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## Disclaimer



## Advice for users

AUTOSAR Specification Documents may contain exemplary items (exemplary reference models, “use cases”, and/or references to exemplary technical solutions, devices, processes or software).

Any such exemplary items are contained in the Specification Documents for illustration purposes only, and they themselves are not part of the AUTOSAR Standard. Neither their presence in such Specification Documents, nor any later documentation of AUTOSAR conformance of products actually implementing such exemplary items, imply that intellectual property rights covering such exemplary items are licensed under the same rules as applicable to the AUTOSAR Standard.

# Table of Contents

# 0 Abbreviations

| *Abbreviation* | *Description* |
|---|---|
| **ADC** | Analog Digital Converter |
| **AMM** | Application Mode Management |
| **API** | Application Programming Interface |
| **ARP** | Address Resolution Protocol |
| **ASAM** | Association for Standardization of Automation and Measuring systems |
| **ASIL** | Automotive Safety Integrity Levels |
| **AUTOSAR** | AUTomotive Open System Architecture |
| **BSW** | Basic SoftWare |
| **BSWM** | Basic SoftWare Modul |
| **CAN** | Controller Area Network |
| **CD** | Complex Driver |
| **COM** | Communication |
| **CPU** | Central Processing Unit |
| **CTA** | Conformance Test Agency |
| **CTS** | Conformance Test Suite |
| **DAC** | Digital to Analog Converter |
| **DEM** | Diagnostic Event Manager |
| **DET** | Development Error Tracer |
| **DHCP** | Dynamic Host Configuration Protocol |
| **DIO** | Digital Input/Output |
| **DLC** | Data Length Code |
| **DoIP** | Diagnostics over Internet Protocol |
| **DTD** | Document Type Definition |
| **ECU** | Electronic Control Unit |
| **FIFO** | First In First Out |
| **FPU** | Floating Point Unit |
| **FW** | Fire Wire |
| **GSM** | Global System for Mobile Communication |
| **HIS** | Hersteller Initiative Software |
| **HW** | Hardware |
| **ICC** | Implementation Conformance Class |

| | |
|---|---|
| **ICMP** | Internet Control Message Protocol |
| **IEC** | International Electrotechnical Commission |
| **I-PDU** | Interaction Layer Protocol Data Unit |
| **ISR** | Interrupt Service Routine |
| **L-PDU** | Protocol Data Unit of the data Link layer |
| **L-SDU** | SDU of the data Link layer |
| **LIFO** | Last In First Out |
| **LIN** | Local Interconnected Network |
| **LSB** | Least Significant Bit |
| **µC** | MicroController |
| **MCAL** | MicroController Abstraction Layer |
| **MIPS** | Million Instructions Per Second |
| **MMU** | Memory Management Unit |
| **MMI** | Man Machine Interface |
| **MOST** | Media Oriented Systems Transport |
| **µP** | MicroProcessor |
| **MPU** | Memory Protection Unit |
| **MSB** | Most Significant Bit |
| **N-PDU** | Protocol Data Unit of the Network layer (transport protocols) |
| **N-SDU** | SDU of the Network layer (transport protocols) |
| **NVRAM** | Non-Volatile Random Access Memory |
| **OEM** | Original Equipment Manufacturer |
| **OIL** | OSEK Implementation Language |
| **OS** | Operating System |
| **OSEK** | Open Systems and the Corresponding Interfaces for Automotive Electronics |
| **PCI** | Protocol Control Information |
| **PDU** | Protocol Data Unit |
| **PS** | Product Supplier |
| **PWM** | Pulse Width Modulation |
| **RfC** | Request for Change |
| **RTE** | Runtime Environment |
| **SAE** | Society of Automotive Engineers |
| **SDU** | Service Data Unit |

| | |
|---|---|
| **SIL** | Safety Integrity Level |
| **SW** | Software |
| **SW-C** | Software Component |
| **TCP** | Transmission Control Protocol |
| **TP** | Transport Protocol |
| **TTP** | Time Triggered Protocol |
| **UDP** | User (Universal) Datagram Protocol |
| **UdpNm** | UDP Network Management |
| **USB** | Universal Serial Bus |
| **VFB** | Virtual Functional Bus |
| **VMM** | Vehicle Mode Management |
| **WCET** | Worst Case Execution Time |
| **WCRT** | Worst Case Response time |
| **XCP** | Universal Calibration Protocol |
| **XML** | Extensible Markup Language |

# 1 Introduction

This document is the overall glossary of AUTOSAR. It contains definitions of all major terms and notions used within AUTOSAR. It does not claim to be complete and please keep in mind that some WPs have more specific terms defined within their domain specific glossary.

# 2 How to read this document

The title of the subchapters is identical to the term to be defined.

## 2.1 <Definition>

| | |
|---|---|
| ***Definition*** | *tbd - term to be defined* |
| ***Initiator*** | *tbd – person and/or group who introduced the term* |
| ***Further Explanations*** | *tbd – further explanation of the definition* |
| ***Comment*** | *tbd – comment or hints* |
| ***Example*** | *tbd – example of the term* |
| ***Reference*** | *tbd – reference of definition* |

# 3 Definitions

## 3.1 Accreditation

| | |
|---|---|
| ***Definition*** | Third-party (→ definition 3.230) attestation to an organization conveying formal demonstration of its competence to carry out AUTOSAR conformance test tasks. |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | Within the AUTOSAR environment two different scopes of Accreditation exist:<br>- In reference to ISO/IEC 17025 for accreditation of organizations performing conformance testing within own laboratories.<br>- In reference to ISO/IEC Guide 65 for accreditation of Conformance Test Agencies (CTA) (→ definition 3.54) performing 3rd party product conformance attestation. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO/IEC 17000] |

## 3.2 Accreditation Body

| | |
|---|---|
| ***Definition*** | This is an organization, which employs or contracts individual assessors, who in turn perform the independent assessments (→ definition 3.9) as part of the accreditation (→ definition3.1) process. |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | In the AUTOSAR context the Accreditation Bodies have the role to accredit the Conformance Test Agencies. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.3 Application

| | |
|---|---|
| ***Definition*** | A software (or program) that is specified to the solution of a problem of an end user requiring information processing for its solution.<br>The software configuration (→ definition 3.211) of a software entity. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | To 1. of Definition:<br>In AUTOSAR Application software is located above the AUTOSAR RTE (RunTimeEnvironment). |
| ***Comment*** | Definition 1 is the “by default” meaning for application in AUTOSAR. When definition 2 is meant, it has to be explicitly mentioned. |
| ***Example*** | -- |
| ***Reference*** | [ISO 2382-20] |

## 3.4 Application Programming Interface (API)

| | |
|---|---|
| ***Definition*** | An Application Programming Interface (API) is the prescribed method of a specific software part by which a programmer writing a program can make requests to that software part. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | OSEK OS API |

| | |
|---|---|
| ***Reference*** | -- |

## 3.5 Application Software Component

| | |
|---|---|
| ***Definition*** | An Application Software Component is a specific Software Component (→ definition 3.209) which realizes a defined functionality on application level and runs on the AUTOSAR infrastructure. It communicates only through the AUTOSAR Runtime Environment. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | Application Software-Components are located "above" the AUTOSAR Runtime Environment. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.6 Architecture

| | |
|---|---|
| ***Definition*** | The fundamental organization of a system embodied in its components, their static and dynamic relationships to each other, and to the environment, and the principles guiding its design and evolution. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | “Static and dynamic” added to EAST definition. |
| ***Example*** | -- |
| ***Reference*** | [IEEE 1471], [EAST-Glossary] |

## 3.7 Artifact

| | |
|---|---|
| ***Definition*** | This is a Work Product Definition that provides a description and definition for tangible work product types. Artifacts may be composed of other artifacts ([14]). At a high level, an artifact is represented as a single conceptual file. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.8 Asserted Property

| | |
|---|---|
| ***Definition*** | A property or quality of a design entity (e.g. SW component or system) is asserted, if the design entity guarantees that this property or quality is fulfilled. |
| ***Initiator*** | WP Body and Comfort |
| ***Further Explanations*** | A property or quality of a design unit can be asserted by the design unit itself or in combination with another design unit. |
| ***Comment*** | -- |
| ***Example*** | If the worst case execution time of a task (w.r.t. a certain CPU etc.) is asserted to be 3 ms, the execution time of this task will under any circumstances be less than or equal to 3 ms. |
| ***Reference*** | Compare required property (→ definition 3.184) |

## 3.9 Assessment

| | |
|---|---|
| ***Definition*** | Activity conducted by an assessor to demonstrate that the assessed organization fulfills the set requirements. |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | Within the AUTOSAR context after the initial assessment a new full-set assessment will be repeated every 4 years. In between, surveillances (→ definition 3.221) take place once a year. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO/IEC 17011] |

## 3.10 Asset

| | |
|---|---|
| ***Definition*** | An item that has been designed for use in multiple contexts. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | An asset can be design, specifications, source code, documentation, test suits, manual procedures, etc.. |
| ***Reference*** | [IEEE 1517], [EAST-Glossary] |

## 3.11 Asynchronous Communication

| | |
|---|---|
| ***Definition*** | Asynchronous communication does not block the sending software entity.<br>The sending software entity continues its operation without getting a response from the communication partner(s). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | There could be an acknowledgement by the communication system about the sending of the information.<br>A later response to the sending software entity is possible. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.12 Attestation

| | |
|---|---|
| ***Definition*** | Issue of a statement, based on a decision following a review, that fulfillment of specified requirements has been demonstrated. |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | The resulting statement, referred to in the International Standard as a "statement of conformity", conveys the assurance that the specified requirements have been fulfilled. Such an assurance does not, of itself, afford contractual or other legal guarantees. |
| ***Comment*** | -- |
| ***Example*** | Attestation of product conformance given by a third party like a CTA (→ definition 3.54). Attestation of product conformance given by a first party like the Product Supplier (also called declaration). |
| ***Reference*** | [ISO/IEC 17000] |

## 3.13 Atomic Software Component

| | |
|---|---|
| ***Definition*** | Non-composed Software-Component. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | An Atomic Software Component might access HW or not, therefore not all Atomic SW-Cs are relocatable. |
| ***Comment*** | -- |
| ***Example*** | Application Software-Component, Complex Driver |
| ***Reference*** | -- |

