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△

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1 Introduction and functional overview

This document defines primitive `CppImplementationDataTypes` that can be used in `ServiceInterface` descriptions provided in ARXML as defined in TPS_ManifestSpecification [1].

The definition of common used `CppImplementationDataTypes` increases the portability of applications and prevents from re-defining the same types for each application.

2 Acronyms and Abbreviations

The glossary below includes acronyms and abbreviations used in this document that are not included in the [2, AUTOSAR glossary].

Terms:	Description:
2's complement	method of signed number representation.

3 Related documentation

3.1 Input documents & related standards and norms

- [1] Specification of Manifest
AUTOSAR_AP_TPS_ManifestSpecification
- [2] Glossary
AUTOSAR_FO_TR_Glossary
- [3] Specification of Communication Management
AUTOSAR_AP_SWS_CommunicationManagement
- [4] General Requirements specific to Adaptive Platform
AUTOSAR_AP_RS_General
- [5] ISO/IEC 14882:2014, Information technology – Programming languages – C++
<https://www.iso.org>
- [6] Specification of Adaptive Platform Core
AUTOSAR_AP_SWS_Core

3.2 Related specification

The TPS Manifest specification [1] defines the meta-model that is used for the description of primitive datatypes that are presented in this document.

The specification SWS CommunicationManagement [3] defines the language binding rules for model artifacts.

4 Constraints and assumptions

4.1 Limitations

No limitations known.

4.2 Applicability to car domains

No restrictions to applicability.

5 Dependencies to other Functional Clusters

This document is dependent on the language binding rules defined in SWS CommunicationManagement [3].

6 Requirements Tracing

Requirements against this document are exclusively stated in the corresponding requirements document [4].

The following table references the requirements specified in the corresponding requirements document and provides information about individual specification items that fulfill a given requirement.

Requirement	Description	Satisfied by
[RS_AP_00111]	Source Code Portability Support	[SWS_APT_00001] [SWS_APT_00004] [SWS_APT_00007] [SWS_APT_00010] [SWS_APT_00022] [SWS_APT_00025] [SWS_APT_00028] [SWS_APT_00031] [SWS_APT_00043] [SWS_APT_00046] [SWS_APT_00049]

Table 6.1: Requirements Tracing

7 Functional specification

7.1 Primitive ImplementationDataTypes and their mapping to C++ datatypes

This chapter describes diverse primitive `StdCppImplementationDataTypes` that are predefined by AUTOSAR for the usage in the Adaptive Platform and defines their mapping to C++ datatypes.

The mapping of a primitive `StdCppImplementationDataType` that is used in a `ServiceInterface` to a C++ datatype is defined in `SWS_CommunicationManagement` [3].

Please note that [RS_AP_00114] in [4] defines that interfaces of AUTOSAR Adaptive platform are designed to be compatible with C++14 [5] but at the same time it is allowed to use newer C++ versions like C++17. In addition the Adaptive Core document [6] defines common classes and functionality that is used by multiple AUTOSAR functional clusters as part of their public interfaces.

7.1.1 Bool

[SWS_APT_00049] primitive Implementation Data Type *bool*

Upstream requirements: [RS_AP_00111](#)

[The primitive Implementation Data Type *bool* is defined by the `StdCppImplementationDataType` with the `category` VALUE and the `shortName` `bool`.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>bool</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <TYPE-EMITTER>FUNDAMENTAL_TYPE</TYPE-EMITTER>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.1: Boolean ImplementationDataType

The *bool* `StdCppImplementationDataType` will be mapped to the `bool`-type in C++, that is capable of holding one of the two values: `true` or `false`. Please note that in C++ `sizeof(bool)` is implementation-defined.

Please note that according to [TPS_MANI_01177] if the `typeEmitter` is set to any value other than `TYPE_EMITTER_ARA`, the ARA generator shall not generate the corresponding data type definition.

7.1.2 Signed Integer

7.1.2.1 int8_t

[SWS_APT_00001] primitive Implementation Data Type *int8_t*

Upstream requirements: [RS_AP_00111](#)

[The signed integer type of 8 bits is defined by the [StdCppImplementationDataType](#) with the [category](#) VALUE and the [shortName](#) int8_t.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>int8_t</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <HEADER-FILE>cstdint</HEADER-FILE>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.2: int8_t StdCppImplementationDataType

The *int8_t* [StdCppImplementationDataType](#) will be mapped to int8_t of the C++ standard library with width of exactly 8 bit.

