still exist in response to the existence of further conditions.
handleNever Received	Boolean	0..1	attr	This attribute specifies whether for the corresponding VariableDataPrototype the "never received" flag is available. If yes, the RTE is supposed to assume that initially the VariableDataPrototype has not been received before. After the first reception of the corresponding VariableDataPrototype the flag is cleared. <ul style="list-style-type: none"> <li>• If the value of this attribute is set to "true" the flag is required.</li> <li>• If set to "false", the RTE shall not support the "never received" functionality for the corresponding VariableDataPrototype.</li> </ul>
handleTimeout Type	HandleTimeoutEnum	0..1	attr	This attribute controls the behavior with respect to the handling of timeouts.





Class	NonqueuedReceiverComSpec			
initValue	<a href="#">ValueSpecification</a>	0..1	aggr	Initial value to be used in case the sending component is not yet initialized. If the sender also specifies an initial value, then the receiver's value will be used.
timeout Substitution Value	<a href="#">ValueSpecification</a>	0..1	aggr	This attribute represents the substitution value applicable in the case of a timeout.

**Table A.613: NonqueuedReceiverComSpec**

Class	NonqueuedSenderComSpec			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Communication attributes for non-queued sender/receiver communication (sender side)			
Base	<a href="#">ARObject</a> , <a href="#">PPortComSpec</a> , <a href="#">SenderComSpec</a>			
Attribute	Type	Mult.	Kind	Note
dataFilter	<a href="#">DataFilter</a>	0..1	aggr	The applicable filter algorithm for filtering the value of the corresponding dataElement.
initValue	<a href="#">ValueSpecification</a>	0..1	aggr	Initial value to be sent if sender component is not yet fully initialized, but receiver needs data already.

**Table A.614: NonqueuedSenderComSpec**

Class	NotAvailableValueSpecification			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	<p>This meta-class provides the ability to specify a ValueSpecification to state that the respective element is not available. This ability is needed to support the existence of ApplicationRecordElements where attribute isOptional ist set to the value True.</p> <p><b>Tags:</b>atp.Status=draft</p>			
Base	<a href="#">ARObject</a> , <a href="#">ValueSpecification</a>			
Attribute	Type	Mult.	Kind	Note
defaultPattern	PositiveInteger	0..1	attr	The content of this attribute shall be used to initialize gaps in the memory occupied by a structured data type in the case that an NotAvailableValueSpecification is used. Note that this pattern is only applied during initialization!

**Table A.615: NotAvailableValueSpecification**

Primitive	Numerical			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes			
Note	<p>This primitive specifies a numerical value. It can be denoted in different formats such as Decimal, Octal, Hexadecimal, Float. See the xsd pattern for details.</p> <p>The value can be expressed in octal, hexadecimal, binary representation. Negative numbers can only be expressed in decimal or float notation.</p> <p><b>Tags:</b>  xml.xsd.customType=NUMERICAL-VALUE  xml.xsd.pattern=(0[xX][0-9a-fA-F]+) (0[0-7]+) (0[bB][0-1]+) (([\+-]?[1-9][0-9]+ \\.[0-9]+)? [\+-]?[0-9](\\.[0-9]+)?)([eE]([\+-]?[0-9]+)? \\.0 INF -INF NaN  xml.xsd.type=string</p>			

**Table A.616: Numerical**

<b>Class</b>	<b>NumericalOrText</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Constants			
<b>Note</b>	This meta-class represents the ability to yield either a numerical or a string. A typical use case is that two or more instances of this meta-class are aggregated with a VariationPoint where some instances yield strings while other instances yield numerical depending on the resolution of the binding expression.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
vf	Numerical	0..1	attr	This attribute represents the ability to provide a numerical value. The latest binding time of the VariationPoint shall be preCompileTime. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=10
vt	String	0..1	attr	This attribute represents the ability to provide a textual value. <b>Tags:</b> xml.sequenceOffset=20

**Table A.617: NumericalOrText**

<b>Class</b>	<b>NumericalRuleBasedValueSpecification</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Constants			
<b>Note</b>	This meta-class is used to support a rule-based initialization approach for data types with an array-nature (ImplementationDataType of category ARRAY).			
<b>Base</b>	ARObject, <a href="#">AbstractRuleBasedValueSpecification</a> , <a href="#">ValueSpecification</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
ruleBasedValues	RuleBasedValueSpecification	0..1	aggr	This represents the rule based value specification for the array. <b>Tags:</b> xml.roleElement=true xml.roleWrapperElement=false xml.typeWrapperElement=false

**Table A.618: NumericalRuleBasedValueSpecification**

<b>Class</b>	<b>NumericalValueSpecification</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Constants			
<b>Note</b>	A numerical ValueSpecification which is intended to be assigned to a Primitive data element. Note that the numerical value is a variant, it can be computed by a formula.			
<b>Base</b>	ARObject, <a href="#">ValueSpecification</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
value	Numerical	0..1	attr	This is the value itself. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.619: NumericalValueSpecification**

<b>Class</b>	<b>NvBlockDataMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::NvBlockComponent			





Class	NvBlockDataMapping			
Note	<p>Defines the mapping between the VariableDataPrototypes in the NvBlockComponents ports and the VariableDataPrototypes of the RAM Block.</p> <p>The data types of the referenced VariableDataPrototypes in the ports and the referenced sub-element (inside a CompositeDataType) of the VariableDataPrototype representing the RAM Block shall be compatible.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
bitfieldTextTableMaskNvBlockDescriptor	PositiveInteger	0..1	attr	This attribute identifies the applicable bit mask on the side of the Nv Block.
bitfieldTextTableMaskPortPrototype	PositiveInteger	0..1	attr	This attribute identifies the applicable bit mask on the side of the PortPrototype.
nvRamBlockElement	<a href="#">AutosarVariableRef</a>	0..1	aggr	Reference to a VariableDataPrototype of a RAM Block.
readNvData	<a href="#">AutosarVariableRef</a>	0..1	aggr	Reference to a VariableDataPrototype of a pPort of the NvBlockComponent providing read access to the RAM Block. If there is no PortPrototype providing read access (write-only) the reference can be omitted.
writtenNvData	<a href="#">AutosarVariableRef</a>	0..1	aggr	Reference to a VariableDataPrototype of a rPort of the NvBlockComponent providing write access to the RAM Block. If there is no port providing write access (read-only) the reference can be omitted.
writtenReadNvData	<a href="#">AutosarVariableRef</a>	0..1	aggr	Reference to a VariableDataPrototype of a PRPort Prototype of the NvBlockSwComponentType providing write and read access to the RAM Block.

**Table A.620: NvBlockDataMapping**

Class	NvBlockDescriptor			
Package	M2::AUTOSARTemplates::SWComponentTemplate::NvBlockComponent			
Note	Specifies the properties of exactly on NVRAM Block.			
Base	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
clientServerPort	<a href="#">RoleBasedPortAssignment</a>	*	aggr	<p>The RoleBasedPortAssignment defines which client server port of the NvBlockSwComponentType serves for which kind of service or notification. In case of notifications one common callback function is provided by the RTE for each individual kind of notification defined by the "role".</p> <p>The aggregation of RoleBasedPortAssignment is subject to variability with the purpose to support the conditional existence of ports.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>
constantValueMapping	ConstantSpecificationMappingSet	*	ref	<p>Reference to the ConstantSpecificationMapping to be applied for the particular NVRAM Block</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b> atp.Splitkey=constantValueMapping</p>





Class	NvBlockDescriptor			
dataTypeMapping	<a href="#">DataTypeMappingSet</a>	*	ref	Reference to the DataTypeMapping to be applied for the particular NVRAM Block. <b>Stereotypes:</b> atpSplittable <b>Tags:</b> atp.Splitkey=dataTypeMapping
instantiationDataDefProps	<a href="#">InstantiationDataDefProps</a>	*	aggr	The purpose of InstantiationDataDefProps are the refinement of some data def properties of individual instantiations within the context of a NvBlockSw ComponentType.  The aggregation of InstantiationDataDefProps is subject to variability with the purpose to support the conditional existence of ports, component internal memory objects and those attributes. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
modeSwitchEventTriggeredActivity	<a href="#">ModeSwitchEventTriggeredActivity</a>	*	aggr	This represents the collection of ModeSwitchEventTriggeredActivities related to the enclosing NvBlockDescriptor. <b>Stereotypes:</b> atpSplittable; atpVariation <b>Tags:</b> atp.Splitkey=modeSwitchEventTriggeredActivity, modeSwitchEventTriggeredActivity.variationPoint.shortLabel vh.latestBindingTime=preCompileTime
nvBlockDataMapping	<a href="#">NvBlockDataMapping</a>	*	aggr	Defines the mapping between the VariableData Prototypes in the NvBlockComponents ports and the VariableDataPrototypes of the RAM Block.  The aggregation of NvBlockDataMapping is subject to variability with the purpose to support the conditional existence of nv data ports. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
nvBlockNeeds	<a href="#">NvBlockNeeds</a>	0..1	aggr	Specifies the abstract needs on the configuration of the NVRAM Manager for the single NVRAM Block described by this NvBlockDescriptor.  In addition, it may define requirements for writing strategies in an implementation of an NvBlockSw ComponentType by the RTE.  Please note that the attributes nDataSets and nRom Blocks are not relevant for this aggregation because the RTE will allocate just one block anyway. In a different context, however, they do make sense.
ramBlock	<a href="#">VariableDataPrototype</a>	0..1	aggr	Defines the RAM Block of the NVRAM Block provided by NvBlockSwComponentType.
romBlock	<a href="#">ParameterDataPrototype</a>	0..1	aggr	Defines the ROM Block of the NVRAM Block provided by NvBlockSwComponentType.
supportDirtyFlag	Boolean	0..1	attr	Specifies whether calling of NvM functions for writing and/or status control of potentially modified RAM Blocks to NV memory shall be controlled by the RTE.
timingEvent	<a href="#">TimingEvent</a>	0..1	ref	this reference can be taken to identify the TimingEvent to be used by the RTE for implementing a cyclic writing strategy for this block
writingStrategy	<a href="#">RoleBasedDataAssignment</a>	*	aggr	This attribute allows for assigning a specific writing strategy for an incoming AutosarDataPrototype.

**Table A.621: NvBlockDescriptor**

<b>Class</b>	<b>NvBlockNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	Specifies the abstract needs on the configuration of a single NVRAM Block.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
calcRamBlockCrc	Boolean	0..1	attr	Defines if CRC (re)calculation for the permanent RAM Block is required.
checkStaticBlockId	Boolean	0..1	attr	Defines if the Static Block Id check shall be enabled.
cyclicWritingPeriod	TimeValue	0..1	attr	This represents the period for cyclic writing of NvData to store the associated RAM Block.
nDataSets	PositiveInteger	0..1	attr	Number of data sets to be provided by the NVRAM manager for this block. This is the total number of ROM Blocks and RAM Blocks.
nRomBlocks	PositiveInteger	0..1	attr	Number of ROM Blocks to be provided by the NVRAM manager for this block. Please note that these multiple ROM Blocks are given in a contiguous area.
ramBlockStatusControl	RamBlockStatusControlEnum	0..1	attr	This attribute defines how the management of the RAM Block status is controlled.
readonly	Boolean	0..1	attr	True: data of this NVRAM Block are write protected for normal operation (but protection can be disabled) false: no restriction
reliability	<a href="#">NvBlockNeedsReliabilityEnum</a>	0..1	attr	Reliability against data loss on the non-volatile medium.
resistantToChangedSw	Boolean	0..1	attr	Defines whether an NVRAM Block shall be treated resistant to configuration changes (true) or not (false). For details how to handle initialization in the latter case, please refer to the NVRAM specification.
restoreAtStart	Boolean	0..1	attr	Defines whether the associated RAM Block shall be implicitly restored during startup by the basic software.
selectBlockForFirstInitAll	Boolean	0..1	attr	If this attribute is set to true the NvM shall process this block in the NvM_FirstInitAll() function.
storeAtShutdown	Boolean	0..1	attr	Defines whether or not the associated RAM Block shall be implicitly stored during shutdown by the basic software.
storeCyclic	Boolean	0..1	attr	Defines whether or not the associated RAM Block shall be implicitly stored periodically by the basic software.
storeEmergency	Boolean	0..1	attr	Defines whether or not the associated RAM Block shall be implicitly stored in case of ECU failure (e.g. loss of power) by the basic software. If the attribute storeEmergency is set to true the associated RAM Block shall be configured to have immediate priority.
storeImmediate	Boolean	0..1	attr	Defines whether or not the associated RAM Block shall be implicitly stored immediately during or after execution of the according SW-C RunnableEntity by the basic software.
storeOnChange	Boolean	0..1	attr	This attribute defines whether the associated RAM Block shall be stored immediately if the written value is different to the value stored in the associated RAM Block(s) during or after execution of the according SW-C RunnableEntity.
useAutoValidationAtShutDown	Boolean	0..1	attr	If set to true the RAM Block shall be auto validated during shutdown phase.
useCRCCompMechanism	Boolean	0..1	attr	If set to true the CRC of the RAM Block shall be compared during a write job with the CRC which was calculated during the last successful read or write job in order to skip unnecessary NVRAM writings.





Class	NvBlockNeeds			
writeOnlyOnce	Boolean	0..1	attr	Defines write protection after first write:  true: This block is prevented from being changed/erased or being replaced with the default ROM data after first initialization by the software-component.  false: No such restriction.
writeVerification	Boolean	0..1	attr	Defines if Write Verification shall be enabled for this NVRAM Block.
writingFrequency	PositiveInteger	0..1	attr	Provides the amount of updates to this block from the application point of view. It has to be provided in "number of write access per year".
writingPriority	NvBlockNeedsWritingPriorityEnum	0..1	attr	Requires the priority of writing this block in case of concurrent requests to write other blocks.

Table A.622: NvBlockNeeds

Enumeration	NvBlockNeedsReliabilityEnum
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds
Note	Reliability against data loss on the non-volatile medium. These requirements give only a relative indication, for example on the required degree of redundancy for storage.  They do, however, not specify by which means (e.g. software or hardware) the reliability is actually achieved.
Literal	Description
errorCorrection	Errors shall be corrected <b>Tags:</b> atp.EnumerationLiteralIndex=0
errorDetection	Errors shall be detected <b>Tags:</b> atp.EnumerationLiteralIndex=1
noProtection	Data need not to be handled with protection <b>Tags:</b> atp.EnumerationLiteralIndex=2

Table A.623: NvBlockNeedsReliabilityEnum

Class	NvBlockSwComponentType			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	The NvBlockSwComponentType defines non volatile data which data can be shared between Sw ComponentPrototypes. The non volatile data of the NvBlockSwComponentType are accessible via provided and required ports. <b>Tags:</b> atp.recommendedPackage=SwComponentTypes			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtomicSwComponentType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
Attribute	Type	Mult.	Kind	Note
bulkNvDataDescriptor	<a href="#">BulkNvDataDescriptor</a>	*	aggr	This aggregation formally defines the bulk Nv Blocks that are provided to the application software by the enclosing NvBlockSwComponentType.  <b>Stereotypes:</b> atp.Splitable; atp.Variation <b>Tags:</b> atp.Splitkey=bulkNvDataDescriptor.shortName, bulkNvDataDescriptor.variationPoint.shortLabel vh.latestBindingTime=preCompileTime







Class	NvBlockSwComponentType			
nvBlockDescriptor	<a href="#">NvBlockDescriptor</a>	*	aggr	<p>Specification of the properties of exactly one NVRAM Block.</p> <p><b>Stereotypes:</b> atpSplittable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=nvBlockDescriptor.shortName, nvBlockDescriptor.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>

Table A.624: NvBlockSwComponentType

Class	NvDataInterface			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	<p>A non volatile data interface declares a number of VariableDataPrototypes to be exchanged between non volatile block components and atomic software components.</p> <p><b>Tags:</b>atp.recommendedPackage=PortInterfaces</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">DataInterface</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">PortInterface</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
nvData	<a href="#">VariableDataPrototype</a>	*	aggr	The VariableDataPrototype of this nv data interface.

Table A.625: NvDataInterface

Class	NvDataPortAnnotation			
Package	M2::AUTOSARTemplates::SWComponentTemplate::ApplicationAttributes			
Note	Annotation to a port regarding a certain VariableDataPrototype.			
Base	<a href="#">ARObject</a> , <a href="#">GeneralAnnotation</a>			
Attribute	Type	Mult.	Kind	Note
variable	<a href="#">VariableDataPrototype</a>	0..1	ref	The instance of nv data annotated.

Table A.626: NvDataPortAnnotation

Class	NvProvideComSpec			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Communication attributes of PPortPrototypes with respect to Nv data communication on the provided side.			
Base	<a href="#">ARObject</a> , <a href="#">PPortComSpec</a>			
Attribute	Type	Mult.	Kind	Note
ramBlockInit Value	<a href="#">ValueSpecification</a>	0..1	aggr	This represents the initial value of the RAM Block that corresponds to the referenced variable.
romBlockInit Value	<a href="#">ValueSpecification</a>	0..1	aggr	This represents the initial value of the ROM block that corresponds to the referenced variable.
variable	<a href="#">VariableDataPrototype</a>	0..1	ref	This represents the variable for which the ComSpec is specified.

Table A.627: NvProvideComSpec

<b>Class</b>	<b>NvRequireComSpec</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
<b>Note</b>	Communication attributes of RPortPrototypes with respect to Nv data communication on the required side.			
<b>Base</b>	ARObject, <a href="#">RPortComSpec</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
initValue	<a href="#">ValueSpecification</a>	0..1	aggr	The initial value owned by the NvComSpec
variable	<a href="#">VariableDataPrototype</a>	0..1	ref	The VariableDataPrototype the ComSpec applies for.

**Table A.628: NvRequireComSpec**

<b>Class</b>	<b>ObdControlServiceNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	Specifies the abstract needs of a component or module on the configuration of OBD Service 08 (request control of on-board system) in relation to a particular test-Identifier (TID) supported by this component or module.			
<b>Base</b>	ARObject, <a href="#">DiagnosticCapabilityElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.629: ObdControlServiceNeeds**

<b>Class</b>	<b>ObdInfoServiceNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	Specifies the abstract needs of a component or module on the configuration of OBD Services in relation to a given InfoType (OBD Service 09) which is supported by this component or module.			
<b>Base</b>	ARObject, <a href="#">DiagnosticCapabilityElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.630: ObdInfoServiceNeeds**

<b>Class</b>	<b>ObdPidServiceNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	<p>Specifies the abstract needs of a component or module on the configuration of OBD Services in relation to a particular PID (parameter identifier) which is supported by this component or module.</p> <p>In case of using a client/server communicated value, the related value shall be communicated via the port referenced by assignedPort. The details of this communication (e.g. appropriate naming conventions) are specified in the related software specifications (SWS).</p>			
<b>Base</b>	ARObject, <a href="#">DiagnosticCapabilityElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.631: ObdPidServiceNeeds**

<b>Enumeration</b>	<b>ObdRatioConnectionKindEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds
<b>Note</b>	Defines the way how the IUMPR service connection between the Dem and the client component or module is handled (for details see the DEM Specification).
<b>Literal</b>	<b>Description</b>
apiUse	The IUMPR service (of the DEM) uses an explicit API to connect to the component or module. <b>Tags:</b> atp.EnumerationLiteralIndex=0
observer	The IUMPR service (of the DEM) uses no API but "observes" the associated diagnostic event. <b>Tags:</b> atp.EnumerationLiteralIndex=1

**Table A.632: ObdRatioConnectionKindEnum**

<b>Class</b>	<b>ObdRatioServiceNeeds</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	Specifies the abstract needs of a component or module on the configuration of OBD Services in relation to a particular "ratio monitoring" which is supported by this component or module.			
<b>Base</b>	<i>ARObject</i> , <i>DiagnosticCapabilityElement</i> , <i>Identifiable</i> , <i>MultilanguageReferrable</i> , <i>Referrable</i> , <i>Service Needs</i>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
connectionType	<a href="#">ObdRatioConnectionKindEnum</a>	0..1	attr	Defines how the DEM is connected to the component or module to perform the IUMPR (In use monitor performance ratio) service.
rateBasedMonitoredEvent	<a href="#">DiagnosticEventNeeds</a>	0..1	ref	The rate based monitored Diagnostic Event.
usedFid	<a href="#">FunctionInhibitionNeeds</a>	0..1	ref	This represents the primary Function Inhibition Identifier used for the rate based monitor. This is an optional attribute.

**Table A.633: ObdRatioServiceNeeds**

<b>Class</b>	<b>OperationInSystemInstanceRef</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::InstanceRefs			
<b>Note</b>				
<b>Base</b>	<i>ARObject</i> , <i>AtpInstanceRef</i>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
base	<a href="#">System</a>	0..1	ref	<b>Stereotypes:</b> atpDerived <b>Tags:</b> xml.sequenceOffset=10
contextComponent (ordered)	<a href="#">SwComponentPrototype</a>	*	ref	<b>Tags:</b> xml.sequenceOffset=30
contextComposition	<a href="#">RootSwCompositionPrototype</a>	0..1	ref	<b>Tags:</b> xml.sequenceOffset=20
contextPort	<a href="#">PortPrototype</a>	1	ref	<b>Tags:</b> xml.sequenceOffset=40
targetOperation	<a href="#">ClientServerOperation</a>	1	ref	<b>Tags:</b> xml.sequenceOffset=50

**Table A.634: OperationInSystemInstanceRef**

<b>Class</b>	<b>OperationInvokedEvent</b>
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents





Class	OperationInvokedEvent			
Note	This event is raised when the ClientServerOperation referenced in OperationInvokedEvent.operation shall be invoked.			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
operation	<a href="#">ClientServerOperation</a>	0..1	iref	This represents the ClientServerOperation which shall be invoked.  <b>InstanceRef implemented by:</b> POperationInAtomicSwc InstanceRef

**Table A.635: OperationInvokedEvent**

Class	OsTaskExecutionEvent			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	This RTEEvent is supposed to execute RunnableEntities which have to react on the execution of specific OsTasks. Therefore, this event is unconditionally raised whenever the OsTask on which it is mapped is executed. The main use case for this event is scheduling of Runnables of Complex Drivers which have to react on task executions.  <b>Tags:</b> atp.Status=draft			
Base	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.636: OsTaskExecutionEvent**

Class	PPortComSpec (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Communication attributes of a provided PortPrototype. This class will contain attributes that are valid for all kinds of provide ports, independent of client-server or sender-receiver communication patterns.			
Base	ARObject			
Subclasses	<a href="#">ModeSwitchSenderComSpec</a> , <a href="#">NvProvideComSpec</a> , <a href="#">ParameterProvideComSpec</a> , <a href="#">SenderComSpec</a> , <a href="#">ServerComSpec</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.637: PPortComSpec**

Class	PPortPrototype			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	Component port providing a certain port interface.			
Base	ARObject, <a href="#">AbstractProvidedPortPrototype</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpFeature</a> , <a href="#">AtpPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PortPrototype</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
provided Interface	<a href="#">PortInterface</a>	0..1	tref	The interface that this port provides.  <b>Stereotypes:</b> isOfType

**Table A.638: PPortPrototype**

<b>Class</b>	<b>PRPortPrototype</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Components			
<b>Note</b>	This kind of PortPrototype can take the role of both a required and a provided PortPrototype.			
<b>Base</b>	ARObject, <a href="#">AbstractProvidedPortPrototype</a> , <a href="#">AbstractRequiredPortPrototype</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpFeature</a> , <a href="#">AtpPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PortPrototype</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
provided Required Interface	<a href="#">PortInterface</a>	0..1	tref	This represents the PortInterface used to type the PRPort Prototype <b>Stereotypes:</b> isOfType

**Table A.639: PRPortPrototype**

<b>Class</b>	<b>PackageableElement</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::ARPackage			
<b>Note</b>	This meta-class specifies the ability to be a member of an AUTOSAR package.			
<b>Base</b>	ARObject, <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">ARElement</a> , <a href="#">EnumerationMappingTable</a> , <a href="#">FibexElement</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.640: PackageableElement**

<b>Class</b>	<b>ParameterAccess</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::DataElements			
<b>Note</b>	The presence of a ParameterAccess implies that a RunnableEntity needs access to a ParameterData Prototype.			
<b>Base</b>	ARObject, <a href="#">AbstractAccessPoint</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
accessed Parameter	<a href="#">AutosarParameterRef</a>	0..1	aggr	Reference to the accessed calibration parameter.
swDataDef Props	<a href="#">SwDataDefProps</a>	0..1	aggr	This allows denote instance and access specific properties, mainly input values and common axis.

**Table A.641: ParameterAccess**

<b>Class</b>	<b>ParameterDataPrototype</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
<b>Note</b>	A parameter element used for parameter interface and internal behavior, supporting signal like parameter and characteristic value communication patterns and parameter and characteristic value definition.			
<b>Base</b>	ARObject, <a href="#">AtpFeature</a> , <a href="#">AtpPrototype</a> , <a href="#">AutosarDataPrototype</a> , <a href="#">DataPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
initValue	<a href="#">ValueSpecification</a>	0..1	aggr	Specifies initial value(s) of the ParameterDataPrototype

**Table A.642: ParameterDataPrototype**

Class	ParameterInAtomicSWCTypeInstanceRef			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::DataElements::InstanceRefs Usage			
Note	This class implements an instance reference which can be applied for variables as well as for parameters.			
Base	ARObject, <a href="#">AtpInstanceRef</a>			
Attribute	Type	Mult.	Kind	Note
base	<a href="#">AtomicSwComponentType</a>	0..1	ref	<b>Stereotypes:</b> atpDerived <b>Tags:</b> xml.sequenceOffset=10
contextData Prototype (ordered)	<a href="#">ApplicationCompositeElementDataPrototype</a>	*	ref	This is the context in a compositeDataType. <b>Tags:</b> xml.sequenceOffset=40
portPrototype	<a href="#">PortPrototype</a>	0..1	ref	This is the port providing the variable or the entry point to the variable structure. <b>Tags:</b> xml.sequenceOffset=20
rootParameter DataPrototype	<a href="#">DataPrototype</a>	0..1	ref	This represents the entry point for references into a CompositeDataType. <b>Tags:</b> xml.sequenceOffset=30
targetData Prototype	<a href="#">DataPrototype</a>	0..1	ref	This is the target parameter element. Note that this must be nested in ParameterDataPrototype. The target must be one of ParameterDataPrototype, ApplicationCompositeElementDataPrototype. <b>Tags:</b> xml.sequenceOffset=50

**Table A.643: ParameterInAtomicSWCTypeInstanceRef**

Class	ParameterInterface			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	A parameter interface declares a number of parameter and characteristic values to be exchanged between parameter components and software components. <b>Tags:</b> atp.recommendedPackage=PortInterfaces			
Base	<a href="#">ARElement</a> , ARObject, <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">DataInterface</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">PortInterface</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
parameter	<a href="#">ParameterDataPrototype</a>	*	aggr	The ParameterDataPrototype of this ParameterInterface.

**Table A.644: ParameterInterface**

Class	ParameterPortAnnotation			
Package	M2::AUTOSARTemplates::SWComponentTemplate::ApplicationAttributes			
Note	Annotation to a port used for calibration regarding a certain ParameterDataPrototype.			
Base	ARObject, GeneralAnnotation			
Attribute	Type	Mult.	Kind	Note
parameter	<a href="#">ParameterDataPrototype</a>	0..1	ref	The instance of annotated ParameterDataPrototype.

**Table A.645: ParameterPortAnnotation**

<b>Class</b>	<b>ParameterProvideComSpec</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
<b>Note</b>	"Communication" specification that applies to parameters on the provided side of a connection.			
<b>Base</b>	ARObject, <a href="#">PPortComSpec</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
initValue	<a href="#">ValueSpecification</a>	0..1	aggr	The initial value applicable for the corresponding ParameterDataPrototype.
parameter	<a href="#">ParameterDataPrototype</a>	0..1	ref	The ParameterDataPrototype to which the Parameter ComSpec applies.

**Table A.646: ParameterProvideComSpec**

<b>Class</b>	<b>ParameterRequireComSpec</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
<b>Note</b>	"Communication" specification that applies to parameters on the required side of a connection.			
<b>Base</b>	ARObject, <a href="#">RPortComSpec</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
initValue	<a href="#">ValueSpecification</a>	0..1	aggr	The initial value applicable for the corresponding ParameterDataPrototype.
parameter	<a href="#">ParameterDataPrototype</a>	0..1	ref	The ParameterDataPrototype to which the Parameter RequireComSpec applies.

**Table A.647: ParameterRequireComSpec**

<b>Class</b>	<b>ParameterSwComponentType</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Components			
<b>Note</b>	The ParameterSwComponentType defines parameters and characteristic values accessible via provided Ports. The provided values are the same for all connected SwComponentPrototypes  <b>Tags:</b> atp.recommendedPackage=SwComponentTypes			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
constant Mapping	ConstantSpecification MappingSet	*	ref	Reference to the ConstantSpecificationMapping to be applied for the particular ParameterSwComponentType  <b>Stereotypes:</b> atp.Splittable <b>Tags:</b> atp.Splitkey=constantMapping
data Type Mapping	<a href="#">DataTypeMappingSet</a>	*	ref	Reference to the DataTypeMapping to be applied for the particular ParameterSwComponentType  <b>Stereotypes:</b> atp.Splittable <b>Tags:</b> atp.Splitkey=dataTypeMapping
instantiation DataDefProps	<a href="#">InstantiationDataDefProps</a>	*	aggr	The purpose of this is that within the context of a given SwComponentType some data def properties of individual instantiations can be modified.  The aggregation of InstantiationDataDefProps is subject to variability with the purpose to support the conditional existence of PortPrototypes  <b>Stereotypes:</b> atp.Variation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.648: ParameterSwComponentType**

<b>Class</b>	<b>PassThroughSwConnector</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
<b>Note</b>	This kind of SwConnector can be used inside a CompositionSwComponentType to connect two delegation PortPrototypes.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">SwConnector</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
providedOuter Port	<a href="#">AbstractProvidedPort Prototype</a>	0..1	ref	This represents the provided outer delegation Port Prototype of the PassThroughSwConnector.
requiredOuter Port	<a href="#">AbstractRequiredPort Prototype</a>	0..1	ref	This represents the required outer delegation Port Prototype of the PassThroughSwConnector.

**Table A.649: PassThroughSwConnector**

<b>Class</b>	<b>Pdu</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Collection of all Pdus that can be routed through a bus interface.			
<b>Base</b>	ARObject, <a href="#">CollectableElement</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">GeneralPurposePdu</a> , <a href="#">IPdu</a> , <a href="#">NmPdu</a> , <a href="#">UserDefinedPdu</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
hasDynamic Length	Boolean	0..1	attr	This attribute defines whether the Pdu has dynamic length (true) or not (false). Please note that the usage of this attribute is restricted by <a href="#">[constr_3448]</a> .
length	<a href="#">UnlimitedInteger</a>	0..1	attr	Pdu length in bytes. In case of dynamic length IPdus (containing a dynamical length signal), this value indicates the maximum data length. It should be noted that in former AUTOSAR releases (Rel 2.1, Rel 3.0, Rel 3.1, Rel 4.0 Rev. 1) this parameter was defined in bits.  The Pdu length of zero bytes is allowed.

**Table A.650: Pdu**

<b>Class</b>	<b>PduActivationRoutingGroup</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
<b>Note</b>	Group of Pdus that can be activated or deactivated for transmission over a socket connection.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
eventGroup ControlType	<a href="#">EventGroupControlType Enum</a>	0..1	attr	This attribute defines the type of a RoutingGroup. There are RoutingGroups that activate the data path for unicast or multicast events of an event group. And there are RoutingGroups that activate the data path for initial events that are triggered, namely events that are sent out on the server side after a client got subscribed. Please note that this attribute is only valid for event communication (Sender Receiver communication) and shall be omitted in MethodActivationRoutingGroups.
iPduIdentifier Tcp	<a href="#">SoConIPduIdentifier</a>	*	ref	PduIdentifiers assigned for transmission over Tcp in case that the referencing PduActivationRoutingGroup is activated.







Class	PduActivationRoutingGroup			
iPduIdentifier Udp	<a href="#">SoConIPduIdentifier</a>	*	ref	PduIdentifiers assigned for transmission over Udp in case that the referencing PduActivationRoutingGroup is activated.

**Table A.651: PduActivationRoutingGroup**

Class	<<atpPrototype>> PduToFrameMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	A PduToFrameMapping defines the composition of Pdus in each frame.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
packingByte Order	<a href="#">ByteOrderEnum</a>	1	attr	This attribute defines the order of the bytes of the Pdu and the packing into the Frame. Please consider that <a href="#">[constr_3246]</a> and <a href="#">[constr_3222]</a> are restricting the usage of this attribute.
pdu	<a href="#">Pdu</a>	1	ref	Reference to a I-Pdu, N-Pdu or NmPdu that is transmitted in the Frame.
startPosition	Integer	1	attr	<p>This attribute describes the bitposition of a Pdu within a Frame.</p> <p>Please note that the absolute position of the Pdu in the Frame is determined by the definition of the packingByte Order attribute. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the Frame. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the Frame. The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.</p> <p>The Pdus are byte aligned in a Frame and only the values 0, 8, 16, 24,... (for little endian) and 7, 15, 23, ... (for big endian) are allowed.</p>
update IndicationBit Position	Integer	0..1	attr	<p>Indication to the receivers that the corresponding Pdu was updated by the sender. This attribute describes the position of the update bit in the frame that aggregates this PDUToFrameMapping. Length is always one bit.</p> <p>Note that the exact bit position of the updateIndicationBit Position is linked to the value of the attribute packingByte Order because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing Frame still undergoes a change.</p> <p>This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.</p>

**Table A.652: PduToFrameMapping**

<b>Class</b>	<b>PduTriggering</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	<p>The PduTriggering describes on which channel the IPdu is transmitted. The Pdu routing by the PduR is only allowed for subclasses of IPdu.</p> <p>Depending on its relation to entities such channels and clusters it can be unambiguously deduced whether a fan-out is handled by the Pdu router or the Bus Interface.</p> <p>If the fan-out is specified between different clusters it shall be handled by the Pdu Router. If the fan-out is specified between different channels of the same cluster it shall be handled by the Bus Interface.</p>			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
iPdu	<a href="#">Pdu</a>	1	ref	<p>Reference to the Pdu for which the PduTriggering is defined. One I-Pdu can be triggered on different channels (PduR fan-out). The Pdu routing by the PduR is only allowed for subclasses of IPdu.</p> <p>Nevertheless is the reference to the Pdu element necessary since the PduTriggering element is also used to specify the sending and receiving connections to Ecu Ports.</p>
iPduPort	<a href="#">IPduPort</a>	*	ref	<p>References to the IPduPort on every ECU of the system which sends and/or receives the I-PDU.</p> <p>References for both the sender and the receiver side shall be included when the system is completely defined.</p>
iSignalTriggering	<a href="#">ISignalTriggering</a>	*	ref	<p>This reference provides the relationship to the ISignalTriggerings that are implemented by the PduTriggering. The reference is optional since no ISignalTriggering can be defined for DCM and Multiplexed Pdus.</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild</p>
secOcCryptoMapping	SecOcCryptoServiceMapping	0..1	ref	<p>This reference identifies the crypto profile applicable to the usage (send, receive) of the also referenced Secured IPdu.</p> <p>Obviously, this reference is only applicable if the PduTriggering also references a SecuredIPdu in the role i Pdu.</p>
triggerIPduSendCondition	TriggerIPduSendCondition	*	aggr	<p>Defines the trigger for the Com_TriggerIPDUSend API call. Only if all defined TriggerIPduSendConditions evaluate to true (AND associated) the Com_TriggerIPDUSend API shall be called.</p>

Table A.653: PduTriggering

<b>Class</b>	<b>PerInstanceMemory</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::PerInstanceMemory			
<b>Note</b>	<p>Defines a 'C' typed memory-block that needs to be available for each instance of the SW-component. This is typically only useful if supportsMultipleInstantiation is set to "true" or if the software-component defines NVRAM access via permanent blocks.</p>			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
initValue	String	0..1	attr	Specifies initial value(s) of the PerInstanceMemory
swDataDefProps	<a href="#">SwDataDefProps</a>	0..1	aggr	This represents the ability to allocate RAM at specific memory sections, for example, to support the RAM Block recovery strategy by mapping to uninitialized RAM.
type	CIdentifier	0..1	attr	The name of the "C"-type





Class	PerInstanceMemory			
typeDefinition	String	0..1	attr	A definition of the type with the syntax of a 'C' typedef.