## 3.14 Automotive Safety Integrity Levels (ASIL)

| | |
|---|---|
| ***Definition*** | Automotive Safety Integrity Levels (ASIL) are used within ISO 26262 to express the level of risk reduction required to prevent a specific hazard, with ASIL D representing the highest and ASIL A the lowest. The ASIL is assigned to the according safety goal and inherited to the safety requirements derived from it. |
| ***Initiator*** | WP Functional Safety and Processes |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.15 AUTOSAR Authoring Tool

| | |
|---|---|
| ***Definition*** | An AUTOSAR Tool used to create and modify AUTOSAR XML Descriptions (→ definition 3.25). |
| ***Initiator*** | WP Authoring Tools |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | System Description Editor |
| ***Reference*** | -- |

## 3.16 AUTOSAR Converter Tool

| | |
|---|---|
| ***Definition*** | An AUTOSAR Tool used to create AUTOSAR XML files by converting information from other AUTOSAR XML files. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | ECU Flattener |
| ***Reference*** | -- |

## 3.17 AUTOSAR Definition

| | |
|---|---|
| ***Definition*** | This is the definition of parameters which can have values. One could say that the parameter values are instances of the definitions. But in the meta model hierarchy of AUTOSAR, definitions are also instances of the meta model and therefore considered as a description. |
| ***Initiator*** | WP General Methodology and Configuration |

| | |
|---|---|
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | EcucParameterDef, PostBuildVariantCriterion, SwSystemconst |
| ***Reference*** | -- |

## 3.18 AUTOSAR Interface

| | |
|---|---|
| ***Definition*** | The AUTOSAR Interface of a software component (→ definition 3.209) refers to the collection of all ports (→ definition 3.170) of that component through which it interacts with other components. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | Note that an AUTOSAR Interface is different from a Port Interface (→ definition 3.171). The latter characterizes one specific port of a component. |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus], Chapter " Modeling of Communication, Graphical Notation" |

## 3.19 AUTOSAR Metamodel

| | |
|---|---|
| ***Definition*** | The AUTOSAR metamodel is a UML2.0 model that defines the language for describing AUTOSAR systems and related artifacts. |
| ***Initiator*** | WG Meta Model Team |
| ***Further Explanations*** | The AUTOSAR metamodel is a graphical representation of a template (→ definition 3.229). UML2.0 class diagrams are used to describe the attributes and their interrelationships. Stereotypes and OCL (object constraint language) are used for defining specific semantics and constraints. |
| ***Comment*** | The AUTOSAR XML Schema (→ definition 3.26) is derived from the AUTOSAR metamodel. |
| ***Example*** | -- |
| ***Reference*** | [UML 2.0] |

## 3.20 AUTOSAR Model

| | |
|---|---|
| ***Definition*** | This is a representation of an AUTOSAR product. The AUTOSAR model represents aspects suitable to the intended use according to the AUTOSAR methodology. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | Strictly speaking, this is an instance of the AUTOSAR metamodel (→ definition 3.19). The information contained in the AUTOSAR model can be anything that is representable according to the AUTOSAR meta-model. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.21 AUTOSAR Partial Model

| | |
|---|---|
| ***Definition*** | In AUTOSAR, the possible partitioning of models is marked in the meta-model by <<atpSplitable>>. One partial model is represented in an AUTOSAR XML description (→ definition 3.25) by one file. The partial model does not need to fulfill |

| | |
|---|---|
| | all semantic constraints applicable to an AUTOSAR model. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.22 AUTOSAR Processor Tool

| | |
|---|---|
| ***Definition*** | An AUTOSAR Tool used to create non-AUTOSAR files by processing information from AUTOSAR XML files. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | RTE Generator |
| ***Reference*** | -- |

## 3.23 AUTOSAR Service

| | |
|---|---|
| ***Definition*** | An AUTOSAR Service is a logical entity of the basic software (→ definition 3.28) offering general functionality to be used by various software components. The functionality is accessed via standardized AUTOSAR Interfaces (→ definition 3.18). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | Parts of the basic software required to realize AUTOSAR communication patterns and communication attributes are not called AUTOSAR services. |
| ***Example*** | Error memory for diagnosis.<br>Timer service.<br>ECU state manager. |
| ***Reference*** | -- |

## 3.24 AUTOSAR Tool

| | |
|---|---|
| ***Definition*** | This is a software tool which supports one or more tasks defined as AUTOSAR tasks in the methodology. Depending on the supported tasks, an AUTOSAR tool can act as an authoring tool (→ definition 3.15), a converter tool (→ definition 3.16), a processor tool (→ definition 3.22) or as a combination of those. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.25 AUTOSAR XML description

| | |
|---|---|
| ***Definition*** | In AUTOSAR this means "Filled Template". In fact an AUTOSAR XML description is the XML representation of an AUTOSAR model (→ definition 3.20). The |

| | |
|---|---|
| | AUTOSAR XML description can consist of several files. Each individual file represents an AUTOSAR partial model (→ definition 3.21) and must validate successfully against the AUTOSAR XML schema (→ definition 3.26). |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.26 AUTOSAR XML Schema

| | |
|---|---|
| ***Definition*** | The AUTOSAR XML Schema is an XML language definition for exchanging AUTOSAR models (→ definition 3.20) and descriptions. |
| ***Initiator*** | WP Authoring Tools |
| ***Further Explanations*** | The AUTOSAR XML Schema is a W3C XML schema that defines the language for exchanging AUTOSAR models. This Schema is derived from the AUTOSAR metamodel (→ definition 3.19).<br>The AUTOSAR XML Schema defines the AUTOSAR data exchange format. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.27 Availability

| | |
|---|---|
| ***Definition*** | 1. Probability that a system or functional unit is able to perform its normal operation under specified conditions at a specific time.<br><br>2. The property of data or resources being accessible and usable on demand by an authorized entity. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | The time can be used to model a decrease of the availability over time due to e.g. aging of components. |
| ***Comment*** | 1. Degraded modes are covered by this definition (see example) |
| ***Example*** | 1. Power Steering: if the support function fails it is not available while the steering as a base function has full availability. |
| ***Reference*** | based on [ISO 2382-14], [ISO 2382-8],<br>Reliability (→ definition 3.181) |

## 3.28 Basic Software (BSW)

| | |
|---|---|
| ***Definition*** | The Basic Software provides the infrastructural (schematic dependent and schematic independent) functionalities of an ECU (→ definition 3.73).<br>It consists of Integration Code (→ definition 3.136) and Standard Software (→ definition 3.219). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | MCAL, AUTOSAR services, communication layer |
| ***Reference*** | -- |

## 3.29 Basic Software Module (BSWM)

| | |
|---|---|
| ***Definition*** | A collection of software files (code and description) that define a certain basic software functionality present on an ECU. |
| ***Initiator*** | WP ECU Configuration |
| ***Further Explanations*** | Standard software (→ definition 3.219) may be composed of several software modules (→ definition 3.213) that are developed independently. A software module may consist of Integration Code (→ definition 3.136), and/or standard software (→ definition 3.219). |
| ***Comment*** | -- |
| ***Example*** | A Digital IO Driver, Complex Driver, OS are examples of basic software modules. |
| ***Reference*** | -- |

## 3.30 Bit Position

| | |
|---|---|
| ***Definition*** | In AUTOSAR the bit position N within an I-PDU denotes the bit I, with I = N modulo 8, within the byte J, with J = N / 8. The byte J and bit position I is interpreted in accordance to the definition in OSEK COM chapter 2.4.1: “An I-PDU is a sequence of bytes numbered from 0 upwards. Within an I-PDU byte, bits are numbered from 0 upwards with bit 0 being the least significant bit.” |
| ***Initiator*** | WP COM Stack |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.31 Blueprint

| | |
|---|---|
| ***Definition*** | This is a model from which other models can be derived by copy and refinement. Note that in contrast to meta model resp. types, this process is not an instantiation. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.32 Bulk Data

| | |
|---|---|
| ***Definition*** | “Bulk Data” is a set of data such big in size, that standard mechanisms used to handle smaller data sets become inconvenient. This implies that bulk data in a software system are modeled, stored, accessed and transported by different mechanisms than smaller data sets. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | Bulk data are typically handled by adding a level of abstraction (e.g. files) which separates the containment of the data from the internal structure. |
| ***Comment*** | The critical size, above which data must be regarded as bulk data depends on the technical infrastructure (e.g. bus system) and the considered use case (transport, storage etc.). |
| ***Example*** | Data on a persistent medium which has a capacity of a few kBytes (e.g. EEPROM) can be directly accessed via memory addresses, address offsets can be mapped to symbols of a programming language: No bulk data mechanisms are |

| | |
|---|---|
| | needed. For media with bigger capacity this becomes inconvenient or even impossible, so that a file system is used: The data are treated as bulk data. |
| ***Reference*** | -- |

## 3.33 Bus Wake-Up

| | |
|---|---|
| ***Definition*** | A bus wake-up is caused by a specific wake pulse on the bus defined within the specification of the dedicated communication standard (e.g. CAN, LIN, FR). A bus wake-up initiates that the transceiver and controller leave their energy saving mode and enter normal mode to start bus communication again. |
| ***Initiator*** | WP COM Stack |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.34 Calibration

| | |
|---|---|
| ***Definition*** | Calibration is the adjustment of parameters of SW-Components realizing the control functionality (namely parameters of AUTOSAR SW-Cs, ECU abstraction or Complex Drivers). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | Only those software modules can be calibrated, which are above RTE and ECU Abstraction and CD. Calibration is always done at post-build time. Used techniques to set calibration data include end-of-line programming, garage programming and adaptive calibration (e.g. in the case of anti-pinch protection for power window). |
| ***Comment*** | -- |
| ***Example*** | The calibration of the engine control will take into account the production differences of the individual motor this system will control. |
| ***Reference*** | -- |

## 3.35 Callback

| | |
|---|---|
| ***Definition*** | Functionality that is defined by an AUTOSAR module so that lower-level modules (i.e. lower in the Layered Software Architecture) can provide notification as required (e.g. when certain events occur or asynchronous processing completes). |
| ***Initiator*** | WP-1.1.1 |
| ***Further Explanations*** | In AUTOSAR, modules usually provide a register mechanism for callback functions which is set through configuration.<br><br>A module provides callbacks so that other modules can initiate its processing while the module calls callouts (--> definition 3.xx) to execute functionality that could not be specified by AUTOSAR, i.e. integration code (--> 3.125) |
| ***Comment*** | -- |
| ***Example*** | (from the viewpoint of a particular SWS):<br>The module being specified (Msws) should be informed about an event (--> definition 3.68) in another module (Mexternal). In this example, Msws calls Mexternal to perform some processing and can only resume when Mexternal completes. Upon completion, Mexternal calls Msws's callback function. That is, the called module (Mexternal) CALLS the calling module (Msws) BACK when complete ==> a callback. |

| | |
|---|---|
| | (from AUTOSAR):<br>COM callback (OSEK-BD) |
| ***Reference*** | -- |