7.1.2.2 int16_t

[SWS_APT_00004] primitive Implementation Data Type *int16_t*

Upstream requirements: [RS_AP_00111](#)

[The signed integer type of 16 bits is defined by the [StdCppImplementationDataType](#) with the [category](#) VALUE and the [shortName](#) int16_t.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>int16_t</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <HEADER-FILE>cstdint</HEADER-FILE>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.3: int16_t StdCppImplementationDataType

The *int16_t* [StdCppImplementationDataType](#) will be mapped to int16_t of the C++ standard library with width of exactly 16 bit.

7.1.2.3 int32_t

[SWS_APT_00007] primitive Implementation Data Type *int32_t*

Upstream requirements: [RS_AP_00111](#)

[The signed integer type of 32 bits is defined by the `StdCppImplementationDataType` with the `category` VALUE and the `shortName` `int32_t`.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>int32_t</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <HEADER-FILE>cstdint</HEADER-FILE>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.4: `int32_t` `StdCppImplementationDataType`

The `int32_t` `StdCppImplementationDataType` will be mapped to `int32_t` of the C++ standard library with width of exactly 32 bit.

7.1.2.4 int64_t

[SWS_APT_00010] primitive Implementation Data Type *int64_t*

Upstream requirements: [RS_AP_00111](#)

[The signed integer type of 64 bits is defined by the `StdCppImplementationDataType` with the `category` VALUE and the `shortName` `int64_t`.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>int64_t</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <HEADER-FILE>cstdint</HEADER-FILE>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.5: `int64_t` `StdCppImplementationDataType`

The `int64_t` `StdCppImplementationDataType` will be mapped to `int64_t` of the C++ standard library with width of exactly 64 bit.

7.1.3 Unsigned Integer

7.1.3.1 uint8_t

[SWS_APT_00022] primitive Implementation Data Type *uint8_t*

Upstream requirements: [RS_AP_00111](#)

[The unsigned integer type of 8 bits is defined by the [StdCppImplementationDataType](#) with the [category](#) VALUE and the [shortName](#) `uint8_t`.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>uint8_t</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <HEADER-FILE>cstdint</HEADER-FILE>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.6: uint8_t StdCppImplementationDataType

The *uint8_t* [StdCppImplementationDataType](#) will be mapped to `uint8_t` of the C++ standard library with width of exactly 8 bit.

7.1.3.2 uint16_t

[SWS_APT_00025] primitive Implementation Data Type *uint16_t*

Upstream requirements: [RS_AP_00111](#)

[The unsigned integer type of 16 bits is defined by the [StdCppImplementationDataType](#) with the [category](#) VALUE and the [shortName](#) `uint16_t`.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>uint16_t</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <HEADER-FILE>cstdint</HEADER-FILE>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.7: uint16_t StdCppImplementationDataType

The *uint16_t* [StdCppImplementationDataType](#) will be mapped to `uint16_t` of the C++ standard library with width of exactly 16 bit.

7.1.3.3 uint32_t

[SWS_APT_00028] primitive Implementation Data Type *uint32_t*

Upstream requirements: [RS_AP_00111](#)

[The unsigned integer type of 32 bits is defined by the [StdCppImplementation-DataType](#) with the [category](#) VALUE and the [shortName](#) `uint32_t`.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>uint32_t</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <HEADER-FILE>cstdint</HEADER-FILE>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.8: `uint32_t` StdCppImplementationDataType

The `uint32_t` [StdCppImplementationDataType](#) will be mapped to `uint32_t` of the C++ standard library with width of exactly 32 bit.

7.1.3.4 uint64_t

[SWS_APT_00031] primitive Implementation Data Type *uint64_t*

Upstream requirements: [RS_AP_00111](#)

[The unsigned integer type of 64 bits is defined by the [StdCppImplementation-DataType](#) with the [category](#) VALUE and the [shortName](#) `uint64_t`.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>uint64_t</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <HEADER-FILE>cstdint</HEADER-FILE>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.9: `uint64_t` StdCppImplementationDataType

The `uint64_t` [StdCppImplementationDataType](#) will be mapped to `uint64_t` of the C++ standard library with width of exactly 64 bit.

7.1.4 Floating point types

7.1.4.1 float

[SWS_APT_00043] primitive Implementation Data Type *float*

Upstream requirements: [RS_AP_00111](#)

[The single precision floating point type is defined by the [StdCppImplementationDataType](#) with the `category` VALUE and the `shortName` float.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>float</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <TYPE-EMITTER>FUNDAMENTAL_TYPE</TYPE-EMITTER>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.10: float StdCppImplementationDataType

The *float* [StdCppImplementationDataType](#) will be mapped in C++ to `float` that is the 32 bit floating point type.