**Table A.654: PerInstanceMemory**

Class	PerInstanceMemorySize			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcImplementation			
Note	Resources needed by the allocation of PerInstanceMemory for each SWC instance. Note that these resources are not covered by an ObjectFileSection, because they are supposed to be allocated by the RTE.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
alignment	PositiveInteger	0..1	attr	Required alignment (1,2,4,...) of the referenced Per InstanceMemory. Unit: byte.
perInstanceMemory	<a href="#">PerInstanceMemory</a>	0..1	ref	This represents the referenced PerInstanceMemory.
size	PositiveInteger	0..1	attr	Size (in bytes) of the reference perInstanceMemory. The aggregation of PerInstanceMemorySize is subject to variability with the purpose to support variability in the software components implementations. Different algorithms in the implementation might require a different PerInstanceMemorySize.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.655: PerInstanceMemorySize**

Class	PeriodicEventTriggering			
Package	M2::AUTOSARTemplates::CommonStructure::Timing::TimingConstraint::EventTriggeringConstraint			
Note	The PeriodicEventTriggering describes the behavior of an event with a strict periodic occurrence pattern, given by the period attribute.  Additionally, it is possible to soften the strictness of the periodic occurrence behavior by specifying a jitter, so that there can be a deviation from the period up to the size of the jitter.			
Base	ARObject, EventTriggeringConstraint, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , TimingConstraint, <a href="#">Traceable</a>			
Attribute	Type	Mult.	Kind	Note
jitter	MultidimensionalTime	1	aggr	The maximum jitter of the periodic event occurrence. <b>Tags:</b> xml.sequenceOffset=20
minimumInterArrivalTime	MultidimensionalTime	1	aggr	The minimum time distance between two consecutive occurrences of the associated event. <b>Tags:</b> xml.sequenceOffset=10
period	MultidimensionalTime	1	aggr	The period of the event occurrence. <b>Tags:</b> xml.sequenceOffset=30

**Table A.656: PeriodicEventTriggering**

Class	PhysConstrs			
Package	M2::MSR::AsamHdo::Constraints::GlobalConstraints			
Note	This meta-class represents the ability to express physical constraints. Therefore it has (in opposite to InternalConstrs) a reference to a Unit.			





Class	PhysConstrs			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
lowerLimit	Limit	0..1	attr	This specifies the lower limit of the constraint. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=20
maxDiff	Numerical	0..1	attr	Maximum difference that is permitted between two consecutive values if the constraint is applied to an axis. <b>Tags:</b> xml.sequenceOffset=60
maxGradient	Numerical	0..1	attr	This element specifies the maximum slope that may be used in curves and maps. <b>Tags:</b> xml.sequenceOffset=50
monotony	MonotonyEnum	0..1	attr	This specifies the monotony constraints on the data object. Note that this applies only to curves and maps. <b>Tags:</b> xml.sequenceOffset=70
scaleConstr (ordered)	ScaleConstr	*	aggr	This is one particular scale which contributes to the data constraints. <b>Tags:</b> xml.roleElement=true xml.roleWrapperElement=true xml.sequenceOffset=40 xml.typeElement=false xml.typeWrapperElement=false
unit	Unit	0..1	ref	This is the unit to which the physical constraints relate to. In particular, it is the physical unit of the specified limits. <b>Tags:</b> xml.sequenceOffset=80
upperLimit	Limit	0..1	attr	This specifies the upper limit of the constraint. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=30

Table A.657: PhysConstrs

Class	PhysicalChannel (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	<p>A physical channel is the transmission medium that is used to send and receive information between communicating ECUs. Each CommunicationCluster has at least one physical channel. Bus systems like CAN and LIN only have exactly one PhysicalChannel. A FlexRay cluster may have more than one PhysicalChannels that may be used in parallel for redundant communication.</p> <p>An ECU is part of a cluster if it contains at least one controller that is connected to at least one channel of the cluster.#</p>			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Subclasses	AbstractCanPhysicalChannel, EthernetPhysicalChannel, FlexrayPhysicalChannel, LinPhysicalChannel, UserDefinedPhysicalChannel			
Attribute	Type	Mult.	Kind	Note





Class	PhysicalChannel (abstract)			
comm Connector	Communication Connector	*	ref	<p>Reference to the ECUInstance via a Communication Connector to which the channel is connected.</p> <p>atpVariation: Variable assignment of Physical Channels to different CommunicationConnectors is expressed with this variation.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=postBuild</p>
frameTriggering	FrameTriggering	*	aggr	<p>One frame triggering is defined for exactly one channel. Channels may have assigned an arbitrary number of frame triggerings.</p> <p>atpVariation: If signals/PDUs/frames are variable, the corresponding triggerings shall be variable, too.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b> atp.Splitkey=frameTriggering.shortName, frameTriggering.variationPoint.shortLabel vh.latestBindingTime=postBuild</p>
iSignal Triggering	ISignalTriggering	*	aggr	<p>One ISignalTriggering is defined for exactly one channel. Channels may have assigned an arbitrary number of ISignaltriggerings.</p> <p>atpVariation: If signals/PDUs/frames are variable, the corresponding triggerings shall be variable, too.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b> atp.Splitkey=iSignalTriggering.shortName, iSignalTriggering.variationPoint.shortLabel vh.latestBindingTime=postBuild</p>
managed Physical Channel	PhysicalChannel	*	ref	<p>Reference between a channel with role managing channel and a channel with role managed channel.</p>
pduTriggering	PduTriggering	*	aggr	<p>One PduTriggering is defined for exactly one channel. Channels may have assigned an arbitrary number of I-Pdu triggerings.</p> <p>atpVariation: If signals/PDUs/frames are variable, the corresponding triggerings shall be variable, too.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b> atp.Splitkey=pduTriggering.shortName, pduTriggering.variationPoint.shortLabel vh.latestBindingTime=postBuild</p>

Table A.658: PhysicalChannel

Class	PhysicalDimension
Package	M2::MSR::AsamHdo::Units





Class	PhysicalDimension			
Note	<p>This class represents a physical dimension. If the physical dimension of two units is identical, then a conversion between them is possible. The conversion between units is related to the definition of the physical dimension.</p> <p>Note that the equivalence of the exponents does not per se define the convertibility. For example Energy and Torque share the same exponents (Nm).</p> <p>Please note further the value of an exponent does not necessarily have to be an integer number. It is also possible that the value yields a rational number, e.g. to compute the square root of a given physical quantity. In this case the exponent value would be a rational number where the numerator value is 1 and the denominator value is 2.</p> <p><b>Tags:</b>atp.recommendedPackage=PhysicalDimensions</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
currentExp	Numerical	0..1	attr	<p>This attribute represents the exponent of the physical dimension "electric current".</p> <p><b>Tags:</b>xml.sequenceOffset=50</p>
lengthExp	Numerical	0..1	attr	<p>The exponent of the physical dimension "length".</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
luminousIntensityExp	Numerical	0..1	attr	<p>The exponent of the physical dimension "luminous intensity".</p> <p><b>Tags:</b>xml.sequenceOffset=80</p>
massExp	Numerical	0..1	attr	<p>The exponent of the physical dimension "mass".</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
molarAmountExp	Numerical	0..1	attr	<p>The exponent of the physical dimension "quantity of substance".</p> <p><b>Tags:</b>xml.sequenceOffset=70</p>
temperatureExp	Numerical	0..1	attr	<p>The exponent of the physical dimension "temperature".</p> <p><b>Tags:</b>xml.sequenceOffset=60</p>
timeExp	Numerical	0..1	attr	<p>The exponent of the physical dimension "time".</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>

Table A.659: PhysicalDimension

Class	PhysicalDimensionMapping			
Package	M2::MSR::AsamHdo::Units			
Note	This class represents a specific mapping between two PhysicalDimensions.			
Base	<a href="#">ARObject</a>			
Attribute	Type	Mult.	Kind	Note
firstPhysicalDimension	PhysicalDimension	0..1	ref	This represents the first PhysicalDimension of the enclosing PhysicalDimensionMapping.
secondPhysicalDimension	PhysicalDimension	0..1	ref	This represents the first PhysicalDimension of the enclosing PhysicalDimensionMapping.

Table A.660: PhysicalDimensionMapping

<b>Class</b>	<b>PlcProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	This meta-class allows to configure the PLCA (Physical Layer Collision Avoidance) in case 10-BASE-T1S Ethernet is used and PLCA is enabled on the CouplingPort (PHY).			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
plcaLocalNode Id	PositiveInteger	0..1	attr	This attribute defines the node ID when the PLCA mode for 10BASE-T1S is used.
plcaMaxBurst Count	PositiveInteger	0..1	attr	Defines maximum packets allowed to be transmitted within a TO. This configuration can be different from one ECU to another within the PLCA mixed segment.
plcaMaxBurst Timer	PositiveInteger	0..1	attr	Limits the burst frames in bit time. This configuration can be different from one ECU to another within the PLCA mixed segment. For PLCA burst mode to work properly this timer should be set greater than one IPG.

Table A.661: PlcProps

<b>Enumeration</b>	<b>PncGatewayTypeEnum</b>
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology
<b>Note</b>	Defines the PncGateway roles.
<b>Literal</b>	<b>Description</b>
active	The active PncGateway functionality shall be performed <b>Tags:</b> atp.EnumerationLiteralIndex=0
none	No PncGateway functionality shall be performed <b>Tags:</b> atp.EnumerationLiteralIndex=1
passive	The passive PncGateway functionality shall be performed <b>Tags:</b> atp.EnumerationLiteralIndex=2

Table A.662: PncGatewayTypeEnum

<b>Class</b>	<b>PncMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::PncMapping			
<b>Note</b>	Describes a mapping between one or several Virtual Function Clusters onto Partial Network Clusters. A Virtual Function Cluster is realized by a PortGroup. A Partial Network Cluster is realized by one or more IPduGroups.			
<b>Base</b>	ARObject, Describable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dynamicPnc MappingPdu Group	<a href="#">ISignalIPduGroup</a>	*	ref	Reference to an ISignalIPduGroup that allows mapping of this PNC without statically mapping this PNC directly to a channel. This is needed to describe dynamic PNCs that can be learned only at run-time and which have also a relation to an ISignalIPduGroup. <b>Tags:</b> atp.Status=draft
ident	<a href="#">PncMappingIdent</a>	0..1	aggr	This adds the ability to become referable to PncMapping.
physical Channel	<a href="#">PhysicalChannel</a>	*	ref	This reference maps the partial network to a communication channel.





Class	PncMapping			
pncConsumed Provided ServiceInstance Group	ConsumedProvided ServiceInstanceGroup	*	ref	ConsumedProvidedServiceInstanceGroup used in a Partial Network Cluster. This reference is optional, since this could be used for starting and stopping Consumed ProvidedServiceInstanceGroup according the requested partial network, but is not necessarily needed.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
pncGroup	<a href="#">ISignalIPduGroup</a>	*	ref	IPduGroup participating in a Partial Network Cluster. This reference is optional in case an ecu extract has only indirect pnc access, i.e. ecu is not directly connected to a network which supports partial network.
pncIdentifier	PositiveInteger	1	attr	Identifier of the Partial Network Cluster. This number represents the absolute bit position of this Partial Network Cluster in the NM Pdu.
pncPdurGroup	PdurIPduGroup	*	ref	This reference maps the Partial Network Cluster to a set of PdurIPduGroups.
pncWakeup Enable	Boolean	0..1	attr	If this parameter is available and set to true then this PNC will be woken up as soon as a channel wakeup occurs on a channel where this PNC is assigned to. This is ensured by adding this PNC to the corresponding channel wakeup sources during upstream mapping.
relevantFor DynamicPnc Mapping	<a href="#">EcuInstance</a>	*	ref	Reference to a PNC Gateway ECU for PNCs which do not have a static channel mapping. This is needed to describe dynamic PNCs that can be learned only at run-time and which have no relation to an ISignalIPdu Group.  <b>Tags:</b> atp.Status=draft
shortLabel	<a href="#">Identifier</a>	0..1	attr	This attribute specifies an identifying shortName for the PncMapping. It shall be unique in the System scope.
vfc	<a href="#">PortGroup</a>	*	iref	Virtual Function Cluster to be mapped onto a Partial Network Cluster. This reference is optional in case that the System Description doesn't use a complete Software Component Description (VFB View). This supports the inclusion of legacy systems.  <b>InstanceRef implemented by:</b> PortGroupInSystem InstanceRef
wakeupFrame	<a href="#">FrameTriggering</a>	*	ref	Reference to collection of FrameTriggerings that are used for the wakeup of this PNC (Application Frames or Nm Frames can be used). This reference is only valid if this EcuExtract represents an ECU which has direct PNC access, i.e. ECU is directly connected to a network which supports partial network.

**Table A.663: PncMapping**

Class	PncMappingIdent			
Package	M2::AUTOSARTemplates::SystemTemplate::PncMapping			
Note	This meta-class is created to add the ability to become the target of a reference to the non-Referrable PncMapping.			
Base	<a href="#">ARObject</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
—	—	—	—	—

**Table A.664: PncMappingIdent**



<b>Class</b>	<b>PortAPIOption</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::PortAPIOptions			
<b>Note</b>	Options how to generate the signatures of calls for an AtomicSwComponentType in order to communicate over a PortPrototype (for calls into a RunnableEntity as well as for calls from a RunnableEntity to the PortPrototype).			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
enableTakeAddress	Boolean	0..1	attr	If set to true, the software-component is able to use the API reference for deriving a pointer to an object.
errorHandling	DataTransformationErrorHandlingEnum	0..1	attr	This specifies whether a RunnableEntity accessing a PortPrototype that is referenced by this PortAPIOption shall specifically handle transformer errors or not.
indirectAPI	Boolean	0..1	attr	If set to true this attribute specifies an "indirect API" to be generated for the associated port which means that the software-component is able to access the actions on a port via a pointer to an object representing a port. This allows e.g. iterating over ports in a loop. This option has no effect for PPortPrototypes of client/server interfaces.
port	PortPrototype	0..1	ref	The option is valid for generated functions related to communication over this port
portArgValue (ordered)	PortDefinedArgumentValue	*	aggr	An argument value defined by this port.
supportedFeature	SwcSupportedFeature	*	aggr	This collection specifies which features are supported by the RunnableEntitis which access a PortPrototype that it referenced by this PortAPIOption.
transformerStatusForwarding	DataTransformationStatusForwardingEnum	0..1	attr	This specifies whether a RunnableEntity accessing a PortPrototype that is referenced by this PortAPIOption shall be able to forward a status to the transformer chain.

Table A.665: PortAPIOption

<b>Class</b>	<b>PortDefinedArgumentValue</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::PortAPIOptions			
<b>Note</b>	A PortDefinedArgumentValue is passed to a RunnableEntity dealing with the ClientServerOperations provided by a given PortPrototype. Note that this is restricted to PPortPrototypes of a ClientServerInterface.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
value	ValueSpecification	0..1	aggr	Specifies the actual value.
valueType	ImplementationDataType	0..1	trf	The implementation type of this argument value. It should not be composite type or a pointer. <b>Stereotypes:</b> isOfType

Table A.666: PortDefinedArgumentValue

<b>Class</b>	<b>PortElementToCommunicationResourceMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate			
<b>Note</b>	This meta class maps a communication resource to CP Software Clusters. In this case the kind of PortPrototype specified whether the Software Cluster has to provide or to require the resource. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject, Identifiable, MultilanguageReferrable, Referrable			





Class	PortElementToCommunicationResourceMapping			
Attribute	Type	Mult.	Kind	Note
clientServerOperation	<a href="#">ClientServerOperation</a>	0..1	iref	ClientServerOperation instance qualifying the communication resource <b>Tags:</b> atp.Status=draft <b>InstanceRef implemented by:</b> <a href="#">OperationInSystemInstanceRef</a>
communicationResource	<a href="#">CpSoftwareClusterCommunicationResource</a>	0..1	ref	Communication resource for which the mapping applies. <b>Tags:</b> atp.Status=draft
modeDeclarationGroupPrototype	<a href="#">ModeDeclarationGroupPrototype</a>	0..1	iref	ModeDeclarationGroupPrototype instance qualifying the communication resource <b>Tags:</b> atp.Status=draft <b>InstanceRef implemented by:</b> ModeDeclarationGroupPrototypeInSystemInstanceRef
parameterDataPrototype	<a href="#">ParameterDataPrototype</a>	0..1	iref	ParameterDataPrototype instance qualifying the communication resource. <b>Tags:</b> atp.Status=draft <b>InstanceRef implemented by:</b> ParameterDataPrototypeInSystemInstanceRef
trigger	<a href="#">Trigger</a>	0..1	iref	Trigger instance qualifying the communication resource. <b>Tags:</b> atp.Status=draft <b>InstanceRef implemented by:</b> TriggerInSystemInstanceRef
variableDataPrototype	<a href="#">VariableDataPrototype</a>	0..1	iref	VariableDataPrototype instance qualifying the communication resource <b>Tags:</b> atp.Status=draft <b>InstanceRef implemented by:</b> <a href="#">VariableDataPrototypeInSystemInstanceRef</a>

**Table A.667: PortElementToCommunicationResourceMapping**

Class	PortGroup			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	<p>Group of ports which share a common functionality  , e.g. need specific network resources. This information shall be available on the VFB level in order to delegate it properly via compositions. When propagated into the ECU extract, this information is used as input for the configuration of Services like the Communication Manager.</p> <p>A PortGroup is defined locally in a component (which can be a composition) and refers to the "outer" ports belonging to the group as well as to the "inner" groups which propagate this group into the components which are part of a composition. A PortGroup within an atomic SWC cannot be linked to inner groups.</p>			
Base	<a href="#">ARObject</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
innerGroup	<a href="#">PortGroup</a>	*	iref	Links a PortGroup in a composition to another PortGroup, that is defined in a component which is part of this CompositionSwComponentType. <b>InstanceRef implemented by:</b> InnerPortGroupInCompositionInstanceRef





Class	PortGroup			
outerPort	<a href="#">PortPrototype</a>	*	ref	Outer PortPrototype of this AtomicSwComponentType which belongs to the group. A port can belong to several groups or to no group at all.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

Table A.668: PortGroup

Class	<b>PortInterface</b> (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	Abstract base class for an interface that is either provided or required by a port of a software component.			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">ClientServerInterface</a> , <a href="#">DataInterface</a> , <a href="#">ModeSwitchInterface</a> , <a href="#">TriggerInterface</a>			
Attribute	Type	Mult.	Kind	Note
isService	Boolean	0..1	attr	This flag is set if the PortInterface is to be used for communication between an <ul style="list-style-type: none"> <li>• ApplicationSwComponentType or</li> <li>• ServiceProxySwComponentType or</li> <li>• SensorActuatorSwComponentType or</li> <li>• ComplexDeviceDriverSwComponentType</li> <li>• ServiceSwComponentType</li> <li>• EcuAbstractionSwComponentType</li> </ul> and a ServiceSwComponentType (namely an AUTOSAR Service) located on the same ECU. Otherwise the flag is not set.
serviceKind	ServiceProviderEnum	0..1	attr	This attribute provides further details about the nature of the applied service.

Table A.669: PortInterface

Class	<b>PortInterfaceMapping</b> (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	Specifies one PortInterfaceMapping to support the connection of Ports typed by two different Port Interfaces with PortInterface elements having unequal names and/or unequal semantic (resolution or range).			
Base	<a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">ClientServerInterfaceMapping</a> , <a href="#">ModelInterfaceMapping</a> , <a href="#">TriggerInterfaceMapping</a> , <a href="#">VariableAndParameterInterfaceMapping</a>			
Attribute	Type	Mult.	Kind	Note
—	—	—	—	—

Table A.670: PortInterfaceMapping

Class	<b>PortPrototype</b> (abstract)
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components





Class	PortPrototype (abstract)			
Note	<p>Base class for the ports of an AUTOSAR software component.</p> <p>The aggregation of PortPrototypes is subject to variability with the purpose to support the conditional existence of ports.</p>			
Base	ARObject, AtpBlueprintable, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, Referrable			
Subclasses	AbstractProvidedPortPrototype, AbstractRequiredPortPrototype			
Attribute	Type	Mult.	Kind	Note
clientServer Annotation	ClientServerAnnotation	*	aggr	Annotation of this PortPrototype with respect to client/server communication.
delegatedPort Annotation	DelegatedPortAnnotation	0..1	aggr	Annotations on this delegated port.
ioHwAbstractionServer Annotation	IoHwAbstractionServerAnnotation	*	aggr	Annotations on this IO Hardware Abstraction port.
logAndTraceMessageCollectionSet	LogAndTraceMessageCollectionSet	0..1	ref	<p>Reference to a collection of Log or Trace messages that will be used by the application.</p> <p><b>Tags:</b>atp.Status=draft</p>
modePort Annotation	ModePortAnnotation	*	aggr	Annotations on this mode port.
nvDataPort Annotation	NvDataPortAnnotation	*	aggr	Annotations on this non volatile data port.
parameterPort Annotation	ParameterPortAnnotation	*	aggr	Annotations on this parameter port.
senderReceiver Annotation	SenderReceiverAnnotation	*	aggr	Collection of annotations of this ports sender/receiver communication.
triggerPort Annotation	TriggerPortAnnotation	*	aggr	Annotations on this trigger port.

Table A.671: PortPrototype

Class	PortPrototypeBlueprint			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::BlueprintDedicated::PortPrototypeBlueprint			
Note	<p>This meta-class represents the ability to express a blueprint of a PortPrototype by referring to a particular PortInterface. This blueprint can then be used as a guidance to create particular PortPrototypes which are defined according to this blueprint. By this it is possible to standardize application interfaces without the need to also standardize software-components with PortPrototypes typed by the standardized Port Interfaces.</p> <p><b>Tags:</b>atp.recommendedPackage=PortPrototypeBlueprints</p>			
Base	ARElement, ARObject, AtpBlueprint, AtpClassifier, AtpFeature, AtpStructureElement, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mult.	Kind	Note
initValue	PortPrototypeBlueprintInitValue	*	aggr	This specifies the init values for the dataElements in the particular PortPrototypeBlueprint.
interface	PortInterface	1	ref	This is the interface for which the blueprint is defined. It may be a blueprint itself or a standardized PortInterface
providedComSpec	PPortComSpec	*	aggr	Provided communication attributes per interface element (data element or operation).
requiredComSpec	RPortComSpec	*	aggr	Required communication attributes, one for each interface element.

Table A.672: PortPrototypeBlueprint

<b>Class</b>	<b>PostBuildVariantCondition</b>			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
<b>Note</b>	<p>This class specifies the value which shall be assigned to a particular variant criterion in order to bind the variation point. If multiple criterion/value pairs are specified, they shall all match to bind the variation point.</p> <p>In other words binding can be represented by  (criterion1 == value1) &amp;&amp; (condition2 == value2) ...</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
matching Criterion	PostBuildVariant Criterion	1	ref	This is the criterion which needs to match the value in order to make the PostbuildVariantCondition to be true.
value	Integer	1	attr	<p>This is the particular value of the post-build variant criterion.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>

**Table A.673: PostBuildVariantCondition**

<b>Class</b>	<b>PredefinedVariant</b>			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
<b>Note</b>	<p>This specifies one predefined variant. It is characterized by the union of all system constant values and post-build variant criterion values aggregated within all referenced system constant value sets and post build variant criterion value sets plus the value sets of the included variants.</p> <p><b>Tags:</b> atp.recommendedPackage=PredefinedVariants</p>			
<b>Base</b>	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, Packageable Element, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
includedVariant	PredefinedVariant	*	ref	The associated variants are considered part of this PredefinedVariant. This means the settings of the included variants are included in the settings of the referencing PredefinedVariant. Nevertheless the included variants might be included in several predefined variants.
postBuildVariant CriterionValue Set	PostBuildVariant CriterionValueSet	*	ref	This is the postBuildVariantCriterionValueSet contributing to the predefined variant.
sw Systemconstant ValueSet	SwSystemconstant ValueSet	*	ref	This ist the set of Systemconstant Values contributing to the predefined variant.

**Table A.674: PredefinedVariant**

<b>Class</b>	<b>PrimitiveAttributeCondition</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::Data FormatTailoring			
<b>Note</b>	The PrimitiveAttributeCondition evaluates to true, if the referenced primitive attribute is accepted by all rules of this condition.			
<b>Base</b>	ARObject, AbstractCondition, AbstractMultiplicityRestriction, AbstractValueRestriction, AttributeCondition			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
attribute	PrimitiveAttribute Tailoring	1	ref	The primitive attribute that has to be accepted by the restrictions of this PrimitiveAttributeCondition

**Table A.675: PrimitiveAttributeCondition**

<b>Class</b>	<b>PrimitiveAttributeTailoring</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::DataFormatTailoring			
<b>Note</b>	Tailoring of primitive attributes. Primitive attributes are attributes that have a type which is marked by the stereotype <<primitive>> or <<enumeration>>			
<b>Base</b>	ARObject, <a href="#">AttributeTailoring</a> , <a href="#">DataFormatElementReference</a> , <a href="#">DataFormatElementScope</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">SpecElementReference</a> , <a href="#">SpecElementScope</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
defaultValueHandling	DefaultValueApplicationStrategyEnum	0..1	attr	Specification of how to handle AUTOSAR defined default values.
subAttributeTailoring	<a href="#">PrimitiveAttributeTailoring</a>	*	aggr	Tailors the attribute of a <<primitive>> data type.
valueRestriction	ValueRestrictionWithSeverity	0..1	aggr	The restriction of the attribute value.

**Table A.676: PrimitiveAttributeTailoring**

<b>Class</b>	<b>ProvidedServiceInstance</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
<b>Note</b>	Service instances that are provided by the ECU that is connected via the ApplicationEndpoint to a CommunicationConnector.			
<b>Base</b>	ARObject, <a href="#">AbstractServiceInstance</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
autoAvailable	Boolean	0..1	attr	Defines that this ProvidedServiceInstance shall be offered by the service discovery at ECU start.
eventHandler	<a href="#">EventHandler</a>	*	aggr	Collection of event groups provided by the ProvidedServiceInstance <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
instanceIdentifier	PositiveInteger	0..1	attr	Instance identifier. Can be used for e.g. service discovery to identify the instance of the service.
loadBalancingPriority	PositiveInteger	0..1	attr	Defines the value to be used for load balancing priority in the service offer. Lower value means higher priority.
loadBalancingWeight	PositiveInteger	0..1	attr	Defines the value to be used for load balancing weight in the service offer. Higher value means higher probability to be chosen.
localUnicastAddress	<a href="#">ApplicationEndpoint</a>	0..2	ref	The local address over which the PSI is provided (udp, tcp or both). <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
minorVersion	PositiveInteger	0..1	attr	Minor Version of the Service that is provided by this ProvidedServiceInstance.
priority	PositiveInteger	0..1	attr	Defines the frame priority where values from 0 (best effort) to 7 (highest) are allowed.
remoteMulticastSubscriptionAddress	<a href="#">ApplicationEndpoint</a>	*	ref	This reference defines the remote multicast subscribed addresses of service consumers. This reference shall ONLY be used if the remote address of the clients is determined from the configuration and not at runtime. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild





Class	ProvidedServiceInstance			
remoteUnicastAddress	<a href="#">ApplicationEndpoint</a>	*	ref	This reference defines the remote addresses of service consumers. This reference shall ONLY be used if the remote address of the clients is determined from the configuration and not at runtime. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
sdServerConfig	SdServerConfig	0..1	aggr	Service Discovery Server configuration. <b>Tags:</b> atp.Status=obsolete
sdServerTimerConfig	<a href="#">SomeipSdServerServiceInstanceConfig</a>	0..1	ref	Server specific configuration settings relevant for the SOME/IP service discovery. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
serviceIdentifier	PositiveInteger	0..1	attr	This attribute represents the ability to describe the SOME/IP service ID that is offered.

**Table A.677: ProvidedServiceInstance**

Class	QueuedReceiverComSpec			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Communication attributes specific to queued receiving.			
Base	<a href="#">ARObject</a> , <a href="#">RPortComSpec</a> , <a href="#">ReceiverComSpec</a>			
Attribute	Type	Mult.	Kind	Note
queueLength	PositiveInteger	0..1	attr	Length of queue for received events.

**Table A.678: QueuedReceiverComSpec**

Class	QueuedSenderComSpec			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Communication attributes specific to distribution of events (PPortPrototype, SenderReceiverInterface and dataElement carries an "event").			
Base	<a href="#">ARObject</a> , <a href="#">PPortComSpec</a> , <a href="#">SenderComSpec</a>			
Attribute	Type	Mult.	Kind	Note
—	—	—	—	—

**Table A.679: QueuedSenderComSpec**

Class	<a href="#">RPortComSpec</a> (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Communication attributes of a required PortPrototype. This class will contain attributes that are valid for all kinds of require-ports, independent of client-server or sender-receiver communication patterns.			
Base	<a href="#">ARObject</a>			
Subclasses	<a href="#">ClientComSpec</a> , <a href="#">ModeSwitchReceiverComSpec</a> , <a href="#">NvRequireComSpec</a> , <a href="#">ParameterRequireComSpec</a> , <a href="#">ReceiverComSpec</a>			
Attribute	Type	Mult.	Kind	Note
—	—	—	—	—

**Table A.680: RPortComSpec**

<b>Class</b>	<b>RPortPrototype</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Components			
<b>Note</b>	Component port requiring a certain port interface.			
<b>Base</b>	ARObject, <a href="#">AbstractRequiredPortPrototype</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpFeature</a> , <a href="#">AtpPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PortPrototype</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
mayBeUnconnected	Boolean	0..1	attr	If set to true, this attribute indicates that the enclosing RPortPrototype may be left unconnected and that this aspect has explicitly been considered in the software-component's design.
requiredInterface	<a href="#">PortInterface</a>	0..1	tref	The interface that this port requires. <b>Stereotypes:</b> isOfType

**Table A.681: RPortPrototype**

<b>Class</b>	<b>RTEEvent</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
<b>Note</b>	Abstract base class for all RTE-related events			
<b>Base</b>	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">AsynchronousServerCallReturnsEvent</a> , <a href="#">BackgroundEvent</a> , <a href="#">DataReceiveErrorEvent</a> , <a href="#">DataReceivedEvent</a> , <a href="#">DataSendCompletedEvent</a> , <a href="#">DataWriteCompletedEvent</a> , <a href="#">ExternalTriggerOccurredEvent</a> , <a href="#">InitEvent</a> , <a href="#">InternalTriggerOccurredEvent</a> , <a href="#">ModeSwitchedAckEvent</a> , <a href="#">OperationInvokedEvent</a> , <a href="#">OsTaskExecutionEvent</a> , <a href="#">SwcModeManagerErrorEvent</a> , <a href="#">SwcModeSwitchEvent</a> , <a href="#">TimingEvent</a> , <a href="#">TransformerHardErrorEvent</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
disabledMode	<a href="#">ModeDeclaration</a>	*	iref	Reference to the Modes that disable the Event. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=disabledMode.contextPort, disabledMode.contextModeDeclarationGroupPrototype, disabledMode.targetModeDeclaration <b>InstanceRef implemented by:</b> RModeInAtomicSwc InstanceRef
startOnEvent	<a href="#">RunnableEntity</a>	0..1	ref	The referenced RunnableEntity starts when the corresponding RTEEvent is raised.

**Table A.682: RTEEvent**

<b>Class</b>	<b>RapidPrototypingScenario</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::RPTScenario			
<b>Note</b>	This meta-class provides the ability to describe a Rapid Prototyping Scenario. Such a Rapid Prototyping Scenario consist out of two main aspects, the description of the byPassPoints and the relation to an rpt Hook. <b>Tags:</b> atp.recommendedPackage=RapidPrototypingScenarios			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
hostSystem	<a href="#">System</a>	0..1	ref	System which describes the software components of the host ECU.