## 3.36 Callout

| | |
|---|---|
| ***Definition*** | Function stubs that the system designer can replace with code to add functionality to a module which could not be specified by AUTOSAR. |
| ***Initiator*** | WP-1.1.1 MMS |
| ***Further Explanations*** | A module calls callouts (--> definition 3.xx) to execute functionality that could not be specified by AUTOSAR, i.e. integration code (--> 3.125) while the module provides callbacks so that other modules can initiate its processing.<br><br>Callouts can be separated into two classes:<br>1) callouts that provide mandatory functionality and thus serve as a hardware abstraction layer<br>2) callouts that provide optional functionality |
| ***Comment*** | -- |
| ***Example*** | In the EcuM:<br>For class 1): EcuM_EnableWakeupSources<br>For class 2): The Init Lists (EcuM_AL_DriverInitZero) |
| ***Reference*** | -- |

## 3.37 Call Point

| | |
|---|---|
| ***Definition*** | A point in a Software-Component (→ definition 3.209) where the SW-C enforce an execution entity (Entry point → definition 3.76) in another SW-C. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Request Service<br>Send Information |
| ***Reference*** | -- |

## 3.38 Category 1 Interrupt

| | |
|---|---|
| ***Definition*** | Category 1 (Cat1) Interrupts are supported by the OS but their code is only allowed to call a very small subset of OS functions. Furthermore they can bypass the OS. The code of Category 1 Interrupts depends (normally) on the used compiler and microcontroller. Category 1 Interrupts are not allowed to use the ISR() macro. Category 1 Interrupts need to implement/establish their own Interrupt Frame. Nevertheless they have to be configured in order to be included in the Interrupt Vector Table. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.39 Category 2 Interrupt

| | |
|---|---|
| ***Definition*** | Category 2 (Cat2) Interrupts are supported by the OS and their code can call a subset of OS functions. The definition of the Cat2 Interrupt must use the ISR() macro in order to be recognized by the OS. The Interrupt Frame of a Category 2 Interrupt is managed by the OS. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | ISR(timer1)<br>{<br>/* here is the code which handles timer1 interrupts */<br>…<br>} |
| ***Reference*** | -- |

## 3.40 Causality of Transmission

| | |
|---|---|
| ***Definition*** | Transmit order of PDUs with the same identifier (instances of PDUs) from a source network is preserved in the destination network. |
| ***Initiator*** | WP Gateway |
| ***Further Explanations*** | Transmission of PDUs (→ definition 3.166) with the same identifier has a particular temporal order in a given source network. After routing over a gateway the temporal order of transmission of PDUs in a destination network may be changed. Only in case that the temporal order is the same, causality is given. Otherwise causality is violated. Causality can be in contradiction to prioritization of PDUs. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.41 Client

| | |
|---|---|
| ***Definition*** | Software entity which uses services of a server (→ definition 3.204). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The client and the server might be located on one ECU (→ definition 3.73) or distributed on different calculation units (e.g. ECU, external diagnostic tester). |
| ***Comment*** | Adapted from Balzert. |
| ***Example*** | -- |
| ***Reference*** | [Balzert99] |

## 3.42 Client-Server Communication

| | |
|---|---|
| ***Definition*** | A specific form of communication in a possibly distributed system in which software entities act as clients (→ definition 3.41), servers (→ definition 3.204) or both, where 1...n clients are requesting services via a specific protocol from typically one server. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | Client-server communication can be realized by synchronous or asynchronous communication.<br>• Client takes initiative: requesting that the server performs a service, e.g. client triggers action within server (server does not start action on its own) |

| | |
|---|---|
| | • Client is after service request blocked / non-blocked<br>• Client expects response from server: data flow (+ control flow, if blocked)<br>One example for 1 client to n server communication (currently not supported) is a functional request by diagnosis. This has to be treated as a specific exception. |
| ***Comment*** | Adapted from Hyper Dictionary |
| ***Example*** | Internet (TCP/IP) |
| ***Reference*** | [Hyper Dictionary] |

## 3.43 Client-Server Interface

| | |
|---|---|
| ***Definition*** | The client-server interface is a special kind of port-interface (→ definition 3.171) used for the case of client-server communication (→ definition 3.42). The client-server interface defines the operations that are provided by the server (→ definition 3.204) and that can be used by the client (→ definition 3.41). |
| ***Initiator*** | WG System Team |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.44 Cluster Signal

| | |
|---|---|
| ***Definition*** | A cluster signal represents the aggregating system signal on one specific communication cluster. Cluster signals can be defined independently of frames. This allows a development methodology where the signals are defined first, and are assigned to frames in a later stage. |
| ***Initiator*** | WP System Constraint Template |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.45 Code Generator

| | |
|---|---|
| ***Definition*** | The Code Generator consumes complete and correctly formed XML for a BSW module and generates code and data that configures the module. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR_InterruptHandling_Explanation.doc] |

## 3.46 Code Variant Coding

| | |
|---|---|
| ***Definition*** | Adaptation of SW by selection of functional alternatives according to external requirements |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | Code Variant Coding might influences RTE (RuntimeEnvironment) and BSW modules (→ definition 3.29), not only the application software modules. Code |

| | |
|---|---|
| | Variant Coding is always done at pre-compile time or at link time. Code Variant Coding also includes vehicle-specific (not user-specific) SW adaptation due to end-customer wishes (e.g. deactivation of speed dependent automatic locking). |
| ***Comment*** | In case of the C language the #if or #ifdef directive can be used for creating code variants. Code Variant Coding is a design time concept. |
| ***Example*** | The same window lifter ECU is used for cars with 2 and 4 doors, however different code segments have to be used in both cases. |
| ***Reference*** | |

## 3.47 Communication Attribute

| | |
|---|---|
| ***Definition*** | Communication attributes define, according to the development phase, behavioral as well as implementation aspects of the AUTOSAR communication patterns. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The exact characteristics of the communication patterns provided by AUTOSAR (client-server and sender-receiver) can be specified more precisely by communication attributes. |
| ***Comment*** | See chapter 4.1.6 in Specification of the Virtual Functional Bus |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.48 Complex Driver (CD)

| | |
|---|---|
| ***Definition*** | An Atomic Software Component (→ definition 3.12) that on one side interfaces with the VFB (→ definition 3.244) and on the other side directly accesses Peripheral Hardware (→ definition 3.168) and/or ECU-Abstraction (→ definition 3.70) and/or MCAL (→ definition 3.151). Complex Driver can be accessed via AUTOSAR Interfaces and/or directly by Basic Software Modules. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | SW situated below the AUTOSAR RTE.<br>This software in general is not relocatable. |
| ***Comment*** | The Complex Driver is sometimes referred to as Complex Device Driver or CDD. |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.49 Composition

| | |
|---|---|
| ***Definition*** | An AUTOSAR Composition encapsulates a collaboration of software components (→ definition 3.209), thereby hiding detail and allowing the creation of higher abstraction levels.<br>Through Delegation Connectors (→ definition 3.56) a Composition (→ definition3.49) explicitly specifies, which Ports (→ definition 3.170) of the internal components are visible from the outside.<br>AUTOSAR Compositions are a type of Components, e.g. they can be part of further compositions. |
| ***Initiator*** | WP SW Component Template |
| ***Further Explanations*** | -- |
| ***Comment*** | See Virtual Functional Bus Specification, Chapter “VFB View, Meta-Model |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.50 Compositionality

| | |
|---|---|
| ***Definition*** | Compositionality is given when the behavior of a software component or subsystem of a system is independent of the overall system load and configuration. |
| ***Initiator*** | BMW |
| ***Further Explanations*** | Compositionality is an important property of deterministic systems. This property leads to a complete decoupling of systems. Smooth subsystem integration without backlashes is then easily achievable. |
| ***Comment*** | -- |
| ***Example*** | A new component or a subsystem can be added to a system without changing the behavior of the original components. |
| ***Reference*** | -- |

## 3.51 Conditioned Signal

| | |
|---|---|
| ***Definition*** | The conditioned signal is the internal electrical representation of the electrical signal within the ECU. It is delivered to the processor and represented in voltage and time (or, in case of logical signals, by high or low level). |
| ***Initiator*** | -- |
| ***Further Explanations*** | The Electrical Signal (→ definition 3.74) usually can not be processed by the peripherals directly, but has to be adopted. This includes amplification and limitation, conversion from a current into a voltage and so on. This conversion is performed by some electronical devices in the ECU and the result of the conversion is called the Conditioned Signal.<br>The description means for the Conditioned Signal can also be the same as for Technical Signals (→ definition 3.228) and Electrical Signals, but limited to electrical voltage |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.52 Configuration

| | |
|---|---|
| ***Definition*** | The arrangement of hardware and/or software elements in a system. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A configuration in general takes place before runtime. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AST-Glossary], [SO 61511-1] |

## 3.53 Confirmation

| | |
|---|---|
| ***Definition*** | Service primitive defined in the ISO/OSI Reference model (ISO 7498). With the 'confirmation' service primitive a service provider informs a service user about the result of a preceding service request of the service user [OSEK BD] |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A confirmation is e.g. a specific notification generated by the OSEK underlying layer to inform about a Message Transmission Error. |
| ***Comment*** | -- |
| ***Example*** | OSEK Com notification class 2 and 4 |
| ***Reference*** | [SEK BD], [OSEK Com] |

## 3.54 Conformance Test Agency (CTA)

| | |
|---|---|
| ***Definition*** | This is an organization performing a role with specific tasks in the conformance test process. Two possibilities are distinguished, a third party (→ definition 0) CTA or a first party (→ definition 3.93) CTA (which is also a product supplier). |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | The tasks/services provided by a CTA is:<br>- Provision of a CTS<br>- Test execution<br>- Attestation of product conformance<br><br>For a third party CTA the focus is on the attestation and for a first party the focus is on the test execution. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.55 Conformance Test Suite (CTS)

| | |
|---|---|
| ***Definition*** | Is a test implementation used in the context of Conformance Testing. Typically, multiple test implementations from different vendors (e.g. CTA) will exist, each of which implements the standardized Conformance Test specifications. |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | ISO 9646 distinguishes between Abstract Test Suites and Executable Test Suites. For AUTOSAR the earlier relates to the Conformance Test Specifications, whereas the latter to the test implementations or Conformance Test Suites. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO 9646, Parts 1,2 and 4] |

## 3.56 Connector

| | |
|---|---|
| ***Definition*** | A connector connects ports (→ definition 3.170) of software components (→ definition 3.209) and represents the flow of information between those ports. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | For more information see AUTOSAR Specification of VFB |
| ***Example*** | AssemblyConnector, DelegationConnector |
| ***Reference*** | [AUTOSAR Specification of Virtual Function Bus] |