Please note that according to [TPS_MANI_01177] if the `typeEmitter` is set to any value other than `TYPE_EMITTER_ARA`, the ARA generator shall not generate the corresponding data type definition.

7.1.4.2 double

[SWS_APT_00046] primitive Implementation Data Type *double*

Upstream requirements: [RS_AP_00111](#)

[The double precision floating point type is defined by the [StdCppImplementationDataType](#) with the `category` VALUE and the `shortName` double.]

```
<STD-CPP-IMPLEMENTATION-DATA-TYPE>
  <SHORT-NAME>double</SHORT-NAME>
  <CATEGORY>VALUE</CATEGORY>
  <TYPE-EMITTER>FUNDAMENTAL_TYPE</TYPE-EMITTER>
</STD-CPP-IMPLEMENTATION-DATA-TYPE>
```

Listing 7.11: double StdCppImplementationDataType

The *double* [StdCppImplementationDataType](#) will be mapped in C++ to `double` that is the 64 bit floating point type.

Please note that according to [TPS_MANI_01177] if the `typeEmitter` is set to any value other than `TYPE_EMITTER_ARA`, the ARA generator shall not generate the corresponding data type definition.

A Mentioned Manifest Elements

For the sake of completeness, this chapter contains a set of class tables representing meta-classes mentioned in the context of this document but which are not contained directly in the scope of describing specific meta-model semantics.

Class	<i>CppImplementationDataType</i> (abstract)			
Package	M2::AUTOSARTemplates::AdaptivePlatform::ApplicationDesign::CppImplementationDataType			
Note	This meta-class represents the way to specify a reusable data type definition taken as a the basis for a C++ language binding			
Base	<i>ARElement</i> , <i>ARObject</i> , <i>AbstractImplementationDataType</i> , <i>AtpBlueprint</i> , <i>AtpBlueprintable</i> , <i>AtpClassifier</i> , <i>AtpType</i> , <i>AutosarDataType</i> , <i>CollectableElement</i> , <i>CppImplementationDataTypeContextTarget</i> , <i>Identifiable</i> , <i>MultilanguageReferrable</i> , <i>PackageableElement</i> , <i>Referrable</i>			
Subclasses	CustomCppImplementationDataType, StdCppImplementationDataType			
Aggregated by	ARPackage.element			
Attribute	Type	Mult.	Kind	Note
arraySize	PositiveInteger	0..1	attr	This attribute can be used to specify the array size if the enclosing CppImplementationDataType has array semantics. Stereotypes: atpVariation Tags: vh.latestBindingTime=preCompileTime
headerFile	String	0..1	attr	Configuration of the Header File with the custom class declaration.
namespace (ordered)	SymbolProps	*	aggr	This aggregation allows for the definition an own namespace for the enclosing CppImplementationDataType.
subElement (ordered)	CppImplementationDataTypeElement	*	aggr	This represents the collection of sub-elements of the enclosing CppImplementationDataType
template Argument (ordered)	CppTemplateArgument	*	aggr	This aggregation allows for the specification of properties of template arguments
typeEmitter	NameToken	0..1	attr	This attribute can be taken to control how the respective CppImplementationDataType is contributed to the language binding.
typeReference	CppImplementationDataType	0..1	ref	This reference shall be defined to define a type reference (a.k.a. typedef).

Table A.1: CppImplementationDataType

Class	<i>Identifiable</i> (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	<i>ARObject</i> , <i>MultilanguageReferrable</i> , <i>Referrable</i>