Class	RapidPrototypingScenario			
rptContainer	<a href="#">RptContainer</a>	*	aggr	Top-level rptContainer definitions of this specific rapid prototyping scenario. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=rptContainer.shortName, rptContainer.variationPoint.shortLabel vh.latestBindingTime=preCompileTime
rptProfile	<a href="#">RptProfile</a>	*	aggr	Defiens the applicable Rapid Prototyping profls which are especially defining the smbol of the service functions and the valid id range. The order of the RptProfiles determines the order of the service function invocation by RTE. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=rptProfile.shortName
rptSystem	<a href="#">System</a>	0..1	ref	System which describes the rapid prototyping algorithm in the format of AUTOSAR Software Components. <b>Stereotypes:</b> atpSplitable <b>Tags:</b> atp.Splitkey=rptSystem

**Table A.683: RapidPrototypingScenario**

Class	ReceiverComSpec (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Receiver-specific communication attributes (RPortPrototype typed by SenderReceiverInterface).			
Base	ARObject, <a href="#">RPortComSpec</a>			
Subclasses	<a href="#">NonqueuedReceiverComSpec</a> , <a href="#">QueuedReceiverComSpec</a>			
Attribute	Type	Mult.	Kind	Note
composite Network Representation	<a href="#">CompositeNetworkRepresentation</a>	*	aggr	This represents a CompositeNetworkRepresentation defined in the context of a ReceiverComSpec. The purpose of this aggregation is to be able to specify the network representation of leaf elements of Application CompositeDataTypes.
dataElement	<a href="#">AutosarDataPrototype</a>	0..1	ref	Data element these attributes belong to.
handleOutOfRange	<a href="#">HandleOutOfRangeEnum</a>	0..1	attr	This attribute controls how values that are out of the specified range are handled according to the values of HandleOutOfRangeEnum.
handleOutOfRangeStatus	HandleOutOfRangeStatusEnum	0..1	attr	Control the way how return values are created in case of an out-of-range situation.
maxDeltaCounterInit	PositiveInteger	0..1	attr	Initial maximum allowed gap between two counter values of two consecutively received valid Data, i.e. how many subsequent lost data is accepted. For example, if the receiver gets Data with counter 1 and MaxDeltaCounter Init is 1, then at the next reception the receiver can accept Counters with values 2 and 3, but not 4.  Note that if the receiver does not receive new Data at a consecutive read, then the receiver increments the tolerance by 1.  Caveat: The E2E wrapper approach involves technologies that are not subjected to the AUTOSAR standard and is superseded by the superior E2E transformer approach (which is fully standardized by AUTOSAR). Hence, new projects (without legacy





Class	ReceiverComSpec (abstract)			
				<p>constraints due to carry-over parts) shall use the fully standardized E2E transformer approach.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>
maxNoNewOrRepeatedData	PositiveInteger	0..1	attr	<p>The maximum amount of missing or repeated Data which the receiver does not expect to exceed under normal communication conditions.</p> <p>Caveat: The E2E wrapper approach involves technologies that are not subjected to the AUTOSAR standard and is superseded by the superior E2E transformer approach (which is fully standardized by AUTOSAR). Hence, new projects (without legacy constraints due to carry-over parts) shall use the fully standardized E2E transformer approach.</p>
networkRepresentation	SwDataDefProps	0..1	aggr	A networkRepresentation is used to define how the data Element is mapped to a communication bus.
receptionProps	ReceptionComSpecProps	0..1	aggr	"This aggregation represents the definition transmission props in the context of the enclosing ReceiverComSpec.
replaceWith	VariableAccess	0..1	aggr	This aggregation is used to identify the AutosarData Prototype to be taken for sourcing an external replacement in the out-of-range handling.
syncCounterInit	PositiveInteger	0..1	attr	<p>Number of Data required for validating the consistency of the counter that shall be received with a valid counter (i.e. counter within the allowed lock-in range) after the detection of an unexpected behavior of a received counter.</p> <p>Caveat: The E2E wrapper approach involves technologies that are not subjected to the AUTOSAR standard and is superseded by the superior E2E transformer approach (which is fully standardized by AUTOSAR). Hence, new projects (without legacy constraints due to carry-over parts) shall use the fully standardized E2E transformer approach.</p>
transformationComSpecProps	TransformationComSpecProps	*	aggr	This references the TransformationComSpecProps which define port-specific configuration for data transformation.
usesEndToEndProtection	Boolean	0..1	attr	<p>This indicates whether the corresponding dataElement shall be transmitted using end-to-end protection.</p> <p>Caveat: The E2E wrapper approach involves technologies that are not subjected to the AUTOSAR standard and is superseded by the superior E2E transformer approach (which is fully standardized by AUTOSAR). Hence, new projects (without legacy constraints due to carry-over parts) shall use the fully standardized E2E transformer approach.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>

**Table A.684: ReceiverComSpec**

Class	RecordValueSpecification
Package	M2::AUTOSARTemplates::CommonStructure::Constants
Note	Specifies the values for a record.
Base	ARObject, <a href="#">CompositeValueSpecification</a> , <a href="#">ValueSpecification</a>





Class	RecordValueSpecification			
Attribute	Type	Mult.	Kind	Note
field (ordered)	ValueSpecification	*	aggr	<p>The value for a single record field. This could also be mapped explicitly to a record element of the data type using the shortName of the ValueSpecification. But this would introduce a relationship to the data type that is too strong. As of now, it is only important that the structure of the data type matches the structure of the Value Specification independently of the shortNames.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>

**Table A.685: RecordValueSpecification**

Enumeration	ReentrancyLevelEnum
Package	M2::AUTOSARTemplates::CommonStructure::InternalBehavior
Note	Specifies if and in which kinds of environments an entity is reentrant.
Literal	Description
multicoreReentrant	<p>Unlimited concurrent execution of this entity is possible, including preemption and parallel execution on multi core systems.</p> <p><b>Tags:</b> atp.EnumerationLiteralIndex=0</p>
nonReentrant	<p>Concurrent execution of this entity is not possible.</p> <p><b>Tags:</b> atp.EnumerationLiteralIndex=1</p>
singleCoreReentrant	<p>Pseudo-concurrent execution (i.e. preemption) of this entity is possible on single core systems.</p> <p><b>Tags:</b> atp.EnumerationLiteralIndex=2</p>

**Table A.686: ReentrancyLevelEnum**

Primitive	Ref			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes			
Note	<p>This primitive denotes a name based reference. For detailed syntax see the xsd.pattern.</p> <ul style="list-style-type: none"> <li>• first slash (relative or absolute reference) [optional]</li> <li>• Identifier [required]</li> <li>• a sequence of slashes and Identifiers [optional]</li> </ul> <p>This primitive is used by the meta-model tools to create the references.</p> <p><b>Tags:</b>  xml.xsd.customType=REF  xml.xsd.pattern=?[a-zA-Z][a-zA-Z0-9_]{0,127}/([a-zA-Z][a-zA-Z0-9_]{0,127})*  xml.xsd.type=string</p>			
Attribute	Type	Mult.	Kind	Note
base	Identifier	0..1	attr	<p>This attribute reflects the base to be used for this reference.</p> <p><b>Tags:</b> xml.attribute=true</p>
blueprintValue	String	0..1	attr	<p>This represents a description that documents how the value shall be defined when deriving objects from the blueprint.</p> <p><b>Tags:</b>  atp.Status=draft  xml.attribute=true</p>





Primitive	Ref			
index	PositiveInteger	0..1	attr	<p>This attribute supports the use case to point on specific elements in an array. This is in particular required if arrays are used to implement particular data objects.</p> <p><b>Tags:</b>xml.attribute=true</p>

Table A.687: Ref

Class	ReferenceBase			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::ARPackage			
Note	This meta-class establishes a basis for relative references. Reference bases are identified by the short Label which shall be unique in the current package.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
baselsThisPackage	Boolean	1	attr	<p>This indicates that this base is established by the current package. In this case the association "package" can be derived as the qualified shortName of the enclosing package.</p> <p>If the value of baselsThisPackage is set to true then one of the following shall be true:</p> <ul style="list-style-type: none"> <li>target of the association "package" shall be the enclosing package.</li> <li>association "package" is omitted.</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=28</p>
globalElement	ReferrableSubtypes Enum	*	attr	<p>This attribute represents a meta-class for which the global referencing is supported via this reference base.</p> <p><b>Tags:</b>xml.sequenceOffset=29</p>
globalInPackage	ARPackage	*	ref	<p>This represents the ability to express that global elements live in various packages which do not have a common ancestor package. Packages mentioned by ReferenceBase.globalInPackage are used in addition to the one in ReferenceBase.package.</p> <p><b>Tags:</b>xml.sequenceOffset=28</p>
isDefault	Boolean	1	attr	<p>This attribute denotes if the current ReferenceBase is the default. Note that there can only be one default reference base within a package.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
isGlobal	Boolean	1	attr	<p>This indicates that the target of the applicable reference can be resolved via the non-qualified shortName. This requires that the shortName of the target is unique within the package referenced in the reference base.</p> <p>The default is false.</p> <p>Note that the reference base also maintains a list of elements which may be referenced using a "global Reference".</p> <p><b>Tags:</b>xml.sequenceOffset=25</p>
package	ARPackage	0..1	ref	<p>This association specifies the basis of all relative references with the base equals shortLabel.</p> <p>This association shall exist unless the value of baselsThisPackage is set to true.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>





Class	ReferenceBase			
shortLabel	Identifier	1	attr	<p>This is the name of the reference base. By this name, particular references can denote the applicable base.</p> <p><b>Stereotypes:</b> atpIdentityContributor</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>

**Table A.688: ReferenceBase**

Class	ReferenceCondition			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::DataFormatTailoring			
Note	The ReferenceCondition evaluates to true, if the referenced reference is accepted by all rules of this condition.			
Base	ARObject, AbstractCondition, AbstractMultiplicityRestriction, AttributeCondition			
Attribute	Type	Mult.	Kind	Note
reference	ReferenceTailoring	1	ref	The reference that has to be accepted by the restrictions of this ReferenceCondition

**Table A.689: ReferenceCondition**

Class	ReferenceTailoring			
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::DataFormatTailoring			
Note	Tailoring of Non-Containment References.			
Base	ARObject, AttributeTailoring, DataFormatElementReference, DataFormatElementScope, Identifiable, MultilanguageReferrable, Referrable, SpecElementReference, SpecElementScope			
Attribute	Type	Mult.	Kind	Note
typeTailoring	ClassTailoring	*	aggr	Local class tailoring for content that is referenced by this reference.
unresolvedReferenceRestriction	UnresolvedReferenceRestrictionWithSeverity	0..1	aggr	Specifies the severity of unresolved references.

**Table A.690: ReferenceTailoring**

Class	ReferenceValueSpecification			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	Specifies a reference to a data prototype to be used as an initial value for a pointer in the software.			
Base	ARObject, ValueSpecification			
Attribute	Type	Mult.	Kind	Note
referenceValue	DataPrototype	0..1	ref	The referenced data prototype.

**Table A.691: ReferenceValueSpecification**

Class	Referrable (abstract)			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::Identifiable			
Note	Instances of this class can be referred to by their identifier (while adhering to namespace borders).			
Base	ARObject			





Class	Referrable (abstract)			
Subclasses	<i>AtpDefinition</i> , <i>BswDistinguishedPartition</i> , <i>BswModuleCallPoint</i> , <i>BswModuleClientServerEntry</i> , <i>BswVariableAccess</i> , <i>CouplingPortTrafficClassAssignment</i> , <i>DiagnosticEnvModeElement</i> , <i>EthernetPriorityRegeneration</i> , <i>ExclusiveAreaNestingOrder</i> , <i>HwDescriptionEntity</i> , <i>ImplementationProps</i> , <i>LinSlaveConfigIdent</i> , <i>ModeTransition</i> , <i>MultilanguageReferrable</i> , <i>PncMappingIdent</i> , <i>SingleLanguageReferrable</i> , <i>SoConlPdulIdentifier</i> , <i>SocketConnectionBundle</i> , <i>TimeSyncServerConfiguration</i> , <i>TpConnectionIdent</i>			
Attribute	Type	Mult.	Kind	Note
shortName	Identifier	1	attr	<p>This specifies an identifying shortName for the object. It needs to be unique within its context and is intended for humans but even more for technical reference.</p> <p><b>Stereotypes:</b> atpIdentityContributor</p> <p><b>Tags:</b>  xml.enforceMinMultiplicity=true  xml.sequenceOffset=-100</p>
shortName Fragment	ShortNameFragment	*	aggr	<p>This specifies how the Referrable.shortName is composed of several shortNameFragments.</p> <p><b>Tags:</b>xml.sequenceOffset=-90</p>

Table A.692: Referrable

Class	RoleBasedDataAssignment			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	<p>This class specifies an assignment of a role to a particular data object in either</p> <ul style="list-style-type: none"> <li>the SwcInternalBehavior of a software component (or in the BswInternalBehavior of a BSW module or BSW cluster) in the context of an AUTOSAR Service or</li> <li>an NvBlockDescriptor to sort out the assignment of event-based writing strategies to data elements in a PortPrototype.</li> </ul> <p>With this assignment, the role of the data can be mapped to a DataPrototype that is used in the context of the definition of a specific ServiceNeeds or NvBlockDescriptor, so that a tool is able to create the correct access or writing strategy.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
role	Identifier	0..1	attr	<p>This is the role of the assigned data in the given context, for example for an NVRAM Block it is used to distinguish between an mirror block and a ROM default block. Possible values need to be specified on M1 level.</p> <p>This also is intended to support the so called "Signal based Approach" of the DCM. In this use case the name of the involved data element is required. This name shall be taken from the DataElement referenced by the property usedDataElement.</p> <p>The following values are standardized:</p> <ul style="list-style-type: none"> <li><b>ramBlock</b> indicates data to be used as a mirror for an NVRAM Block.</li> <li><b>defaultValue</b> indicates constant data to be used as default in the context of this ServiceNeeds, e.g. for an NVRAM Block.</li> <li><b>signalBasedDiagnostics</b> indicates the Role BasedDataAssignment shall be used for signal based diagnostics.</li> </ul>





Class	RoleBasedDataAssignment			
usedDataElement	<a href="#">AutosarVariableRef</a>	0..1	aggr	<p>The VariableDataPrototype used in this role, e.g.</p> <ul style="list-style-type: none"> <li>Permanent RAM Block of an NVRAM Block which shall belong to the same SwcInternalBehavior or BswInternalBehavior.</li> <li>In the role signalBasedDiagnostics it has to refer to a VariableDataPrototype in a SenderReceiverInterface or a NvDataInterface.</li> </ul>
usedParameterElement	<a href="#">AutosarParameterRef</a>	0..1	aggr	<p>The ParameterDataPrototype used in this role, e.g.</p> <ul style="list-style-type: none"> <li>ROM Block of an NVRAM Block. It shall belong to the same SwcInternalBehavior or BswInternalbehavior.</li> <li>In the role signalBasedDiagnostics it has to refer to a ParameterDataPrototype in a ParameterInterface.</li> </ul>
usedPim	<a href="#">PerInstanceMemory</a>	0..1	ref	The (untyped) PerInstanceMemory used in this role (e.g. as a Permanent RAM Block for an NVRAM Block).

**Table A.693: RoleBasedDataAssignment**

Class	RoleBasedDataTypeAssignment			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::ServiceMapping			
Note	<p>This class specifies an assignment of a role to a particular data type of a software component (or in the BswModuleBehavior of a module or cluster) in the context of an AUTOSAR Service.</p> <p>With this assignment, the role of the data type can be mapped to a specific ServiceNeeds element, so that a tool is able to create the correct access.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
role	<a href="#">Identifier</a>	0..1	attr	This is the role of the associated data type in the given context.
usedImplementationDataType	<a href="#">ImplementationDataType</a>	0..1	ref	This represents the associated ImplementationDataType.

**Table A.694: RoleBasedDataTypeAssignment**

Class	RoleBasedPortAssignment			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::ServiceMapping			
Note	<p>This class specifies an assignment of a role to a particular service port (RPortPrototype or PPortPrototype) of an AtomicSwComponentType. With this assignment, the role of the service port can be mapped to a specific ServiceNeeds element, so that a tool is able to create the correct connector.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
portPrototype	<a href="#">PortPrototype</a>	0..1	ref	Service PortPrototype used in the assigned role. This PortPrototype shall either belong to the same AtomicSwComponentType as the SwcInternalBehavior which owns the ServiceDependency or to the same NvBlockSwComponentType as the NvBlockDescriptor.
role	<a href="#">Identifier</a>	0..1	attr	<p>This is the role of the assigned Port in the given context.</p> <p>The value shall be a shortName of the Blueprint of a Port Interface as standardized in the Software Specification of the related AUTOSAR Service.</p>

**Table A.695: RoleBasedPortAssignment**

<b>Class</b>	<b>RptContainer</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::RPTScenario			
<b>Note</b>	<p>This meta-class defines a byPassPoint and the relation to a rptHook.</p> <p>Additionally it may contain further rptContainers if the byPassPoint is not atomic. For example a byPassPoint referencing to a RunnableEntity may contain rptContainers referring to the data access points of the RunnableEntity.</p> <p>The RptContainer structure on M1 shall follow the M1 structure of the Software Component Descriptions. The category attribute denotes which level of the Software Component Description is annotated.</p>			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
byPassPoint	AtpFeature	*	iref	<p>byPassPoint describes the required preparation of the host ECU. At a byPassPoint the host ECU shall be capable to communicate with a RPT System in order to support the execution of the rapid prototyping algorithms with the original data calculated by the host system and to replace dedicated results of the host system by the results of the rapid prototyping algorithm.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=byPassPoint.contextElement, byPassPoint.target, byPassPoint.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p> <p><b>InstanceRef implemented by:</b><a href="#">AnyInstanceRef</a></p>
explicitRptProfileSelection	<a href="#">RptProfile</a>	*	ref	<p>This attribute defines the applicable RptProfiles for the specific RptContainer. If not any references to a specific RptProfile is defined, all RptProfiles defined in the Rapid PrototypingScenario are applicable.</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b>atp.Splitkey=explicitRptProfileSelection</p>
rptContainer	<a href="#">RptContainer</a>	*	aggr	<p>Sub-level rptContainer definitions of this specific rapid prototyping scenario.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=rptContainer.shortName, rptContainer.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
rptExecutableEntityProperties	<a href="#">RptExecutableEntityProperties</a>	0..1	aggr	<p>Describes the required code preparation for rapid prototyping at ExecutableEntity invocation.</p>
rptHook	<a href="#">RptHook</a>	0..1	aggr	<p>The rptHook describes the link between a byPassPoint and the rapid prototyping algorithm.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=rptHook, rptHook.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
rptImplPolicy	<a href="#">RptImplPolicy</a>	0..1	aggr	<p>Describes the required code preparation for rapid prototyping at data accesses.</p>
rptSwPrototypingAccess	<a href="#">RptSwPrototypingAccess</a>	0..1	aggr	<p>Describes the required accessibility of data and modes by the rapid prototyping tooling.</p>

**Table A.696: RptContainer**



<b>Class</b>	<b>RptExecutableEntityProperties</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::RPTScenario			
<b>Note</b>	Describes the code preparation for rapid prototyping at ExecutableEntity invocation.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
maxRptEventId	PositiveInteger	0..1	attr	Highest RPT event id usable for RTE generated service points. This attribute is relevant, if dedicated id range shall be applied to the ExecutableEntitys of a software component or specific ExecutableEntitys.
minRptEventId	PositiveInteger	0..1	attr	Lowest RPT event id usable for RTE generated service points. This attribute is relevant, if dedicated id range shall be applied to the ExecutableEntitys of a software component or specific ExecutableEntitys.
rptExecutionControl	RptExecutionControlEnum	0..1	attr	This attribute specifies the rapid prototyping control of the executable
rptServicePoint	RptServicePointEnum	0..1	attr	Enables generation of service points by the RTE generator.

**Table A.697: RptExecutableEntityProperties**

<b>Class</b>	<b>RptHook</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::RPTScenario			
<b>Note</b>	This meta-class provide the ability to describe a rapid prototyping hook. This can either be described by an other AUTOSAR system with the category RPT_SYSTEM or as a non AUTOSAR software.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
codeLabel	CIdentifier	0..1	attr	This attribute provides a code label which is used in the implementation of the hook. For example this can be an C function name or the name of data definition.
mcdIdentifier	NameToken	0..1	attr	This attribute provides an identifier which shall be used in a MCD System to display the Rpt Hook.
rptArHook	AtpFeature	0..1	iref	This describes the hook with the means of another AUTOSAR system. <b>InstanceRef implemented by:</b> <a href="#">AnyInstanceRef</a>
sdg	Sdg	*	aggr	This property allows to keep special data which is not represented by the standard model. It can be utilized to keep e.g. tool specific data.

**Table A.698: RptHook**

<b>Class</b>	<b>RptImplPolicy</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::RPTScenario			
<b>Note</b>	Describes the code preparation for rapid prototyping at data accesses.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
rptEnablerImplType	RptEnablerImplTypeEnum	0..1	attr	For Level 2 or Level3 this property determines how the RTE implements the additional "RP enabler" flag.
rptPreparationLevel	RptPreparationEnum	0..1	attr	Mandates RP preparation level for access to VariableData Prototype within generated RTE implementation.

**Table A.699: RptImplPolicy**

<b>Class</b>	<b>RptProfile</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::RPTScenario			
<b>Note</b>	The RptProfile describes the common properties of a Rapid Prototyping method.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
maxServicePointId	PositiveInteger	0..1	attr	Highest service point id useable for RTE generated service points.
minServicePointId	PositiveInteger	0..1	attr	Lowest service point id useable for RTE generated service points.
servicePointSymbolPost	CIdentifier	0..1	attr	Complete symbol of the function implementing the post service point. This symbol is used for post-build hooking purposes.
servicePointSymbolPre	CIdentifier	0..1	attr	Complete symbol of the function implementing the pre service point. This symbol is used for post-build hooking purposes.
stimEnabler	RptEnablerImplType Enum	0..1	attr	Defines if the service points support the stimulation enabler. If RptProfile.stimEnabler is "none" then no stimulation enabler is passed to the service function. Otherwise the stimulation enabler will be passed as a parameter.

**Table A.700: RptProfile**

<b>Class</b>	<b>RptSwPrototypingAccess</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::MeasurementCalibrationSupport::RptSupport			
<b>Note</b>	Describes the accessibility of data and modes by the rapid prototyping tooling.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
rptHookAccess	RptAccessEnum	0..1	attr	The related data element can be modified using a post-build hooking tool. An ENABLED VariableData Prototype is implicitly READABLE/WRITEABLE.
rptReadAccess	RptAccessEnum	0..1	attr	The related data element can be used as input for bypass functionality by RP tool. If rptImplPolicy is not specified then RTE generation shall ensure at least suitable MC read points are created.
rptWriteAccess	RptAccessEnum	0..1	attr	The related data element can be used as output for bypass functionality by RP tool. The data element shall be prepared to rptLevel2 and related write service points are present.

**Table A.701: RptSwPrototypingAccess**

<b>Class</b>	<b>RtePluginProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::FlatMap			
<b>Note</b>	The properties of a communication graph with respect to the utilization of RTE Implementation Plug-in.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
associatedCrossSwClusterComRtePlugin	<a href="#">EcucContainerValue</a>	0..1	ref	This associates a communication graph to a specific RTE Implementation Plug-in handling cross Software Cluster communication.





Class	RtePluginProps			
associatedRtePlugin	<a href="#">EcucContainerValue</a>	0..1	ref	This associates a communication graph to a specific RTE Implementation Plug-in handling local Software Cluster communication or communication in a non-cluster ECU.

**Table A.702: RtePluginProps**

Class	<<atpMixed>> RuleArguments			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	This represents the arguments for a rule-based value specification.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
v	<a href="#">Numerical</a>	0..1	attr	This represents a numerical value for the RuleBased ValueSpecification.
vf	<a href="#">Numerical</a>	0..1	attr	This represents a numerical value for the RuleBased ValueSpecification which may subject to variability. The latest binding time of the VariationPoint shall be pre CompileTime.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
vt	VerbatimString	0..1	attr	This represents a textual value for the RuleBasedValue Specification.
vtf	<a href="#">NumericalOrText</a>	0..1	aggr	This aggregation represents the ability to provide a value that is either numerical or text which existence is subject to variability.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.703: RuleArguments**

Class	RuleBasedAxisCont			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	This represents the values for the axis of a compound primitive (curve, map).  For standard and fix axes, SwAxisCont contains the values of the axis directly.  The axis values of SwAxisCont with the category COM_AXIS, RES_AXIS are for display only. For editing and processing, only the values in the related GroupAxis are binding.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
category	<a href="#">CalprmAxisCategory Enum</a>	0..1	attr	This category specifies the particular axis types: <ul style="list-style-type: none"> <li>• STD_AXIS</li> <li>• COM_AXIS</li> <li>• RES_AXIS (swArraysize necessary)</li> </ul> <b>Tags:</b> xml.sequenceOffset=20
ruleBasedValues	<a href="#">RuleBasedValue Specification</a>	0..1	aggr	This represents the rule based value specification for the axis of a compound primitive (curve, map).  <b>Tags:</b> xml.roleElement=true xml.roleWrapperElement=false xml.sequenceOffset=80 xml.typeWrapperElement=false





Class	RuleBasedAxisCont			
swArraysize	ValueList	0..1	aggr	For multidimensional compound primitives (curve, map ...) it is necessary to know the dimensions. They are specified using swArraySize. <b>Tags:</b> xml.sequenceOffset=40
swAxisIndex	AxisIndexType	0..1	attr	This property allows to explicitly assign the axis contents to a particular axis. It is specified by numbers where 1 corresponds to the x-axis. It is also possible to derive the axis association from the sequence of the parent. <b>Tags:</b> xml.sequenceOffset=50
unit	Unit	0..1	ref	This represents the physical unit of the provided values. <b>Tags:</b> xml.sequenceOffset=30

**Table A.704: RuleBasedAxisCont**

Class	RuleBasedValueCont			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	This represents the values of a compound primitive (CURVE, MAP, CUBOID, CUBE_4, CUBE_5, VAL_BLK) or an array.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
ruleBasedValues	RuleBasedValueSpecification	0..1	aggr	This represents the rule based value specification for the array or compound primitive (CURVE, MAP, CUBOID, CUBE_4, CUBE_5, VAL_BLK). <b>Tags:</b> xml.roleElement=true xml.roleWrapperElement=false xml.sequenceOffset=80 xml.typeWrapperElement=false
swArraysize	ValueList	0..1	aggr	This attribute defines the size of each dimension for compound primitives CURVE, MAP, CUBOID, CUBE_4, CUBE_5, COM_AXIS, RES_AXIS, VAL_BLK. For each dimension one value has to be defined, e.g. one in case of COM_AXIS and two or more in case of MAP. <b>Tags:</b> xml.sequenceOffset=40
unit	Unit	0..1	ref	This represents the physical unit of the provided values. <b>Tags:</b> xml.sequenceOffset=30

**Table A.705: RuleBasedValueCont**

Class	RuleBasedValueSpecification			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	This meta-class is used to support a rule-based initialization approach for data types with an array-nature (ApplicationArrayDataType and ImplementationDataType of category ARRAY) or a compound ApplicationPrimitiveDataType (which also boils down to an array-nature).			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note





Class	RuleBasedValueSpecification			
arguments	<a href="#">RuleArguments</a>	0..1	aggr	This represents the arguments for the RuleBasedValue Specification. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=30
maxSizeToFill	Integer	0..1	attr	If a rule is chosen which does not fill until the end, this determines until which size the rule shall fill the values. <b>Tags:</b> xml.sequenceOffset=40
rule	<a href="#">Identifier</a>	0..1	attr	This denotes the name of the rule of the RuleBasedValue Specification. The rule determines the calculation specification according which the arguments are used to calculated the values. <b>Tags:</b> xml.sequenceOffset=20

**Table A.706: RuleBasedValueSpecification**

Class	RunnableEntity			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior			
Note	A RunnableEntity represents the smallest code-fragment that is provided by an AtomicSwComponent Type and are executed under control of the RTE. RunnableEntities are for instance set up to respond to data reception or operation invocation on a server.			
Base	<a href="#">ARObject</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">ExecutableEntity</a> , <a href="#">Identifiable</a> , <a href="#">Multilanguage</a> , <a href="#">Referrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
argument (ordered)	<a href="#">RunnableEntity</a> <a href="#">Argument</a>	*	aggr	This represents the formal definition of a an argument to a RunnableEntity.
asynchronous ServerCall ResultPoint	<a href="#">AsynchronousServer</a> <a href="#">CallResultPoint</a>	*	aggr	The server call result point admits a runnable to fetch the result of an asynchronous server call.  The aggregation of AsynchronousServerCallResultPoint is subject to variability with the purpose to support the conditional existence of client server PortPrototypes and the variant existence of server call result points in the implementation. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=asynchronousServerCallResultPoint.short Name, asynchronousServerCallResultPoint.variation Point.shortLabel vh.latestBindingTime=preCompileTime
canBeInvoked Concurrently	Boolean	0..1	attr	If the value of this attribute is set to "true" the enclosing RunnableEntity can be invoked concurrently (even for one instance of the corresponding AtomicSwComponent Type). This implies that it is the responsibility of the implementation of the RunnableEntity to take care of this form of concurrency.





Class	RunnableEntity			
dataRead Access	VariableAccess	*	aggr	<p>RunnableEntity has implicit read access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype.</p> <p>The aggregation of dataReadAccess is subject to variability with the purpose to support the conditional existence of sender receiver ports or the variant existence of dataReadAccess in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=dataReadAccess.shortName, dataReadAccess.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
dataReceive PointBy Argument	VariableAccess	*	aggr	<p>RunnableEntity has explicit read access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype. The result is passed back to the application by means of an argument in the function signature.</p> <p>The aggregation of dataReceivePointByArgument is subject to variability with the purpose to support the conditional existence of sender receiver PortPrototype or the variant existence of data receive points in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=dataReceivePointByArgument.shortName, dataReceivePointByArgument.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
dataReceive PointByValue	VariableAccess	*	aggr	<p>RunnableEntity has explicit read access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype.</p> <p>The result is passed back to the application by means of the return value. The aggregation of dataReceivePointByValue is subject to variability with the purpose to support the conditional existence of sender receiver ports or the variant existence of data receive points in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=dataReceivePointByValue.shortName, dataReceivePointByValue.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
dataSendPoint	VariableAccess	*	aggr	<p>RunnableEntity has explicit write access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype.</p> <p>The aggregation of dataSendPoint is subject to variability with the purpose to support the conditional existence of sender receiver PortPrototype or the variant existence of data send points in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=dataSendPoint.shortName, dataSendPoint.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>





Class	RunnableEntity			
dataWrite Access	<a href="#">VariableAccess</a>	*	aggr	<p>RunnableEntity has implicit write access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype.</p> <p>The aggregation of dataWriteAccess is subject to variability with the purpose to support the conditional existence of sender receiver ports or the variant existence of dataWriteAccess in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=dataWriteAccess.shortName, dataWriteAccess.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
external TriggeringPoint	<a href="#">ExternalTriggeringPoint</a>	*	aggr	<p>The aggregation of ExternalTriggeringPoint is subject to variability with the purpose to support the conditional existence of trigger ports or the variant existence of external triggering points in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=externalTriggeringPoint.ident.shortName, externalTriggeringPoint.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
internal TriggeringPoint	<a href="#">InternalTriggeringPoint</a>	*	aggr	<p>The aggregation of InternalTriggeringPoint is subject to variability with the purpose to support the variant existence of internal triggering points in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=internalTriggeringPoint.shortName, internalTriggeringPoint.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
modeAccess Point	ModeAccessPoint	*	aggr	<p>The runnable has a mode access point. The aggregation of ModeAccessPoint is subject to variability with the purpose to support the conditional existence of mode ports or the variant existence of mode access points in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=modeAccessPoint.ident.shortName, modeAccessPoint.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
modeSwitch Point	<a href="#">ModeSwitchPoint</a>	*	aggr	<p>The runnable has a mode switch point. The aggregation of ModeSwitchPoint is subject to variability with the purpose to support the conditional existence of mode ports or the variant existence of mode switch points in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=modeSwitchPoint.shortName, modeSwitchPoint.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>





Class	RunnableEntity			
parameter Access	<a href="#">ParameterAccess</a>	*	aggr	<p>The presence of a ParameterAccess implies that a RunnableEntity needs read only access to a Parameter DataPrototype which may either be local or within a Port Prototype.</p> <p>The aggregation of ParameterAccess is subject to variability with the purpose to support the conditional existence of parameter ports and component local parameters as well as the variant existence of Parameter Access (points) in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=parameterAccess.shortName, parameter Access.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
readLocal Variable	<a href="#">VariableAccess</a>	*	aggr	<p>The presence of a readLocalVariable implies that a RunnableEntity needs read access to a VariableData Prototype in the role of implicitInterRunnableVariable or explicitInterRunnableVariable.</p> <p>The aggregation of readLocalVariable is subject to variability with the purpose to support the conditional existence of implicitInterRunnableVariable and explicit InterRunnableVariable or the variant existence of read LocalVariable (points) in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=readLocalVariable.shortName, readLocal Variable.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
serverCallPoint	<a href="#">ServerCallPoint</a>	*	aggr	<p>The RunnableEntity has a ServerCallPoint. The aggregation of ServerCallPoint is subject to variability with the purpose to support the conditional existence of client server PortPrototypes or the variant existence of server call points in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=serverCallPoint.shortName, serverCall Point.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
symbol	CIdentifier	0..1	attr	<p>The symbol describing this RunnableEntity's entry point. This is considered the API of the RunnableEntity and is required during the RTE contract phase.</p>
waitPoint	<a href="#">WaitPoint</a>	*	aggr	<p>The WaitPoint associated with the RunnableEntity.</p>
writtenLocal Variable	<a href="#">VariableAccess</a>	*	aggr	<p>The presence of a writtenLocalVariable implies that a RunnableEntity needs write access to a VariableData Prototype in the role of implicitInterRunnableVariable or explicitInterRunnableVariable.</p> <p>The aggregation of writtenLocalVariable is subject to variability with the purpose to support the conditional existence of implicitInterRunnableVariable and explicit InterRunnableVariable or the variant existence of written LocalVariable (points) in the implementation.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=writtenLocalVariable.shortName, written LocalVariable.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>

**Table A.707: RunnableEntity**



<b>Class</b>	<b>RunnableEntityArgument</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RunnableEntity			
<b>Note</b>	This meta-class represents the ability to provide specific information regarding the arguments to a RunnableEntity.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
symbol	CIdentifier	0..1	attr	This represents the symbol to be generated into the actual signature on the level of the C programming language.

**Table A.708: RunnableEntityArgument**

<b>Enumeration</b>	<b>RxAcceptContainedIPduEnum</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Defines whether this ContainerIPdu has a fixed set of containedIPdus assigned for reception.			
<b>Literal</b>	<b>Description</b>			
acceptAll	No fixed set of containedIPdus is defined for reception, any known containedIPdu (based on headerId) shall be expected within this ContainerIPdu. <b>Tags:</b> atp.EnumerationLiteralIndex=0			
acceptConfigured	A fixed set of containedIPdus is defined for reception. Only these assigned containedIPdus (based on headerId) are expected in this ContainerIPdu. If a not assigned containedIPdu is received within this ContainerIPdu this containedIPdu is discarded. <b>Tags:</b> atp.EnumerationLiteralIndex=1			

**Table A.709: RxAcceptContainedIPduEnum**

<b>Class</b>	<b>SOMEIPTransformationDescription</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Transformer			
<b>Note</b>	The SOMEIPTransformationDescription is used to specify SOME/IP transformer specific attributes.			
<b>Base</b>	ARObject, Describable, <a href="#">TransformationDescription</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
alignment	PositiveInteger	1	attr	Defines the padding for alignment purposes that will be added by the SOME/IP transformer after the serialized data of the variable data length data element. The alignment shall be specified in Bits.
byteOrder	<a href="#">ByteOrderEnum</a>	1	attr	Defines which byte order shall be serialized by the SOME/IP transformer
interfaceVersion	PositiveInteger	1	attr	The interface version the SOME/IP transformer shall use.

**Table A.710: SOMEIPTransformationDescription**

<b>Class</b>	<<atpVariation>> <b>SOMEIPTransformationISignalProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Transformer			
<b>Note</b>	The class SOMEIPTransformationISignalProps specifies ISignal specific configuration properties for SOME/IP transformer attributes.			
<b>Base</b>	ARObject, Describable, <a href="#">TransformationISignalProps</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	<<atpVariation>> SOMEIPTransformationISignalProps			
implements LegacyString Serialization	Boolean	0..1	attr	<p>This attribute indicates that Strings in the SOME/IP message shall NOT be serialized according to the SOME/IP specification for Strings.</p> <p>If this attribute is set to true, BOM and null-termination shall NOT be added in the serialization for Strings in the payload. If this attribute is set to false (or not set) BOM and null-termination shall be added in the serialization for Strings in the payload according to the SOME/IP specification for Strings.</p> <p>NOTE! This attribute is not future safe, and will be removed in an upcoming AUTOSAR release!"</p>
interfaceVersion	PositiveInteger	0..1	attr	The interface version the SOME/IP transformer shall use.
isDynamic LengthFieldSize	Boolean	0..1	attr	This attribute shall be used to determine the wire type in the context of using the TLV encoding.
messageType	SOMEIPMessageType Enum	0..1	attr	The Message Type which shall be placed into the SOME/IP header.
session HandlingSR	SOMEIPTransformer SessionHandlingEnum	0..1	attr	Defines whether the SOME/IP transformer shall use session handling for Sender/Receiver communication.
sizeOfArray LengthFields	PositiveInteger	0..1	attr	The size of all length fields (in Bytes) of fixed-size arrays or dynamic size arrays in the SOME/IP message. This attribute is valid for all available occurrences of fixed-size arrays or dynamic size arrays in the SOME/IP message.
sizeOfString LengthFields	PositiveInteger	0..1	attr	The size of all length fields (in Bytes) of dynamic length strings in the SOME/IP message. This attribute is valid for all available occurrences of strings in the SOME/IP message.
sizeOfStruct LengthFields	PositiveInteger	0..1	attr	The size of all length fields (in Bytes) of structs in the SOME/IP message. This attribute is valid for all available occurrences of structures in the SOME/IP message. For a more fine granular modeling on the level of Data Prototypes the DataPrototypeTransformationProps shall be used.
sizeOfUnion LengthFields	PositiveInteger	0..1	attr	The size of all length fields (in Bytes) of unions in the SOME/IP message. This attribute is valid for all available occurrences of Unions in the SOME/IP message. For a more fine granular modeling on the level of Data Prototypes the DataPrototypeTransformationProps shall be used.
tlvDataId Definition	<a href="#">TlvDataIdDefinitionSet</a>	*	ref	This reference identifies the TlvDataIdDefinitions relevant for the enclosing SOMEIPTransformationISignalProps

**Table A.711: SOMEIPTransformationISignalProps**

Class	SOMEIPTransformationProps			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The class SOMEIPTransformationProps specifies SOME/IP specific configuration properties.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TransformationProps</a>			
Attribute	Type	Mult.	Kind	Note
alignment	PositiveInteger	0..1	attr	Defines the padding for alignment purposes that will be added by the SOME/IP transformer after the serialized data of the variable data length data element. The alignment shall be specified in Bits.