## 3.57 Control Flow

| | |
|---|---|
| ***Definition*** | The directed transmission of information between multiple entities, directly resulting in a state change of the receiving entity. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A state change could result in an activation of a schedulable entity. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.58 Coordinate

| | |
|---|---|
| ***Definition*** | To control and harmonize two or more events or operations to act in an organized and predictable way. |
| ***Initiator*** | WP COM Stack |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Two NM Channels can be coordinated to synchronize different stages of network sleep. |
| ***Reference*** | AUTOSAR Generic NM Interface |

## 3.59 Data

| | |
|---|---|
| ***Definition*** | A reinterpretable representation of information in a formalized manner suitable for communication, interpretation or processing. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Flag, Notification, etc. |
| ***Reference*** | [ISO 2382-1] |

## 3.60 Data Element

| | |
|---|---|
| ***Definition*** | Data elements are declared within the context of a “Sender-Receiver Interface” (→ definition 3.202). They serve as the data units that are exchanged between sender and receiver. |
| ***Initiator*** | Stefaan Sonck Thiebaut |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR SoftwareComponentTemplate] |

## 3.61 Data Flow

| | |
|---|---|
| ***Definition*** | The directed transmission of data (→ definition 3.59) between multiple entities. The transmissioned data are not directly related to a state change at the receiver side. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Asynchronous communication. |
| ***Reference*** | -- |

## 3.62 Data Variant Coding

| | |
|---|---|
| ***Definition*** | Adaptation of SW by setup of certain characteristic data according to external |

| | |
|---|---|
| | requirements. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | Data Variant Coding might influences RTE (RunTimeEnvironment) and BSW modules (→ definition 3.29) not only the application software modules. (Multiple configuration parameter sets are needed.) Variant Coding is always done at post-build time. Variant Coding also includes vehicle-specific (not user-specific) SW adaptation due to end-customer wishes (e.g. deactivation of speed dependent automatic locking). Used techniques to select variants include end-of-line programming and garage programming. |
| ***Comment*** | The major difference with calibration is that this later doesn't aim to adapt the SW functionality itself but only aims to adjust the characteristic data of the SW to the HW/SW environment. Characteristic data in the source code of a software function have a significant impact on the functionality of the software. |
| ***Example*** | - Steering wheel controller adaptation to the left or right side can be done with Variant Coding. (Selection of the configuration.)<br>- Country related adaptation of MMI with respect to speed and/or temperature unit (km/h vs. mph, °C vs. F). |
| ***Reference*** | |

## 3.63 Deadline

| | |
|---|---|
| ***Definition*** | The point in time when an execution of an entity must be finished. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A deadline is calculated dependent on its local reference system. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [OSEKtime, OS Specification] |

## 3.64 Debugging

| | |
|---|---|
| ***Definition*** | Debugging is the process of gathering information in case of a software problem. The information is used to analyze the software problem. |
| ***Initiator*** | WP Debugging |
| ***Further Explanations*** | To analyze and later fix a software problem, in many cases more information than the one provided by the software API is necessary. This can be for example the state of internal variables of the software or a trace of the communication. The information can be collected by different means, e.g. an emulator or a tracing tool for the communication bus. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.65 (Conformance) Declaration

| | |
|---|---|
| ***Definition*** | First-party (→ definition 3.93) attestation |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Attestation of product conformance given by a first party, i.e. the Product Supplier. |
| ***Reference*** | [ISO/IEC 17000]; [ISO/IEC 17050] |

## 3.66 Dependability

| | |
|---|---|
| ***Definition*** | Dependability is defined as the trustworthiness of a computer system such that reliance can justifiable be placed on the service it delivers. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [EAST-Glossary] |

## 3.67 Dynamic Routing

| | |
|---|---|
| ***Definition*** | The routing of signals or PDUs (→ definition 3.166) in a gateway can be changed throughout operation without change of the operation mode of the gateway. |
| ***Initiator*** | WP Gateway |
| ***Further Explanations*** | Dynamic routing requires the change of routing tables during operation. It is not intended to use dynamic routing in the gateway. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [EAST-Glossary] |

## 3.68 E2E Profile

| | |
|---|---|
| ***Definition*** | A functional and complete description of a specific communication stack in terms of data structures, services, behavioral state-machines, error handling. E2E Profiles are defined in AUTOSAR E2E Library. An E2E Profile is configurable by runtime parameters. A specific set of runtime parameters is called E2E profile variant. In order to reach interoperability, the application developers should use the E2E profile variants defined in the E2E library. |
| ***Initiator*** | WP Functional Safety and Processes |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.69 ECU

| | |
|---|---|
| ***Definition*** | In the AUTOSAR sense an ECU means a microcontroller plus peripherals and the according software/configuration. Therefore, each microcontroller requires its own ECU Configuration. |
| ***Initiator*** | WP-1.2 |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.70 ECU Abstraction Layer

| | |
|---|---|
| ***Definition*** | The ECU Abstraction Layer is located above the Microcontroller Abstraction Layer |

| | |
|---|---|
| | (→ definition 3.151) and abstracts from the ECU schematic.<br>It is implemented for a specific ECU.and offers an API for access to peripherals and devices regardless of their location (onchip/offchip) and their connection to the microcontroller (port pins, type of interface).<br>Task: make higher software layers independent of the ECU hardware layout. |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | The ECU Abstraction Layer consists of the following parts:<br>• I/O Hardware Abstraction<br>• Communication Hardware Abstraction<br>• Memory Hardware Abstraction<br>• Onboard Device Abstraction<br>Properties:<br>• Implementation: µC independent, ECU hardware dependent<br>• Upper Interface (API): µC and ECU hardware independent, dependent on signal type |
| ***Comment*** | -- |
| ***Example*** | See Layered Software Architecture |
| ***Reference*** | [AUTOSAR SoftwareArchitecture] |

## 3.71 ECU Configuration

| | |
|---|---|
| ***Definition*** | Activity of integrating and configuring one ECU's software. |
| ***Initiator*** | WP ECU Configuration |
| ***Further Explanations*** | Further Explanations: ECU Configuration denotes the activity when one ECU's software is set up for a specific usage inside the ECU. In AUTOSAR the ECU Configuration activity is divided into "Pre-compile time", "Link time" and "Post-build time" configuration. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | ECU Configuration Description (→ definition 3.72), Pre-compile time configuration (→ definition 3.173), Link time configuration (→ definition 3.146), Post-build time configuration (→ definition 3.172), Multiple Configuration Sets (→ definition 3.156). |

## 3.72 ECU Configuration Description

| | |
|---|---|
| ***Definition*** | Output of the ECU Configuration activity containing the values of configuration parameters and references. |
| ***Initiator*** | WP ECU Configuration |
| ***Further Explanations*** | ECU Configuration Description holds the configuration parameter values and references to other module's configurations which have been defined in the ECU Configuration activity. |
| ***Comment*** | ECU Configuration Description may contain the whole ECU Configuration information or only the parts relevant for a specific configuration step (e.g. Pre-compile time). |
| ***Example*** | -- |
| ***Reference*** | ECU Configuration Description (→ definition 3.72), Pre-compile time configuration (→ definition 3.173), Link time configuration (→ definition 3.146), Post-build time configuration (→ definition 3.172), Multiple Configuration Sets (→ definition 3.156). |

## 3.73 Electronic Control Unit (ECU)

| | |
|---|---|
| ***Definition*** | Embedded computer system consisting out of at least one CPU and corresponding periphery which is placed in one housing. |
| ***Initiator*** | WP Virtual Functional Bus |

| | |
|---|---|
| ***Further Explanations*** | -- |
| ***Comment*** | "Small" deleted from EAST definition<br>The term ECU is problematic using LIN busses: An ECU can carry at least one SW-Component. Sensors and Actuators which are according to this definition not an ECU are related to an ECU which capsules the sensors or actuators functionality -new |
| ***Example*** | Head Unit (telematics domain). |
| ***Reference*** | [EAST-Glossary] |

## 3.74 Electrical Signal

| | |
|---|---|
| ***Definition*** | The electrical signal is the electrical representation of technical signals (→ definition 3.228). Electrical signals can only be represented in voltage, current and time |
| ***Initiator*** | WP ECU Resource Template |
| ***Further Explanations*** | When a sensor processes the Technical Signal it is converted into an Electrical Signal. The information can be provided in the current, the voltage or in the timely change of the signal (e.g. a pulse width modulation). |
| ***Comment*** | To describe the Electrical Signal the same means as for the Technical Signal can be used, limited to electrical current and voltage. |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.75 Empty Function

| | |
|---|---|
| ***Definition*** | Any C function defined by an AUTOSAR specification which does not implement or alter behavior required to accomplish the assigned functional responsibility. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | As such an empty function in the context of AUTOSAR can still have code but this code shall not impact the state machine other than error reporting. Auxiliary code like validating arguments to report to the DET does not constitute functional behavior because without the code and proper calling this code would still fulfill its architectural responsibility. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.76 Entry Point

| | |
|---|---|
| ***Definition*** | A point in a Software-Component (→ definition 3.209) where an execution entity of the SW-C begins. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | • Service of the Server in Client/Server Communication<br>• Reaction after receive Information (Notification) |
| ***Reference*** | -- |

## 3.77 Error

| | |
|---|---|
| ***Definition*** | Discrepancy between a computed, observed or measured value or condition and the true, specified, or theoretically correct value or condition. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | An error can arise as a result of unforeseen operating conditions or due to a fault within the system, subsystem or component being considered.<br>A fault can manifest itself as an error within the considered element and, at the end of its latency, the error can cause a failure. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO DIS 26262, Part 1] |

## 3.78 Error Detection Rate

| | |
|---|---|
| ***Definition*** | Ratio between detected lost/faulty words/symbols/blocks, divided by the total number of symbols/words/blocks sent. |
| ***Initiator*** | WP Functional Safety and Processes |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.79 Event

| | |
|---|---|
| ***Definition*** | State change of a hardware and/or software entity. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.80 Execution Time

| | |
|---|---|
| ***Definition*** | The time during which a program is actually executing, or more precisely during which a certain thread of execution is active. |
| ***Initiator*** | WP SW Component Template |
| ***Further Explanations*** | The execution time of software is the time during which the CPU is executing its instructions. The time the CPU spends on task switches or on the execution of other pieces of software is not considered here.<br>See also: response time, worst case execution time, worst case response time. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.81 Exit Point

| | |
|---|---|
| ***Definition*** | A point in a Software-Component (→ definition 3.209) where an execution entity of the SW-C ends. |

| | |
|---|---|
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Return point. |
| ***Reference*** | -- |