Class	Identifiable (abstract)			
Subclasses	<p>ARPackage, <i>AbstractDolpLogicAddressProps</i>, <i>AbstractEvent</i>, <i>AbstractFunctionalClusterDesign</i>, <i>AbstractImplementationDataTypeElement</i>, <i>AbstractSecurityEventFilter</i>, <i>AbstractSecurityIdsmInstanceFilter</i>, <i>AbstractServiceInstance</i>, <i>AbstractSignalBasedToSignalTriggeringMapping</i>, AdaptiveSwcInternalBehavior, ApApplicationEndpoint, <i>ApmcAbstractDefinition</i>, <i>ApmcConfigurationElementDef</i>, <i>ApmcContainerElementValue</i>, ApmcContainerValue, ApmcEnumerationLiteralDef, ApplicationEndpoint, ApplicationError, AppliedStandard, ArtifactChecksum, ArtifactLocator, <i>AtpBlueprint</i>, <i>AtpBlueprintable</i>, <i>AtpClassifier</i>, <i>AtpFeature</i>, AutosarOperationArgumentInstance, AutosarVariableInstance, <i>BuildActionEntity</i>, BuildActionEnvironment, Chapter, CheckpointTransition, ClassContentConditional, ClientIdDefinition, ClientServerOperation, Code, <i>CollectableElement</i>, ComManagementMapping, <i>CommConnectorPort</i>, <i>CommunicationConnector</i>, <i>CommunicationController</i>, Compiler, ConsistencyNeeds, ConsumedEventGroup, CouplingPort, <i>CouplingPortAbstractShaper</i>, <i>CouplingPortStructuralElement</i>, CryptoCertificate, CryptoKeySlot, CryptoKeySlotDesign, CryptoKeySlotUsageDesign, CryptoProvider, <i>CryptoServiceMapping</i>, DataPrototypeGroup, DataPrototypeTransformationPropsIdent, DataTransformation, DdsCpDomain, DdsCpPartition, DdsCpQosProfile, DdsCpTopic, DdsDomainRange, DependencyOnArtifact, <i>DiagEventDebounceAlgorithm</i>, DiagnosticAuthTransmitCertificateEvaluation, DiagnosticConnectedIndicator, DiagnosticDataElement, DiagnosticDebounceAlgorithmProps, DiagnosticFunctionInhibitSource, DiagnosticParameterElement, <i>DiagnosticRoutineSubfunction</i>, DiagnosticSovdMethodPrimitive, DltApplication, DltArgument, DltMessage, DolpInterface, DolpLogicAddress, DolpLogicalAddress, DolpNetworkConfigurationDesign, DolpRoutingActivation, E2EProfileConfiguration, End2EndEventProtectionProps, End2EndMethodProtectionProps, EndToEndProtection, EthernetWakeUpSleepOnDatalineConfig, EventHandler, EventMapping, ExclusiveArea, <i>ExecutableEntity</i>, <i>ExecutionTime</i>, FMAttributeDef, FMFeatureMapAssertion, FMFeatureMapCondition, FMFeatureMapElement, FMFeatureRelation, FMFeatureRestriction, FMFeatureSelection, FieldMapping, FireAndForgetMethodMapping, FlexrayArTpNode, FlexrayTpPduPool, <i>FrameTriggering</i>, GeneralParameter, GlobalSupervision, GlobalTimeGateway, <i>GlobalTimeMaster</i>, <i>GlobalTimeSlave</i>, <i>HealthChannel</i>, <i>HeapUsage</i>, HwAttributeDef, HwAttributeLiteralDef, HwPin, HwPinGroup, <i>IEEE1722TpAcfBus</i>, <i>IEEE1722TpAcfBusPart</i>, IPsecRule, IPv6ExtHeaderFilterList, ISignalToIPduMapping, ISignalTriggering, <i>IdentCaption</i>, ImpositionTime, InternalTriggeringPoint, Keyword, LifecycleState, Linker, MacAddressVlanMembership, MacMulticastGroup, MacSecKayParticipant, McDataInstance, MemorySection, MemoryUsage, MethodMapping, ModeDeclaration, ModeDeclarationMapping, ModeSwitchPoint, NetworkEndpoint, <i>NmCluster</i>, <i>NmNode</i>, <i>PackageableElement</i>, ParameterAccess, PduActivationRoutingGroup, PduToFrameMapping, PduTriggering, PerInstanceMemory, <i>PersistencyDeploymentElement</i>, <i>PersistencyInterfaceElement</i>, <i>PhmSupervision</i>, <i>PhysicalChannel</i>, PortGroup, <i>PortInterfaceMapping</i>, ProcessToMachineMapping, Processor, ProcessorCore, PskIdentityToKeySlotMapping, ResourceConsumption, ResourceGroup, RootSwClusterDesignComponentPrototype, RootSwComponentPrototype, RootSwCompositionPrototype, RptComponent, RptContainer, RptExecutableEntity, RptExecutableEntityEvent, RptExecutionContext, RptProfile, RptServicePoint, RunnableEntityGroup, <i>SdgAttribute</i>, SdgClass, SecOcJobMapping, SecOcJobRequirement, SecureCommunicationAuthenticationProps, <i>SecureCommunicationDeployment</i>, SecureCommunicationFreshnessProps, SecurityEventContextDataElement, SecurityEventContextProps, <i>ServiceEventDeployment</i>, <i>ServiceFieldDeployment</i>, ServiceInterfaceElementSecureComConfig, <i>ServiceMethodDeployment</i>, <i>ServiceNeeds</i>, SignalServiceTranslationEventProps, SignalServiceTranslationProps, SocketAddress, SoftwarePackageStep, SomeipEventGroup, SomeipProvidedEventGroup, SomeipTpChannel, <i>SpecElementReference</i>, <i>StackUsage</i>, <i>StateManagementActionItem</i>, StateManagementActionList, StateManagementStateNotification, <i>StateManagementStateRequest</i>, StaticSocketConnection, StructuredReq, SupervisionCheckpoint, SupervisionMode, SupervisionModeCondition, SwGenericAxisParamType, SwServiceArg, SwcServiceDependency, SwitchAsynchronousTrafficShaperGroupEntry, SystemMapping, <i>TimeBaseResource</i>, <i>TimingClock</i>, TimingClockSyncAccuracy, TimingCondition, <i>TimingConstraint</i>, <i>TimingDescription</i>, TimingExtensionResource, TimingModelInstance, TlsCryptoCipherSuite, TlsCryptoCipherSuiteProps, TlsJobMapping, Topic1, TpAddress, TraceableTable, TraceableText, <i>TracedFailure</i>, TransformationISignalPropsIdent, <i>TransformationProps</i>, TransformationTechnology, Trigger, UcmDescription, UcmRetryStrategy, UcmStep, VariableAccess, VariationPointProxy, VehicleRolloutStep, ViewMap, VlanConfig, WaitPoint</p>			
Attribute	Type	Mult.	Kind	Note
adminData	AdminData	0..1	aggr	<p>This represents the administrative data for the identifiable object.</p> <p>Stereotypes: atpSplitable Tags: atp.Splitkey=adminData xml.sequenceOffset=-40</p>