Class	SOMEIPTransformationProps			
sizeOfArrayLengthField	PositiveInteger	0..1	attr	This attribute describes the size of the length field (in Bytes) that will be put in front of the referenced Array in the SOME/IP message.
sizeOfStringLengthField	PositiveInteger	0..1	attr	This attribute describes the size of the length field (in Bytes) that will be put in front of the referenced String in the SOME/IP message.
sizeOfStructLengthField	PositiveInteger	0..1	attr	This attribute describes the size of the length field (in Bytes) that will be put in front of a Structure in the SOME/IP message.
sizeOfUnionLengthField	PositiveInteger	0..1	attr	This attribute describes the size of the length field (in Bytes) that will be put in front of a Union in the SOME/IP message.

**Table A.712: SOMEIPTransformationProps**

Class	SdgClass			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::SpecialDataDef			
Note	An SdgClass specifies the name and structure of the SDG that may be used to store proprietary data in an AUTOSAR model.  The SdgClass is similar to an UML stereotype.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">SdgElementWithGid</a>			
Attribute	Type	Mult.	Kind	Note
attribute (ordered)	SdgAttribute	*	aggr	Defintion of the structure of the Sdg <b>Tags:</b> xml.sequenceOffset=30
caption	Boolean	0..1	attr	Specifies if a caption is required. Note: only Sdgs that have a caption can be referenced <b>Tags:</b> xml.sequenceOffset=20
extendsMetaClass	MetaClassName	0..1	attr	The AUTOSAR Meta-Class that may be extended by this SdgClass. <b>Tags:</b> xml.sequenceOffset=10
sdgConstraint	<a href="#">TraceableText</a>	*	ref	Semantic constraints that restrict the structure of the special data group. <b>Tags:</b> xml.sequenceOffset=40

**Table A.713: SdgClass**

Class	SdgDef			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::SpecialDataDef			
Note	A SdgDef groups several SdgClasses which belong to the same extension.  The concept of an SdgDef is similiar to an UML Profile. <b>Tags:</b> atp.recommendedPackage=SdgDefs			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
sdgClass	<a href="#">SdgClass</a>	*	aggr	The owned sdgClasses which define the structure of the Sdgs <b>Tags:</b> xml.namePlural=SDG-CLASSES

**Table A.714: SdgDef**

<b>Primitive</b>	<b>SectionInitializationPolicyType</b>
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes
<b>Note</b>	<p>SectionInitializationPolicyType describes the intended initialization of MemorySections. The following values are standardized in AUTOSAR Methodology:</p> <ul style="list-style-type: none"> <li>• <b>INIT</b>: To be used for (explicitly or not explicitly) initialized variables.</li> <li>• <b>CLEARED</b>: To be used for not explicitly initialized variables.</li> <li>• <b>POWER-ON-CLEARED</b>: To be used for variables that are not explicitly initialized (cleared) during normal start-up. Instead these are cleared only after power on reset.</li> </ul> <p>Please note that the values are defined similar to the representation of enumeration types in the XML schema to ensure backward compatibility.</p> <p><b>Tags:</b>  xml.xsd.customType=SECTION-INITIALIZATION-POLICY-TYPE  xml.xsd.type=NMTOKEN</p>

**Table A.715: SectionInitializationPolicyType**

<b>Class</b>	<b>SectionNamePrefix</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::MemorySectionUsage			
<b>Note</b>	A prefix to be used for generated code artifacts defining a memory section name in the source code of the using module or SWC.			
<b>Base</b>	ARObject, <a href="#">ImplementationProps</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
implementedIn	<a href="#">DependencyOnArtifact</a>	0..1	ref	<p>Optional reference that allows to Indicate the code artifact (header file) containing the preprocessor implementation of memory sections with this prefix.</p> <p>The usage of this link supersedes the usage of a memory mapping header with the default name (derived from the BswModuleDescription's shortName).</p>

**Table A.716: SectionNamePrefix**

<b>Class</b>	<b>SecureCommunicationAuthenticationProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Authentication properties used to configure SecuredIPdus.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
authInfoTxLength	PositiveInteger	0..1	attr	This attribute defines the length in bits of the authentication code to be included in the payload of the authenticated Pdu.

**Table A.717: SecureCommunicationAuthenticationProps**

<b>Class</b>	<b>SecureCommunicationFreshnessProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Freshness properties used to configure SecuredIPdus.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	SecureCommunicationFreshnessProps			
freshnessCounterSyncAttempts	PositiveInteger	0..1	attr	This attribute defines the number of Freshness Counter re-synchronization attempts when a verification failed for a Secured I-PDU. If the value is zero, there will be no additional verification attempt to synchronize with a potentially better fitting Freshness Counter value. This attribute is only applicable if useFreshnessTimestamp is FALSE.
freshnessTimestampTimePeriodFactor	PositiveInteger	0..1	attr	This attribute defines a factor that specifies the time period for the Freshness Timestamp. It holds a multiplication factor that specifies the concrete meaning of a Freshness Timestamp increment by one on basis of microseconds.
freshnessValueLength	PositiveInteger	0..1	attr	This attribute defines the complete length in bits of the Freshness Value. As long as the key doesn't change the counter shall not overflow. The length of the counter shall be determined based on the expected life time of the corresponding key and frequency of usage of the counter.
freshnessValueTxLength	PositiveInteger	0..1	attr	This attribute defines the length in bits of the Freshness Value to be included in the payload of the Secured I-PDU. This length is specific to the least significant bits of the complete Freshness Counter. If the attribute is 0 no Freshness Value is included in the Secured I-PDU.
useFreshnessTimestamp	Boolean	0..1	attr	This attribute specifies whether the Freshness Value is generated through individual Freshness Counters or by a Timestamps. The value is set to TRUE when Timestamps are used.

**Table A.718: SecureCommunicationFreshnessProps**

Class	SecureCommunicationProps			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	This meta-class contains configuration settings that are specific for an individual SecuredIPdu.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
authDataFreshnessLength	PositiveInteger	0..1	attr	This attribute defines the length in bits of the authentic PDU data that is passed to the SWC that verifies and generates the Freshness.
authDataFreshnessStartPosition	PositiveInteger	0..1	attr	This value determines the start position in bits of the Authentic PDU that shall be passed on to the SWC that verifies and generates the Freshness. The bit counting is done according to TPS_SYST_01068.
authenticationBuildAttempts	PositiveInteger	0..1	attr	This attribute specifies the number of authentication build attempts.
authenticationRetries	PositiveInteger	1	attr	This attribute defines the additional number of authentication attempts that are to be carried out when the generation of the authentication information failed for a given SecuredIPdu. If zero is set than only one authentication attempt is done.
dataId	PositiveInteger	1	attr	This attribute defines a numerical identifier for the Secured I-PDU.
freshnessValueId	PositiveInteger	0..1	attr	This attribute defines the Id of the Freshness Value. The Freshness Value might be a normal counter or a time value.





Class	SecureCommunicationProps			
messageLinkLength	PositiveInteger	0..1	attr	SecOC links an AuthenticIPdu and CryptographicIPdu together by repeating a specific part (Message Linker) of the AuthenticIPdu in the CryptographicIPdu. This attribute defines the length in bits of the messageLinker.
messageLinkPosition	PositiveInteger	0..1	attr	SecOC links an AuthenticIPdu and CryptographicIPdu together by repeating a specific part (Message Linker) of the AuthenticIPdu in the CryptographicIPdu. This attribute defines the startPosition in bits of the messageLinker.
secondaryFreshnessValueId	PositiveInteger	0..1	attr	This attribute defines the Id of the Secondary Freshness Value. The Secondary Freshness Value might be a normal counter or a time value. Please note that this attribute is for documentation only to allow the configuration of required freshness value manager and no upstream mapping is defined for it.
securedAreaLength	PositiveInteger	0..1	attr	This attribute defines the length in bytes of the area within the payload Pdu which will be secured.
securedAreaOffset	PositiveInteger	0..1	attr	This attribute defines the start position (offset in byte) of the area within the payload Pdu which will be secured.

**Table A.719: SecureCommunicationProps**

Class	SecuredIPdu			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	<p>If useAsCryptographicPdu is not set or set to false this IPdu contains the payload of an Authentic IPdu supplemented by additional Authentication Information (Freshness Counter and an Authenticator).</p> <p>If useAsCryptographicPdu is set to true this IPdu contains the Authenticator for a payload that is transported in a separate message. The separate Authentic IPdu is described by the Pdu that is referenced with the payload reference from this SecuredIPdu.</p> <p><b>Tags:</b>atp.recommendedPackage=Pdus</p>			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	Type	Mult.	Kind	Note
authenticationProps	<a href="#">SecureCommunicationAuthenticationProps</a>	0..1	ref	Reference to authentication properties that are valid for this SecuredIPdu.
freshnessProps	<a href="#">SecureCommunicationFreshnessProps</a>	0..1	ref	Reference to freshness properties that are valid for this SecuredIPdu.
payload	<a href="#">PduTriggering</a>	1	ref	Reference to a Pdu that will be protected against unauthorized manipulation and replay attacks.
secureCommunicationProps	<a href="#">SecureCommunicationProps</a>	1	aggr	Specific configuration properties for this SecuredIPdu.
useAsCryptographicIPdu	Boolean	0..1	attr	<p>If this attribute is set to true the SecuredIPdu contains the Authentication Information for an AuthenticIPdu that is transmitted in a separate message. The AuthenticIPdu contains the original payload, i.e. the secured data.</p> <p>If this attribute is set to false this SecuredIPdu contains the payload of an Authentic IPdu supplemented by additional Authentication Information.</p>
useSecuredPduHeader	SecuredPduHeaderEnum	0..1	attr	This attribute defines the size of the header which is inserted into the SecuredIPdu. If this attribute is set to anything but noHeader, the SecuredIPdu contains the Secured I-PDU Header to indicate the length of the AuthenticIPdu. The AuthenticIPdu contains the original payload, i.e. the secured data.

**Table A.720: SecuredIPdu**

<b>Class</b>	<b>SecurityEventContextProps</b>			
<b>Package</b>	M2::AUTOSARTemplates::SecurityExtractTemplate			
<b>Note</b>	<p>This meta-class specifies the SecurityEventDefinition to be mapped to an IdsmInstance and adds mapping-dependent properties of this security event valid only for this specific mapping.</p> <p><b>Tags:</b>atp.Status=draft</p>			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
contextData	SecurityEventContextData	0..1	aggr	<p>This aggregation represents the definition of optional context data for security events.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> atp.Status=draft vh.latestBindingTime=systemDesignTime</p>
defaultReportingMode	SecurityEventReportingModeEnum	0..1	attr	<p>This attribute defines the default reporting mode for the referenced security event.</p> <p><b>Tags:</b>atp.Status=draft</p>
persistentStorage	Boolean	0..1	attr	<p>This attribute controls whether qualified reportings of the referenced security event shall be stored persistently by the mapped IdsmInstance or not.</p> <p><b>Tags:</b>atp.Status=draft</p>
securityEvent	SecurityEventDefinition	0..1	ref	<p>This reference defines the security event that is mapped and enriched by SecurityEventMappingProps with mapping dependent properties.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> atp.Status=draft vh.latestBindingTime=systemDesignTime</p>
sensorInstanceId	PositiveInteger	0..1	attr	<p>This attribute defines the ID of the security sensor that detects the referenced security event.</p> <p><b>Tags:</b>atp.Status=draft</p>
severity	PositiveInteger	0..1	attr	<p>This attribute defines how critical/severe the referenced security event is. Please note that currently, the severity level meanings of specific integer values is not specified by AUTOSAR but left to the party responsible for the IDS system design (e.g. the OEM).</p> <p><b>Tags:</b>atp.Status=draft</p>

**Table A.721: SecurityEventContextProps**

<b>Class</b>	<b>SegmentPosition</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	<p>The StaticPart and the DynamicPart can be separated in multiple segments within the multiplexed PDU.</p> <p>The ISignalPdu's are copied bit by bit into the MultiplexedIPdu. If the space of the first segment is 5 bits large than the first 5 bits of the ISignalPdu are copied into this first segment and so on.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
segmentByteOrder	<a href="#">ByteOrderEnum</a>	1	attr	<p>This attribute defines the order of the bytes of the segment and the packing into the MultiplexedIPdu. Please consider that <a href="#">[constr_3247]</a> and <a href="#">[constr_3224]</a> are restricting the usage of this attribute.</p>
segmentLength	Integer	1	attr	Data Length of the segment in bits.





Class	SegmentPosition			
segment Position	Integer	1	attr	<p>Segments bit position relatively to the beginning of a multiplexed IPdu.</p> <p>Note that the absolute position of the segment in the MultiplexedIPdu is determined by the definition of the segmentByteOrder attribute of the SegmentPosition. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.</p>

Table A.722: SegmentPosition

Class	SenderComSpec (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Communication attributes for a sender port (PPortPrototype typed by SenderReceiverInterface).			
Base	ARObject, PPortComSpec			
Subclasses	NonqueuedSenderComSpec, QueuedSenderComSpec			
Attribute	Type	Mult.	Kind	Note
composite Network Representation	CompositeNetworkRepresentation	*	aggr	This represents a CompositeNetworkRepresentation defined in the context of a SenderComSpec.
dataElement	AutosarDataPrototype	0..1	ref	Data element these quality of service attributes apply to.
handleOutOf Range	HandleOutOfRangeEnum	0..1	attr	This attribute controls how out-of-range values shall be dealt with.
network Representation	SwDataDefProps	0..1	aggr	A networkRepresentation is used to define how the data Element is mapped to a communication bus.
transmission Acknowledge	TransmissionAcknowledgementRequest	0..1	aggr	Requested transmission acknowledgement for data element.
transmission Props	TransmissionComSpec Props	0..1	aggr	This aggregation represents the definition transmission props in the context of the enclosing SenderComSpec.
usesEndToEnd Protection	Boolean	0..1	attr	<p>This indicates whether the corresponding dataElement shall be transmitted using end-to-end protection.</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime</p>

Table A.723: SenderComSpec

Class	SenderRecArrayElementMapping
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping







Class	SenderRecArrayElementMapping			
Note	<p>The SenderRecArrayElement may be a primitive one or a composite one. If the element is primitive, it will be mapped to the SystemSignal (multiplicity 1). If the VariableDataPrototype that is referenced by SenderReceiverToSignalGroupMapping is typed by an ApplicationDataType the reference to the ApplicationArrayElement shall be used. If the VariableDataPrototype is typed by the ImplementationDataType the reference to the ImplementationArrayElement shall be used.</p> <p>If the element is composite, there will be no mapping to the SystemSignal (multiplicity 0). In this case the ArrayElementMapping element will aggregate the TypeMapping element. In that way also the composite datatypes can be mapped to SystemSignals.</p> <p>Regardless whether composite or primitive array element is mapped the indexed element always needs to be specified.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
complexTypeMapping	<a href="#">SenderRecCompositeTypeMapping</a>	0..1	aggr	This aggregation will be used if the element is composite.
indexedArrayElement	<a href="#">IndexedArrayElement</a>	1	aggr	Reference to an indexed array element in the context of the dataElement or in the context of a composite element.
systemSignal	<a href="#">SystemSignal</a>	0..1	ref	Reference to the system signal used to carry the primitive ApplicationArrayElement.

**Table A.724: SenderRecArrayElementMapping**

Class	SenderRecCompositeTypeMapping (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	<p>Two mappings exist for the composite data types: "ArrayTypeMapping" and "RecordTypeMapping". In both, a primitive datatype will be mapped to a system signal.</p> <p>But it is also possible to combine the arrays and the records, so that an "array" could be an element of a "record" and in the same manner a "record" could be an element of an "array". Nesting these data types is also possible.</p> <p>If an element of a composite data type is again a composite one, the "CompositeTypeMapping" element will be used one more time (aggregation between the ArrayElementMapping and CompositeTypeMapping or aggregation between the RecordElementMapping and CompositeTypeMapping).</p>			
Base	ARObject			
Subclasses	SenderRecArrayTypeMapping, SenderRecRecordTypeMapping			
Attribute	Type	Mult.	Kind	Note
—	—	—	—	—

**Table A.725: SenderRecCompositeTypeMapping**

Class	SenderRecRecordElementMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	<p>Mapping of a primitive record element to a SystemSignal. If the VariableDataPrototype that is referenced by SenderReceiverToSignalGroupMapping is typed by an ApplicationDataType the reference applicationRecordElement shall be used. If the VariableDataPrototype is typed by the ImplementationDataType the reference implementationRecordElement shall be used. Either the implementationRecordElement or applicationRecordElement reference shall be used.</p> <p>If the element is composite, there will be no mapping to the SystemSignal (multiplicity 0). In this case the RecordElementMapping element will aggregate the complexTypeMapping element. In that way also the composite datatypes can be mapped to SystemSignals.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note





Class	SenderRecRecordElementMapping			
applicationRecordElement	<a href="#">ApplicationRecordElement</a>	0..1	ref	Reference to an ApplicationRecordElement in the context of the dataElement or in the context of a composite element.
complexTypeMapping	<a href="#">SenderRecCompositeTypeMapping</a>	0..1	aggr	This aggregation will be used if the element is composite.
implementationRecordElement	<a href="#">ImplementationDataElement</a>	0..1	ref	Reference to an ImplementationRecordElement in the context of the dataElement or in the context of a composite element.
senderToSignalTextTableMapping	<a href="#">TextTableMapping</a>	0..1	aggr	This mapping allows for the text-table translation between the sending DataPrototype that is defined in the Port Prototype and the physicalProps defined for the System Signal.
signalToReceiverTextTableMapping	<a href="#">TextTableMapping</a>	0..1	aggr	This mapping allows for the text-table translation between the physicalProps defined for the SystemSignal and a receiving DataPrototype that is defined in the Port Prototype.
systemSignal	<a href="#">SystemSignal</a>	0..1	ref	Reference to the system signal used to carry the primitive ApplicationRecordElement.

**Table A.726: SenderRecRecordElementMapping**

Class	SenderReceiverAnnotation (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::ApplicationAttributes			
Note	Annotation of the data elements in a port that realizes a sender/receiver interface.			
Base	ARObject, GeneralAnnotation			
Subclasses	ReceiverAnnotation, SenderAnnotation			
Attribute	Type	Mult.	Kind	Note
computed	Boolean	0..1	attr	Flag whether this data element was not measured directly but instead was calculated from possibly several other measured or calculated values.
dataElement	<a href="#">VariableDataPrototype</a>	0..1	ref	The instance of VariableDataPrototype annotated.
limitKind	DataLimitKindEnum	0..1	attr	This min or max has not to be mismatched with the min- and max for data-value in a compu-method. For example, this annotation shows when the result of the calculation performed in a RunnableEntity owned by one AtomicSw ComponentType is transmitted to another AtomicSw ComponentType whose RunnableEntity will use this value as a limit, e.g. the max.power which can be used by that software-component, or the current min. slip.
processingKind	ProcessingKindEnum	0..1	attr	This attribute controls how data is processed according to the possible values of ProcessingKindEnum.

**Table A.727: SenderReceiverAnnotation**

Class	SenderReceiverCompositeElementToSignalMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Mapping of an Variable Data Prototype which is aggregated within a composite datatype to a System Signal (only one element of the composite data type is mapped).			
Base	ARObject, <a href="#">DataMapping</a>			
Attribute	Type	Mult.	Kind	Note





Class	SenderReceiverCompositeElementToSignalMapping			
dataElement	<a href="#">VariableDataPrototype</a>	0..1	iref	Reference to a data element with a composite datatype from which one element is mapped to a SystemSignal. <b>InstanceRef implemented by:</b> <a href="#">VariableDataPrototypeInSystemInstanceRef</a>
systemSignal	<a href="#">SystemSignal</a>	1	ref	Reference to the SystemSignal to which one primitive of the composite type is mapped.
typeMapping	<a href="#">SenderRecCompositeTypeMapping</a>	1	aggr	The CompositeTypeMapping maps one VariableData Prototype of the composite data type to a SystemSignal.

**Table A.728: SenderReceiverCompositeElementToSignalMapping**

Class	SenderReceiverInterface			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	A sender/receiver interface declares a number of data elements to be sent and received. <b>Tags:</b> atp.recommendedPackage=PortInterfaces			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">DataInterface</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">PortInterface</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
dataElement	<a href="#">VariableDataPrototype</a>	*	aggr	The data elements of this SenderReceiverInterface.
invalidationPolicy	<a href="#">InvalidationPolicy</a>	*	aggr	InvalidationPolicy for a particular dataElement
metaDataItemSet	<a href="#">MetaDataItemSet</a>	*	aggr	This aggregation defines fixed sets of meta-data items associated with dataElements of the enclosing Sender ReceiverInterface

**Table A.729: SenderReceiverInterface**

Class	SenderReceiverToSignalGroupMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Mapping of a sender receiver communication data element with a composite datatype to a signal group.			
Base	<a href="#">ARObject</a> , <a href="#">DataMapping</a>			
Attribute	Type	Mult.	Kind	Note
dataElement	<a href="#">VariableDataPrototype</a>	1	iref	Reference to a data element with a composite datatype which is mapped to a signal group. <b>InstanceRef implemented by:</b> <a href="#">VariableDataPrototypeInSystemInstanceRef</a>
signalGroup	<a href="#">SystemSignalGroup</a>	1	ref	Reference to the signal group, which contain all primitive datatypes of the composite type
typeMapping	<a href="#">SenderRecCompositeTypeMapping</a>	1	aggr	The CompositeTypeMapping maps the ApplicationArray Elements and ApplicationRecordElements to Signals of the SignalGroup.

**Table A.730: SenderReceiverToSignalGroupMapping**

Class	SenderReceiverToSignalMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Mapping of a sender receiver communication data element to a signal.			
Base	<a href="#">ARObject</a> , <a href="#">DataMapping</a>			





Class	SenderReceiverToSignalMapping			
Attribute	Type	Mult.	Kind	Note
dataElement	<a href="#">VariableDataPrototype</a>	1	iref	Reference to the data element. <b>InstanceRef implemented by:</b> <a href="#">VariableDataPrototypeInSystemInstanceRef</a>
senderToSignal TextTable Mapping	<a href="#">TextTableMapping</a>	0..1	aggr	This mapping allows for the text-table translation between the sending DataPrototype that is defined in the Port Prototype and the physicalProps defined for the System Signal.
signalTo ReceiverText TableMapping	<a href="#">TextTableMapping</a>	0..1	aggr	This mapping allows for the text-table translation between the physicalProps defined for the SystemSignal and a receiving DataPrototype that is defined in the Port Prototype.
systemSignal	<a href="#">SystemSignal</a>	1	ref	Reference to the system signal used to carry the data element.

**Table A.731: SenderReceiverToSignalMapping**

Class	SensorActuatorSwComponentType			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	The SensorActuatorSwComponentType introduces the possibility to link from the software representation of a sensor/actuator to its hardware description provided by the ECU Resource Template. <b>Tags:</b> atp.recommendedPackage=SwComponentTypes			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtomicSwComponentType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
Attribute	Type	Mult.	Kind	Note
sensorActuator	<a href="#">HwDescriptionEntity</a>	0..1	ref	Reference from the Sensor Actuator Software Component Type to the description of the actual hardware.

**Table A.732: SensorActuatorSwComponentType**

Enumeration	ServerArgumentImplPolicyEnum			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	This defines how the argument type of the servers RunnableEntity is implemented.			
Literal	Description			
useArgumentType	The argument type of the RunnableEntity is derived from the AutosarDataType of the Argument Prototype. <b>Tags:</b> atp.EnumerationLiteralIndex=0			
useVoid	The argument type of the RunnableEntity is void. <b>Tags:</b> atp.EnumerationLiteralIndex=2			

**Table A.733: ServerArgumentImplPolicyEnum**

Class	ServerCallPoint (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::ServerCall			
Note	If a RunnableEntity owns a ServerCallPoint it is entitled to invoke a particular ClientServerOperation of a specific RPortPrototype of the corresponding AtomicSwComponentType			
Base	<a href="#">ARObject</a> , <a href="#">AbstractAccessPoint</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			





Class	<b>ServerCallPoint</b> (abstract)			
Subclasses	<a href="#">AsynchronousServerCallPoint</a> , <a href="#">SynchronousServerCallPoint</a>			
Attribute	Type	Mult.	Kind	Note
operation	<a href="#">ClientServerOperation</a>	0..1	iref	The operation that is called by this runnable.  <b>InstanceRef implemented by:</b> ROperationInAtomicSwc InstanceRef
timeout	TimeValue	0..1	attr	Time in seconds before the server call times out and returns with an error message. It depends on the call type (synchronous or asynchronous) how this is reported.

**Table A.734: ServerCallPoint**

Class	<b>ServerComSpec</b>			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Communication attributes for a server port (PPortPrototype and ClientServerInterface).			
Base	<a href="#">ARObject</a> , <a href="#">PPortComSpec</a>			
Attribute	Type	Mult.	Kind	Note
operation	<a href="#">ClientServerOperation</a>	0..1	ref	Operation these communication attributes apply to.
queueLength	PositiveInteger	0..1	attr	Length of call queue on the server side. The queue is implemented by the RTE. The value shall be greater or equal to 1. Setting the value of queueLength to 1 implies that incoming requests are rejected while another request that arrived earlier is being processed.
transformation ComSpecProps	TransformationCom SpecProps	*	aggr	This references the TransformationComSpecProps which define port-specific configuration for data transformation.

**Table A.735: ServerComSpec**

Class	<b>ServiceDependency</b> (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	Collects all dependencies of a software module or component on an AUTOSAR Service related to a specific item (e.g. an NVRAM Block, a diagnostic event etc.). It defines the quality of service (Service Needs) of this item as well as (optionally) references to additional elements.  This information is required for tools in order to generate the related basic software configuration and ServiceSwComponentTypes.			
Base	<a href="#">ARObject</a>			
Subclasses	<a href="#">BswServiceDependency</a> , <a href="#">SwcServiceDependency</a>			
Attribute	Type	Mult.	Kind	Note
assignedData Type	<a href="#">RoleBasedDataType Assignment</a>	0..1	aggr	This is the role of the assignment data type in the given context.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
diagnostic Relevance	ServiceDiagnostic RelevanceEnum	0..1	attr	If this attribute indicates a relevance for diagnostics then the integrator has a much easier time identifying the candidates for the configuration of the diagnostic stack.  Example: identification of mode conditions (e.g. communication between application and BswM) relevant for the Dcm.
symbolicName Props	SymbolicNameProps	0..1	aggr	This attribute can be taken to contribute to the creation of symbolic name values.

**Table A.736: ServiceDependency**

<b>Class</b>	<b>ServiceNeeds</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	This expresses the abstract needs that a Software Component or Basic Software Module has on the configuration of an AUTOSAR Service to which it will be connected. "Abstract needs" means that the model abstracts from the Configuration Parameters of the underlying Basic Software.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	BswMgrNeeds, ComMgrUserNeeds, CryptoKeyManagementNeeds, CryptoServiceJobNeeds, CryptoServiceNeeds, <a href="#">DiagnosticCapabilityElement</a> , DltUserNeeds, <a href="#">DolpServiceNeeds</a> , EcuStateMgrUserNeeds, <a href="#">ErrorTracerNeeds</a> , FunctionInhibitionAvailabilityNeeds, <a href="#">FunctionInhibitionNeeds</a> , GlobalSupervisionNeeds, HardwareTestNeeds, IdsMgrCustomTimestampNeeds, IdsMgrNeeds, IndicatorStatusNeeds, J1939DcmDm19Support, J1939RmIncomingRequestServiceNeeds, J1939RmOutgoingRequestServiceNeeds, <a href="#">NvBlockNeeds</a> , SecureOnBoardCommunicationNeeds, SupervisedEntityCheckpointNeeds, <a href="#">SupervisedEntityNeeds</a> , SyncTimeBaseMgrUserNeeds, V2xFacUserNeeds, V2xMUserNeeds, VendorSpecificServiceNeeds			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

Table A.737: ServiceNeeds

<b>Class</b>	<b>ServiceProxySwComponentType</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Components			
<b>Note</b>	<p>This class provides the ability to express a software-component which provides access to an internal service for remote ECUs. It acts as a proxy for the service providing access to the service.</p> <p>An important use case is the request of vehicle mode switches: Such requests can be communicated via sender-receiver interfaces across ECU boundaries, but the mode manager being responsible to perform the mode switches is an AUTOSAR Service which is located in the Basic Software and is not visible in the VFB view. To handle this situation, a ServiceProxySwComponentType will act as proxy for the mode manager. It will have R-Ports to be connected with the mode requestors on VFB level and Service-Ports to be connected with the local mode manager at ECU integration time.</p> <p>Apart from the semantics, a ServiceProxySwComponentType has these specific properties:</p> <ul style="list-style-type: none"> <li>• A prototype of it can be mapped to more than one ECUs in the system description.</li> <li>• Exactly one additional instance of it will be created in the ECU-Extract per ECU to which the prototype has been mapped.</li> <li>• For remote communication, it can have only R-Ports with sender-receiver interfaces and 1:n semantics.</li> <li>• There shall be no connectors between two prototypes of any ServiceProxySwComponentType.</li> </ul> <p><b>Tags:</b>atp.recommendedPackage=SwComponentTypes</p>			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, <a href="#">AtomicSwComponentType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

Table A.738: ServiceProxySwComponentType

<b>Class</b>	<b>ServiceSwComponentType</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Components			
<b>Note</b>	<p>ServiceSwComponentType is used for configuring services for a given ECU. Instances of this class are only to be created in ECU Configuration phase for the specific purpose of the service configuration.</p> <p><b>Tags:</b>atp.recommendedPackage=SwComponentTypes</p>			





Class	ServiceSwComponentType			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtomicSwComponentType</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">SwComponentType</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.739: ServiceSwComponentType**

Enumeration	ServiceVersionAcceptanceKindEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances
Note	Defined the possible acceptance kinds for required service instances. <b>Tags:</b> atp.Status=draft
Literal	Description
exactOrAnyMinorVersion	Search for ANY or specific minor version service instance and select either ALL returned service instances (in case of ANY) or exactly the specific minor version service instances defined in required MinorVersion. <b>Tags:</b> atp.EnumerationLiteralIndex=0 atp.Status=draft
minimumMinorVersion	Search for ANY minor version service instance and select only those service instances which have an equal or greater minor version than given in requiredMinorVersion. <b>Tags:</b> atp.EnumerationLiteralIndex=1 atp.Status=draft

**Table A.740: ServiceVersionAcceptanceKindEnum**

Enumeration	SignalServiceTranslationControlEnum
Package	M2::AUTOSARTemplates::CommonStructure::SignalServiceTranslation
Note	This enumeration allows to define how the service instance offer/subscribe control shall behave.
Literal	Description
partialNetwork	Defines the start of service control when specific partial networks are active. <b>Tags:</b> atp.EnumerationLiteralIndex=1
serviceDiscovery	Defines the start of service control when other service is available. <b>Tags:</b> atp.EnumerationLiteralIndex=2
translationStart	Defines the start of service control at translation start. <b>Tags:</b> atp.EnumerationLiteralIndex=0

**Table A.741: SignalServiceTranslationControlEnum**

Class	SignalServiceTranslationElementProps			
Package	M2::AUTOSARTemplates::CommonStructure::SignalServiceTranslation			
Note	Defined translation properties for individual mapped elements.			
Base	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
element	<a href="#">DataPrototypeReference</a>	0..1	aggr	Reference to the leaf element the SignalService TranslationElementProps apply to.







Class	SignalServiceTranslationElementProps			
filter	<a href="#">DataFilter</a>	0..1	aggr	Defines an optional filter to be applied during translation.
transmission Trigger	Boolean	0..1	attr	Defines whether the source element (which is mapped to the referenced element) triggers the sending of the respective payload.

**Table A.742: SignalServiceTranslationElementProps**

Class	SignalServiceTranslationEventProps			
Package	M2::AUTOSARTemplates::CommonStructure::SignalServiceTranslation			
Note	This element allows to define the properties which are applicable for the signal/service translation event.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
elementProps	<a href="#">SignalServiceTranslationElementProps</a>	*	aggr	Defines properties for a single translated element.
safeTranslation	Boolean	1	attr	Defined whether the translation shall happen in a safe way.
secure Translation	Boolean	1	attr	Defined whether the translation shall happen in a secure way.
translation Target	<a href="#">VariableDataPrototype</a>	0..1	iref	Reference to a VariableDataPrototype representing the target of signal/service translation.  <b>InstanceRef implemented by:</b> <a href="#">VariableDataPrototypeInSystemInstanceRef</a>

**Table A.743: SignalServiceTranslationEventProps**

Class	SignalServiceTranslationProps			
Package	M2::AUTOSARTemplates::CommonStructure::SignalServiceTranslation			
Note	This element allows to define the properties which are applicable for the signal/service translation service.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
control Consumed EventGroup	<a href="#">ConsumedEventGroup</a>	*	ref	Reference to the EventGroup which encapsulates the signal-based payload.
controlPnc	<a href="#">PncMappingIdent</a>	*	ref	Reference to the PNCs which control the offer/subscribe behavior of the translated service instance.
controlProvided EventGroup	<a href="#">EventHandler</a>	*	ref	Reference to the provided event group (aka Event Handler) which is automatically available when service Control equals translationStart.
serviceControl	<a href="#">SignalServiceTranslationControlEnum</a>	1	attr	Defines how the service instance control shall behave.
signalService Translation EventProps	<a href="#">SignalServiceTranslationEventProps</a>	*	aggr	Defines properties for a single translated event.

**Table A.744: SignalServiceTranslationProps**



<b>Class</b>	<b>SimulatedExecutionTime</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::ExecutionTime			
<b>Note</b>	Specifies the ExecutionTime which has been gathered using simulation means.			
<b>Base</b>	ARObject, ExecutionTime, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
maximum ExecutionTime	MultidimensionalTime	1	aggr	The maximum simulated execution time.
minimum ExecutionTime	MultidimensionalTime	1	aggr	The minimum simulated execution time.
nominal ExecutionTime	MultidimensionalTime	1	aggr	The nominal simulated execution time.

**Table A.745: SimulatedExecutionTime**

<b>Class</b>	<b>SoAdConfig</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
<b>Note</b>	SoAd Configuration for one specific Physical Channel.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
connection	<a href="#">SocketConnection</a>	*	aggr	This aggregation is obsolete and will be removed in the future. The connectionGroup aggregation with bundled Connections shall be used instead.  Old description: Collection of socket connections.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> atp.Status=obsolete vh.latestBindingTime=postBuild
connection Bundle	SocketConnection Bundle	*	aggr	Collection of SocketConnectionBundles.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> atp.Status=obsolete vh.latestBindingTime=postBuild
socketAddress	<a href="#">SocketAddress</a>	1..*	aggr	Collection of SoAdAddresses.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild

**Table A.746: SoAdConfig**

<b>Class</b>	<b>SoConIPduIdentifier</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
<b>Note</b>	Identification of Pdu content on a socket connection. This Identifier is required in case that multiple Pdus are transmitted over the same socket connection.			
<b>Base</b>	ARObject, <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
headerId	PositiveInteger	0..1	attr	If multiple Pdus are transmitted over the same connection this headerId can be used to distinguish between the different Pdus.
pduCollection PduTimeout	TimeValue	0..1	attr	Defines the timeout in seconds the PDU collection shall be transmitted at the latest after this PDU has been put into the buffer.