## 3.82 Fail-degraded

| | |
|---|---|
| ***Definition*** | Property of a system or functional unit.<br>Describes the ability of a system to continue with intended degraded operation at its output interfaces despite the presence of hardware or software faults. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | -- |
| ***Comment*** | 1. Safety means are not regarded as a part of the normal functionality respectively operation.<br>2. Also known as: Fail-reduced, Fail-soft |
| ***Example*** | “Limp home” functionality for ECU (reduce torque to assure an arrival at home or service station) |
| ***Reference*** | -- |

## 3.83 Fail-operational

| | |
|---|---|
| ***Definition*** | Property of a system or functional unit.<br>Describes the ability of a system or functional unit to continue normal operation at its output interfaces despite the presence of hardware or software faults. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | -- |
| ***Comment*** | 1. Typically, a fail-operational system or functional unit has no safe state.<br>2. Safety means are not regarded as a part of the normal functionality respectively operation. |
| ***Example*** | Braking system |
| ***Reference*** | -- |

## 3.84 Fail-safe

| | |
|---|---|
| ***Definition*** | Property of a system or functional unit.<br>In case of a fault the system or functional unit transits to a safe state. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.85 Fail-silent

| | |
|---|---|
| ***Definition*** | Property of a system or functional unit.<br>In case of a fault the output interfaces are disabled in a way that no further outputs are made. |

| | |
|---|---|
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | Fail-silent is a special case of the fail-safe property. |
| ***Comment*** | -- |
| ***Example*** | The fail-silent property can be used to avoid that “babbling idiots” disturb the overall communication. |
| ***Reference*** | -- |

## 3.86 Failure

| | |
|---|---|
| ***Definition*** | Termination of the ability of an element or an item to perform a function as required. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | Termination is a reduction in, or loss of, ability of an element or an item to perform a function as required.<br>There is a difference between “to perform a function as required” (stronger definition, use-oriented) and ”to perform a function as specified”, so a failure can result from an incorrect specification. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO DIS 26262, Part 1] |

## 3.87 Failure Rate

| | |
|---|---|
| ***Definition*** | Frequency of occurrence of an error measured within a specific period. It is usually expressed in [1e9 * $h^{-1}$] = [FIT], which means how many faults happen within 1.000.000.000 hours. Error rates can be determined by physical/mathematical models and by tracking of failures of already produced units. |
| ***Initiator*** | WP Functional Safety and Processes |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.88 Fault

| | |
|---|---|
| ***Definition*** | Abnormal condition that can cause an element or an item to fail. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | In the context of AUTOSAR an element is e.g. a BSWM, a SW-C or the CPU. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO DIS 26262, Part 1] |

## 3.89 Fault Detection

| | |
|---|---|
| ***Definition*** | The action of monitoring errors and setting fault states to specific values is called fault detection. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further*** | The different states are called “not detected”/ “present”/ ”intermittent or |

| | |
|---|---|
| ***Explanations*** | maturing"/…<br>The names of the fault states are following the ISO/SAE norms; however there is a coordination step in between the states of the DTCs (Diagnostic Trouble Code → see definition in ISO 15765/ ISO14229) and the states of the faults.<br>The SW-C's Fault Detection is executed decentralized, e.g. each SW-C sets the state of a fault according to the defined fault qualification (SW-C Template). Therefore the Fault Detection is implemented in the SW-C (SW-C could be either Application SW Component or Basic SW Component). There are exceptions; these will be pointed out individually for each fault. The SW-C's developer will define the conditions (=fault qualification), when these conditions are fulfilled the SW-C notifies a fault to the Diagnostic Memory Management. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO 15765], [ISO14229]<br>[AUTOSAR Specification of Virtual Functional Bus] |

## 3.90 Fault Reaction

| | |
|---|---|
| ***Definition*** | In case of a Failure of a SW-C there is a specific action to be carried out. This action is called "Fault Reaction". |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Fault Reactions can be implemented decentralized in the SW-C. There might also be the need of coordinating the fault reactions since there are reactions excluding each other. This will be done by a central fault reaction manager. |
| ***Reference*** | -- |

## 3.91 Fault Tolerance

| | |
|---|---|
| ***Definition*** | Property of a system or functional unit.<br>In case of n faults the system or functional unit continues with full functionality (n>0). |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.92 Feature

| | |
|---|---|
| ***Definition*** | The term feature is commonly used in the software tool community to describe characteristics (functionality) of the software. |
| ***Initiator*** | WP Authoring Tools |
| ***Further Explanations*** | In AUTOSAR a feature is represented by one or many metaclasses and their attributes in the AUTOSAR meta-model. Features are used to implement use cases such that a single use case requires one or more features for implementation. |
| ***Comment*** | -- |
| ***Example*** | Automatic windshield wiper |
| ***Reference*** | [EAST-Glossary] |

## 3.93 First party

| | |
|---|---|
| ***Definition*** | An organization that provides automotive products, which are subject to AUTOSAR conformance testing. |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.94 Flag

| | |
|---|---|
| ***Definition*** | A piece of data that can take on one of two values indicating whether a logical condition is true or false. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Notification flag |
| ***Reference*** | -- |

## 3.95 FlexRay Base Cycle

| | |
|---|---|
| ***Definition*** | One operand of the equation used to calculate the Cycle Numbers (→ definition 3.101) of the FlexRay Cells (→ definition 3.97) being used for periodic transmission of FlexRay Frames (→ definition 3.104) in a given FlexRay Slot (→ definition 3.113).<br>Equation:<br>**Cycle Number = $(B + n * 2^R)_{mod64}$**<br>Where:<br>• Base Cycle **B** = 0 … 63<br>• Cycle Repetition **$2^R$** = $2^0$ … $2^6$ = 1, 2, 4, 8, … 64<br>• Variable **n** = 0 … 64<br>• **$B < 2^R$**<br>(See also graphic in FlexRay L-SDU-Identifier → definition 3.108) |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | Synonym: “Cycle Offset”, “Cycle Counter Offset” |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.96 FlexRay Bus

| | |
|---|---|
| ***Definition*** | A communication system **topology** in which Nodes (→ definition 3.111) are directly connected to a single, common communication media (as opposed to connection through Stars (→ definition 3.116), gateways, etc.). The term “bus” is also used to refer to **the media itself**. |

| | |
|---|---|
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | The term “FlexRay Bus” is not to be confused with the term “FlexRay Cluster” (→ definition 3.99) or “FlexRay Network” (→ definition 3.110). |
| ***Comment*** | Synonym: “FlexRay Communication Bus” |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.97 FlexRay Cell

| | |
|---|---|
| ***Definition*** | One element in a FlexRay Matrix (→ definition 3.109) unequivocally defined by a combination of exactly one FlexRay Slot (or FlexRay Slot Number) (→ definition 3.113) and exactly one FlexRay Cycle (or FlexRay Cycle Number) (→ definition 3.100). In other words: a FlexRay Cell is defined by the tuple <Slot Number, Cycle Number>.<br>Each FlexRay Cell represents one (possible) transmission time interval for at most one FlexRay Frame (→ definition 3.104). If a FlexRay Network (→ definition 3.110) consists of two Channels (→ definition 3.98), there is one FlexRay Matrix per Channel , so there are also two FlexRay Cells defined by the same tuple <Slot Number, Cycle Number>, one for “Channel A” and one for “Channel B”. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | In order to achieve periodic transmission of FlexRay Frames in a given FlexRay Slot, the Cycle Numbers of the FlexRay Cells being used for transmission have to fulfill the following equation:<br>Equation:<br>$\textbf{Cycle Number} = (B + n * 2^R)_{mod64}$<br>Where:<br>• Base Cycle **B** = 0 … 63<br>• Cycle Repetition $2^R = 2^0 \ldots 2^6 = 1, 2, 4, 8, \ldots 64$<br>• Variable **n** = 0 … 64<br>• $B < 2^R$ |
| ***Comment*** | Synonym: “FlexRay Matrix Cell” |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.98 FlexRay Channel

| | |
|---|---|
| ***Definition*** | The inter-Node (→ definition 3.111) connection through which signals are conveyed for the purpose of communication. The communication channel abstracts both the network topology, i.e., Bus (→ definition 3.96) or Star (→ definition 3.116), as well as the physical transmission medium, i.e. electrical or optical. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | According to the FlexRay Protocol Specification, the two possible Channels of a FlexRay Network (→ definition 3.110) are named “Channel A” and “Channel B”. |
| ***Comment*** | Synonym: “FlexRay Communication Channel” |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.99 FlexRay Cluster

| | |
|---|---|
| ***Definition*** | A communication system of multiple Nodes (→ definition 3.111) connected directly (Bus topology) or by Star Couplers (Star topology) (→ definition 3.116) via a |

| | |
|---|---|
| | Communication Network consisting of at least one Communication Channel. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | The term “FlexRay Cluster” is not to be confused with the term “FlexRay Bus” (→ definition 3.96) which describes a communication system topology.<br>A FlexRay Cluster consists of a FlexRay Network (→ definition 3.110) and several FlexRay Nodes. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.100 FlexRay Cycle

| | |
|---|---|
| ***Definition*** | One complete instance of the communication structure that is periodically repeated to comprise the media access method of the FlexRay system. The Communication Cycle consists of a Static Segment, an optional Dynamic Segment, an optional Symbol Window, and a Network Idle Time.<br>The FlexRay Cycles are unequivocally numbered by the FlexRay Cycle Number (→ definition 3.101) ranging from 0 to 63.<br>Even if a FlexRay Network (→ definition 3.110) consists of two Channels, the FlexRay Cycle is always a common quantity of both Channels, irrespective of the data transmission schedule possibly being different for the two Channels. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | Synonym: “FlexRay Communication Cycle” |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.101 FlexRay Cycle Number

| | |
|---|---|
| ***Definition*** | An unequivocal number of a FlexRay Cycle (→ definition 3.100), ranging from 0 to 63. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | Synonym: “FlexRay Communication Cycle Number” |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.102 FlexRay Cycle Offset

| | |
|---|---|
| ***Definition*** | See definition of Base Cycle (→ definition 3.95). |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | This term is mentioned here to simplify finding it via this document’s table of contents.<br><br>Synonym: “Cycle Counter Offset”, “Base Cycle” |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.103 FlexRay Cycle Repetition

| | |
|---|---|
| ***Definition*** | One operand of the equation used to calculate the Cycle Numbers (→ definition 3.101) of the FlexRay Cells (→ definition 3.97) being used for periodic transmission of FlexRay Frames (→ definition 3.104) in a given FlexRay Slot (→ definition 3.113).<br>Equation:<br>**Cycle Number = $(B + n * 2^R)_{mod64}$**<br>Where:<br>• Base Cycle **B** = 0 … 63<br>• Cycle Repetition **$2^R$** = $2^0$ … $2^6$ = 1, 2, 4, 8, … 64<br>• Variable **n** = 0 … 64<br>• **$B < 2^R$**<br>(See also graphic in FlexRay L-SDU-Identifier → definition 3.108) |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | Synonym: “Cycle Counter Repetition” |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.104 FlexRay Frame

| | |
|---|---|
| ***Definition*** | A structure used by the communication system to exchange information within the system. A FlexRay Frame consists of a header segment, a payload segment and a trailer segment. The payload segment is used to convey application data. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | A FlexRay Frame is a “data package” that may be transmitted within a FlexRay Cell (→ definition 3.97). |
| ***Comment*** | Synonym: “FlexRay L-PDU” |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.105 FlexRay Global Time