Class	Identifiable (abstract)			
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>Tags: 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>Tags: xml.sequenceOffset=-50</p>
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! 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>Tags: xml.sequenceOffset=-60</p>
introduction	DocumentationBlock	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>Tags: 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 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>Tags: xml.attribute=true</p>

Table A.2: Identifiable

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, BswDistinguishedPartition, BswModuleCallPoint, BswModuleClientServerEntry, BswVariableAccess, CouplingPortTrafficClassAssignment, CppImplementationDataTypeContextTarget, DiagnosticEnvModeElement, EthernetPriorityRegeneration, ExclusiveAreaNestingOrder, HwDescriptionEntity, ImplementationProps, ModeTransition, MultilanguageReferrable, NmNetworkHandle, PncMappingIdent, SingleLanguageReferrable, SoConIPdulIdentifier, SocketConnectionBundle, SomeipRequiredEventGroup, TimeSyncServerConfiguration, TpConnectionIdent</i>			
Attribute	Type	Mult.	Kind	Note
shortName	Identifier	1	attr	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. Stereotypes: atpIdentityContributor Tags: xml.enforceMinMultiplicity=true xml.sequenceOffset=-100
shortName Fragment	ShortNameFragment	*	aggr	This specifies how the Referrable.shortName is composed of several shortNameFragments. Tags: xml.sequenceOffset=-90

Table A.3: Referrable

Class	ServiceInterface			
Package	M2::AUTOSARTemplates::AdaptivePlatform::ApplicationDesign::PortInterface			
Note	This represents the ability to define a PortInterface that consists of a heterogeneous collection of methods, events and fields. Tags: atp.recommendedPackage=ServiceInterfaces			
Base	<i>ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, PortInterface, Referrable</i>			
Aggregated by	ARPackage.element			
Attribute	Type	Mult.	Kind	Note
event	VariableDataPrototype	*	aggr	This represents the collection of events defined in the context of a ServiceInterface. Stereotypes: atpSplitable; atpVariation Tags: atp.Splitkey=event.shortName, event.variationPoint.shortLabel vh.latestBindingTime=blueprintDerivationTime xml.sequenceOffset=30
field	Field	*	aggr	This represents the collection of fields defined in the context of a ServiceInterface. Stereotypes: atpSplitable; atpVariation Tags: atp.Splitkey=field.shortName, field.variationPoint.shortLabel vh.latestBindingTime=blueprintDerivationTime xml.sequenceOffset=40
majorVersion	PositiveInteger	0..1	attr	Major version of the service contract. Tags: xml.sequenceOffset=10