Class	SoConIPdulIdentifier			
pduCollectionSemantics	PduCollectionSemanticsEnum	0..1	attr	Specifies if the referenced PduTriggering shall be collected using a queued (i.e. all PDU instances) or last-is-best (i.e. only the last PDU instance) semantics. If this attribute is not present the behavior of "queued" is assumed.
pduCollectionTrigger	PduCollectionTriggerEnum	0..1	attr	Defines whether the referenced Pdu contributes to the triggering of the socket transmission if Pdu collection is enabled for this socket.
pduTriggering	<a href="#">PduTriggering</a>	0..1	ref	Reference to a Pdu that is transmitted over a socket connection.

**Table A.747: SoConIPdulIdentifier**

Class	SocketAddress			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
Note	This meta-class represents a socket address towards the rest of the meta-model. The actual semantics of the represented socket address, however, is contributed by aggregation of an ApplicationEndpoint.			
Base	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
allowedIPv6ExtHeaders	<a href="#">IPv6ExtHeaderFilterList</a>	0..1	ref	Reference to a list of IPv6 Extension Headers allowed for this SocketConnection. If no list is referenced all IPv6 Extension Headers are allowed and processed.
allowedTcpOptions	TcpOptionFilterList	0..1	ref	Reference to a list of TCP options allowed for this Socket Connection.
applicationEndpoint	<a href="#">ApplicationEndpoint</a>	0..1	aggr	Application addressing
connector	<a href="#">EthernetCommunicationConnector</a>	0..1	ref	Association to a CommunicationConnector in the topology description. This reference shall be used if the SocketAddress describes an IP unicast address for an ECU that is part of the model.
differentiatedServiceField	PositiveInteger	0..1	attr	The 6-bit Differentiated Service Field in the IP headers may be used for classifying network traffic. If not set a value of zero is used to indicate packets that have not been classified.
flowLabel	PositiveInteger	0..1	attr	The 20-bit Flow Label field in the IPv6 header may be used by a source to label sequences of packets for which it requests special handling by the IPv6 routers, such as non-default quality of service. If not set a Flow Label of zero is used to indicate packets that have not been labeled.
multicastConnector	<a href="#">EthernetCommunicationConnector</a>	*	ref	Association to a CommunicationConnector in the topology description. This reference shall be used if the Socket Address describes an IP multicast address. This multicast SocketAddress contains references to those ECUs in the model that want to receive the multicast messages.
pathMtuDiscoveryEnabled	Boolean	0..1	attr	Defines whether the Path MTU Discovery shall be performed for the related socket.
pduCollectionMaxBufferSize	PositiveInteger	0..1	attr	Defines the maximum buffer size in Byte which shall be filled before a socket with Pdu collection enabled shall be transmitted to the lower layer.
pduCollectionTimeout	TimeValue	0..1	attr	Defines the time in seconds which shall pass before a socket with Pdu collection enabled shall be transmitted to the lower layer after the first Pdu has been put into the socket buffer.





Class	SocketAddress			
staticSocketConnection	<a href="#">StaticSocketConnection</a>	*	aggr	Definition of a static SocketConnection. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
udpChecksumHandling	UdpChecksumCalculationEnum	0..1	attr	Specifies if UDP checksum handling shall be enabled (udpChecksumEnabled) or skipped (udpChecksumDisabled) on the related socket connection.

**Table A.748: SocketAddress**

Class	SocketConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ObsoleteModel			
Note	The SoAd serves as a (De)Multiplexer between different PDU sources and the TCP/IP stack. <b>Tags:</b> atp.Status=obsolete			
Base	ARObject, Describable			
Attribute	Type	Mult.	Kind	Note
clientIpAddrFromConnectionRequest	Boolean	0..1	attr	If set to true the Server "learns" the client IP address on connection request. This means that the statically configured IP Address of the related client shall be ignored. If set to false the Server only accepts statically configured IP address, e.g. 192.168.1.2. This means that the statically configured IP Address of the Client shall be used.
clientPort	<a href="#">SocketAddress</a>	0..1	ref	Client Port for TCP/UDP connection in an abstract communication sense. The client is the major requester of the communication. Please note that the client may also produce data. <b>Tags:</b> atp.Status=obsolete
clientPortFromConnectionRequest	Boolean	0..1	attr	If set to true the Server "learns" the client Port on connection request. This means that the statically configured Port of the related client shall be ignored. If set to false the Server only accepts statically configured Port. This means that the statically configured Port of the Client shall be used.
pdu	SocketConnectionIpduIdentifier	*	aggr	PDUs handed over by the PDU Router (Transmission over the Ethernet) or PDUs handed over by SoAd (Reception over Ethernet). Multiple IPdus can be transmitted over one socket connection. <b>Tags:</b> atp.Status=obsolete
pduCollectionMaxBufferSize	PositiveInteger	0..1	attr	Defines the maximum buffer size in Byte which shall be filled before a socket with Pdu collection enabled shall be transmitted to the lower layer.
pduCollectionTimeout	TimeValue	0..1	attr	Defines the time in seconds which shall pass before a socket with Pdu collection enabled shall be transmitted to the lower layer after the first Pdu has been put into the socket buffer.
runtimeIpAddressConfiguration	RuntimeAddressConfigurationEnum	0..1	attr	This attribute determines which protocol is used by the client to obtain the IP Address information. If this attribute is not set to none the value determines the service used by the client to obtain the IP Address information for the SocketConnection. If this attribute is set to none the client used the statically configured IP Address information.





Class	SocketConnection			
runtimePort Configuration	RuntimeAddress ConfigurationEnum	0..1	attr	This attribute determines which protocol is used by the client to obtain the Port information. If this attribute is not set to none the value determines the service used by the client to obtain the Port information for the Socket Connection. If this attribute is set to none the client uses the statically configured Port information.
shortLabel	Identifier	0..1	attr	This attribute specifies an identifying shortName for the SocketConnection. It shall be unique within its context.

Table A.749: SocketConnection

Class	SomeipSdClientEventGroupTimingConfig			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
Note	This meta-class is used to specify configuration related to service discovery in the context of an event group on SOME/IP. <b>Tags:</b> atp.recommendedPackage=SomeipSdTimingConfigs			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, Packageable Element, Referrable			
Attribute	Type	Mult.	Kind	Note
request ResponseDelay	RequestResponseDelay	0..1	aggr	The Service Discovery shall delay answers to unicast messages triggered by multicast messages (e.g. Subscribe Eventgroup after Offer Service).
subscribe Eventgroup RetryDelay	TimeValue	0..1	attr	This attribute defines the interval in seconds to re-trigger a subscription to a Eventgroup, if a retry to subscribe to a Eventgroup is configured (subscribeEventgroupRetryMax > 0).
subscribe Eventgroup RetryMax	PositiveInteger	0..1	attr	This attribute define the maximum counts of retries to subscribe to an Eventgroup. If the value is set to 0 no retry shall be done. If the value is set to 255 the retry shall be done as long as the Eventgroup is requested and no SubscribeEventGroupAck was received.
timeToLive	PositiveInteger	1	attr	Defines the time in seconds the subscription of this event is expected by the client. this value is sent from the client to the server in the SD-subscribeEvent message.

Table A.750: SomeipSdClientEventGroupTimingConfig

Class	SomeipSdServerServiceInstanceConfig			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
Note	Server specific settings that are relevant for the configuration of SOME/IP Service-Discovery. <b>Tags:</b> atp.recommendedPackage=SomeipSdTimingConfigs			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, Packageable Element, Referrable			
Attribute	Type	Mult.	Kind	Note
initialOffer Behavior	InitialSdDelayConfig	0..1	aggr	Controls offer behavior of the server.
offerCyclicDelay	TimeValue	0..1	attr	Optional attribute to define cyclic offers. Cyclic offer is active, if the delay is set (in seconds).





Class	SomeipSdServerServiceInstanceConfig			
priority	PositiveInteger	0..1	attr	This attribute defines the VLAN frame priority for Service Discovery messages that result from ProvidedSomeipServiceInstances that are referencing the SomeipSdServerServiceInstanceConfig (OfferService, StopOfferService, SubscribeEventGroupAck). Values from 0 (best effort) to 7 (highest) are allowed.
request ResponseDelay	RequestResponseDelay	0..1	aggr	Maximum/Minimum allowable response delay to entries received by multicast in seconds. The Service Discovery shall delay answers to entries that were transported in a multicast SOME/IP-SD message (e.g. FindService).
serviceOffer TimeToLive	PositiveInteger	1	attr	Defines the time in seconds the service offer is valid.

**Table A.751: SomeipSdServerServiceInstanceConfig**

Class	SomeipServiceVersion			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
Note	This meta-class represents the ability to describe a version of a SOME/IP Service. <b>Tags:</b> atp.Status=draft			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
majorVersion	PositiveInteger	0..1	attr	Major Version of the ServiceInterface. <b>Tags:</b> atp.Status=draft xml.sequenceOffset=10
minorVersion	PositiveInteger	1	attr	Minor Version of the ServiceInterface. <b>Tags:</b> atp.Status=draft xml.sequenceOffset=20

**Table A.752: SomeipServiceVersion**

Class	SomeipTpConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A connection identifies the sender and the receiver of this particular communication. The SOME/IP TP module routes a Pdu through this connection.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
tpChannel	SomeipTpChannel	0..1	ref	Assignment of configuration properties valid for this SomeipTpConnection.
tpSdu	<a href="#">PduTriggering</a>	0..1	ref	Reference to an IPdu that is segmented by the Transport Protocol.
transportPdu	<a href="#">PduTriggering</a>	0..1	ref	Reference to the segmented IPdu.

**Table A.753: SomeipTpConnection**

Class	SpecElementReference (abstract)
Package	M2::AUTOSARTemplates::CommonStructure::StandardizationTemplate::DataExchangePoint::Common Patterns





<b>Class</b>	<b>SpecElementReference</b> (abstract)			
<b>Note</b>	This is a reference to a specification element in the Autosar standard.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	DataFormatElementReference, SpecElementScope			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
alternative Name	String	0..1	attr	Alternative name of a specification element if its name doesn't fit into the shortName. E.g. because the name contains spaces.

**Table A.754: SpecElementReference**

<b>Class</b>	<b>StaticPart</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	Some parts/signals of the I-PDU may be the same regardless of the selector field. Such a part is called static part. The static part is optional.			
<b>Base</b>	ARObject, MultiplexedPart			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
iPdu	<a href="#">ISignalIPdu</a>	1	ref	Reference to a Com IPdu which is routed to the IPduM module and is combined to a multiplexedPdu.

**Table A.755: StaticPart**

<b>Class</b>	<b>StaticSocketConnection</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::ServiceInstances			
<b>Note</b>	Definition of static SocketConnection between the Socket that is defined by the aggregating Socket Address and the remoteAddress.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
iPduIdentifier	<a href="#">SoConIPduIdentifier</a>	*	ref	Assignment of IPduIdentifiers that are transmitted over the static SocketConnection.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
remoteAddress	<a href="#">SocketAddress</a>	0..1	ref	RemoteAddress of the static SocketConnection.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
tcpConnect Timeout	TimeValue	0..1	attr	Specifies the time in seconds how long TCP connect attempts are repeated to reach SOAD_SOCON_ONLINE. This attribute is restricted to socket_connection groups which are initiating a TCP connection and are under control of SoAd.
tcpRole	TcpRoleEnum	0..1	attr	Defines whether the local Address (that is aggregating the StaticSocketConnection) does a listen or a connect.

**Table A.756: StaticSocketConnection**

<b>Class</b>	<b>Std</b>			
<b>Package</b>	M2::MSR::Documentation::TextModel::InlineTextElements			
<b>Note</b>	This represents a reference to external standards.			
<b>Base</b>	ARObject, <a href="#">Referrable</a> , SingleLanguageReferrable			





Class	Std			
Attribute	Type	Mult.	Kind	Note
date	DateTime	0..1	attr	This element specifies the release date of the external standard if applicable. <b>Tags:</b> xml.sequenceOffset=50
position	String	0..1	attr	This represents the reference to the relevant positions of a standard. Kept as a string. <b>Tags:</b> xml.sequenceOffset=70
state	String	0..1	attr	This represents version and state of a standard. Kept as a string. <b>Tags:</b> xml.sequenceOffset=40
subtitle	String	0..1	attr	This represents the subtitle of the standard. <b>Tags:</b> xml.sequenceOffset=30
url	Url	0..1	aggr	This represents the URL of the standard. <b>Tags:</b> xml.sequenceOffset=60

Table A.757: Std

Class	SubElementMapping			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	This meta-class allows for the definition of mappings of elements of a composite data type.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
firstElement	SubElementRef	0..1	aggr	This represents the first element referenced in the scope of the mapping. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
secondElement	SubElementRef	0..1	aggr	This represents the second element referenced in the scope of the mapping. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
textTable Mapping	<a href="#">TextTableMapping</a>	0..2	aggr	This allows for the text-table translation of individual elements of a composite data type.

Table A.758: SubElementMapping

Class	SupervisedEntityNeeds			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	Specifies the abstract needs on the configuration of the Watchdog Manager for one specific Supervised Entity.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceNeeds</a>			
Attribute	Type	Mult.	Kind	Note
activateAtStart	Boolean	0..1	attr	True/false: supervision activation status of Supervised Entity shall be enabled/disabled at start.
checkpoints	SupervisedEntity CheckpointNeeds	*	ref	This reference indicates the checkpoints belonging to the Supervised Entity. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime





Class	SupervisedEntityNeeds			
enableDeactivation	Boolean	0..1	attr	True: software-component shall be allowed to deactivate supervision of this SupervisedEntity false: software-component shall be not allowed to deactivate supervision of this SupervisedEntity
expectedAliveCycle	TimeValue	0..1	attr	Expected cycle time of alive trigger of this Supervised Entity (in seconds).
maxAliveCycle	TimeValue	0..1	attr	Maximum cycle time of alive trigger of this Supervised Entity (in seconds).
minAliveCycle	TimeValue	0..1	attr	Minimum cycle time of alive trigger of this Supervised Entity (in seconds).
toleratedFailedCycles	PositiveInteger	0..1	attr	Number of consecutive failed alive cycles for this SupervisedEntity which shall be tolerated until the supervision status of the SupervisedEntity is set to Wdgm_ALIVE_EXPIRED (see SWS Wdgm for more details).  Note that this value has to be recalculated with respect to the Wdgm's own cycle time for ECU configuration.

**Table A.759: SupervisedEntityNeeds**

Class	SwAddrMethod			
Package	M2::MSR::DataDictionary::AuxiliaryObjects			
Note	Used to assign a common addressing method, e.g. common memory section, to data or code objects. These objects could actually live in different modules or components.  Tags:atp.recommendedPackage=SwAddrMethods			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
memoryAllocationKeywordPolicy	<a href="#">MemoryAllocationKeywordPolicyType</a>	0..1	attr	Enumeration to specify the name pattern of the Memory Allocation Keyword.
option	<a href="#">Identifier</a>	*	attr	This attribute introduces the ability to specify further intended properties of the MemorySection in with the related objects shall be placed.  These properties are handled as to be selected. The intended options are mentioned in the list.  In the Memory Mapping configuration, this option list is used to determine an appropriate MemMapAddressing ModeSet.
sectionInitializationPolicy	<a href="#">SectionInitializationPolicyType</a>	0..1	attr	Specifies the expected initialization of the variables (inclusive those which are implementing VariableData Prototypes). Therefore this is an implementation constraint for initialization code of BSW modules (especially RTE) as well as the start-up code which initializes the memory segment to which the AutosarData Prototypes referring to the SwAddrMethod's are later on mapped.  If the attribute is not defined it has the identical semantic as the attribute value "INIT"
sectionType	MemorySectionType	0..1	attr	Defines the type of memory sections which can be associated with this addressing method.

**Table A.760: SwAddrMethod**



<b>Class</b>	<b>SwAxisCont</b>			
<b>Package</b>	M2::MSR::CalibrationData::CalibrationValue			
<b>Note</b>	<p>This represents the values for the axis of a compound primitive (curve, map).</p> <p>For standard and fix axes, SwAxisCont contains the values of the axis directly.</p> <p>The axis values of SwAxisCont with the category COM_AXIS, RES_AXIS are for display only. For editing and processing, only the values in the related GroupAxis are binding.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
category	<a href="#">CalprmAxisCategory Enum</a>	0..1	attr	<p>This category specifies the particular axis types:</p> <ul style="list-style-type: none"> <li>• STD_AXIS</li> <li>• COM_AXIS</li> <li>• RES_AXIS (swArraysize necessary)</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=20</p>
swArraysize	ValueList	0..1	aggr	<p>For multidimensional compound primitives (curve, map ...) it is necessary to know the dimensions. They are specified using swArraySize.</p> <ul style="list-style-type: none"> <li>• RES_AXIS</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=70</p>
swAxisIndex	AxisIndexType	0..1	attr	<p>This property allows to explicitly assign the axis contents to a particular axis. It is specified by numbers where 1 corresponds to the x-axis. It is also possible to derive the axis association from the sequence of the parent.</p> <p><b>Tags:</b>xml.sequenceOffset=50</p>
swValuesPhys	<a href="#">SwValues</a>	0..1	aggr	<p>swValuesPhys represents the values in the physical domain.</p> <p><b>Tags:</b>xml.sequenceOffset=80</p>
unit	<a href="#">Unit</a>	0..1	ref	<p>This represents the physical unit of the provided values.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
unitDisplay Name	SingleLanguageUnit Names	0..1	aggr	<p>This represents the display name which is used for the physical unit of the axis.</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>

Table A.761: SwAxisCont

<b>Class</b>	<b>SwAxisGeneric</b>			
<b>Package</b>	M2::MSR::DataDictionary::Axis			
<b>Note</b>	<p>This meta-class defines a generic axis. In a generic axis the axispoints points are calculated in the ECU.</p> <p>The ECU is equipped with a fixed calculation algorithm. Parameters for the algorithm can be stored in the data component of the ECU. Therefore these parameters are specified in the data declaration, not in the calibration data.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
swAxisType	SwAxisType	0..1	ref	<p>Associated axis calculation strategy.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>





Class	SwAxisGeneric			
swGenericAxisParam	SwGenericAxisParam	*	aggr	<p>Specific parameter of a generic axis.</p> <p><b>Tags:</b>  xml.roleElement=true  xml.roleWrapperElement=true  xml.sequenceOffset=40  xml.typeElement=false  xml.typeWrapperElement=false</p>

**Table A.762: SwAxisGeneric**

Class	SwAxisGrouped			
Package	M2::MSR::DataDictionary::Axis			
Note	An SwAxisGrouped is an axis which is shared between multiple calibration parameters.			
Base	ARObject, SwCalprmAxisTypeProps			
Attribute	Type	Mult.	Kind	Note
sharedAxisType	<a href="#">ApplicationPrimitiveDataType</a>	0..1	ref	This is the datatype of the calibration parameter providing the shared axis.
swAxisIndex	AxisIndexType	0..1	attr	<p>Describes which axis of the referenced calibration parameter provides the values for the group axis. The index satisfies the following convention:</p> <ul style="list-style-type: none"> <li>0 = value axis. in this case, the interpolation result of the referenced parameter is used as a base point index.</li> <li>The index should only be specified if the parameter under swCalprm contains more than one axis. It is standard practice for the axis index of parameters with more than one axis, to be set to 1, if data has not been assigned to swAxisIndex.</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=20</p>
swCalprmRef	<a href="#">SwCalprmRefProxy</a>	1	aggr	<p>This property specifies the calibration parameter which serves as the input axis. In AUTOSAR, the type of the referenced Calibration parameter shall be compatible to the type specified by sharedAxisType.</p> <p><b>Tags:</b>  xml.roleElement=false  xml.roleWrapperElement=false  xml.sequenceOffset=30  xml.typeElement=false  xml.typeWrapperElement=false</p>

**Table A.763: SwAxisGrouped**

Class	SwAxisIndividual			
Package	M2::MSR::DataDictionary::Axis			
Note	This meta-class describes an axis integrated into a parameter (field etc.). The integration makes this individual to each parameter. The so-called grouped axis represents the counterpart to this. It is conceived as an independent parameter (see class SwAxisGrouped).			
Base	ARObject, SwCalprmAxisTypeProps			
Attribute	Type	Mult.	Kind	Note





Class	SwAxisIndividual			
compuMethod	<a href="#">CompuMethod</a>	0..1	ref	<p>This is the compuMethod which is expected for the axis. It is used in early stages if the particular input-value is not yet available.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
dataConstr	<a href="#">DataConstr</a>	0..1	ref	<p>Refers to constraints, e.g. for plausibility checks.</p> <p><b>Tags:</b>xml.sequenceOffset=80</p>
inputVariableType	<a href="#">ApplicationPrimitiveDataType</a>	0..1	ref	<p>This is the datatype of the input value for the axis. This allows to define e.g. a type of curve, where the input value is finalized at the access point.</p>
swAxisGeneric	<a href="#">SwAxisGeneric</a>	0..1	aggr	<p>this specifies the properties of a generic axis if applicable.</p> <p><b>Tags:</b>xml.sequenceOffset=90</p>
swMaxAxisPoints	Integer	0..1	attr	<p>Maximum number of base points contained in the axis of a map or curve.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=60</p>
swMinAxisPoints	Integer	0..1	attr	<p>Minimum number of base points contained in the axis of a map or curve.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=70</p>
swVariableRef (ordered)	<a href="#">SwVariableRefProxy</a>	*	aggr	<p>Refers to input variables of the axis. It is possible to specify more than one variable. Here the following is valid:</p> <ul style="list-style-type: none"> <li>• The variable with the highest priority shall be given first. It is used in the generation of the code and is also displayed first in the application system.</li> <li>• All variables referenced shall be of the same physical nature. This is usually detected in that the conversion formulae affected refer back to the same SI-units.</li> </ul> <p>In AUTOSAR this ensured by the constraint, that the referenced input variables shall use a type compatible to "inputVariableType".</p> <ul style="list-style-type: none"> <li>• This multiple referencing allows a base point distribution for more than one input variable to be used. One example of this are the temperature curves which can depend both on the induction air temperature and the engine temperature.</li> </ul> <p>These variables can be displayed simultaneously by MCD systems (adjustment systems), enabling operating points to be shown in the curves.</p> <p><b>Tags:</b> xml.roleElement=false xml.roleWrapperElement=true xml.sequenceOffset=20 xml.typeElement=false xml.typeWrapperElement=false</p>





Class	SwAxisIndividual			
unit	Unit	0..1	ref	<p>This represents the physical unit of the input value of the axis. It is provided to support the case that the particular input variable is not yet known.</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>

**Table A.764: SwAxisIndividual**

Class	SwBaseType			
Package	M2::MSR::AsamHdo::BaseTypes			
Note	<p>This meta-class represents a base type used within ECU software.</p> <p><b>Tags:</b>atp.recommendedPackage=BaseTypes</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">BaseType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.765: SwBaseType**

Enumeration	SwCalibrationAccessEnum			
Package	M2::MSR::DataDictionary::DataDefProperties			
Note	Determines the access rights to a data object w.r.t. measurement and calibration.			
Literal	Description			
notAccessible	<p>The element will not be accessible via MCD tools, i.e. will not appear in the ASAP file.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=0</p>			
readOnly	<p>The element will only appear as read-only in an ASAP file.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=1</p>			
readWrite	<p>The element will appear in the ASAP file with both read and write access.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=2</p>			

**Table A.766: SwCalibrationAccessEnum**

Class	SwCalprmAxisSet			
Package	M2::MSR::DataDictionary::CalibrationParameter			
Note	This element specifies the input parameter axes (abscissas) of parameters (and variables, if these are used adaptively).			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
swCalprmAxis	SwCalprmAxis	*	aggr	<p>One axis belonging to this SwCalprmAxisSet</p> <p><b>Tags:</b>  xml.roleElement=true  xml.roleWrapperElement=false  xml.sequenceOffset=20  xml.typeElement=false  xml.typeWrapperElement=false </p>

**Table A.767: SwCalprmAxisSet**

<b>Class</b>	<b>SwCalprmRefProxy</b>			
<b>Package</b>	M2::MSR::DataDictionary::DatadictionaryProxies			
<b>Note</b>	Wrapper class for different kinds of references to a calibration parameter.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
arParameter	<a href="#">AutosarParameterRef</a>	0..1	aggr	This represents a Parameter within AUTOSAR. Note that the Datatype of the referenced ParameterDataPrototype shall be an ApplicationDataType of category VALUE.
mcDataInstance	<a href="#">McDataInstance</a>	0..1	ref	This reference is used in the McSupport file to express the final instance of group axis etc. It is not allowed to use this outside of an McDataInstance.  The referenced mcDataInstance shall be originated from a ParameterDataPrototype.

**Table A.768: SwCalprmRefProxy**

<b>Class</b>	<b>SwComponentPrototype</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
<b>Note</b>	Role of a software component within a composition.			
<b>Base</b>	ARObject, AtpFeature, <a href="#">AtpPrototype</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
type	<a href="#">SwComponentType</a>	0..1	tref	Type of the instance.  <b>Stereotypes:</b> isOfType

**Table A.769: SwComponentPrototype**

<b>Class</b>	<b>SwComponentPrototypeAssignment</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::SoftwareCluster			
<b>Note</b>	This meta-class is only required to allow for the variant modeling of an instanceRef. <b>Tags:</b> atp.Status=draft			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
swComponent	<a href="#">SwComponentPrototype</a>	0..1	iref	hierarchical tree(s) of Software Components belonging to this CP Software Cluster. This reference is used to describe the belonging SWCs if the CP Software Cluster is described in the context of a System,  <b>Tags:</b> atp.Status=draft <b>InstanceRef implemented by:</b> ComponentInSystem InstanceRef

**Table A.770: SwComponentPrototypeAssignment**

<b>Class</b>	<b>SwComponentType</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Components			
<b>Note</b>	Base class for AUTOSAR software components.			
<b>Base</b>	<a href="#">ARElement</a> , ARObject, <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">AtomicSwComponentType</a> , <a href="#">CompositionSwComponentType</a> , <a href="#">ParameterSwComponentType</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	SwComponentType (abstract)			
consistency Needs	<a href="#">ConsistencyNeeds</a>	*	aggr	This represents the collection of ConsistencyNeeds owned by the enclosing SwComponentType. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=consistencyNeeds.shortName, consistencyNeeds.variationPoint.shortLabel vh.latestBindingTime=preCompileTime
port	<a href="#">PortPrototype</a>	*	aggr	The PortPrototypes through which this SwComponent Type can communicate.  The aggregation of PortPrototype is subject to variability with the purpose to support the conditional existence of PortPrototypes. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=port.shortName, port.variationPoint.shortLabel vh.latestBindingTime=preCompileTime
portGroup	<a href="#">PortGroup</a>	*	aggr	A port group being part of this component. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
swcMapping Constraint	SwComponentMapping Constraints	*	ref	Reference to constraints that are valid for this Sw ComponentType.
swComponent Documentation	SwComponent Documentation	0..1	aggr	This adds a documentation to the SwComponentType. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=swComponentDocumentation, swComponentDocumentation.variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=-10
unitGroup	UnitGroup	*	ref	This allows for the specification of which UnitGroups are relevant in the context of referencing SwComponentType.

**Table A.771: SwComponentType**

Class	SwConnector (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	The base class for connectors between ports. Connectors have to be identifiable to allow references from the system constraint template.			
Base	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Subclasses	<a href="#">AssemblySwConnector</a> , <a href="#">DelegationSwConnector</a> , <a href="#">PassThroughSwConnector</a>			
Attribute	Type	Mult.	Kind	Note
mapping	<a href="#">PortInterfaceMapping</a>	0..1	ref	Reference to a PortInterfaceMapping specifying the mapping of unequal named PortInterface elements of the two different PortInterfaces typing the two PortPrototypes which are referenced by the ConnectorPrototype.

**Table A.772: SwConnector**

Class	<<atpVariation>> SwDataDefProps
Package	M2::MSR::DataDictionary::DataDefProperties





<b>Class</b>	<<atpVariation>> <b>SwDataDefProps</b>			
<b>Note</b>	<p>This class is a collection of properties relevant for data objects under various aspects. One could consider this class as a "pattern of inheritance by aggregation". The properties can be applied to all objects of all classes in which SwDataDefProps is aggregated.</p> <p>Note that not all of the attributes or associated elements are useful all of the time. Hence, the process definition (e.g. expressed with an OCL or a Document Control Instance MSR-DCI) has the task of implementing limitations.</p> <p>SwDataDefProps covers various aspects:</p> <ul style="list-style-type: none"> <li>• Structure of the data element for calibration use cases: is it a single value, a curve, or a map, but also the recordLayouts which specify how such elements are mapped/converted to the Data Types in the programming language (or in AUTOSAR). This is mainly expressed by properties like swRecordLayout and swCalprmAxisSet</li> <li>• Implementation aspects, mainly expressed by swImplPolicy, swVariableAccessImplPolicy, swAddrMethod, swPointerTargetProps, baseType, implementationDataType and additionalNativeTypeQualifier</li> <li>• Access policy for the MCD system, mainly expressed by swCalibrationAccess</li> <li>• Semantics of the data element, mainly expressed by compuMethod and/or unit, dataConstr, invalidValue</li> <li>• Code generation policy provided by swRecordLayout</li> </ul> <p><b>Tags:</b>vh.latestBindingTime=codeGenerationTime</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
additionalNativeTypeQualifier	NativeDeclarationString	0..1	attr	<p>This attribute is used to declare native qualifiers of the programming language which can neither be deduced from the baseType (e.g. because the data object describes a pointer) nor from other more abstract attributes. Examples are qualifiers like "volatile", "strict" or "enum" of the C-language. All such declarations have to be put into one string.</p> <p><b>Tags:</b>xml.sequenceOffset=235</p>
annotation	Annotation	*	aggr	<p>This aggregation allows to add annotations (yellow pads ...) related to the current data object.</p> <p><b>Tags:</b>  xml.roleElement=true  xml.roleWrapperElement=true  xml.sequenceOffset=20  xml.typeElement=false  xml.typeWrapperElement=false</p>
baseType	<a href="#">SwBaseType</a>	0..1	ref	<p>Base type associated with the containing data object.</p> <p><b>Tags:</b>xml.sequenceOffset=50</p>
compuMethod	<a href="#">CompuMethod</a>	0..1	ref	<p>Computation method associated with the semantics of this data object.</p> <p><b>Tags:</b>xml.sequenceOffset=180</p>
dataConstr	<a href="#">DataConstr</a>	0..1	ref	<p>Data constraint for this data object.</p> <p><b>Tags:</b>xml.sequenceOffset=190</p>
displayFormat	DisplayFormatString	0..1	attr	<p>This property describes how a number is to be rendered e.g. in documents or in a measurement and calibration system.</p> <p><b>Tags:</b>xml.sequenceOffset=210</p>
displayPresentation	DisplayPresentationEnum	0..1	attr	<p>This attribute controls the presentation of the related data for measurement and calibration tools.</p>





Class	<<atpVariation>> SwDataDefProps			
implementation DataType	<a href="#">AbstractImplementation DataType</a>	0..1	ref	<p>This association denotes the ImplementationDataType of a data declaration via its aggregated SwDataDefProps. It is used whenever a data declaration is not directly referring to a base type. Especially</p> <ul style="list-style-type: none"> <li>• redefinition of an ImplementationDataType via a "typedef" to another ImplementationDatatype</li> <li>• the target type of a pointer (see SwPointerTarget Props), if it does not refer to a base type directly</li> <li>• the data type of an array or record element within an ImplementationDataType, if it does not refer to a base type directly</li> <li>• the data type of an SwServiceArg, if it does not refer to a base type directly</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=215</p>
invalidValue	<a href="#">ValueSpecification</a>	0..1	aggr	<p>Optional value to express invalidity of the actual data element.</p> <p><b>Tags:</b>xml.sequenceOffset=255</p>
stepSize	Float	0..1	attr	<p>This attribute can be used to define a value which is added to or subtracted from the value of a DataPrototype when using up/down keys while calibrating.</p>
swAddrMethod	<a href="#">SwAddrMethod</a>	0..1	ref	<p>Addressing method related to this data object. Via an association to the same SwAddrMethod it can be specified that several DataPrototypes shall be located in the same memory without already specifying the memory section itself.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
swAlignment	AlignmentType	0..1	attr	<p>The attribute describes the intended typical alignment of the DataPrototype. If the attribute is not defined the alignment is determined by the swBaseType size and the memoryAllocationKeywordPolicy of the referenced Sw AddrMethod.</p> <p><b>Tags:</b>xml.sequenceOffset=33</p>
swBit Representation	SwBitRepresentation	0..1	aggr	<p>Description of the binary representation in case of a bit variable.</p> <p><b>Tags:</b>xml.sequenceOffset=60</p>
swCalibration Access	<a href="#">SwCalibrationAccess Enum</a>	0..1	attr	<p>Specifies the read or write access by MCD tools for this data object.</p> <p><b>Tags:</b>xml.sequenceOffset=70</p>
swCalprmAxis Set	<a href="#">SwCalprmAxisSet</a>	0..1	aggr	<p>This specifies the properties of the axes in case of a curve or map etc. This is mainly applicable to calibration parameters.</p> <p><b>Tags:</b>xml.sequenceOffset=90</p>
swComparison Variable	<a href="#">SwVariableRefProxy</a>	*	aggr	<p>Variables used for comparison in an MCD process.</p> <p><b>Tags:</b> xml.sequenceOffset=170 xml.typeElement=false</p>
swData Dependency	SwDataDependency	0..1	aggr	<p>Describes how the value of the data object has to be calculated from the value of another data object (by the MCD system).</p> <p><b>Tags:</b>xml.sequenceOffset=200</p>







Class	<<atpVariation>> SwDataDefProps			
swHostVariable	SwVariableRefProxy	0..1	aggr	<p>Contains a reference to a variable which serves as a host-variable for a bit variable. Only applicable to bit objects.</p> <p><b>Tags:</b> xml.sequenceOffset=220 xml.typeElement=false</p>
swImplPolicy	SwImplPolicyEnum	0..1	attr	<p>Implementation policy for this data object.</p> <p><b>Tags:</b>xml.sequenceOffset=230</p>
swIntendedResolution	Numerical	0..1	attr	<p>The purpose of this element is to describe the requested quantization of data objects early on in the design process.</p> <p>The resolution ultimately occurs via the conversion formula present (compuMethod), which specifies the transition from the physical world to the standardized world (and vice-versa) (here, "the slope per bit" is present implicitly in the conversion formula).</p> <p>In the case of a development phase without a fixed conversion formula, a pre-specification can occur through swIntendedResolution.</p> <p>The resolution is specified in the physical domain according to the property "unit".</p> <p><b>Tags:</b>xml.sequenceOffset=240</p>
swInterpolationMethod	Identifier	0..1	attr	<p>This is a keyword identifying the mathematical method to be applied for interpolation. The keyword needs to be related to the interpolation routine which needs to be invoked.</p> <p><b>Tags:</b>xml.sequenceOffset=250</p>
swIsVirtual	Boolean	0..1	attr	<p>This element distinguishes virtual objects. Virtual objects do not appear in the memory, their derivation is much more dependent on other objects and hence they shall have a swDataDependency .</p> <p><b>Tags:</b>xml.sequenceOffset=260</p>
swPointerTargetProps	SwPointerTargetProps	0..1	aggr	<p>Specifies that the containing data object is a pointer to another data object.</p> <p><b>Tags:</b>xml.sequenceOffset=280</p>
swRecordLayout	SwRecordLayout	0..1	ref	<p>Record layout for this data object.</p> <p><b>Tags:</b>xml.sequenceOffset=290</p>
swRefreshTiming	MultidimensionalTime	0..1	aggr	<p>This element specifies the frequency in which the object involved shall be or is called or calculated. This timing can be collected from the task in which write access processes to the variable run. But this cannot be done by the MCD system.</p> <p>So this attribute can be used in an early phase to express the desired refresh timing and later on to specify the real refresh timing.</p> <p><b>Tags:</b>xml.sequenceOffset=300</p>
swTextProps	SwTextProps	0..1	aggr	<p>the specific properties if the data object is a text object.</p> <p><b>Tags:</b>xml.sequenceOffset=120</p>
swValueBlockSize	Numerical	0..1	attr	<p>This represents the size of a Value Block</p> <p><b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=80</p>