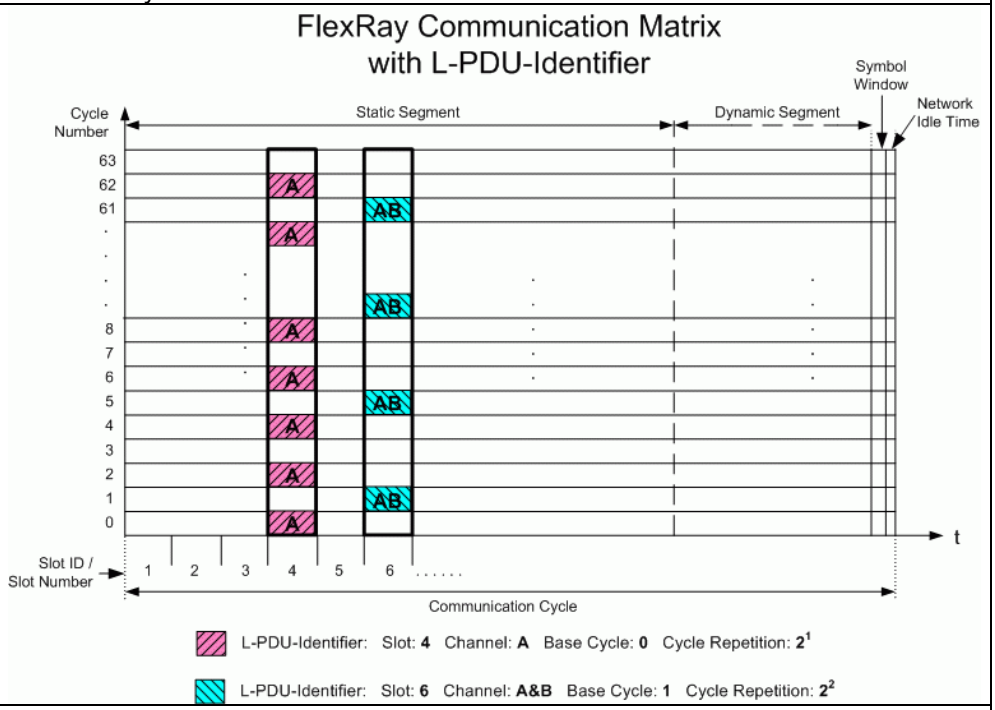
| | |
|---|---|
| ***Definition*** | A tuple consisting of one specific value of the FlexRay Cycle Counter and one specific value of the FlexRay Cycle Time in Macroticks. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.106 FlexRay L-PDU

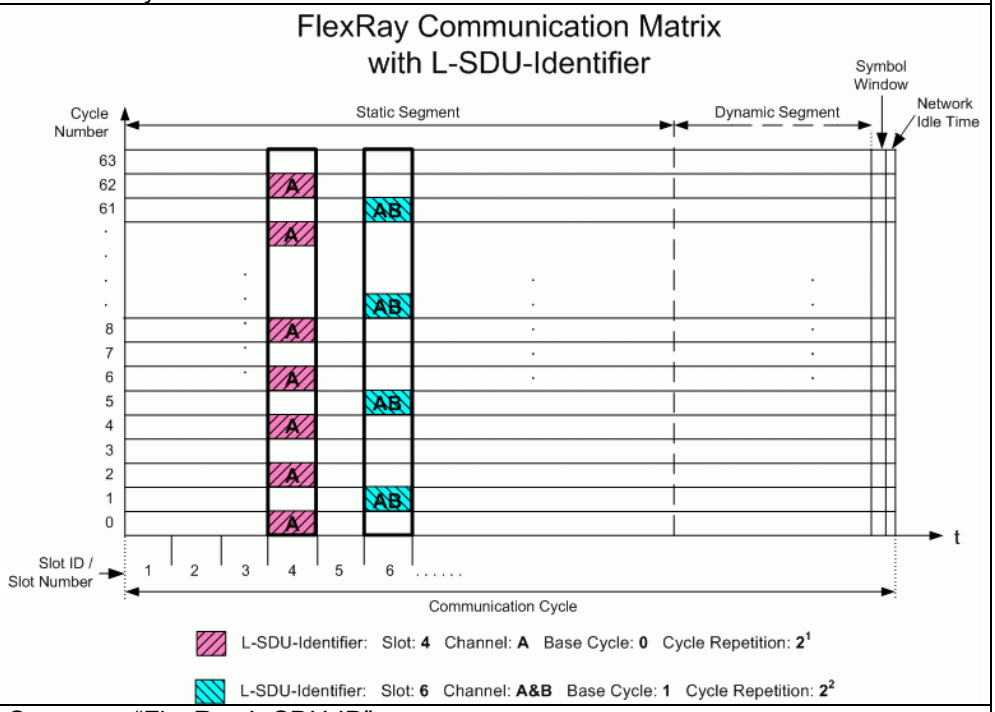
| | |
|---|---|
| ***Definition*** | See definition of FlexRay Frame (→ definition 3.104). |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | This term is mentioned here to simplify finding it via this document’s table of |

| | |
|---|---|
| | contents. |
| ***Example*** | -- |
| ***Reference*** | Synonym: “FlexRay Frame” |

## 3.107 FlexRay L-PDU-Identifier

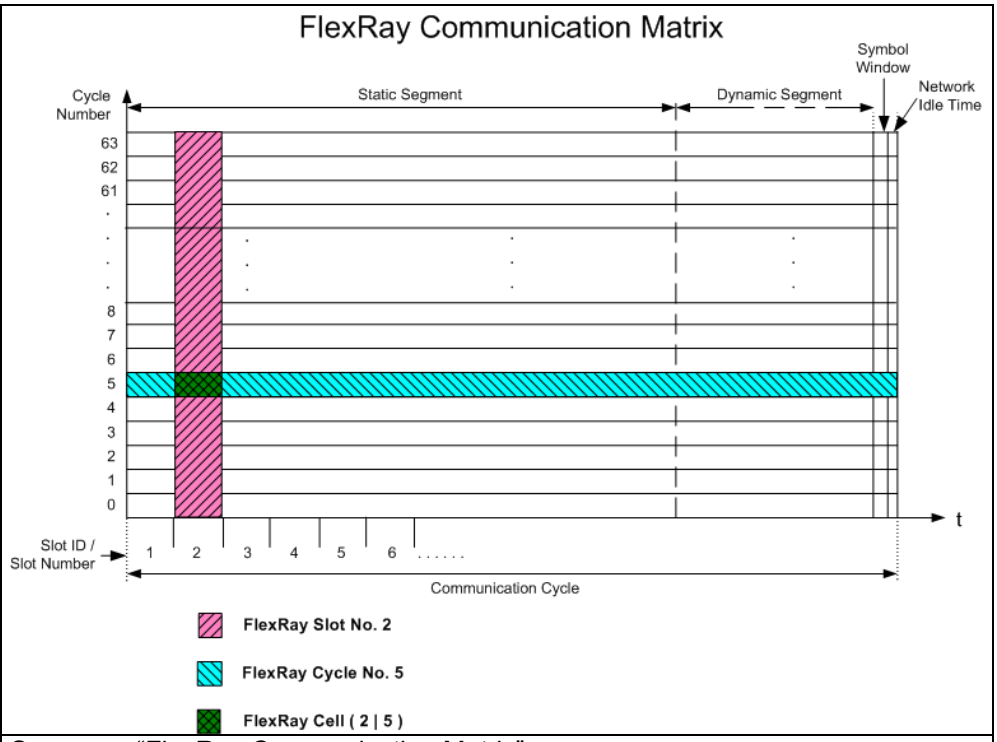
| | |
|---|---|
| ***Definition*** | A unequivocal identifier of a set of FlexRay Cells (→ definition 3.97) used for periodic transmission of FlexRay Frames (→ definition 3.104) over one or both FlexRay Channels (→ definition 3.98) in a specific FlexRay Slot (→ definition 3.113), which fulfill the equation:<br>**Cycle Number = $(B + n * 2^R)_{mod64}$**<br>with **exactly one tuple** of values for **B** and $2^R$.<br>(See also graphics below.)<br>In other words: a FlexRay L-PDU-ID comprises the 4 parameters:<br>• Slot Number = 1 … MaxSlotNumber (≤ 2047)<br>• Base Cycle **B** = 0 … 63<br>• Cycle Repetition $2^R = 2^0 … 2^6$ = 1, 2, 4, 8, … 64<br>• Channel = “A”, “B”, “A and B”<br>In order to prevent collisions of FlexRay Frames on the Bus (→ definition 3.96), the FlexRay Cells of different FlexRay L-PDU-Identifiers used for transmission shall be disjunctive. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** |  |
| ***Comment*** | Usually, on one specific FlexRay Node (→ definition 3.111), **one** FlexRay L-PDU-Identifier has **one** configuration of a FlexRay Communication Controller buffer assigned to it.<br><br>Synonym: “FlexRay L-PDU-ID” |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.108 FlexRay L-SDU-Identifier

| | |
|---|---|
| ***Definition*** | A unequivocal identifier of the **payload** contained in one or multiple FlexRay Frames (→ definition 3.104) assigned to the same FlexRay L-PDU-Identifier (→ definition 3.107) and therefore periodically transmitted over one or both FlexRay Channels (→ definition 3.98) in one or multiple FlexRay Cells (→ definition 3.97) in a specific FlexRay Slot (→ definition 3.113), and where the equation:<br>**Cycle Number = $(B + n * 2^R)_{mod64}$**<br>is fulfilled with **exactly one tuple** of values for **B** and $2^R$.<br>(See also graphics below.) |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** |  |
| ***Comment*** | Synonym: “FlexRay L-SDU-ID” |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.109 FlexRay Matrix

| | |
|---|---|
| ***Definition*** | A two-dimensional array with a width of the number of FlexRay Slots (→ definition 3.113) within one FlexRay Cycle (→ definition 3.100) and a height of 64 FlexRay Cycles, numbered 0 … 63. (See also graphics below.)<br>This array is being used to describe the (possible) transmission time intervals on a FlexRay Channel (→ definition 3.98).<br>If a FlexRay Network (→ definition 3.110) consists of two Channels, there is one FlexRay Matrix per Channel (resulting in a total of two Matrixes), since the data transmission schedule may be different for the two FlexRay Channels. |
| ***Initiator*** | WP FlexRay |

| | |
|---|---|
| ***Further Explanations*** |  |
| ***Comment*** | Synonym: “FlexRay Communication Matrix” |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.110 FlexRay Network

| | |
|---|---|
| ***Definition*** | The combination of the (up to two) FlexRay Communication Channels that connect the FlexRay Nodes (→ definition 3.111) of a FlexRay Cluster (→ definition 3.99). |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | The term “FlexRay Network” is not to be confused with the term “FlexRay Cluster” or “FlexRay Bus” (→ definition 3.96). |
| ***Comment*** | Synonym: “FlexRay Communication Network” |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.111 FlexRay Node

| | |
|---|---|
| ***Definition*** | A logical entity connected to the FlexRay Network (→ definition 3.110) that is capable of sending and/or receiving frames. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.112 FlexRay Physical Communication Link

| | |
|---|---|
| ***Definition*** | An inter-Node (→ definition 3.111) connection through which signals are conveyed for the purpose of communication. All Nodes connected to a given Physical Communication Link share the same electrical or optical signals (i.e., they are not |