Class	ServiceInterface			
method	ClientServerOperation	*	aggr	This represents the collection of methods defined in the context of a ServiceInterface. Stereotypes: atpSplitable; atpVariation Tags: atp.Splitkey=method.shortName, method.variation Point.shortLabel vh.latestBindingTime=blueprintDerivationTime xml.sequenceOffset=50
minorVersion	PositiveInteger	0..1	attr	Minor version of the service contract. Tags: xml.sequenceOffset=20
trigger	Trigger	*	aggr	This represents the collection of triggers defined in the context of a ServiceInterface. Stereotypes: atpSplitable; atpVariation Tags: atp.Splitkey=trigger.shortName, trigger.variation Point.shortLabel vh.latestBindingTime=blueprintDerivationTime xml.sequenceOffset=60

Table A.4: ServiceInterface

Class	StdCplusplusImplementationDataType			
Package	M2::AUTOSARTemplates::AdaptivePlatform::ApplicationDesign::CplusplusImplementationDataType			
Note	This meta-class represents the way to specify a data type definition that is taken as the basis for a C++ language binding to a C++ Standard Library feature. Tags: atp.recommendedPackage=CplusplusImplementationDataTypes			
Base	<i>ARElement, ARObject, AbstractImplementationDataType, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, AutosarDataType, CollectableElement, CplusplusImplementationDataType, CplusplusImplementationDataTypeContextTarget, Identifiable, MultilanguageReferrable, PackageableElement, Referrable</i>			
Aggregated by	ARPackage.element			
Attribute	Type	Mult.	Kind	Note
–	–	–	–	–

Table A.5: StdCplusplusImplementationDataType

B History of Specification Items

B.1 Constraint and Specification Item History of this document according to AUTOSAR Release 17-10

B.1.1 Added Specification Items in 17-10

Number	Heading
[SWS_APT_00001]	primitive Implementation Data Type <i>sint8</i>
[SWS_APT_00002]	SwBaseType <i>sint8</i>
[SWS_APT_00003]	Platform specific settings in SwBaseType <i>sint8</i>
[SWS_APT_00004]	primitive Implementation Data Type <i>sint16</i>
[SWS_APT_00005]	SwBaseType <i>sint16</i>
[SWS_APT_00006]	Platform specific settings in SwBaseType <i>sint16</i>
[SWS_APT_00007]	primitive Implementation Data Type <i>sint32</i>
[SWS_APT_00008]	SwBaseType <i>sint32</i>
[SWS_APT_00009]	Platform specific settings in SwBaseType <i>sint32</i>
[SWS_APT_00010]	primitive Implementation Data Type <i>sint64</i>
[SWS_APT_00011]	SwBaseType <i>sint64</i>
[SWS_APT_00012]	Platform specific settings in SwBaseType <i>sint64</i>
[SWS_APT_00013]	primitive Implementation Data Type <i>sint8_least</i>
[SWS_APT_00014]	SwBaseType <i>sint8_least</i>
[SWS_APT_00015]	Platform specific settings in SwBaseType <i>sint8_least</i>
[SWS_APT_00016]	primitive Implementation Data Type <i>sint16_least</i>
[SWS_APT_00017]	SwBaseType <i>sint16_least</i>
[SWS_APT_00018]	Platform specific settings in SwBaseType <i>sint16_least</i>
[SWS_APT_00019]	primitive Implementation Data Type <i>sint32_least</i>
[SWS_APT_00020]	SwBaseType <i>sint32_least</i>
[SWS_APT_00021]	Platform specific settings in SwBaseType <i>sint32_least</i>
[SWS_APT_00022]	primitive Implementation Data Type <i>uint8</i>
[SWS_APT_00023]	SwBaseType <i>uint8</i>
[SWS_APT_00024]	Platform specific settings in SwBaseType <i>uint8</i>
[SWS_APT_00025]	primitive Implementation Data Type <i>uint16</i>
[SWS_APT_00026]	SwBaseType <i>uint16</i>
[SWS_APT_00027]	Platform specific settings in SwBaseType <i>uint16</i>
[SWS_APT_00028]	primitive Implementation Data Type <i>uint32</i>
[SWS_APT_00029]	SwBaseType <i>uint32</i>
[SWS_APT_00030]	Platform specific settings in SwBaseType <i>uint32</i>
[SWS_APT_00031]	primitive Implementation Data Type <i>uint64</i>
[SWS_APT_00032]	SwBaseType <i>uint64</i>