Class	<<atpVariation>> SwDataDefProps			
swValueBlockSizeMult (ordered)	Numerical	*	attr	<p>This attribute is used to specify the dimensions of a value block (VAL_BLK) for the case that that value block has more than one dimension.</p> <p>The dimensions given in this attribute are ordered such that the first entry represents the first dimension, the second entry represents the second dimension, and so on.</p> <p>For one-dimensional value blocks the attribute swValueBlockSize shall be used and this attribute shall not exist.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
unit	Unit	0..1	ref	<p>Physical unit associated with the semantics of this data object. This attribute applies if no compuMethod is specified. If both units (this as well as via compuMethod) are specified the units shall be compatible.</p> <p><b>Tags:</b>xml.sequenceOffset=350</p>
valueAxisDataType	ApplicationPrimitiveDataType	0..1	ref	<p>The referenced ApplicationPrimitiveDataType represents the primitive data type of the value axis within a compound primitive (e.g. curve, map). It supersedes CompuMethod, Unit, and BaseType.</p> <p><b>Tags:</b>xml.sequenceOffset=355</p>

Table A.773: SwDataDefProps

Enumeration	SwImplPolicyEnum
Package	M2::MSR::DataDictionary::DataDefProperties
Note	Specifies the implementation strategy with respect to consistency mechanisms of variables.
Literal	Description
const	<p>forced implementation such that the running software within the ECU shall not modify it. For example implemented with the "const" modifier in C. This can be applied for parameters (not for those in NVRAM) as well as argument data prototypes.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=0</p>
fixed	<p>This data element is fixed. In particular this indicates, that it might also be implemented e.g. as in place data, (#DEFINE).</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=1</p>
measurementPoint	<p>The data element is created for measurement purposes only. The data element is never read directly within the ECU software. In contrast to a "standard" data element in an unconnected provide port is, this unconnection is guaranteed for measurementPoint data elements.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=2</p>
queued	<p>The content of the data element is queued and the data element has 'event' semantics, i.e. data elements are stored in a queue and all data elements are processed in 'first in first out' order. The queuing is intended to be implemented by RTE Generator. This value is not applicable for parameters.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=3</p>
standard	<p>This is applicable for all kinds of data elements. For variable data prototypes the 'last is best' semantics applies. For parameter there is no specific implementation directive.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=4</p>

Table A.774: SwImplPolicyEnum

<b>Class</b>	<b>SwPointerTargetProps</b>			
<b>Package</b>	M2::MSR::DataDictionary::DataDefProperties			
<b>Note</b>	<p>This element defines, that the data object (which is specified by the aggregating element) contains a reference to another data object or to a function in the CPU code. This corresponds to a pointer in the C-language.</p> <p>The attributes of this element describe the category and the detailed properties of the target which is either a data description or a function signature.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
functionPointer Signature	BswModuleEntry	0..1	ref	<p>The referenced BswModuleEntry serves as the signature of a function pointer definition. Primary use case: function pointer passed as argument to other function.</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>
swDataDef Props	SwDataDefProps	0..1	aggr	<p>The properties of the target data type.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
targetCategory	Identifier	0..1	attr	<p>This specifies the category of the target:</p> <ul style="list-style-type: none"> <li>In case of a data pointer, it shall specify the category of the referenced data.</li> <li>In case of a function pointer, it could be used to denote the category of the referenced BswModuleEntry. Since currently no categories for BswModuleEntry are defined it will be empty.</li> </ul> <p><b>Tags:</b>xml.sequenceOffset=5</p>

**Table A.775: SwPointerTargetProps**

<b>Class</b>	<b>SwRecordLayout</b>			
<b>Package</b>	M2::MSR::DataDictionary::RecordLayout			
<b>Note</b>	<p>Defines how the data objects (variables, calibration parameters etc.) are to be stored in the ECU memory. As an example, this definition specifies the sequence of axis points in the ECU memory. Iterations through axis values are stored within the sub-elements swRecordLayoutGroup.</p> <p><b>Tags:</b>atp.recommendedPackage=SwRecordLayouts</p>			
<b>Base</b>	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
swRecord LayoutGroup	SwRecordLayoutGroup	0..1	aggr	<p>This is the top level record layout group.</p> <p><b>Tags:</b>  xml.roleElement=true  xml.roleWrapperElement=false  xml.sequenceOffset=20  xml.typeElement=false  xml.typeWrapperElement=false</p>

**Table A.776: SwRecordLayout**

<b>Class</b>	<b>SwRecordLayoutV</b>			
<b>Package</b>	M2::MSR::DataDictionary::RecordLayout			
<b>Note</b>	<p>This element specifies which values are stored for the current SwRecordLayoutGroup. If no baseType is present, the SwBaseType referenced initially in the parent SwRecordLayoutGroup is valid. The specification of swRecordLayoutVAxis gives the axis of the values which shall be stored in accordance with the current record layout SwRecordLayoutGroup. In swRecordLayoutVProp one can specify the information which shall be stored.</p>			





Class	SwRecordLayoutV			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
baseType	SwBaseType	0..1	ref	<p>This association allows to refer to a base type in case a specific encoding is intended. If no base type is referred, the base type referenced initially in the corresponding DataPrototype is to be used.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
category	AsamRecordLayoutSemantics	0..1	attr	<p>This attribute denotes the semantics in particular in terms of the corresponding A2L-Keyword. This is to support the mapping of the more general record layouts in AUTOSAR/MSR to the specific A2I keywords. It is possible to express the specific semantics of A2I RecordLayout keywords in swRecordLayoutGroup but not always vice versa. Therefore the mapping is provided in this optional attribute.</p> <p><b>Tags:</b>xml.sequenceOffset=5</p>
desc	MultiLanguageOverviewParagraph	0..1	aggr	<p>This aggregation allows for a brief description about the particular record layout value which can help to identify the entry. In-depth documentation should be added to the introduction of the surrounding record layout.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
shortLabel	Identifier	0..1	attr	<p>This attribute specifies a name which can be used e.g. when ECU code is generated from the record layout value.</p> <p><b>Tags:</b>xml.sequenceOffset=3</p>
swGenericAxisParamType	SwGenericAxisParamType	0..1	ref	<p>This association supports the case that a value from a generic axis definition shall be stored. This value is denoted by a particular generic axis parameter type.</p> <p><b>Tags:</b>xml.sequenceOffset=70</p>
swRecordLayoutVAxis	AxisIndexType	0..1	attr	<p>This attribute gives the index of the axis of which values that are stored in the record. swRecordVIndex refers to the symbolic names of the iterators for which the axis value shall be stored in the record.</p> <p>In case of nested iterators (mainly for multidimensional objects) the iterator names are specified as whitespace-separated names.</p> <p>These symbolic names relate to swRecordLayoutGroup Index. The iterators are processed from left to right in such a manner that they symbolize the loop index from the outside to the inside.</p> <p>It is considered an error if more components are specified than axes exist in the related ApplicationDataType.</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>
swRecordLayoutVFixValue	Integer	0..1	attr	<p>This attribute specifies the filler character for the current record layout, in the form of hex digits. It is also used to specify the fix value for e.g. FIXRIGHTDIFF.</p> <p><b>Tags:</b>xml.sequenceOffset=80</p>





Class	SwRecordLayoutV			
swRecordLayoutVIndex	NameTokens	0..1	attr	<p>The symbolic value for iteration, or the symbolic values separated by whitespaces, refer to the symbolic values given in swRecordLayoutGroupIndex .</p> <p>The iterators are processed from left to right, in such a manner that they symbolize the loop index from the outside to the inside.</p> <p>It is considered an error if the record layout is referenced by an entity which has less number of axes than index names referenced here.</p> <p><b>Tags:</b>xml.sequenceOffset=60</p>
swRecordLayoutVProp	NameToken	0..1	attr	<p>This attribute describes the kind of values to be stored. More details see below. The standardized values foreseen for this attribute are defined in [TPS_SWCT_01489].</p> <p><b>Tags:</b>xml.sequenceOffset=50</p>

Table A.777: SwRecordLayoutV

Class	SwServiceArg			
Package	M2::MSR::DataDictionary::ServiceProcessTask			
Note	<p>Specifies the properties of a data object exchanged during the call of an SwService, e.g. an argument or a return value.</p> <p>The SwServiceArg can also be used in the argument list of a C-macro. For this purpose the category shall be set to "MACRO". A reference to implementationDataType can optional be added if the actual argument has an implementationDataType.</p>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
direction	<a href="#">ArgumentDirectionEnum</a>	0..1	attr	<p>Specifies the direction of the data transfer. The direction shall indicate the direction of the actual information that is being consumed by the caller and/or the callee, not the direction of formal arguments in C.</p> <p>The attribute is optional for backwards compatibility reasons. For example, if a pointer is used to pass a memory address for the expected result, the direction shall be "out". If a pointer is used to pass a memory address with content to be read by the callee, its direction shall be "in".</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>
swArraysizes	ValueList	0..1	aggr	<p>This turns the argument of the service to an array.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
swDataDefProps	<a href="#">SwDataDefProps</a>	0..1	aggr	<p>Data properties of this SwServiceArg.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>

Table A.778: SwServiceArg

Class	SwSystemconst
Package	M2::MSR::DataDictionary::SystemConstant





Class	SwSystemconst			
Note	<p>This element defines a system constant which serves an input to select a particular variation point. In particular a system constant serves as an operand of the binding function (swSyscond) in a Variation point.</p> <p>Note that the binding process can only happen if a value was assigned to to the referenced system constants.</p> <p><b>Tags:</b>atp.recommendedPackage=SwSystemconsts</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpDefinition</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
swDataDef Props	<a href="#">SwDataDefProps</a>	0..1	aggr	<p>This denotes the data definition properties of the system constant. This supports to express the limits and optionally a conversion within the internal to physical values by a compu method.</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>

**Table A.779: SwSystemconst**

Class	SwSystemconstValue			
Package	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
Note	This meta-class assigns a particular value to a system constant.			
Base	<a href="#">ARObject</a>			
Attribute	Type	Mult.	Kind	Note
annotation	Annotation	*	aggr	<p>This provides the ability to add information why the value is set like it is.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
swSystemconst	<a href="#">SwSystemconst</a>	1	ref	<p>This is the system constant to which the value applies.</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>
value	<a href="#">Numerical</a>	1	attr	<p>This is the particular value of a system constant. It is specified as Numerical. Further restrictions may apply by the definition of the system constant.</p> <p>The value attribute defines the internal value of the Sw Systemconst as it is processed in the Formula Language.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=20</p>

**Table A.780: SwSystemconstValue**

Class	SwSystemconstantValueSet			
Package	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
Note	<p>This meta-class represents the ability to specify a set of system constant values.</p> <p><b>Tags:</b>atp.recommendedPackage=SwSystemconstantValueSets</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
sw Systemconstant Value	<a href="#">SwSystemconstValue</a>	*	aggr	This is one particular value of a system constant.

**Table A.781: SwSystemconstantValueSet**

<b>Class</b>	<b>SwTextProps</b>			
<b>Package</b>	M2::MSR::DataDictionary::DataDefProperties			
<b>Note</b>	This meta-class expresses particular properties applicable to strings in variables or calibration parameters.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
arraySize Semantics	ArraySizeSemantics Enum	0..1	attr	This attribute controls the semantics of the arraysize for the array representing the string in an Implementation DataType.  It is there to support a safe conversion between ApplicationDatatype and ImplementationDatatype, even for variable length strings as required e.g. for Support of SAE J1939.
baseType	SwBaseType	0..1	ref	This is the base type of one character in the string. In particular this baseType denotes the intended encoding of the characters in the string on level of ApplicationData Type. <b>Tags:</b> xml.sequenceOffset=30
swFillCharacter	Integer	0..1	attr	Filler character for text parameter to pad up to the maximum length swMaxTextSize.  The value will be interpreted according to the encoding specified in the associated base type of the data object, e.g. 0x30 (hex) represents the ASCII character zero as filler character and 0 (dec) represents an end of string as filler character.  The usage of the fill character depends on the arraySize Semantics. <b>Tags:</b> xml.sequenceOffset=40
swMaxTextSize	Integer	0..1	attr	Specifies the maximum text size in characters. Note the size in bytes depends on the encoding in the corresponding baseType. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=20

Table A.782: SwTextProps

<b>Class</b>	<b>SwValueCont</b>			
<b>Package</b>	M2::MSR::CalibrationData::CalibrationValue			
<b>Note</b>	This metaclass represents the content of one particular SwInstance.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
swArraysize	ValueList	0..1	aggr	This attribute defines the size of each dimension for compound primitives CURVE, MAP, CUBOID, CUBE_4, CUBE_5, COM_AXIS, RES_AXIS, VAL_BLK.  For each dimension one value has to be defined, e.g. one in case of COM_AXIS and two or more in case of MAP. <b>Tags:</b> xml.sequenceOffset=40
swValuesPhys	SwValues	0..1	aggr	swValuesPhys represents the values in the physical domain. <b>Tags:</b> xml.sequenceOffset=50





Class	SwValueCont			
unit	Unit	0..1	ref	This represents the physical unit of the provided values. <b>Tags:</b> xml.sequenceOffset=20
unitDisplay Name	SingleLanguageUnit Names	0..1	aggr	This specifies how the physical units of the current value set shall be displayed in documents or in user interfaces of tools. <b>Tags:</b> xml.sequenceOffset=30

**Table A.783: SwValueCont**

Class	<<atpMixed>> SwValues			
Package	M2::MSR::CalibrationData::CalibrationValue			
Note	<p>This meta-class represents a list of values. These values can either be the input values of a curve (abscissa values) or the associated values (ordinate values).</p> <p>In case of multidimensional structures, the values are ordered such that the lowest index runs the fastest. In particular for maps and cuboids etc. the resulting long value list can be subsectioned using Value Group. But the processing needs to be done as if vg is not there.</p> <p>Note that numerical values and textual values should not be mixed.</p>			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
v	Numerical	0..1	attr	This is a non variant Value. It is provided for sake of Compatibility to ASAM CDF. <b>Tags:</b> xml.sequenceOffset=40
vf	Numerical	0..1	attr	This allows to specify the value as VariationPoint. It is distinguished to non variant for sake of compatibility to ASAM CDF 2.0. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime xml.sequenceOffset=20
vg	ValueGroup	0..1	aggr	This allows to have intersections in the values in order to support specific rendering (eg. using stylesheets). For tools it is important that the v values are always processed in the same (flattened) order and the tool is able to interpret it without respecting vg. <b>Tags:</b> xml.sequenceOffset=50
vt	VerbatimString	0..1	attr	This represents the values of textual data elements (Strings). Note that vt uses the   to separate the values for the different bitfield masks in case that the semantics of the related DataPrototype is described by means of a BITFIELD_TEXTTABLE in the associated CompuMethod. <b>Tags:</b> xml.sequenceOffset=30
vtf	NumericalOrText	0..1	aggr	This aggregation represents the ability to provide a value that is either numerical or text which existence is subject to variability.  From the formal point of view, the aggregation needs to have the multiplicity 1 because SwValues is modelled with stereotype <<atpMixed>>. Nevertheless, the existence of vtf is optional and subject to constraints. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.784: SwValues**



<b>Class</b>	<b>SwVariableRefProxy</b>			
<b>Package</b>	M2::MSR::DataDictionary::DatadictionaryProxies			
<b>Note</b>	Proxy class for several kinds of references to a variable.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
autosarVariable	<a href="#">AutosarVariableRef</a>	0..1	aggr	This represents the reference to a Variable in an Autosar system. Note that the target of the reference within AutosarVariableRef shall be typed by a primitive data type
mcDataInstance Var	<a href="#">McDataInstance</a>	0..1	ref	This reference is used in the McSupport file to express the final instance of input values etc. It is not allowed to use this outside of an McDataInstance.  The referenced mcDataInstance shall be originated from a VariableDataPrototype.

**Table A.785: SwVariableRefProxy**

<b>Class</b>	<b>SwcBswMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::SwcBswMapping			
<b>Note</b>	Maps an SwcInternalBehavior to an BswInternalBehavior. This is required to coordinate the API generation and the scheduling for AUTOSAR Service Components, ECU Abstraction Components and Complex Driver Components by the RTE and the BSW scheduling mechanisms. <b>Tags:</b> atp.recommendedPackage=SwcBswMappings			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bswBehavior	<a href="#">BswInternalBehavior</a>	0..1	ref	The mapped BswInternalBehavior
runnable Mapping	<a href="#">SwcBswRunnable Mapping</a>	*	aggr	A mapping between a pair of SWC and BSW runnables. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
swcBehavior	<a href="#">SwcInternalBehavior</a>	0..1	ref	The mapped SwcInternalBehavior.
synchronized ModeGroup	<a href="#">SwcBswSynchronized ModeGroupPrototype</a>	*	aggr	A pair of SWC and BSW mode group prototypes to be synchronized by the scheduler. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
synchronized Trigger	<a href="#">SwcBswSynchronized Trigger</a>	*	aggr	A pair of SWC and BSW Triggers to be synchronized by the scheduler. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.786: SwcBswMapping**

<b>Class</b>	<b>SwcBswRunnableMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::SwcBswMapping			
<b>Note</b>	Maps a BswModuleEntity to a RunnableEntity if it is implemented as part of a BSW module (in the case of an AUTOSAR Service, a Complex Driver or an ECU Abstraction). The mapping can be used by a tool to find relevant information on the behavior, e.g. whether the bswEntity shall be running in interrupt context.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bswEntity	<a href="#">BswModuleEntity</a>	1	ref	The mapped BswModuleEntity





Class	SwcBswRunnableMapping			
swcRunnable	<a href="#">RunnableEntity</a>	1	ref	The mapped SWC runnable.

**Table A.787: SwcBswRunnableMapping**

Class	SwcBswSynchronizedModeGroupPrototype			
Package	M2::AUTOSARTemplates::CommonStructure::SwcBswMapping			
Note	Synchronizes a mode group provided by a component via a port with a mode group provided by a BSW module or cluster.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
bswModeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	1	ref	The BSW mode group prototype.
swcModeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	1	iref	The SWC mode group prototype provided by a particular port. <b>InstanceRef implemented by:</b> PModeGroupInAtomicSwcInstanceRef

**Table A.788: SwcBswSynchronizedModeGroupPrototype**

Class	SwcBswSynchronizedTrigger			
Package	M2::AUTOSARTemplates::CommonStructure::SwcBswMapping			
Note	Synchronizes a Trigger provided by a component via a port with a Trigger provided by a BSW module or cluster.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
bswTrigger	<a href="#">Trigger</a>	1	ref	The BSW Trigger.
swcTrigger	<a href="#">Trigger</a>	1	iref	The SWC Trigger provided by a particular port. <b>InstanceRef implemented by:</b> PTriggerInAtomicSwcTypeInstanceRef

**Table A.789: SwcBswSynchronizedTrigger**

Class	SwcExclusiveAreaPolicy			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior			
Note	Options how to generate the ExclusiveArea related APIs. If no SwcExclusiveAreaPolicy is specified for an ExclusiveArea the default values apply.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
apiPrinciple	ApiPrincipleEnum	0..1	attr	Specifies for this ExclusiveArea if either one common set of Enter and Exit APIs for the whole software component is requested from the Rte or if the set of Enter and Exit APIs is expected per RunnableEntity. The default value is "common".
exclusiveArea	<a href="#">ExclusiveArea</a>	0..1	ref	This reference represents the ExclusiveArea for which the policy applies.

**Table A.790: SwcExclusiveAreaPolicy**

<b>Class</b>	<b>SwcImplementation</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcImplementation			
<b>Note</b>	<p>This meta-class represents a specialization of the general Implementation meta-class with respect to the usage in application software.</p> <p><b>Tags:</b>atp.recommendedPackage=SwcImplementations</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">Implementation</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
behavior	<a href="#">SwcInternalBehavior</a>	0..1	ref	The internal behavior implemented by this Implementation.
perInstanceMemorySize	<a href="#">PerInstanceMemorySize</a>	*	aggr	<p>Allows a definition of the size of the per-instance memory for this implementation. The aggregation of PerInstanceMemorySize is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects, in this case PerInstanceMemory.</p> <p><b>Stereotypes:</b> atpVariation  <b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
requiredRTEVendor	String	0..1	attr	<p>Identify a specific RTE vendor. This information is potentially important at the time of integrating (in particular: linking) the application code with the RTE. The semantics is that (if the association exists) the corresponding code has been created to fit to the vendor-mode RTE provided by this specific vendor. Attempting to integrate the code with another RTE generated in vendor mode is in general not possible.</p>

Table A.791: SwcImplementation

<b>Class</b>	<b>SwcInternalBehavior</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior			
<b>Note</b>	<p>The SwcInternalBehavior of an AtomicSwComponentType describes the relevant aspects of the software-component with respect to the RTE, i.e. the RunnableEntities and the RTEEvents they respond to.</p>			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">InternalBehavior</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
arTypedPerInstanceMemory	<a href="#">VariableDataPrototype</a>	*	aggr	<p>Defines an AUTOSAR typed memory-block that needs to be available for each instance of the SW-component.</p> <p>This is typically only useful if supportsMultipleInstantiation is set to "true" or if the component defines NVRAM access via permanent blocks.</p> <p>The aggregation of arTypedPerInstanceMemory is subject to variability with the purpose to support variability in the software component's implementations. Typically different algorithms in the implementation are requiring different number of memory objects.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b>  atp.Splitkey=arTypedPerInstanceMemory.shortName, arTypedPerInstanceMemory.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>





Class	SwcInternalBehavior			
event	<a href="#">RTEEvent</a>	*	aggr	<p>This is a RTEEvent specified for the particular Swc InternalBehavior.</p> <p>The aggregation of RTEEvent is subject to variability with the purpose to support the conditional existence of RTE events. Note: the number of RTE events might vary due to the conditional existence of PortPrototypes using Data ReceivedEvents or due to different scheduling needs of algorithms.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=event.shortName, event.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
exclusiveArea Policy	<a href="#">SwcExclusiveArea Policy</a>	*	aggr	<p>Options how to generate the ExclusiveArea related APIs. When no SwcExclusiveAreaPolicy is specified for an ExclusiveArea the default values apply.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=exclusiveAreaPolicy, exclusiveArea Policy.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
explicitInter Runnable Variable	<a href="#">VariableDataPrototype</a>	*	aggr	<p>Implement state message semantics for establishing communication among runnables of the same component. The aggregation of explicitInterRunnable Variable is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=explicitInterRunnableVariable.shortName, explicitInterRunnableVariable.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
handle TerminationAnd Restart	HandleTerminationAnd RestartEnum	0..1	attr	<p>This attribute controls the behavior with respect to stopping and restarting. The corresponding AtomicSw ComponentType may either not support stop and restart, or support only stop, or support both stop and restart.</p>
implicitInter Runnable Variable	<a href="#">VariableDataPrototype</a>	*	aggr	<p>Implement state message semantics for establishing communication among runnables of the same component. The aggregation of implicitInterRunnable Variable is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=implicitInterRunnableVariable.shortName, implicitInterRunnableVariable.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
includedData TypeSet	IncludedDataTypeSet	*	aggr	<p>The includedDataTypeSet is used by a software component for its implementation.</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b> atp.Splitkey=includedDataTypeSet</p>





Class	SwcInternalBehavior			
includedModeDeclarationGroupSet	IncludedModeDeclarationGroupSet	*	aggr	<p>This aggregation represents the included Mode DeclarationGroups</p> <p><b>Stereotypes:</b> atpSplitable  <b>Tags:</b> atp.Splitkey=includedModeDeclarationGroupSet</p>
instantiationDataDefProps	InstantiationDataDefProps	*	aggr	<p>The purpose of this is that within the context of a given SwComponentType some data def properties of individual instantiations can be modified. The aggregation of InstantiationDataDefProps is subject to variability with the purpose to support the conditional existence of Port Prototypes and component local memories like "per InstanceParameter" or "arTypedPerInstanceMemory".</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b> atp.Splitkey=instantiationDataDefProps, instantiationDataDefProps.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
perInstanceMemory	PerInstanceMemory	*	aggr	<p>Defines a per-instance memory object needed by this software component. The aggregation of PerInstanceMemory is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b> atp.Splitkey=perInstanceMemory.shortName, perInstanceMemory.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
perInstanceParameter	ParameterDataPrototype	*	aggr	<p>Defines parameter(s) or characteristic value(s) that needs to be available for each instance of the software-component. This is typically only useful if supportsMultipleInstantiation is set to "true". The aggregation of perInstanceParameter is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b> atp.Splitkey=perInstanceParameter.shortName, perInstanceParameter.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
portAPIOption	PortAPIOption	*	aggr	<p>Options for generating the signature of port-related calls from a runnable to the RTE and vice versa. The aggregation of PortPrototypes is subject to variability with the purpose to support the conditional existence of ports.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation  <b>Tags:</b> atp.Splitkey=portAPIOption, portAPIOption.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>





Class	SwcInternalBehavior			
runnable	<a href="#">RunnableEntity</a>	*	aggr	<p>This is a RunnableEntity specified for the particular Swc InternalBehavior.</p> <p>The aggregation of RunnableEntity is subject to variability with the purpose to support the conditional existence of RunnableEntities. Note: the number of RunnableEntities might vary due to the conditional existence of Port Prototypes using DataReceivedEvents or due to different scheduling needs of algorithms.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=runnable.shortName, runnable.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
service Dependency	<a href="#">SwcService Dependency</a>	*	aggr	<p>Defines the requirements on AUTOSAR Services for a particular item.</p> <p>The aggregation of SwcServiceDependency is subject to variability with the purpose to support the conditional existence of ports as well as the conditional existence of ServiceNeeds.</p> <p>The SwcServiceDependency owned by an SwcInternal Behavior can be located in a different physical file in order to support that SwcServiceDependency might be provided in later development steps or even by different expert domain (e.g OBD expert for Obd related Service Needs) tools. Therefore the aggregation is &lt;&lt;atp Splitable&gt;&gt;.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=serviceDependency.shortName, serviceDependency.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
shared Parameter	<a href="#">ParameterData Prototype</a>	*	aggr	<p>Defines parameter(s) or characteristic value(s) shared between SwComponentPrototypes of the same Sw ComponentType The aggregation of sharedParameter is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=sharedParameter.shortName, sharedParameter.variationPoint.shortLabel  vh.latestBindingTime=preCompileTime</p>
supports Multiple Instantiation	Boolean	0..1	attr	<p>Indicate whether the corresponding software-component can be multiply instantiated on one ECU. In this case the attribute will result in an appropriate component API on programming language level (with or without instance handle).</p>
variationPoint Proxy	<a href="#">VariationPointProxy</a>	*	aggr	<p>Proxy of a variation points in the C/C++ implementation.</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b>atp.Splitkey=variationPointProxy.shortName</p>

**Table A.792: SwcInternalBehavior**

<b>Class</b>	<b>SwcModeManagerErrorEvent</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
<b>Note</b>	This event is raised when an error occurred during the handling of the referenced ModeDeclarationGroup Prototype.			
<b>Base</b>	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
modeGroup	<a href="#">ModeDeclarationGroupPrototype</a>	0..1	iref	This represents the ModeDeclarationGroupPrototype for which this SwcModeManagerErrorEvent is raised in case of an error.  <b>InstanceRef implemented by:</b> PModeGroupInAtomicSwcInstanceRef

**Table A.793: SwcModeManagerErrorEvent**

<b>Class</b>	<b>SwcModeSwitchEvent</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
<b>Note</b>	This event is raised when the specified mode change occurs.			
<b>Base</b>	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
activation	<a href="#">ModeActivationKind</a>	0..1	attr	Specifies if the event is raised on entering or exiting a specific mode or is raised on the transition between two modes.
mode (ordered)	<a href="#">ModeDeclaration</a>	0..2	iref	The referenced mode or the transition between two modes raises this SwcModeSwitchEvent.  <b>InstanceRef implemented by:</b> RModeInAtomicSwcInstanceRef

**Table A.794: SwcModeSwitchEvent**

<b>Class</b>	<b>SwcServiceDependency</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::ServiceMapping			
<b>Note</b>	Specialization of ServiceDependency in the context of an SwcInternalBehavior. It allows to associate ports, port groups and (in special cases) data defined for an atomic software component to a given ServiceNeeds element.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServiceDependency</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
assignedData	<a href="#">RoleBasedDataAssignment</a>	*	aggr	Defines the role of an associated data object of the same component.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
assignedPort	<a href="#">RoleBasedPortAssignment</a>	*	aggr	Defines the role of an associated port of the same component.  <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=assignedPort, assignedPort.variation Point.shortLabel vh.latestBindingTime=preCompileTime





Class	SwcServiceDependency			
representedPort Group	PortGroup	0..1	ref	This reference specifies an association between the ServiceNeeds and a PortGroup, for example to request a communication mode which applies for communication via these ports. The referred PortGroup shall be local to this atomic SWC, but via the links between the Port Groups, a tool can evaluate this information such that all the ports linked via this port group on the same ECU can be found.
serviceNeeds	ServiceNeeds	0..1	aggr	The associated ServiceNeeds.

**Table A.795: SwcServiceDependency**

Class	SwcToApplicationPartitionMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Allows to map a given SwComponentPrototype to a formally defined partition at a point in time when the corresponding EcuInstance is not yet known or defined.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
application Partition	ApplicationPartition	0..1	ref	Reference to an ApplicationPartition to which a Sw ComponentPrototype is mapped.
swComponent Prototype	SwComponentPrototype	0..1	iref	References to the software component instances that are mapped to the referenced ApplicationPartition. If the component prototype referenced is a composition, this indicates that all atomic software components within the composition are mapped to the ApplicationPartition.  If there is additionally a mapping of some SwComponent Prototype INSIDE the Composition to another Application Partition the inner mapping overrides the outer mapping.  <b>InstanceRef implemented by:</b> ComponentInSystem InstanceRef

**Table A.796: SwcToApplicationPartitionMapping**

Class	SwcToEcuMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Map software components to a specific ECU Instance and optionally to a processing unit and to an Ecu Partition. For each combination of ECUInstance and the optional ProcessingUnit and the optional Ecu Partition and the optional SensorActuator only one SwcToEcuMapping shall be used.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
component	SwComponentPrototype	1..*	iref	References to the software component instances that are mapped to the referenced ECUInstance. If the component prototype referenced is a composition, this indicates that all atomic software components within the composition are mapped to the ECU.  If there is additionally a mapping of some SwComponent Prototype INSIDE the Composition to another ECU Instance the inner mapping overrides the outer mapping.  <b>InstanceRef implemented by:</b> ComponentInSystem InstanceRef
controlledHw Element	HwElement	0..1	ref	Optional mapping of SwComponentPrototypes that are typed by SensorActuatorSwComponentType to a Hw Element with category SensorActuator.







Class	SwcToEcuMapping			
ecuInstance	<a href="#">EcuInstance</a>	1	ref	Reference to a specific ECU Instance description.
processingUnit	<a href="#">HwElement</a>	0..1	ref	Optional mapping of software components to individual microcontroller cores residing in one ECU. A microcontroller core is described in the ECU Resource Template by the HwElement of HwCategory Processing Unit.

Table A.797: SwcToEcuMapping

Class	SymbolProps			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	This meta-class represents the ability to attach with the symbol attribute a symbolic name that is conform to C language requirements to another meta-class, e.g. AtomicSwComponentType, that is a potential subject to a name clash on the level of RTE source code.			
Base	ARObject, <a href="#">ImplementationProps</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

Table A.798: SymbolProps

Class	SynchronizationTimingConstraint			
Package	M2::AUTOSARTemplates::CommonStructure::Timing::TimingConstraint::SynchronizationTimingConstraint			
Note	<p>This constraint is used to restrict the timing behavior of different, but correlated events or event chains, with regard to synchronization.</p> <p>Thereby, in case of imposing a synchronization timing constraint on events or event chains the following two scenarios are supported:</p> <p>1) [synchronizationConstraintType=responseSynchronization] Events: An arbitrary number of correlated events which play the role of responses shall occur synchronously with respect to a predefined tolerance. Event Chains: An arbitrary number of correlated event chains with a common stimulus, but different responses, where the responses shall occur synchronously with respect to a predefined tolerance.</p> <p>2) [synchronizationConstraintType=stimulusSynchronization] Events: An arbitrary number of correlated events which play the role of stimuli shall occur synchronously with respect to a predefined tolerance. Event Chains: An arbitrary number of correlated event chains with a common response, but different stimuli, where the stimuli shall occur synchronously with respect to a predefined tolerance.</p> <p>In case of imposing a synchronization timing constraint on events the following two scenarios are supported:</p> <p>1) [eventOccurrenceKind=singleOccurrence] Any of the events shall occur only once in the given time interval.</p> <p>2) [eventOccurrenceKind=multipleOccurrences] Any of the events may occur more than once in the given time interval. In other words multiple occurrences of an event within the given time interval are permitted.</p>			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TimingConstraint</a> , <a href="#">Traceable</a>			
Attribute	Type	Mult.	Kind	Note
eventOccurrenceKind	EventOccurrenceKind Enum	0..1	attr	The specific occurrence kind of an event occurring within the given time interval.
scope	<a href="#">TimingDescriptionEventChain</a>	*	ref	The event chains that are in the scope of the constraint.
scopeEvent	<a href="#">TimingDescriptionEvent</a>	*	ref	The events that are in the scope of the constraint.
synchronizationConstraintType	SynchronizationType Enum	1	attr	The specific type of this synchronization constraint.





Class	SynchronizationTimingConstraint			
tolerance	MultidimensionalTime	1	aggr	The maximum time interval, within which the synchronized events shall occur.

**Table A.799: SynchronizationTimingConstraint**

Class	SynchronousServerCallPoint			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::ServerCall			
Note	This means that the RunnableEntity is supposed to perform a blocking wait for a response from the server.			
Base	ARObject, <a href="#">AbstractAccessPoint</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">ServerCallPoint</a>			
Attribute	Type	Mult.	Kind	Note
calledFrom WithinExclusive Area	ExclusiveAreaNesting Order	0..1	ref	This indicates that the call point is located at the deepest level inside one or more ExclusiveAreas that are nested in the given order.

**Table A.800: SynchronousServerCallPoint**

Class	System			
Package	M2::AUTOSARTemplates::SystemTemplate			
Note	<p>The top level element of the System Description. The System description defines five major elements: Topology, Software, Communication, Mapping and Mapping Constraints.</p> <p>The System element directly aggregates the elements describing the Software, Mapping and Mapping Constraints; it contains a reference to an ASAM FIBEX description specifying Communication and Topology.</p> <p><b>Tags:</b>atp.recommendedPackage=Systems</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
clientId DefinitionSet	ClientIdDefinitionSet	*	ref	Set of Client Identifiers that are used for inter-ECU client-server communication in the System.
containerIPdu HeaderByte Order	<a href="#">ByteOrderEnum</a>	0..1	attr	Defines the byteOrder of the header in ContainerIPdus.
ecuExtract Version	RevisionLabelString	0..1	attr	Version number of the Ecu Extract.
fibexElement	<a href="#">FibexElement</a>	*	ref	<p>Reference to ASAM FIBEX elements specifying Communication and Topology.</p> <p>All Fibex Elements used within a System Description shall be referenced from the System Element.</p> <p>atpVariation: In order to describe a product-line, all Fibex Elements can be optional.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b>vh.latestBindingTime=postBuild</p>
interpolation Routine MappingSet	<a href="#">InterpolationRoutine MappingSet</a>	*	ref	This reference identifies the InterpolationRoutineMapping Sets that are relevant in the context of the enclosing System.