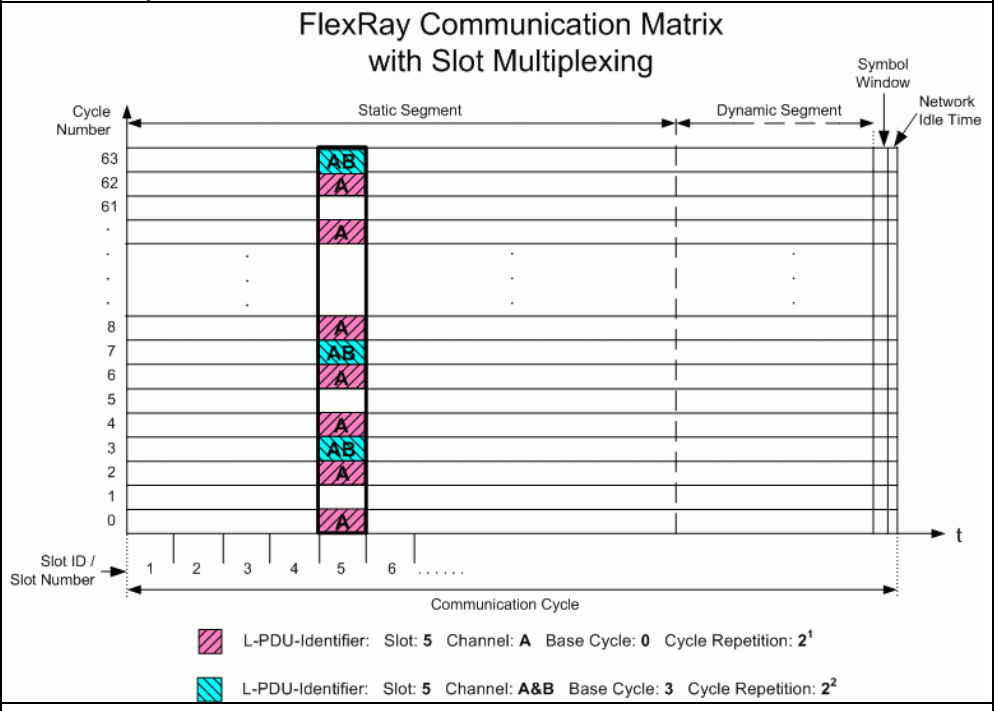
| | |
|---|---|
| | connected through repeaters, Stars (→ definition 3.116), gateways, etc.). Examples of a Physical Communication Link include a Bus (→ definition 3.96) Network or a point-to-point connection between a Node and a Star. A Communication Channel may be constructed by combining one or more Physical Communication Links together using Stars. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.113 FlexRay Slot

| | |
|---|---|
| ***Definition*** | An interval of time during which access to a Communication Channel is granted exclusively (at least in the static segment) to a specific Node (→ definition 3.111) for the transmission of a Frame (→ definition 3.104) with a frame ID corresponding to the Slot Number (→ definition 3.115) of that Slot. FlexRay distinguishes between Static Communication Slots and Dynamic Communication Slots.<br>The FlexRay Slots are unequivocally numbered by the FlexRay Slot Number ranging from 1 to a configurable maximum number ≤ 2047.<br>If a FlexRay Network (→ definition 3.110) consists of two Channels (→ definition 3.98), the Static Slots of "Channel A" and the Static Slots of "Channel B" occur concurrently, since all Static FlexRay Slots have the same length irrespective of the data transmission schedule. However, the Dynamic Slots of "Channel A" are independent from the Dynamic Slots of "Channel B", since the data transmission schedule may be different for the two FlexRay Channels. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | In the dynamic segment, Slot Multiplexing between multiple Nodes is allowed.<br>In the static segment each Slot (→ definition 3.113) on a Channel is owned by exactly one Node (i.e., Slot Multiplexing is **not** allowed in the static segment).<br>Slot Multiplexing (i.e., different FlexRay Nodes owning a Slot in different Cycles (→ definition3.100) for data transmission) is allowed in the dynamic segment, and it is up to the application to ensure that in any given Cycle no two Nodes transmit in the same Slot on the same Channel. |
| ***Comment*** | Synonym: "FlexRay Communication Slot" |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.114 FlexRay Slot Multiplexing

| | |
|---|---|
| ***Definition*** | A method used to fill a FlexRay Slot (→ definition 3.113) on a Channel (→ definition 3.98) more efficiently by alternating the Frames being sent in this Slot from Cycle (→ definition 3.100) to Cycle. In order to achieve periodic transmission of FlexRay Frames (→ definition 3.104) in a given FlexRay Slot, the Cycle Numbers (→ definition 3.101) of the FlexRay Cells (→ definition 3.97) being used for transmission have to fulfill the equation:<br>**Cycle Number = $(B + n * 2^R)_{mod64}$**<br>Where:<br>• Base Cycle **B** = 0 … 63<br>• Cycle Repetition **$2^R$** = $2^0$ … $2^6$ = 1, 2, 4, 8, … 64<br>• Variable **n** = 0 … 64<br>• **$B < 2^R$**<br>In the static segment, each Slot on a Channel is owned by exactly one Node (→ |

| | |
|---|---|
| | definition 3.111). Therefore, in the static segment Slot Multiplexing is only allowed amongst semantically different Frames sent by the same Node, but **not** amongst different Nodes of a FlexRay Cluster (→ definition 3.99). Thus, this form of Multiplexing is called "**Single Sender Slot Multiplexing**".<br>In the dynamic segment, Slot Multiplexing is also allowed amongst different Nodes of a FlexRay Cluster, i.e. different Nodes may send in the same dynamic Slot on the same Channel in different Cycles, hence with different FlexRay L-PDU-Identifier (→ definition 3.107) defining disjunctive FlexRay Cells. Thus, this form of Multiplexing is called "**Multiple Sender Slot Multiplexing**".<br>In any case, it is up to the software to prevent concurrent sending attempts (of different Nodes or applications) in the same Cell.<br>(See also graphics below.) |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** |  |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.115 FlexRay Slot Number

| | |
|---|---|
| ***Definition*** | An unequivocal number of a FlexRay Slot (→ definition 3.113), ranging from 1 to a configurable maximum number ≤ 2047. |
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | Synonym: “FlexRay Slot Identifier”, “FlexRay Slot ID” |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.116 FlexRay Star

| | |
|---|---|
| ***Definition*** | A device that allows information to be transferred from one Physical Communication Link (→ definition 3.112) to one or more other Physical Communication Links. A star duplicates information present on one of its links to the other links connected to the star. A star can be either passive or active. |

| | |
|---|---|
| ***Initiator*** | WP FlexRay |
| ***Further Explanations*** | -- |
| ***Comment*** | Synonym: “Star”, “Star Couplers” |
| ***Example*** | -- |
| ***Reference*** | [FR_PROTOCOL] |

## 3.117 Frame

| | |
|---|---|
| ***Definition*** | Data unit according to the data link protocol specifying the arrangement and meaning of bits or bit fields in the sequence of transfer across the transfer medium . |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | A CAN frame consists of up to 8 bytes of payload data and additional protocol specific bits / bit fields (e.g. CAN-Identifier). |
| ***Reference*** | [ISO OSEK, Glossary] |

## 3.118 Frame PDU

| | |
|---|---|
| ***Definition*** | A PDU that fits into 1 frame instance.<br>e.g. it does not need to be fragmented across more than 1 frame for transmission over a network. |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.119 Function

| | |
|---|---|
| ***Definition*** | 1. A task, action or activity that must be accomplished to achieve a desired outcome.<br>2. A part of programming code that is invoked by other parts of the program to fulfill a desired purpose.<br>3. In mathematics, a function is an association between two sets of values in which each element of one set has one assigned element in the other set so that any element selected becomes the independent variable and its associated element is the dependent variable. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | Due to the different meanings in texts using the term application the appropriate meaning should be explained in detail or referenced. |
| ***Example*** | 2. C-Code Function<br>3. Y=f(x) |
| ***Reference*** | [IEEE12331], [EAST-Glossary] |

## 3.120 Functional Network

| | |
|---|---|
| ***Definition*** | A logical structure of interconnections between defined functional parts of features (→ definition 3.92). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.121 Functional Unit

| | |
|---|---|
| ***Definition*** | An entity of software or hardware, or both, capable of accomplishing a specified purpose. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | ECU, Software Component, ... |
| ***Reference*** | [ISO 2382-1] |

## 3.122 Functionality

| | |
|---|---|
| ***Definition*** | Functionality comprises User-visible and User-non-visible functional aspects of a system. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | EAST glossary not applicable, due to use of function. |
| ***Example*** | Functionality of a communication system is a user-non-visible aspect. |
| ***Reference*** | -- |

## 3.123 Gateway

| | |
|---|---|
| ***Definition*** | A gateway is functionality within an ECU that performs a frame or signal mapping function between two communication systems. Communication system in this context means e.g. a CAN system or one channel of a FlexRay system. |
| ***Initiator*** | WP System Constraint Template |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | Gateway ECU 0 |