Number	Heading
[SWS_APT_00033]	Platform specific settings in SwBaseType <i>uint64</i>
[SWS_APT_00034]	primitive Implementation Data Type <i>uint8_least</i>
[SWS_APT_00035]	SwBaseType <i>uint8_least</i>
[SWS_APT_00036]	Platform specific settings in SwBaseType <i>uint8_least</i>
[SWS_APT_00037]	primitive Implementation Data Type <i>uint16_least</i>
[SWS_APT_00038]	SwBaseType <i>uint16_least</i>
[SWS_APT_00039]	Platform specific settings in SwBaseType <i>uint16_least</i>
[SWS_APT_00040]	primitive Implementation Data Type <i>uint32_least</i>
[SWS_APT_00041]	SwBaseType <i>uint32_least</i>
[SWS_APT_00042]	Platform specific settings in SwBaseType <i>uint32_least</i>
[SWS_APT_00043]	primitive Implementation Data Type <i>float32</i>
[SWS_APT_00044]	SwBaseType <i>float32</i>
[SWS_APT_00045]	Platform specific settings in SwBaseType <i>float32</i>
[SWS_APT_00046]	primitive Implementation Data Type <i>float64</i>
[SWS_APT_00047]	SwBaseType <i>float64</i>
[SWS_APT_00048]	Platform specific settings in SwBaseType <i>float64</i>
[SWS_APT_00049]	primitive Implementation Data Type <i>boolean</i>
[SWS_APT_00050]	SwBaseType <i>boolean</i>
[SWS_APT_00051]	Platform specific settings in SwBaseType <i>boolean</i>

Table B.1: Added Specification Items in 17-10

B.1.2 Changed Specification Items in 17-10

none

B.1.3 Deleted Specification Items in 17-10

none

B.2 Constraint and Specification Item History of this document according to AUTOSAR Release 18-03

B.2.1 Added Specification Items in 18-03

none

B.2.2 Changed Specification Items in 18-03

Number	Heading
[SWS_APT_00003]	Platform specific settings in SwBaseType <i>sint8</i>
[SWS_APT_00015]	Platform specific settings in SwBaseType <i>sint8_least</i>
[SWS_APT_00024]	Platform specific settings in SwBaseType <i>uint8</i>
[SWS_APT_00036]	Platform specific settings in SwBaseType <i>uint8_least</i>

Table B.2: Changed Specification Items in 18-03

B.2.3 Deleted Specification Items in 18-03

none

B.3 Constraint and Specification Item History of this document according to AUTOSAR Release 18-10

B.3.1 Added Specification Items in 18-10

none

B.3.2 Changed Specification Items in 18-10

Number	Heading
[SWS_APT_00001]	primitive Implementation Data Type <i>int8_t</i>
[SWS_APT_00004]	primitive Implementation Data Type <i>int16_t</i>
[SWS_APT_00007]	primitive Implementation Data Type <i>int32_t</i>
[SWS_APT_00010]	primitive Implementation Data Type <i>int64_t</i>
[SWS_APT_00022]	primitive Implementation Data Type <i>uint8_t</i>
[SWS_APT_00025]	primitive Implementation Data Type <i>uint16_t</i>
[SWS_APT_00028]	primitive Implementation Data Type <i>uint32_t</i>
[SWS_APT_00031]	primitive Implementation Data Type <i>uint64_t</i>
[SWS_APT_00043]	primitive Implementation Data Type <i>float</i>
[SWS_APT_00046]	primitive Implementation Data Type <i>double</i>
[SWS_APT_00049]	primitive Implementation Data Type <i>bool</i>