Class	System			
j1939SharedAddressCluster	J1939SharedAddressCluster	*	aggr	<p>Collection of J1939Clusters that share a common address space for the routing of messages.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=j1939SharedAddressCluster.shortName,  j1939SharedAddressCluster.variationPoint.shortLabel  vh.latestBindingTime=postBuild</p>
mapping	SystemMapping	*	aggr	<p>Aggregation of all mapping aspects (mapping of SW components to ECUs, mapping of data elements to signals, and mapping constraints).</p> <p>In order to support OEM / Tier 1 interaction and shared development for one common System this aggregation is atpSplitable and atpVariation. The content of System Mapping can be provided by several parties using different names for the SystemMapping.</p> <p>This element is not required when the System description is used for a network-only use-case.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=mapping.shortName, mapping.variationPoint.shortLabel  vh.latestBindingTime=postBuild</p>
pncVectorLength	PositiveInteger	0..1	attr	Length of the partial networking request release information vector (in bytes).
pncVectorOffset	PositiveInteger	0..1	attr	Absolute offset (with respect to the NM-PDU) of the partial networking request release information vector that is defined in bytes as an index starting with 0.
rootSoftwareComposition	RootSwCompositionPrototype	0..1	aggr	<p>Aggregation of the root software composition, containing all software components in the System in a hierarchical structure. This element is not required when the System description is used for a network-only use-case.</p> <p>atpVariation: The RootSwCompositionPrototype can vary.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=rootSoftwareComposition.shortName, rootSoftwareComposition.variationPoint.shortLabel  vh.latestBindingTime=systemDesignTime</p>
swCluster	CpSoftwareCluster	*	ref	<p>CP Software Clusters of this System</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=swCluster.cpSoftwareCluster, swCluster.variationPoint.shortLabel  atp.Status=draft  vh.latestBindingTime=systemDesignTime</p>
systemDocumentation	Chapter	*	aggr	<p>Possibility to provide additional documentation while defining the System. The System documentation can be composed of several chapters.</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=systemDocumentation.shortName, systemDocumentation.variationPoint.shortLabel  vh.latestBindingTime=systemDesignTime  xml.sequenceOffset=-10</p>
systemVersion	RevisionLabelString	1	attr	Version number of the System Description.

Table A.801: System

<b>Class</b>	<b>SystemMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate			
<b>Note</b>	The system mapping aggregates all mapping aspects (mapping of SW components to ECUs, mapping of data elements to signals, and mapping constraints).			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
applicationPartitionToEcuPartitionMapping	<a href="#">ApplicationPartitionToEcuPartitionMapping</a>	*	aggr	Mapping of ApplicationPartitions to EcuPartitions <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=applicationPartitionToEcuPartitionMapping.shortName, applicationPartitionToEcuPartitionMapping.variationPoint.shortLabel vh.latestBindingTime=postBuild
appOsTaskProxyToEcuTaskProxyMapping	AppOsTaskProxyToEcuTaskProxyMapping	*	aggr	Mapping of an OsTaskProxy that was created in the context of a SwComponent to an OsTaskProxy that was created in the context of an Ecu.
comManagementMapping	ComManagementMapping	*	aggr	Mappings between Mode Management PortGroups and communication channels. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime
cryptoServiceMapping	CryptoServiceMapping	*	aggr	This aggregation represents the collection of crypto service mappings in the context of the enclosing System Mapping. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=cryptoServiceMapping.shortName, cryptoServiceMapping.variationPoint.shortLabel vh.latestBindingTime=postBuild
dataMapping	<a href="#">DataMapping</a>	*	aggr	The data mappings defined. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
ecuResourceMapping	<a href="#">ECUMapping</a>	*	aggr	Mapping of hardware related topology elements onto their counterpart definitions in the ECU Resource Template. atpVariation: The ECU Resource type might be variable. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime
j1939ControllerApplicationToJ1939NmNodeMapping	<a href="#">J1939ControllerApplicationToJ1939NmNodeMapping</a>	*	aggr	Mapping of a J1939ControllerApplication to a J1939NmNode.
mappingConstraint	MappingConstraint	*	aggr	Constraints that limit the mapping freedom for the mapping of SW components to ECUs. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime
pncMapping	<a href="#">PncMapping</a>	*	aggr	Mappings between Virtual Function Clusters and Partial Network Clusters. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime





Class	SystemMapping			
portElementToComResourceMapping	<a href="#">PortElementToCommunicationResourceMapping</a>	*	aggr	maps a communication resource to CP Software Clusters <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=portElementToComResourceMapping.shortName, portElementToComResourceMapping.variationPoint.shortLabel atp.Status=draft vh.latestBindingTime=postBuild
resourceEstimation	<a href="#">EcuResourceEstimation</a>	*	aggr	Resource estimations for this set of mappings, zero or one per ECU instance. atpVariation: Used ECUs are variable. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime
resourceToApplicationPartitionMapping	<a href="#">CpSoftwareClusterResourceToApplicationPartitionMapping</a>	*	aggr	Maps a Software Cluster resource to an Application Partition to restrict the usage. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=resourceToApplicationPartitionMapping.shortName, resourceToApplicationPartitionMapping.variationPoint.shortLabel atp.Status=draft vh.latestBindingTime=systemDesignTime
rteEventSeparation	RteEventInSystemSeparation	*	aggr	Separation constraint that limits the mapping freedom for the mapping of RteEvents to OsTasks in the System context.
rteEventToOsTaskProxyMapping	RteEventInSystemToOsTaskProxyMapping	*	aggr	Constraint that enforces a mapping of RteEvent to a particular OsTask in the System context.
signalPathConstraint	SignalPathConstraint	*	aggr	Constraints that limit the mapping freedom for the mapping of data elements to signals. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=systemDesignTime
softwareClusterToResourceMapping	<a href="#">CpSoftwareClusterToResourceMapping</a>	*	aggr	maps a service resource to CP Software Clusters <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=softwareClusterToResourceMapping.shortName, softwareClusterToResourceMapping.variationPoint.shortLabel atp.Status=draft vh.latestBindingTime=preCompileTime
swClusterMapping	<a href="#">CpSoftwareClusterToEcuInstanceMapping</a>	*	aggr	The mappings of SW cluster to ECUs. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=swClusterMapping.shortName, swClusterMapping.variationPoint.shortLabel atp.Status=draft vh.latestBindingTime=systemDesignTime
swcToApplicationPartitionMapping	<a href="#">SwcToApplicationPartitionMapping</a>	*	aggr	Allows to map a given SwComponentPrototype to a formally defined partition at a point in time when the corresponding EcuInstance is not yet known or defined. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=swcToApplicationPartitionMapping.shortName, swcToApplicationPartitionMapping.variationPoint.shortLabel vh.latestBindingTime=postBuild





Class	SystemMapping			
swImplMapping	SwcToImplMapping	*	aggr	<p>The mappings of AtomicSoftwareComponent Instances to Implementations.</p> <p>atpVariation: Derived, because SwcToEcuMapping is variable.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b>vh.latestBindingTime=preCompileTime</p>
swMapping	<a href="#">SwcToEcuMapping</a>	*	aggr	<p>The mappings of SW components to ECUs.</p> <p>atpVariation: SWC shall be mapped to other ECUs.</p> <p><b>Stereotypes:</b> atpVariation</p> <p><b>Tags:</b>vh.latestBindingTime=preCompileTime</p>

**Table A.802: SystemMapping**

Class	SystemSignal			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	<p>The system signal represents the communication system's view of data exchanged between SW components which reside on different ECUs. The system signals allow to represent this communication in a flattened structure, with exactly one system signal defined for each data element prototype sent and received by connected SW component instances.</p> <p><b>Tags:</b>atp.recommendedPackage=SystemSignals</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
dynamicLength	Boolean	1	attr	The length of dynamic length signals is variable in run-time. Only a maximum length of such a signal is specified in the configuration (attribute length in ISignal element).
physicalProps	<a href="#">SwDataDefProps</a>	0..1	aggr	Specification of the physical representation.

**Table A.803: SystemSignal**

Class	SystemSignalGroup			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	<p>A signal group refers to a set of signals that shall always be kept together. A signal group is used to guarantee the atomic transfer of AUTOSAR composite data types.</p> <p>The SystemSignalGroup defines a signal grouping on VFB level. On cluster level the Signal grouping is described by the ISignalGroup element.</p> <p><b>Tags:</b>atp.recommendedPackage=SystemSignalGroups</p>			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
systemSignal	<a href="#">SystemSignal</a>	*	ref	Reference to a set of SystemSignals that shall always be kept together.
transforming SystemSignal	<a href="#">SystemSignal</a>	0..1	ref	Optional reference to the SystemSignal which shall contain the transformed (linear) data.

**Table A.804: SystemSignalGroup**

<b>Class</b>	<b>SystemTiming</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing			
<b>Note</b>	<p>A model element used to refine timing descriptions and constraints (from a VfbTiming) at System level, utilizing information about topology, software deployment, and signal mapping described in the System Template.</p> <p>TimingDescriptions aggregated by SystemTiming are restricted to events which are derived from the class TDEventVfb, TDEventSwcInternalBehavior and TDEventCom.</p> <p><b>Tags:</b>atp.recommendedPackage=TimingExtensions</p>			
<b>Base</b>	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, TimingExtension			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
system	System	1	ref	This defines the scope of a SystemTiming. All corresponding timing descriptions and constraints shall be defined within this scope.

**Table A.805: SystemTiming**

<b>Class</b>	<b>TDCpSoftwareClusterMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingCpSoftwareCluster			
<b>Note</b>	<p>This is used to specify a mapping between a software cluster that provides temporal and dynamic resources and the software clusters that need these resources.</p> <p><b>Tags:</b>atp.Status=draft</p>			
<b>Base</b>	ARObject, Identifiable, MultilanguageReferrable, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
provider	CpSoftwareCluster	0..1	ref	<p>This is the software cluster that provides the temporal and dynamic resource.</p> <p><b>Tags:</b>atp.Status=draft</p>
requestor	CpSoftwareCluster	*	ref	<p>This is the software cluster that requests the temporal and dynamic resource.</p> <p><b>Tags:</b>atp.Status=draft</p>
timing Description	TimingDescription	0..1	ref	<p>The timing description representing the temporal and dynamic resource.</p> <p><b>Tags:</b>atp.Status=draft</p>

**Table A.806: TDCpSoftwareClusterMapping**

<b>Class</b>	<b>TDCpSoftwareClusterResourceMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingCpSoftwareCluster			
<b>Note</b>	<p>This is used to assign an unequivocal global resource identification to a temporal and dynamic resource.</p> <p><b>Tags:</b>atp.Status=draft</p>			
<b>Base</b>	ARObject, Identifiable, MultilanguageReferrable, Referrable			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
resource	CpSoftwareClusterResource	0..1	ref	<p>The specific resource identification assigned to the temporal and dynamic resource.</p> <p><b>Tags:</b>atp.Status=draft</p>
timing Description	TimingDescription	0..1	ref	<p>The timing description representing the temporal and dynamic resource.</p> <p><b>Tags:</b>atp.Status=draft</p>

**Table A.807: TDCpSoftwareClusterResourceMapping**

<b>Class</b>	<b>TDEventComplex</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription::TimingDescriptionEvents::TDEventComplex			
<b>Note</b>	<p>This is used to describe complex timing events.</p> <p>The context of a complex timing event either is described informally, e.g. using the documentation block, or is described formally by the associated TDEventOccurrenceExpression.</p>			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TimingDescription</a> , <a href="#">TimingDescriptionEvent</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.808: TDEventComplex**

<b>Class</b>	<b>TDEventOccurrenceExpression</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription::TimingDescriptionEvents::TDEventOccurrenceExpression			
<b>Note</b>	<p>This is used to specify a filter on the occurrences of TimingDescriptionEvents by means of a TDEventOccurrenceExpressionFormula. Filter criteria can be variable and argument values, i.e. the timing event only occurs for specific values, as well as the temporal characteristics of the occurrences of arbitrary timing events.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
argument	<a href="#">AutosarOperationArgumentInstance</a>	*	aggr	An occurrence expression can reference an arbitrary number of OperationArgumentPrototypes in its expression. This association aggregates instance references to OperationArgumentPrototypes which can be referenced in the expression.
formula	TDEventOccurrenceExpressionFormula	1	aggr	This is the expression formula which is used to describe the occurrence expression.
mode	TimingModelInstance	*	aggr	An occurrence expression can reference an arbitrary number of TimingModelInstances in its expression. This association aggregates instance references to Mode Declaration which can be referenced in the expression.
variable	<a href="#">AutosarVariableInstance</a>	*	aggr	An occurrence expression can reference an arbitrary number of VariableDataPrototypes in its expression. This association aggregates instance references to VariableDataPrototypes which can be referenced in the expression.

**Table A.809: TDEventOccurrenceExpression**

<b>Class</b>	<b>TDEventOperation</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription::TimingDescriptionEvents::TDEventVfb::Operation			
<b>Note</b>	This is used to describe timing events related to client-server communication at VFB level.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TDEventVfb</a> , <a href="#">TDEventVfbPort</a> , <a href="#">TimingDescription</a> , <a href="#">TimingDescriptionEvent</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
operation	<a href="#">ClientServerOperation</a>	1	ref	The referenced operation.
tdEventOperationType	TDEventOperationTypeEnum	1	attr	The specific type of this timing event.

**Table A.810: TDEventOperation**



<b>Class</b>	<b>TDEventSwcInternalBehavior</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription::TimingDescription Events::TDEventSwcInternalBehavior			
<b>Note</b>	This is used to describe timing events related to the SwcInternalBehavior of an AtomicSwComponent Type.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TDEventSwc</a> , <a href="#">TimingDescription</a> , <a href="#">TimingDescriptionEvent</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
runnable	<a href="#">RunnableEntity</a>	1	ref	The scope of this timing event.
tdEventSwcInternalBehaviorType	TDEventSwcInternalBehaviorTypeEnum	1	attr	The specific type of this timing event.
variableAccess	<a href="#">VariableAccess</a>	0..1	ref	The scope of this timing event.

**Table A.811: TDEventSwcInternalBehavior**

<b>Class</b>	<b>TDEventVariableDataPrototype</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription::TimingDescription Events::TDEventVfb::VariableDataPrototype			
<b>Note</b>	This is used to describe timing events related to sender-receiver communication at VFB level.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TDEventVfb</a> , <a href="#">TDEventVfbPort</a> , <a href="#">TimingDescription</a> , <a href="#">TimingDescriptionEvent</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataElement	<a href="#">VariableDataPrototype</a>	1	ref	The referenced VariableDataPrototype
tdEventVariableDataPrototypeType	TDEventVariableDataPrototypeTypeEnum	1	attr	The specific type of this timing event.

**Table A.812: TDEventVariableDataPrototype**

<b>Class</b>	<b>TDEventVfb</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription::TimingDescription Events::TDEventVfb			
<b>Note</b>	This is the abstract parent class to describe timing events at Virtual Functional Bus (VFB) level.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TimingDescription</a> , <a href="#">TimingDescriptionEvent</a>			
<b>Subclasses</b>	<a href="#">TDEventVfbPort</a> , TDEventVfbReference			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
component	<a href="#">SwComponentPrototype</a>	0..1	iref	The context for the scope of this timing event. <b>InstanceRef implemented by:</b> ComponentInComposition InstanceRef

**Table A.813: TDEventVfb**

<b>Class</b>	<b>TDEventVfbPort</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription::TimingDescription Events::TDEventVfb			
<b>Note</b>	This is the abstract parent class to describe specific timing event types at Virtual Functional Bus (VFB) level.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TDEventVfb</a> , <a href="#">TimingDescription</a> , <a href="#">TimingDescriptionEvent</a>			





<b>Class</b>	<b>TDEventVfbPort</b> (abstract)			
<b>Subclasses</b>	TDEventModeDeclaration, <a href="#">TDEventOperation</a> , TDEventTrigger, <a href="#">TDEventVariableDataPrototype</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
isExternal	Boolean	1	attr	This attribute is used to refer to external events that are related to hardware I/O, like physical sensors and actuators, at Virtual Functional Bus (VFB) level.
port	<a href="#">PortPrototype</a>	0..1	ref	The port scope of the timing event.
portPrototypeBlueprint	<a href="#">PortPrototypeBlueprint</a>	0..1	ref	The PortPrototypeBlueprint is the scope of the timing event.

**Table A.814: TDEventVfbPort**

<b>Class</b>	<b>Tcplplcmpv4Props</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	This meta-class specifies the configuration options for ICMPv4 (Internet Control Message Protocol).			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
tcplplcmpV4EchoReplyEnabled	Boolean	0..1	attr	This attribute enables or disables transmission of ICMP echo reply message in case of a ICMP echo reception.
tcplplcmpV4Ttl	PositiveInteger	0..1	attr	This attribute is only relevant in case that ICMP (Internet Control Message Protocol) is used. It specifies the default Time-to-live value of outgoing ICMP packets.

**Table A.815: Tcplplcmpv4Props**

<b>Class</b>	<b>Tcplplcmpv6Props</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	This meta-class specifies the configuration options for ICMPv6 (Internet Control Message Protocol).			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
tcplplcmpV6EchoReplyAvoidFragmentation	Boolean	0..1	attr	This attribute defines whether the echo reply is only transmitted in case that the incoming ICMPv6 Echo Request (Pings) fits the MTU of the respective interface, i.e. can be transmitted without IPv6 fragmentation.
tcplplcmpV6EchoReplyEnabled	Boolean	0..1	attr	This attribute enables or disables transmission of ICMP echo reply message in case of a ICMP echo reception.
tcplplcmpV6HopLimit	PositiveInteger	0..1	attr	Default Hop-Limit value of outgoing ICMPv6 packets.
tcplplcmpV6MsgDestinationUnreachableEnabled	Boolean	0..1	attr	This attribute Enables/Disables the transmission of Destination Unreachable Messages.
tcplplcmpV6MsgParameterProblemEnabled	Boolean	0..1	attr	If enabled an ICMPv6 parameter problem message will be sent if a received packet has been dropped due to unknown options or headers that are found in the packet.

**Table A.816: Tcplplcmpv6Props**

Class	TcpProps			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	This meta-class specifies the configuration options for TCP (Transmission Control Protocol).			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
tcpCongestionAvoidanceEnabled	Boolean	0..1	attr	Enables (TRUE) or disables (FALSE) support of TCP congestion avoidance algorithm according to IETF RFC 5681.
tcpDelayedAckTimeout	TimeValue	0..1	attr	The maximal time an acknowledgement is delayed for transmission in seconds.
tcpFastRecoveryEnabled	Boolean	0..1	attr	Enables (TRUE) or disables (FALSE) support of TCP Fast Recovery according to IETF RFC 5681.
tcpFastRetransmitEnabled	Boolean	0..1	attr	Enables (TRUE) or disables (FALSE) support of TCP Fast Retransmission according to IETF RFC 5681.
tcpFinWait2Timeout	TimeValue	0..1	attr	Timeout in [s] to receive a FIN from the remote node (after this node has initiated connection termination), i.e. maximum time waiting in FINWAIT-2 for a connection termination request from the remote TCP.
tcpKeepAliveEnabled	Boolean	0..1	attr	Enables (TRUE) or disables (FALSE) TCP Keep Alive Probes according to IETF RFC 1122 chapter 4.2.3.6.
tcpKeepAliveInterval	TimeValue	0..1	attr	Specifies the interval in seconds between subsequent keepalive probes.
tcpKeepAliveProbesMax	PositiveInteger	0..1	attr	Maximum number of times that a TCP Keep Alive is retransmitted before the connection is closed.
tcpKeepAliveTime	TimeValue	0..1	attr	Specifies the time in [s] between the last data packet sent (simple ACKs are not considered data) and the first keepalive probe.
tcpMaxRtx	PositiveInteger	0..1	attr	Maximum number of times that a TCP segment is retransmitted before the TCP connection is closed. This parameter is only valid if tcpRetransmissionTimeout is configured. Note: This parameter also applies for FIN retransmissions.
tcpMsl	TimeValue	0..1	attr	Maximum segment lifetime in [s].
tcpNagleEnabled	Boolean	0..1	attr	Enables (TRUE) or disables (FALSE) support of Nagle's algorithm according to IETF RFC 1122 (chapter 4.2.3.4 When to Send Data). If enabled the Nagle's algorithm is activated per default for all TCP sockets, but can be deactivated per Socket (with the attribute TcpTp.nagleAlgorithm).
tcpReceiveWindowMax	PositiveInteger	0..1	attr	Default value of maximum receive window in bytes.
tcpRetransmissionTimeout	TimeValue	0..1	attr	Timeout in [s] before an unacknowledged TCP segment is sent again. If the timeout is disabled, no TCP segments shall be retransmitted.
tcpSlowStartEnabled	Boolean	0..1	attr	Enables (TRUE) or disables (FALSE) support of TCP slow start algorithm according to IETF RFC 5681.
tcpSynMaxRtx	PositiveInteger	0..1	attr	Maximum number of times that a TCP SYN is retransmitted.
tcpSynReceivedTimeout	TimeValue	0..1	attr	Timeout in [s] to complete a remotely initiated TCP connection establishment, i.e. maximum time waiting in SYN-RECEIVED for a confirming connection request acknowledgement after having both received and sent a connection request.
tcpTtl	PositiveInteger	0..1	attr	Default Time-to-live value of outgoing TCP packets.

**Table A.817: TcpProps**

<b>Class</b>	<b>TcpTp</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	Content Model for TCP configuration.			
<b>Base</b>	ARObject, TcpUdpConfig, TransportProtocolConfiguration			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
keepAliveInterval	TimeValue	0..1	attr	Specifies the interval in seconds between subsequent keepalive probes.
keepAliveProbesMax	PositiveInteger	0..1	attr	Maximum number of times that TCP retransmits an individual data segment before aborting the connection.
keepAlives	Boolean	0..1	attr	Indicates if Keep-Alive messages are sent.
keepAliveTime	TimeValue	0..1	attr	Specifies the time in seconds between the last data packet sent and the first keepalive probe.
naglesAlgorithm	Boolean	0..1	attr	Indicates if Nagle's Algorithm is used.
receiveWindowMin	PositiveInteger	0..1	attr	Minimum size of the TCP receive window in bytes.
tcpRetransmissionTimeout	TimeValue	0..1	attr	Defines the timeout in seconds before an unacknowledged TCP segment is sent again. If the tcpRetransmissionTimeout is not defined or set to "INF", no TCP segments shall be re-transmitted.
tcpTpPort	TpPort	1	aggr	TCP Port configuration.

**Table A.818: TcpTp**

<b>Class</b>	<b>TextTableMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	Defines the mapping of two DataPrototypes typed by AutosarDataTypes that refer to CompuMethods of category TEXTTABLE, SCALE_LINEAR_AND_TEXTTABLE or BITFIELD_TEXTTABLE.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
bitfieldTextTableMaskFirst	PositiveInteger	0..1	attr	This attribute can be used to support the mapping of bit field to bit field, boolean values to bit fields, and vice versa. The attribute defines the bit mask for the first element of the TextTableMapping.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
bitfieldTextTableMaskSecond	PositiveInteger	0..1	attr	This attribute can be used to support the mapping of bit field to bit field, boolean values to bit fields, and vice versa. The attribute defines the bit mask for the second element of the TextTableMapping.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
identicalMapping	Boolean	0..1	attr	If identicalMapping is set == true the values of the two referenced DataPrototypes do not need any conversion of the values.
mappingDirection	MappingDirectionEnum	0..1	attr	Specifies the conversion direction for which the TextTableMapping is applicable.
valuePair	TextTableValuePair	*	aggr	Defines a pair of values which are translated into each other.

**Table A.819: TextTableMapping**

<b>Class</b>	<b>TextTableValuePair</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	Defines a pair of text values which are translated into each other.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
firstValue	Numerical	0..1	attr	Value of first DataPrototype provided similar to a numerical ValueSpecification which is intended to be assigned to a Primitive data element. Note that the numerical value is a variant, it can be computed by a formula.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime
secondValue	Numerical	0..1	attr	Value of second DataPrototype provided similar to a numerical ValueSpecification which is intended to be assigned to a Primitive data element. Note that the numerical value is a variant, it can be computed by a formula.  <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=preCompileTime

**Table A.820: TextTableValuePair**

<b>Class</b>	<b>TextValueSpecification</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Constants			
<b>Note</b>	The purpose of TextValueSpecification is to define the labels that correspond to enumeration values.			
<b>Base</b>	ARObject, ValueSpecification			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
value	VerbatimString	0..1	attr	This is the value itself.  Note that vt uses the   operator to separate the values for the different bitfield masks in case that the semantics of the related DataPrototype is described by means of a BITFIELD_TEXTTABLE in the associated CompuMethod.

**Table A.821: TextValueSpecification**

<b>Class</b>	<b>TimeSyncClientConfiguration</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	Defines the configuration of the time synchronisation client.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
orderedMaster (ordered)	OrderedMaster	*	aggr	Defines a list of ordered NetworkEndpoints.  <b>Tags:</b> xml.namePlural=ORDERED-MASTER-LIST
timeSync Technology	TimeSyncTechnology Enum	1	attr	Defines the time synchronisation technology used.

**Table A.822: TimeSyncClientConfiguration**

<b>Class</b>	<b>TimeSyncServerConfiguration</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			





<b>Class</b>	<b>TimeSyncServerConfiguration</b>			
<b>Note</b>	Defines the configuration of the time synchronisation server.			
<b>Base</b>	ARObject, <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
priority	PositiveInteger	0..1	attr	Server Priority.
syncInterval	TimeValue	1	attr	Synchronisation interval used by the time synchronisation server (in seconds).
timeSyncServer Identifier	String	0..1	attr	Identifier of the TimeSyncServer.
timeSync Technology	TimeSyncTechnology Enum	1	attr	Defines the time synchronisation technology used. Possible values are: NTP_RFC958, PTP_IEEE1588_2002, PTP_IEEE1588_2008, AVB_IEEE802_1AS and others.

**Table A.823: TimeSyncServerConfiguration**

<b>Class</b>	<b>TimingDescriptionEvent</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription			
<b>Note</b>	<p>A timing event is the abstract representation of a specific system behavior – that can be observed at runtime – in the AUTOSAR specification. Timing events are used to define the scope for timing constraints. Depending on the specific scope, the view on the system, and the level of abstraction different types of events are defined.</p> <p>In order to avoid confusion with existing event descriptions in the AUTOSAR templates the timing specific event types use the prefix TD.</p>			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TimingDescription</a>			
<b>Subclasses</b>	TDEventBsw, TDEventBswInternalBehavior, TDEventCom, <a href="#">TDEventComplex</a> , TDEventSwc, <a href="#">TDEventVtb</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
occurrence Expression	<a href="#">TDEventOccurrenceExpression</a>	0..1	aggr	The occurrence expression for this event.

**Table A.824: TimingDescriptionEvent**

<b>Class</b>	<b>TimingDescriptionEventChain</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing::TimingDescription			
<b>Note</b>	An event chain describes the causal order for a set of functionally dependent timing events. Each event chain has a well defined stimulus and response, which describe its start and end point. Furthermore, it can be hierarchically decomposed into an arbitrary number of sub-chains, so called <i>event chain segments</i> .			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TimingDescription</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
response	<a href="#">TimingDescriptionEvent</a>	1	ref	<p>The response event representing the point in time where the event chain is terminated.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
segment	<a href="#">TimingDescriptionEventChain</a>	1..*	ref	<p>A composed event chain consists of an arbitrary number of sub-chains.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
stimulus	<a href="#">TimingDescriptionEvent</a>	1	ref	<p>The stimulus event representing the point in time where the event chain is activated.</p> <p><b>Tags:</b>xml.sequenceOffset=10</p>

**Table A.825: TimingDescriptionEventChain**

<b>Class</b>	<b>TimingEvent</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
<b>Note</b>	This event is used to start RunnableEntities that shall be executed periodically.			
<b>Base</b>	ARObject, <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
offset	TimeValue	0..1	attr	The value makes an assumption about the time offset of the first activation of the RunnableEntity triggered by the mapped TimingEvent relative to the periodic activation of the time base of this TimingEvent. Unit: second.
period	TimeValue	0..1	attr	Period of timing event in seconds. The value of this attribute shall be greater than zero.

**Table A.826: TimingEvent**

<b>Class</b>	<b>TimingExtension</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Timing			
<b>Note</b>	The abstract parent class of the different template specific timing extensions. Depending on the specific timing extension the timing descriptions and timing constraints, that can be used to specify the timing behavior, are restricted.			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	BswCompositionTiming, BswModuleTiming, EcuTiming, SwcTiming, <a href="#">SystemTiming</a> , <a href="#">VfbTiming</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
timingCondition	TimingCondition	*	aggr	The timing condition specifies a specific condition. <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=timingCondition.shortName, timingCondition.variationPoint.shortLabel vh.latestBindingTime=postBuild
timingDescription	TimingDescription	*	aggr	The timing descriptions that belong to a specific timing specification.  In order to support different timing description variants within a timing specification, the aggregation is marked with the stereotype "atpVariation". <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=timingDescription.shortName, timingDescription.variationPoint.shortLabel vh.latestBindingTime=postBuild
timingGuarantee	TimingConstraint	*	aggr	The timing constraints that belong to a specific timing specification in the role of a timing guarantee.  In order to support different timing constraint variants within a timing specification, the aggregation is marked with the stereotype "atpVariation". <b>Stereotypes:</b> atpSplitable; atpVariation <b>Tags:</b> atp.Splitkey=timingGuarantee.shortName, timingGuarantee.variationPoint.shortLabel vh.latestBindingTime=postBuild





Class	TimingExtension (abstract)			
timing Requirement	TimingConstraint	*	aggr	<p>The timing constraints that belong to a specific timing specification in the role of a timing requirement.</p> <p>In order to support different timing constraint variants within a timing specification, the aggregation is marked with the stereotype "atpVariation".</p> <p><b>Stereotypes:</b> atpSplitable; atpVariation</p> <p><b>Tags:</b>  atp.Splitkey=timingRequirement.shortName, timingRequirement.variationPoint.shortLabel  vh.latestBindingTime=postBuild</p>
timingResource	TimingExtension Resource	0..1	aggr	<p>The timing resource contains all instance references referred from within a timing condition formula of a timing view.</p> <p><b>Stereotypes:</b> atpSplitable</p> <p><b>Tags:</b>atp.Splitkey=timingResource.shortName</p>

**Table A.827: TimingExtension**

Class	TlsCryptoCipherSuite			
Package	M2::AUTOSARTemplates::SystemTemplate::SecureCommunication			
Note	This meta-class represents a cipher suite for describing cryptographic operations in the context of establishing a connection of ApplicationEndpoints that is protected by TLS.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
authentication	<a href="#">CryptoServicePrimitive</a>	0..1	ref	This reference identifies the crypto service primitive for the generation and verification of MACs.
certificate	<a href="#">CryptoService Certificate</a>	0..1	ref	This reference identifies the applicable local certificate.
cipherSuiteId	PositiveInteger	0..1	attr	Identification of the CipherSuite according to the IANA assignments list.
cipherSuite ShortLabel	String	0..1	attr	Name of the CipherSuite according to the IANA assignments list.
ellipticCurve	CryptoEllipticCurve Props	*	ref	This references point to the properties of elliptic curves.
encryption	<a href="#">CryptoServicePrimitive</a>	0..1	ref	This reference identifies the crypto service primitive for the execution of encryption.
keyExchange	<a href="#">CryptoServicePrimitive</a>	*	ref	This reference identifies the individual (i.e. per cipher suite) crypto service primitive for the execution of key exchange during the handshake phase.
keyExchange Authentication	<a href="#">CryptoServicePrimitive</a>	*	ref	This reference identifies the crypto service primitives for the generation and verification of signatures during the key exchange algorithm.
priority	PositiveInteger	0..1	attr	This attribute identifies the priority of the cipher suite. Range: 1..65535. Lower values represent higher priorities.
props	TlsCryptoCipherSuite Props	0..1	aggr	The aggregated TlsCryptoCipherSuiteProps provide details for the TLS Cipher Suite.
pskIdentity	<a href="#">TlsPskIdentity</a>	0..1	aggr	Pre-shared key identity shared during the handshake among the communication parties, to establish a TLS connection if the handshake is based on the existence of a pre-shared key.
remote Certificate	<a href="#">CryptoService Certificate</a>	0..1	ref	This reference identifies the applicable remote certificate.







Class	TlsCryptoCipherSuite			
signature Scheme	CryptoSignature Scheme	*	ref	This reference points to the properties of a TLS Signature Scheme.
version	TlsVersionEnum	1	attr	This attribute supports the definition of the applicable version of TLS.

**Table A.828: TlsCryptoCipherSuite**

Class	TlsCryptoServiceMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::SecureCommunication			
Note	This meta-class has the ability to represent a crypto service mapping for the socket-based configuration of Transport Layer Security (TLS).			
Base	ARObject, CryptoServiceMapping, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mult.	Kind	Note
keyExchange	CryptoServicePrimitive	*	ref	This reference identifies the shared(i.e. applicable for each of the aggregated cipher suites) crypto service primitive for the execution of key exchange during the handshake phase.
tlsCipherSuite	TlsCryptoCipherSuite	*	aggr	This aggregation represents the collection of supported cipher suites.
useClient Authentication Request	Boolean	0..1	attr	Defines if client authentication shall be applied for this TLS connection.
useSecurity Extension RecordSize Limit	Boolean	0..1	attr	Defines if the security extension for max_fragment_length shall be supported as defined in IETF RFC 8449, chapter 4.1.

**Table A.829: TlsCryptoServiceMapping**

Class	TlsPskIdentity			
Package	M2::AUTOSARTemplates::SystemTemplate::SecureCommunication			
Note	This element is used to describe the pre-shared key shared during the handshake among the communication parties, to establish a TLS connection if the handshake is based on the existence of a pre-shared key.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note
preSharedKey	CryptoServiceKey	1	ref	This reference identifies the applicable cryptographic key.
pskIdentity	String	1	attr	This attribute provides the key identification.
pskIdentityHint	String	0..1	attr	This attribute provides the identity hint for a pre-shared key.

**Table A.830: TlsPskIdentity**

Class	TlvDataIdDefinition			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	This meta-class represents the ability to define the tlvDataId.			
Base	ARObject			
Attribute	Type	Mult.	Kind	Note





Class	TlvDataIdDefinition			
id	PositiveInteger	1	attr	This attribute represents the definition of the value of the TlvDataId <b>Stereotypes:</b> atpIdentityContributor
tlvArgument	<a href="#">ArgumentDataPrototype</a>	0..1	ref	This reference assigns a tlvDataId to a given argument of a ClientServerOperation.
tlvImplementationDataTypeElement	<a href="#">AbstractImplementationDataTypeElement</a>	0..1	ref	This reference associates the definition of a TLV data id with a given AbstractImplementationDataTypeElement.
tlvRecordElement	<a href="#">ApplicationRecordElement</a>	0..1	ref	This reference associates the definition of a TLV data id with a given ApplicationRecordElement.

**Table A.831: TlvDataIdDefinition**

Class	TlvDataIdDefinitionSet			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	This meta-class acts as a container of TlvDataIdDefinitions to be used in a given context <b>Tags:</b> atp.recommendedPackage=TlvDataDefinitionSets			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
tlvDataIdDefinition	<a href="#">TlvDataIdDefinition</a>	*	aggr	This aggregation represents the collection of TlvDataIdDefinitions aggregated by the TlvDataIdDefinitionSet <b>Stereotypes:</b> atpSplittable <b>Tags:</b> atp.Splitkey=tlvDataIdDefinition.id

**Table A.832: TlvDataIdDefinitionSet**

Class	Topic1			
Package	M2::MSR::Documentation::Chapters			
Note	This meta-class represents a topic of a documentation. Topics are similar to chapters but they cannot be nested.  They also do not appear in the table of content. Topics can be used to produce intermediate headlines thus structuring a chapter internally.			
Base	<a href="#">ARObject</a> , <a href="#">DocumentViewSelectable</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Paginateable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
helpEntry	String	0..1	attr	This specifies an entry point in an online help system to be linked with the parent class. The syntax shall be defined by the applied help system respectively help system generator. <b>Tags:</b> xml.attribute=true
topicContent	TopicContentOrMsrQuery	0..1	aggr	This is the content of the topic. <b>Tags:</b> xml.roleElement=false xml.roleWrapperElement=false xml.sequenceOffset=20 xml.typeElement=false xml.typeWrapperElement=false

**Table A.833: Topic1**

<b>Class</b>	<b><i>TpConnection</i></b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::DiagnosticConnection			
<b>Note</b>	TpConnection Base Class.			
<b>Base</b>	<i>ARObject</i>			
<b>Subclasses</b>	<a href="#">CanTpConnection</a> , <a href="#">DolpTpConnection</a> , <a href="#">EthTpConnection</a> , <a href="#">FlexrayArTpConnection</a> , <a href="#">FlexrayTpConnection</a> , <a href="#">J1939TpConnection</a> , <a href="#">LinTpConnection</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
ident	<a href="#">TpConnectionIdent</a>	0..1	aggr	This adds the ability to become referable to Tp Connection.

**Table A.834: TpConnection**

<b>Class</b>	<b><i>TpConnectionIdent</i></b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::DiagnosticConnection			
<b>Note</b>	This meta-class is created to add the ability to become the target of a reference to the non-Referrable Tp Connection.			
<b>Base</b>	<i>ARObject</i> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
–	–	–	–	–

**Table A.835: TpConnectionIdent**

<b>Class</b>	<b><i>TpPort</i></b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	Dynamic or direct assignment of a PortNumber.			
<b>Base</b>	<i>ARObject</i>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dynamically Assigned	Boolean	0..1	attr	Indicates whether the source port is dynamically assigned. <b>Tags:</b> atp.Status=obsolete
portNumber	PositiveInteger	0..1	attr	Port Number.

**Table A.836: TpPort**

<b>Class</b>	<b><i>Traceable</i></b> (abstract)			
<b>Package</b>	M2::MSR::Documentation::BlockElements::RequirementsTracing			
<b>Note</b>	This meta class represents the ability to be subject to tracing within an AUTOSAR model.  Note that it is expected that its subclasses inherit either from MultilanguageReferrable or from Identifiable. Nevertheless it also inherits from MultilanguageReferrable in order to provide a common reference target for all Traceables.			
<b>Base</b>	<i>ARObject</i> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Subclasses</b>	<a href="#">StructuredReq</a> , <a href="#">TimingConstraint</a> , <a href="#">TraceableTable</a> , <a href="#">TraceableText</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	Traceable (abstract)			
trace	Traceable	*	ref	<p>This association represents the ability to trace to upstream requirements / constraints. This supports for example the bottom up tracing</p> <p>ProjectObjectives &lt;- MainRequirements &lt;- Features &lt;- RequirementSpecs &lt;- BSW/AI</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>

Table A.837: Traceable

Class	TraceableText			
Package	M2::MSR::Documentation::BlockElements::RequirementsTracing			
Note	<p>This meta-class represents the ability to denote a traceable text item such as requirements etc.</p> <p>The following approach applies:</p> <ul style="list-style-type: none"> <li>• <b>shortName</b> represents the tag for tracing</li> <li>• <b>longName</b> represents the head line</li> <li>• <b>category</b> represents the kind of the tagged text</li> </ul>			
Base	ARObject, DocumentViewSelectable, Identifiable, MultilanguageReferrable, Paginateable, Referrable, Traceable			
Attribute	Type	Mult.	Kind	Note
text	DocumentationBlock	1	aggr	<p>This represents the text to which the tag applies.</p> <p><b>Tags:</b>  xml.roleElement=false  xml.roleWrapperElement=false  xml.sequenceOffset=30  xml.typeElement=false  xml.typeWrapperElement=false</p>

Table A.838: TraceableText

Enumeration	TransferPropertyEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Transfer Properties of a Signal.
Literal	Description
pending	<p>If the signal has the TransferProperty pending, then the function Com_SendSignal shall not perform a transmission of the IPdu associated with the signal.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=0</p>
triggered	<p>The signal in the assigned IPdu is updated and a request for the IPdu's transmission is made.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=1</p>
triggeredOnChange	<p>The signal in the assigned IPdu is updated and a request for the IPdus transmission is made only if the signal value is different from the already stored signal value.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=2</p>
triggeredOnChange WithoutRepetition	<p>The signal in the assigned IPdu is updated and a request for the IPdus transmission is made only if the signal value is different from the already stored signal value. In the DIRECT/N-TIMES or MIXED transmission mode (EventControlledTiming) the IPdu will be transmitted just once without a repetition, independent of the defined NumberOfRepeats.</p> <p><b>Tags:</b>atp.EnumerationLiteralIndex=3</p>





Enumeration	TransferPropertyEnum
triggeredWithoutRepetition	The signal in the assigned IPdu is updated and a request for the IPdu's transmission is made. In the DIRECT/N-TIMES or MIXED transmission mode (EventControlledTiming) the IPdu will be transmitted just once without a repetition, independent of the defined NumberOfRepeats. <b>Tags:</b> atp.EnumerationLiteralIndex=4

**Table A.839: TransferPropertyEnum**

Class	TransformationDescription (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The TransformationDescription is the abstract class that can be used by specific transformers to add transformer specific properties.			
Base	ARObject, Describable			
Subclasses	EndToEndTransformationDescription, SOMEIPTransformationDescription, UserDefinedTransformationDescription			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.840: TransformationDescription**

Class	<<atpVariation>> TransformationISignalProps (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	TransformationISignalProps holds all the attributes for the different TransformationTechnologies that are ISignal specific. <b>Tags:</b> vh.latestBindingTime=postBuild			
Base	ARObject, Describable			
Subclasses	EndToEndTransformationISignalProps, SOMEIPTransformationISignalProps, UserDefinedTransformationISignalProps			
Attribute	Type	Mult.	Kind	Note
csErrorReaction	CSTransformerErrorReactionEnum	0..1	attr	Defines whether the transformer chain of client/server communication coordinates an autonomous error reaction together with the RTE or whether any error reaction is the responsibility of the application.
dataPrototypeTransformationProps	DataPrototypeTransformationProps	*	aggr	Fine granular modeling of TransformationProps on the level of DataPrototypes.
transformer	TransformationTechnology	1	ref	Reference to the TransformationTechnology description that contains transformer specific and ISignal independent configuration properties.

**Table A.841: TransformationISignalProps**

Class	TransformationTechnology			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	A TransformationTechnology is a transformer inside a transformer chain. <b>Tags:</b> xml.namePlural=TRANSFORMATION-TECHNOLOGIES			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mult.	Kind	Note
bufferProperties	BufferProperties	1	aggr	Aggregation of the mandatory BufferProperties.





Class	TransformationTechnology			
hasInternalState	Boolean	0..1	attr	This attribute defines whether the Transformer has an internal state or not.
needsOriginalData	Boolean	0..1	attr	Specifies whether this transformer gets access to the SWC's original data.
protocol	String	1	attr	Specifies the protocol that is implemented by this transformer.
transformationDescription	<a href="#">TransformationDescription</a>	0..1	aggr	A transformer can be configured with transformer specific parameters which are represented by the Transformer Description. <b>Stereotypes:</b> atpVariation <b>Tags:</b> vh.latestBindingTime=postBuild
transformerClass	<a href="#">TransformerClassEnum</a>	1	attr	Specifies to which transformer class this transformer belongs.
version	String	1	attr	Version of the implemented protocol.

**Table A.842: TransformationTechnology**

Enumeration	TransformerClassEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer
Note	Specifies the transformer class of a transformer.
Literal	Description
custom	The transformer is a custom transformer. <b>Tags:</b> atp.EnumerationLiteralIndex=0
safety	The transformer is a safety transformer. <b>Tags:</b> atp.EnumerationLiteralIndex=1
security	The transformer is a security transformer. <b>Tags:</b> atp.EnumerationLiteralIndex=2
serializer	The transformer is a serializing transformer. <b>Tags:</b> atp.EnumerationLiteralIndex=3

**Table A.843: TransformerClassEnum**

Class	TransformerHardErrorEvent			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	This event is raised when data are received which should trigger a Client/Server operation or an external Trigger but during transformation of the data a hard transformer error occurred.			
Base	<a href="#">ARObject</a> , <a href="#">AbstractEvent</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">RTEEvent</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
operation	<a href="#">ClientServerOperation</a>	0..1	iref	This represents the ClientServerOperation for which the transformer can raise this TransformerHardErrorEvent. <b>InstanceRef implemented by:</b> POperationInAtomicSwc InstanceRef
requiredTrigger	<a href="#">Trigger</a>	0..1	iref	This represents the Trigger for which the transformer can raise this TransformerHardErrorEvent. <b>InstanceRef implemented by:</b> RTriggerInAtomicSwc InstanceRef

**Table A.844: TransformerHardErrorEvent**

<b>Class</b>	<b>TransientFault</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
<b>Note</b>	The reported failure is classified as runtime error.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a> , <a href="#">TracedFailure</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
possibleErrorReaction	PossibleErrorReaction	*	aggr	Describes a possible error reactions for the transient fault handler.

**Table A.845: TransientFault**

<b>Class</b>	<b>TransmissionAcknowledgementRequest</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
<b>Note</b>	Requests transmission acknowledgement that data has been sent successfully. Success/failure is reported via a SendPoint of a RunnableEntity.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
timeout	TimeValue	0..1	attr	Number of seconds before an error is reported or in case of allowed redundancy, the value is sent again.

**Table A.846: TransmissionAcknowledgementRequest**

<b>Class</b>	<b>TransmissionModeCondition</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
<b>Note</b>	Possibility to attach a condition to each signal within an I-PDU.  If at least one condition evaluates to true, TRANSMISSION MODE True shall be used for this I-Pdu. In all other cases, the TRANSMISSION MODE FALSE shall be used.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataFilter	<a href="#">DataFilter</a>	1	aggr	Possibilities to define conditions
iSignalInIPdu	<a href="#">ISignalToIPduMapping</a>	1	ref	Reference to a signal to which a condition is attached.

**Table A.847: TransmissionModeCondition**

<b>Class</b>	<b>Trigger</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::TriggerDeclaration			
<b>Note</b>	A trigger which is provided (i.e. released) or required (i.e. used to activate something) in the given context.			
<b>Base</b>	ARObject, <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
swImplPolicy	<a href="#">SwImplPolicyEnum</a>	0..1	attr	This attribute, when set to value queued, allows for a queued processing of Triggers.
triggerPeriod	MultidimensionalTime	0..1	aggr	Optional definition of a period in case of a periodically (time or angle) driven external trigger.

**Table A.848: Trigger**

<b>Class</b>	<b>TriggerInterface</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	A trigger interface declares a number of triggers that can be sent by an trigger source. <b>Tags:</b> atp.recommendedPackage=PortInterfaces			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpType</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">PortInterface</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
trigger	<a href="#">Trigger</a>	*	aggr	The Trigger of this trigger interface.

**Table A.849: TriggerInterface**

<b>Class</b>	<b>TriggerInterfaceMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	Defines the mapping of unequal named Triggers in context of two different TriggerInterfaces.			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PortInterfaceMapping</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
triggerMapping	<a href="#">TriggerMapping</a>	*	aggr	Mapping of two Trigger in two different TriggerInterface

**Table A.850: TriggerInterfaceMapping**

<b>Class</b>	<b>TriggerMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::TriggerDeclaration			
<b>Note</b>	Defines the mapping of two particular unequally named Triggers in the given context.			
<b>Base</b>	<a href="#">ARObject</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
firstTrigger	<a href="#">Trigger</a>	0..1	ref	A Trigger to be mapped.
secondTrigger	<a href="#">Trigger</a>	0..1	ref	A Trigger to be mapped.

**Table A.851: TriggerMapping**

<b>Class</b>	<b>TriggerPortAnnotation</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::ApplicationAttributes			
<b>Note</b>	Annotation to a port used for calibration regarding a certain Trigger.			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">GeneralAnnotation</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
trigger	<a href="#">Trigger</a>	0..1	ref	The instance of annotated trigger.

**Table A.852: TriggerPortAnnotation**

<b>Class</b>	<b>TriggerToSignalMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
<b>Note</b>	This meta-class represents the ability to map a trigger to a SystemSignal of size 0. The Trigger does not transport any other information than its existence, therefore the limitation in terms of signal length.			
<b>Base</b>	<a href="#">ARObject</a> , <a href="#">DataMapping</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>







Class	TriggerToSignalMapping			
systemSignal	<a href="#">SystemSignal</a>	1	ref	This is the SystemSignal taken to transport the Trigger over the network. <b>Tags:</b> xml.sequenceOffset=20
trigger	<a href="#">Trigger</a>	1	iref	This represents the Trigger that shall be used to trigger RunnableEntities deployed to a remote ECU. <b>Tags:</b> xml.sequenceOffset=10 <b>InstanceRef implemented by:</b> TriggerInSystemInstanceRef

**Table A.853: TriggerToSignalMapping**

Class	<<atpVariation>> TtcanCluster			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology			
Note	TTCAN bus specific cluster attributes. <b>Tags:</b> atp.recommendedPackage=CommunicationClusters			
Base	ARObject, AbstractCanCluster, CollectableElement, <a href="#">CommunicationCluster</a> , <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
basicCycleLength	Integer	1	attr	Length of a basic-cycle. Unit: NTUs
ntu	TimeValue	1	attr	Unit measuring all times and providing a constant of the whole network. For level 1, this is always the CAN bit time. Unit: seconds.
operationMode	Boolean	1	attr	Possible operation modes True: Time-Triggered False: Event-Synchronised-Time-Triggered

**Table A.854: TtcanCluster**

Class	UdpNmCluster			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Udp specific NmCluster attributes			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">NmCluster</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
nmCbvPosition	Integer	0..1	attr	Defines the position of the control bit vector within the Nm Pdu (Byte position). If this attribute is not configured, the Control Bit Vector is not used.
nmImmediateNmCycleTime	TimeValue	0..1	attr	Defines the immediate NmPdu cycle time in seconds which is used for nmImmediateNmTransmissions NmPdu transmissions. This attribute is only valid if nmImmediateNmTransmissions is greater one.
nmImmediateNmTransmissions	PositiveInteger	0..1	attr	Defines the number of immediate NmPdus which shall be transmitted. If the value is zero no immediate NmPdus are transmitted. The cycle time of immediate NmPdus is defined by nmImmediateNmCycleTime.
nmMessageTimeoutTime	TimeValue	0..1	attr	Timeout of a NmPdu in seconds. It determines how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.





Class	UdpNmCluster			
nmMsgCycleTime	TimeValue	0..1	attr	Period of a NmPdu in seconds. It determines the periodic rate in the periodic transmission mode with bus load reduction and is the basis for transmit scheduling in the periodic transmission mode without bus load reduction.
nmNetworkTimeout	TimeValue	0..1	attr	Network Timeout for NmPdus in seconds. It denotes the time how long the UdpNm shall stay in the Network Mode before transition into Prepare Bus-Sleep Mode shall take place.
nmNidPosition	Integer	0..1	attr	Defines the byte position of the source node identifier within the NmPdu. If this attribute is not configured, the Node Identification is not used.
nmRemoteSleepIndicationTime	TimeValue	0..1	attr	Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.
nmRepeatMessageTime	TimeValue	0..1	attr	Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.
nmWaitBusSleepTime	TimeValue	0..1	attr	Timeout for bus calm down phase in seconds. It denotes the time how long the CanNm shall stay in the Prepare Bus-Sleep Mode before transition into Bus-Sleep Mode shall take place.
vlan	<a href="#">EthernetPhysicalChannel</a>	0..1	ref	Reference to the vlan (represented by the Ethernet PhysicalChannel) this UdpNmCluster shall apply to.

**Table A.855: UdpNmCluster**

Class	UdpNmNode			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Udp specific NM Node attributes.			
Base	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">NmNode</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
allNmMessagesKeepAwake	Boolean	0..1	attr	Specifies if Nm drops irrelevant NM PDUs.  false: Only NM PDUs with a Partial Network Information Bit (PNI) = true and containing a Partial Network request for this ECU trigger the standard RX indication handling and thus keep the ECU awake  true: Every NM PDU triggers the standard RX indication handling and keeps the ECU awake
nmMsgCycleOffset	TimeValue	0..1	attr	Node specific time offset in the periodic transmission node. It determines the start delay of the transmission. Specified in seconds.

**Table A.856: UdpNmNode**

Class	UdpProps			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	This meta-class specifies the configuration options for UDP (User Datagram Protocol).			
Base	<a href="#">ARObject</a>			
Attribute	Type	Mult.	Kind	Note
udpTtl	PositiveInteger	0..1	attr	Default Time-to-live value of outgoing UDP packets.

**Table A.857: UdpProps**

<b>Class</b>	<b>UdpTp</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	Content Model for UDP configuration.			
<b>Base</b>	ARObject, TcpUdpConfig, TransportProtocolConfiguration			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
udpTpPort	<a href="#">TpPort</a>	1	aggr	Udp Port configuration.

**Table A.858: UdpTp**

<b>Class</b>	<b>Unit</b>			
<b>Package</b>	M2::MSR::AsamHdo::Units			
<b>Note</b>	<p>This is a physical measurement unit. All units that might be defined should stem from SI units. In order to convert one unit into another factor and offset are defined.</p> <p>For the calculation from SI-unit to the defined unit the factor (factorSiToUnit ) and the offset (offsetSiToUnit ) are applied as follows:</p> $x \{unit\} := y * \{siUnit\} * factorSiToUnit \{unit\} / \{siUnit\} + offsetSiToUnit \{unit\}$ <p>For the calculation from a unit to SI-unit the reciprocal of the factor (factorSiToUnit ) and the negation of the offset (offsetSiToUnit ) are applied.</p> $y \{siUnit\} := (x \{unit\} - offsetSiToUnit \{unit\}) / (factorSiToUnit \{unit\} / \{siUnit\})$ <p><b>Tags:</b>atp.recommendedPackage=Units</p>			
<b>Base</b>	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
displayName	SingleLanguageUnit Names	0..1	aggr	<p>This specifies how the unit shall be displayed in documents or in user interfaces of tools.The displayName corresponds to the Unit.Display in an ASAM MCD-2MC file.</p> <p><b>Tags:</b>xml.sequenceOffset=20</p>
factorSiToUnit	Float	0..1	attr	<p>This is the factor for the conversion from SI Units to units. The inverse is used for conversion from units to SI Units.</p> <p><b>Tags:</b>xml.sequenceOffset=30</p>
offsetSiToUnit	Float	0..1	attr	<p>This is the offset for the conversion from and to siUnits.</p> <p><b>Tags:</b>xml.sequenceOffset=40</p>
physical Dimension	<a href="#">PhysicalDimension</a>	0..1	ref	<p>This association represents the physical dimension to which the unit belongs to. Note that only values with units of the same physical dimensions might be converted.</p> <p><b>Tags:</b>xml.sequenceOffset=50</p>

**Table A.859: Unit**

<b>Primitive</b>	<b>UnlimitedInteger</b>
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes





<b>Primitive</b>	<b>UnlimitedInteger</b>
<b>Note</b>	<p>An instance of UnlimitedInteger is an element in the set of integer numbers ( ..., -2, -1, 0, 1, 2, ...).</p> <p>The range is limited by constraint 2534.</p> <p>The value can be expressed in decimal, octal, hexadecimal and binary representation. Negative numbers can only be expressed in decimal notation.</p> <p><b>Tags:</b>  xml.xsd.customType=UNLIMITED-INTEGER  xml.xsd.pattern=0 [\+ -]?[1-9][0-9]* 0[xX][0-9a-fA-F]+ 0[bB][0-1]+ 0[0-7]+  xml.xsd.type=string</p>

**Table A.860: UnlimitedInteger**

<b>Class</b>	<b>UserDefinedIPdu</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	<p>UserDefinedIPdu allows to describe PDU-based communication over Complex Drivers. If a new BSW module is added above the PduR (e.g. a Diagnostic Service ) then this IPdu element shall be used to describe the communication.</p> <p><b>Tags:</b>atp.recommendedPackage=Pdus</p>			
<b>Base</b>	ARObject, CollectableElement, <a href="#">FibexElement</a> , <a href="#">IPdu</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Pdu</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
cddType	String	0..1	attr	This attribute defines the CDD that transmits or receives the UserDefinedPdu. If several CDDs are defined this attribute is used to distinguish between them.

**Table A.861: UserDefinedIPdu**

<b>Class</b>	<b>UserDefinedPdu</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
<b>Note</b>	<p>UserDefinedPdu allows to describe PDU-based communication over Complex Drivers. If a new BSW module is added above the BusIf (e.g. a new Nm module) then this Pdu element shall be used to describe the communication.</p> <p><b>Tags:</b>atp.recommendedPackage=Pdus</p>			
<b>Base</b>	ARObject, CollectableElement, <a href="#">FibexElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Pdu</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
cddType	String	0..1	attr	This attribute defines the CDD that transmits or receives the UserDefinedIPdu. If several CDDs are defined this attribute is used to distinguish between them.

**Table A.862: UserDefinedPdu**

<b>Class</b>	<b>UserDefinedPhysicalChannel</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::CddSupport			
<b>Note</b>	This element allows the modeling of arbitrary Physical Channels.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PhysicalChannel</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
—	—	—	—	—

**Table A.863: UserDefinedPhysicalChannel**

<b>Class</b>	<b>ValueSpecification</b> (abstract)			
<b>Package</b>	M2::AUTOSARTemplates::CommonStructure::Constants			
<b>Note</b>	Base class for expressions leading to a value which can be used to initialize a data object.			
<b>Base</b>	ARObject			
<b>Subclasses</b>	<a href="#">AbstractRuleBasedValueSpecification</a> , <a href="#">ApplicationValueSpecification</a> , <a href="#">CompositeValueSpecification</a> , <a href="#">ConstantReference</a> , <a href="#">NotAvailableValueSpecification</a> , <a href="#">NumericalValueSpecification</a> , <a href="#">ReferenceValueSpecification</a> , <a href="#">TextValueSpecification</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
shortLabel	<a href="#">Identifier</a>	0..1	attr	This can be used to identify particular value specifications for human readers, for example elements of a record type.

**Table A.864: ValueSpecification**

<b>Class</b>	<b>VariableAccess</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::DataElements			
<b>Note</b>	The presence of a VariableAccess implies that a RunnableEntity needs access to a VariableData Prototype.  The kind of access is specified by the role in which the class is used.			
<b>Base</b>	ARObject, <a href="#">AbstractAccessPoint</a> , <a href="#">AtpClassifier</a> , <a href="#">AtpFeature</a> , <a href="#">AtpStructureElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
accessed Variable	<a href="#">AutosarVariableRef</a>	0..1	aggr	This denotes the accessed variable.
scope	VariableAccessScope Enum	0..1	attr	This attribute allows for constraining the scope of the corresponding communication. For example, it possible to express whether the communication is intended to cross the boundary of an ECU or whether it is intended not to cross the boundary of a single partition.

**Table A.865: VariableAccess**

<b>Class</b>	<b>VariableAndParameterInterfaceMapping</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
<b>Note</b>	Defines the mapping of VariableDataPrototypes or ParameterDataPrototypes in context of two different SenderReceiverInterfaces, NvDataInterfaces or ParameterInterfaces.			
<b>Base</b>	ARObject, <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PortInterfaceMapping</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
dataMapping	<a href="#">DataPrototypeMapping</a>	*	aggr	Defines the mapping of two particular VariableData Prototypes or ParameterDataPrototypes with unequal names and/or unequal semantic (resolution or range) in context of two different SenderReceiverInterfaces, Nv DataInterfaces or ParameterInterfaces

**Table A.866: VariableAndParameterInterfaceMapping**

<b>Class</b>	<b>VariableDataPrototype</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			





Class	VariableDataPrototype			
Note	<p>A VariableDataPrototype is used to contain values in an ECU application. This means that most likely a VariableDataPrototype allocates "static" memory on the ECU. In some cases optimization strategies might lead to a situation where the memory allocation can be avoided.</p> <p>In particular, the value of a VariableDataPrototype is likely to change as the ECU on which it is used executes.</p>			
Base	ARObject, AtpFeature, AtpPrototype, AutosarDataPrototype, DataPrototype, Identifiable, Multilanguage Referrable, Referrable			
Attribute	Type	Mult.	Kind	Note
initValue	ValueSpecification	0..1	aggr	Specifies initial value(s) of the VariableDataPrototype

Table A.867: VariableDataPrototype

Class	VariableDataPrototypeInSystemInstanceRef			
Package	M2::AUTOSARTemplates::SystemTemplate::InstanceRefs			
Note				
Base	ARObject, AtpInstanceRef			
Attribute	Type	Mult.	Kind	Note
base	System	0..1	ref	Stereotypes: atpDerived
context Component (ordered)	SwComponent Prototype	*	ref	
context Composition	RootSwComposition Prototype	0..1	ref	
contextPort	PortPrototype	1	ref	
targetData Prototype	VariableDataPrototype	0..1	ref	

Table A.868: VariableDataPrototypeInSystemInstanceRef

Class	VariableInAtomicSWCTypeInstanceRef			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::DataElements::InstanceRefs Usage			
Note				
Base	ARObject, AtpInstanceRef			
Attribute	Type	Mult.	Kind	Note
base	AtomicSwComponent Type	0..1	ref	Stereotypes: atpDerived Tags:xml.sequenceOffset=10
contextData Prototype (ordered)	ApplicationComposite ElementDataPrototype	*	ref	This is the context in a compositeDataType. Tags:xml.sequenceOffset=40
portPrototype	PortPrototype	0..1	ref	This is the port providing the parameter or the entry point to the parameter structure. Tags:xml.sequenceOffset=20
rootVariable DataPrototype	VariableDataPrototype	0..1	ref	Tags:xml.sequenceOffset=30
targetData Prototype	DataPrototype	0..1	ref	This is the target of the instance ref. Note that it shall be one of ApplicationCompositeElementDataPrototype of VariableDataPrototype. Tags:xml.sequenceOffset=50

Table A.869: VariableInAtomicSWCTypeInstanceRef

<b>Class</b>	<b>VariationPoint</b>			
<b>Package</b>	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
<b>Note</b>	This meta-class represents the ability to express a "structural variation point". The container of the variation point is part of the selected variant if swSyscond evaluates to true and each postBuildVariant Criterion is fulfilled.			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
blueprintCondition	DocumentationBlock	0..1	aggr	This represents a description that documents how the variation point shall be resolved when deriving objects from the blueprint.  Note that variationPoints are not allowed within a blueprintCondition. <b>Tags:</b> xml.sequenceOffset=28
desc	MultiLanguageOverviewParagraph	0..1	aggr	This allows to describe shortly the purpose of the variation point. <b>Tags:</b> xml.sequenceOffset=20
formalBlueprintGenerator	BlueprintGenerator	0..1	aggr	This represents a description that documents how the variation point shall be resolved when deriving objects from the blueprint by using ARMQL.  Note that variationPoints are not allowed within a formalBlueprintGenerator. <b>Tags:</b> atp.Status=draft xml.sequenceOffset=30
postBuildVariantCondition	PostBuildVariantCondition	*	aggr	This is the set of post build variant conditions which all shall be fulfilled in order to (postbuild) bind the variation point. <b>Tags:</b> xml.sequenceOffset=40
sdg	Sdg	0..1	aggr	An optional special data group is attached to every variation point. These data can be used by external software systems to attach application specific data. For example, a variant management system might add an identifier, an URL or a specific classifier. <b>Tags:</b> xml.sequenceOffset=50
shortLabel	Identifier	0..1	attr	This provides a name to the particular variation point to support the RTE generator. It is necessary for supporting splittable aggregations and if binding time is later than codeGenerationTime, as well as some RTE conditions. It needs to be unique with in the enclosing Identifiables with the same ShortName. <b>Stereotypes:</b> atpIdentityContributor <b>Tags:</b> xml.sequenceOffset=10
swSyscond	ConditionByFormula	0..1	aggr	This condition acts as Binding Function for the Variation Point. Note that the multiplicity is 0..1 in order to support pure postBuild variants. <b>Tags:</b> xml.sequenceOffset=30

Table A.870: VariationPoint

<b>Class</b>	<b>VariationPointProxy</b>
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::VariantHandling





Class	VariationPointProxy			
Note	The VariationPointProxy represents variation points of the C/C++ implementation. In case of bindingTime = compileTime the RTE provides defines which can be used for Pre Processor directives to implement compileTime variability.			
Base	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
conditionAccess	<a href="#">ConditionByFormula</a>	0..1	aggr	This condition acts as Binding Function for the Variation Point.
implementationDataType	<a href="#">AbstractImplementationDataType</a>	0..1	ref	This association to ImplementationDataType shall be taken as an implementation hint by the RTE generator.
postBuildValueAccess	PostBuildVariant Criterion	0..1	ref	This represents the applicable PostBuildVariantCriterion in the context of a VariationPointProxy.  Note that the technical details how to access the particular postBuildValueAccess are still considered internal to the RTE and are consequently not standardized.
postBuildVariantCondition	<a href="#">PostBuildVariantCondition</a>	*	aggr	This represents that applicable PostBuildVariantCondition in the context of aVariationPointProxy.
valueAccess	<a href="#">AttributeValueVariationPoint</a>	0..1	aggr	This value acts as Binding Function for the VariationPoint.

**Table A.871: VariationPointProxy**

Class	VfbTiming			
Package	M2::AUTOSARTemplates::CommonStructure::Timing			
Note	A model element used to define timing descriptions and constraints at VFB level.  TimingDescriptions aggregated by VfbTiming are restricted to event chains referring to events which are derived from the class TDEventVfb.  <b>Tags:</b> atp.recommendedPackage=TimingExtensions			
Base	<a href="#">ARElement</a> , <a href="#">ARObject</a> , <a href="#">AtpBlueprint</a> , <a href="#">AtpBlueprintable</a> , <a href="#">CollectableElement</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">PackageableElement</a> , <a href="#">Referrable</a> , <a href="#">TimingExtension</a>			
Attribute	Type	Mult.	Kind	Note
component	<a href="#">SwComponentType</a>	1	ref	This defines the scope of a VfbTiming. All corresponding timing descriptions and constraints shall be defined within this scope.

**Table A.872: VfbTiming**

Class	VlanConfig			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	VLAN Configuration attributes			
Base	<a href="#">ARObject</a> , <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
Attribute	Type	Mult.	Kind	Note
vlanIdentifier	PositiveInteger	1	attr	A VLAN is identified by this attribute according to IEEE 802.1Q. The allowed values range is from 0..4095.

**Table A.873: VlanConfig**



<b>Class</b>	<b>VlanMembership</b>			
<b>Package</b>	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
<b>Note</b>	<p>Static logical channel or VLAN binding to a switch-port.</p> <p>The reference to an EthernetPhysicalChannel without a VLAN defined represents the handling of untagged frames.</p>			
<b>Base</b>	ARObject			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
defaultPriority	PositiveInteger	1	attr	<p>Standard output-priority outgoing Frames will be tagged with.</p> <p>Defines the priority that received frames are assigned together with the VLAN Id (defaultVlan). The values from 0 (best effort) to 7 (highest) are allowed.</p> <p>In case modifyVlan and an already tagged received frame, the actual priority of the received frame is not modified.</p>
dhcpAddress Assignment	DhcpServer Configuration	0..1	aggr	Specifies the IP Address which will be assigned to a DHCP Client at this SwitchPort. If no dhcpAddress Assignment is provided all DHCP-Discover messages received at this Port will be discarded by the DHCP Server.
sendActivity	EthernetSwitchVlan EgressTaggingEnum	0..1	attr	<p>Attribute denotes whether a VLAN tagged ethernet frame will be</p> <ol style="list-style-type: none"> <li>1. sent with its VLAN tag (sentTagged)</li> <li>2. sent without a VLAN tag (sentUntagged)</li> <li>3. will be dropped at this port (notSent or VLAN not member of this list)</li> </ol>
vlan	<a href="#">EthernetPhysical Channel</a>	1	ref	References a channel that represents a VLAN or an untagged channel.

**Table A.874: VlanMembership**

<b>Class</b>	<b>WaitPoint</b>			
<b>Package</b>	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
<b>Note</b>	This defines a wait-point for which the RunnableEntity can wait.			
<b>Base</b>	ARObject, <a href="#">Identifiable</a> , <a href="#">MultilanguageReferrable</a> , <a href="#">Referrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>
timeout	TimeValue	0..1	attr	Time in seconds before the WaitPoint times out and the blocking wait call returns with an error indicating the timeout.
trigger	<a href="#">RTEEvent</a>	0..1	ref	This is the RTEEvent this WaitPoint is waiting for.

**Table A.875: WaitPoint**

<b>Class</b>	<b>Xdoc</b>			
<b>Package</b>	M2::MSR::Documentation::TextModel::InlineTextElements			
<b>Note</b>	This meta-class represents the ability to refer to an external document which can be rendered as printed matter.			
<b>Base</b>	ARObject, <a href="#">Referrable</a> , <a href="#">SingleLanguageReferrable</a>			
<b>Attribute</b>	<b>Type</b>	<b>Mult.</b>	<b>Kind</b>	<b>Note</b>





Class	Xdoc			
date	DateTime	0..1	attr	This element specifies the release date of the external document if applicable. <b>Tags:</b> xml.sequenceOffset=50
number	String	0..1	attr	This represents document number of an external document that is referenced. Kept as a string. <b>Tags:</b> xml.sequenceOffset=30
position	String	0..1	attr	This represents the reference to the relevant positions of a standard. Kept as a string. <b>Tags:</b> xml.sequenceOffset=80
publisher	String	0..1	attr	This represents the publisher of an external document that is being referenced. Kept as a string. <b>Tags:</b> xml.sequenceOffset=60
state	String	0..1	attr	This represents version and state of the external document. Kept as a string. <b>Tags:</b> xml.sequenceOffset=40
url	Url	0..1	aggr	This specifies the URL of the external document. <b>Tags:</b> xml.sequenceOffset=70

**Table A.876: Xdoc**

Class	Xfile			
Package	M2::MSR::Documentation::TextModel::InlineTextElements			
Note	This represents to reference an external file within a documentation.			
Base	ARObject, <a href="#">Referrable</a> , <a href="#">SingleLanguageReferrable</a>			
Attribute	Type	Mult.	Kind	Note
tool	String	0..1	attr	This element describes the tool which was used to generate the corresponding Xfile . Kept as a string since no specific syntax can be provided to denote a tool. <b>Tags:</b> xml.sequenceOffset=50
toolVersion	String	0..1	attr	This element describes the tool version which was used to generate the corresponding xfile. Kept as a string, since no specific syntax can be specified. <b>Tags:</b> xml.sequenceOffset=60
url	Url	0..1	aggr	This represents the URL of the external file. <b>Tags:</b> xml.sequenceOffset=30

**Table A.877: Xfile**

Class	XrefTarget			
Package	M2::MSR::Documentation::TextModel::InlineTextElements			
Note	This element specifies a reference target which can be scattered throughout the text.			
Base	ARObject, <a href="#">Referrable</a> , <a href="#">SingleLanguageReferrable</a>			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

**Table A.878: XrefTarget**