Table B.3: Changed Specification Items in 18-10

B.3.3 Deleted Specification Items in 18-10

Number	Heading
[SWS_APT_00002]	SwBaseType <i>sint8</i>
[SWS_APT_00003]	Platform specific settings in SwBaseType <i>sint8</i>
[SWS_APT_00005]	SwBaseType <i>sint16</i>
[SWS_APT_00006]	Platform specific settings in SwBaseType <i>sint16</i>
[SWS_APT_00008]	SwBaseType <i>sint32</i>
[SWS_APT_00009]	Platform specific settings in SwBaseType <i>sint32</i>
[SWS_APT_00011]	SwBaseType <i>sint64</i>
[SWS_APT_00012]	Platform specific settings in SwBaseType <i>sint64</i>
[SWS_APT_00013]	primitive Implementation Data Type <i>sint8_least</i>
[SWS_APT_00014]	SwBaseType <i>sint8_least</i>
[SWS_APT_00015]	Platform specific settings in SwBaseType <i>sint8_least</i>
[SWS_APT_00016]	primitive Implementation Data Type <i>sint16_least</i>
[SWS_APT_00017]	SwBaseType <i>sint16_least</i>
[SWS_APT_00018]	Platform specific settings in SwBaseType <i>sint16_least</i>
[SWS_APT_00019]	primitive Implementation Data Type <i>sint32_least</i>
[SWS_APT_00020]	SwBaseType <i>sint32_least</i>
[SWS_APT_00021]	Platform specific settings in SwBaseType <i>sint32_least</i>
[SWS_APT_00023]	SwBaseType <i>uint8</i>
[SWS_APT_00024]	Platform specific settings in SwBaseType <i>uint8</i>
[SWS_APT_00026]	SwBaseType <i>uint16</i>
[SWS_APT_00027]	Platform specific settings in SwBaseType <i>uint16</i>
[SWS_APT_00029]	SwBaseType <i>uint32</i>
[SWS_APT_00030]	Platform specific settings in SwBaseType <i>uint32</i>
[SWS_APT_00032]	SwBaseType <i>uint64</i>
[SWS_APT_00033]	Platform specific settings in SwBaseType <i>uint64</i>
[SWS_APT_00034]	primitive Implementation Data Type <i>uint8_least</i>
[SWS_APT_00035]	SwBaseType <i>uint8_least</i>
[SWS_APT_00036]	Platform specific settings in SwBaseType <i>uint8_least</i>
[SWS_APT_00037]	primitive Implementation Data Type <i>uint16_least</i>
[SWS_APT_00038]	SwBaseType <i>uint16_least</i>
[SWS_APT_00039]	Platform specific settings in SwBaseType <i>uint16_least</i>
[SWS_APT_00040]	primitive Implementation Data Type <i>uint32_least</i>
[SWS_APT_00041]	SwBaseType <i>uint32_least</i>
[SWS_APT_00042]	Platform specific settings in SwBaseType <i>uint32_least</i>
[SWS_APT_00044]	SwBaseType <i>float32</i>
[SWS_APT_00045]	Platform specific settings in SwBaseType <i>float32</i>



△

Number	Heading
[SWS_APT_00047]	SwBaseType <i>float64</i>
[SWS_APT_00048]	Platform specific settings in SwBaseType <i>float64</i>
[SWS_APT_00050]	SwBaseType <i>boolean</i>
[SWS_APT_00051]	Platform specific settings in SwBaseType <i>boolean</i>

Table B.4: Deleted Specification Items in 18-10

B.4 Constraint and Specification Item History of this document according to AUTOSAR Release 19-03

B.4.1 Added Specification Items in 19-03

none

B.4.2 Changed Specification Items in 19-03

none

B.4.3 Deleted Specification Items in 19-03

none

B.5 Constraint and Specification Item History of this document according to AUTOSAR R19-11

B.5.1 Added Specification Items in R19-11

none

B.5.2 Changed Specification Items in R19-11

none

B.5.3 Deleted Specification Items in R19-11

none

B.6 Constraint and Specification Item History of this document according to AUTOSAR R20-11

B.6.1 Added Specification Items in R20-11

none

B.6.2 Changed Specification Items in R20-11

none

B.6.3 Deleted Specification Items in R20-11

none

B.7 Constraint and Specification Item History of this document according to AUTOSAR R21-11

B.7.1 Added Specification Items in R21-11

none

B.7.2 Changed Specification Items in R21-11

none

B.7.3 Deleted Specification Items in R21-11

none

B.8 Constraint and Specification Item History of this document according to AUTOSAR R22-11

B.8.1 Added Specification Items in R22-11

none

B.8.2 Changed Specification Items in R22-11

none

B.8.3 Deleted Specification Items in R22-11

none

B.9 Constraint and Specification Item History of this document according to AUTOSAR R23-11

B.9.1 Added Specification Items in R23-11

none

B.9.2 Changed Specification Items in R23-11

none

B.9.3 Deleted Specification Items in R23-11

none

B.10 Constraint and Specification Item History of this document according to AUTOSAR R24-11

B.10.1 Added Specification Items in R24-11

none

B.10.2 Changed Specification Items in R24-11

none

B.10.3 Deleted Specification Items in R24-11

none