## 3.124 Gateway ECU

| | |
|---|---|
| ***Definition*** | A gateway ECU is an ECU (→ definition 3.73) that is connected to two or more communication channels, and performs gateway functionality. |
| ***Initiator*** | WP System Constraint Template |
| ***Further Explanations*** | -- |

| | |
|---|---|
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | Gateway 3.123 |

## 3.125 Hardware Connection

| | |
|---|---|
| ***Definition*** | HW Connections are used to describe the connection of HW elements (→ definition 3.126) among each other. It defines/characterizes the interrelationship among HW Elements (for abstract modelling). The HW Ports (→ definition 3.128) of the HW Elements serve as connection points for this purpose. |
| ***Initiator*** | WP ECU Resource Template |
| ***Further Explanations*** | In AUTOSAR are 2 kinds of HW Connections defined:<br>Assembly HW Connection<br>Delegation HW Connection |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specfication of ECU Resource Template] |

## 3.126 Hardware Element

| | |
|---|---|
| ***Definition*** | The HW Element is the main describing element of an ECU (→ definition 3.73). It provides HW ports (→ definition 3.128) for being interconnected among each others. A generic HW Element specifies definitions valid for all specific HW Elements. |
| ***Initiator*** | WP ECU Resource Template |
| ***Further Explanations*** | A HW Element is the piece or a part of the piece to be described with the ECU Resource Template. It uses other elements as primitive: This means HW elements can be nested (trough HW Containers, a hierarchical structur of HW Elements). At the lowest level a HW Element only uses promitives |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of ECU Resource Template] |

## 3.127 Hardware Interrupt

| | |
|---|---|
| ***Definition*** | Interrupt triggered by HW event |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | 2 sorts of HW events<br>• Processor-intern: events as for example division by zero, arithmetical overflow, non-implemented instruction<br>• Processor-extern: events as for example response of peripheral device (e.g. PWM), memory error, timer |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | Translation/Adaptation from [VDI Lexikon] |

## 3.128 Hardware Port

| | |
|---|---|
| ***Definition*** | The HW port exposes functionality to the exterior of the HW element (→ definition 3.126). HW elements can be connected via HW Connections (→ definition 3.125). It defines a connection Endpoint for the HW Element. |
| ***Initiator*** | WG System Team |

| | |
|---|---|
| ***Further Explanations*** | HW elements provide HW ports for being interconnected among each others. Each HW port has a name which is unique within the HW element it is located in. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of ECU Resource Template] |

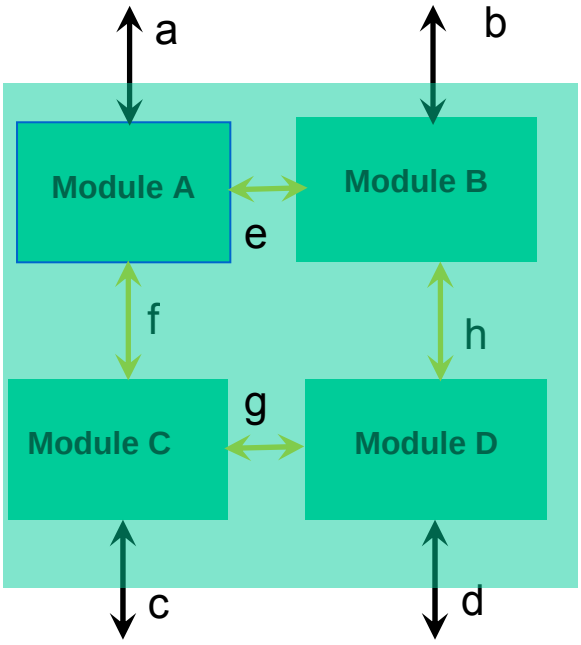
## 3.129 I-PDU

| | |
|---|---|
| ***Definition*** | Interaction Layer Protocol Data Unit<br>Collection of messages for transfer between nodes in a network. At the sending node the Interaction Layer (*IL*) is responsible for packing messages into an I-PDU and then sending it to the Data Link Layer (*DLL)* for transmission. At the receiving node the DLL passes each I-PDU to the IL which then unpacks the messages sending their contents to the application. |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | OSEK COM specifies an Interaction Layer and works on I-PDUs |
| ***Reference*** | [ISO OSEK, Glossary] |

## 3.130 ICC1 (Implementation Conformance Class 1)

| | |
|---|---|
| ***Definition*** | An ICC1 cluster offers a software-component interface (SW-CI) (→ definition 3.210) and/ or an AUTOSAR network interface (NWI) (→ definition 3.158).<br>The SW-CI and NWI of an ICC1 cluster provide the functional behavior as specified in the AUTOSAR specifications on ICC3 level. |
| ***Initiator*** | WP Conformance Test Specification |
| ***Further Explanations*** | In an ICC1 cluster the basic software is regarded as a black box. It allows legacy platforms to migrate to AUTOSAR:<br>- to be integrated into an AUTOSAR network<br>- to support SW-Cs (→ definition 3.209).<br><br>The features of an ICC1 cluster can be a subset of the ICC3 features (e.g. FlexRay not used). This has to be indicated in the Implementation Conformance Statement (ICS) (→ definition 3.133).<br>The functionality represented in AUTOSAR by the RTE must be a part of any ICC1 cluster that provides an SW-CI.<br><br>Typically an ICC1 cluster<br>- is not structured into Basic Software (BSW) modules (ICC3) or BSW module clusters (ICC2)<br>- has a proprietary internal structure and might consist of legacy/proprietary or highly optimized code.<br><br>An ICC1 cluster shall provide an interface to the boot loader.<br><br>ICC1 shall support SW-C compatible configuration for SW-CI and AUTOSAR Network compatible Configuration for NWI. |
| ***Comment*** | Up to Release 4.0 the boot loader architecture is not standardized in AUTOSAR. Therefore the term ICC1 is not applicable to the boot loader architecture itself. |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.131 ICC2 (Implementation Conformance Class 2)

| | |
|---|---|
| ***Definition*** | ICC2 clusters logically related ICC3 Basic Software (BSW) modules (2… N modules).<br>The number of Cluster Features in an ICC2 cluster is a subset of the union of the number of features of the clustered ICC3 modules. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | Each ICC2 cluster presents a subset of the clustered ICC3 module's interfaces. ICC2 cluster provides the functional behavior as specified in the AUTOSAR specifications on ICC3 level.<br><br>ICC2 cluster have a proprietary internal structure and might consist of proprietary or highly optimized code.<br><br>ICC2 shall support AUTOSAR ECU Configuration description as an input for the Cluster Configuration<br>It shall be possible to combine ICC2 Clusters and ICC3 Modules in a BSW Architecture.<br><br>Application interface Conformance (above RTE, software-component interface, SW-CI (→ definition 3.210)) and Bus Conformance (AUTOSAR network interface, NWI (→ definition 3.158)) must be testable for a BSW which contain one or more ICC2 clusters. |
| ***Comment*** | -- |
| ***Example*** | Example of a ICC2 Cluster<br>ICC2 Cluster Y ⊆ ( ICC3 Module A **U** ICC3 Module B **U** ICC3 Module C **U** ICC3 Module D )<br>  <br>  <br>External Interfaces relevant for ICC2 clustering, subset of ICC3 interfaces to other BSW modules or clusters.<br>  <br>Internal Interfaces not relevant for ICC2 clustering (can be proprietary). |
| ***Reference*** | -- |

## 3.132 ICC3 (Implementation Conformance Class 3)

| | |
|---|---|
| ***Definition*** | For ICC3 the AUTOSAR BSW consists of BSW modules as defined in the Basic Software Module List, including the RTE.<br>ICC3 is the highest level of granularity. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | All Basic Software modules as defined in the BSW module list including the RTE, must comply with the defined interfaces and functionality as specified in their respective Software specification document (SWS). |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.133 Implementation Conformance Statement

| | |
|---|---|
| ***Definition*** | Implementation Conformance Statement (ICS) describes the actual implementation of a BSW module or a BSW cluster in terms of<br>(1) the actually supported values or value ranges of parameters that enable the configuration of the functionality of a module/cluster implementation and<br>(2) the signatures of the operations actually provided and required at the interface of a module/cluster implementation |
| ***Initiator*** | WP Conformance Test Specification |
| ***Further Explanations*** | (1) An SWS of a module/cluster specifies the configurable functionality and configurable operations of all SWS-conformant module/cluster implementations (BSW implementations). The ICS restricts the generally configurable functionality and operations according to what a concrete module/cluster actually implements according to the specification (SWS).<br>(2) The ICS is used to derive values of configuration parameters (CP) valid for the given implementation of a module/cluster and, e.g., to select and parameterize conformance test suites.<br>(3) A BSW implementation can consist of variable parts, i.e., operations and functionality. A BSW implementation can be adjusted with CPs within a certain range of permitted parameter values. An ICS describes which parts a BSW implementation actually supports and to what extend.<br>(4) For any given CP :<br>a. The absolute range is limited by the type of the CP.<br>b. The permitted range is limited by the SWS.<br>c. The actual range is limited by the implementation of the BSW module or BSW cluster.<br>A test suite or the integration of the BSW module or BSW cluster into a target platform limits the actual range to a single value. |
| ***Comment*** | An ICS is a view on a BSW Module Description (BSWMD). An ICS can be extracted from a BSWMD. |
| ***Example*** | (1) An ICS describes which operations a BSW module/cluster actually provides<br>(2) The number of entries for the standard job queue of the NVRAM Manager (NvM) is defined with CP NVM_SIZE_STANDARD_JOB_QUEUE.<br>a. The type of the CP is unit8. Thus the absolute range is 0..255.<br>b. The SWS limits the permitted range to 1..255.<br>c. A specific NvM implementation states to support the full range of permitted values 1..255.<br>Tests run the specific NvM implementation with job queues of 1, 8 and 173 entries. During integration the number of queue entries is limited to 64 entries because of known application-specific usage constraints. |
| ***Reference*** | The definition is partially based on ITU-T Recommendation X.296 [1] |

## 3.134 Indication

| | |
|---|---|
| ***Definition*** | Service primitive defined in the ISO/OSI Reference Model (ISO 7498). With the service primitive 'indication' a service provider informs a service user about the occurrence of either an internal event or a service request issued by another service user. [OSEK BD] |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | An indication is e.g. a specific notification generated by the OSEK underlying layer to inform about a Message Reception Error. |
| ***Comment*** | -- |
| ***Example*** | OSEK Com notification class 1 and 3. |
| ***Reference*** | [OSEK BD], [OSEK Com] |

## 3.135 Integration

| | |
|---|---|
| ***Definition*** | The progressive assembling of system components into the whole system. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO 2382-20] |

## 3.136 Integration Code

| | |
|---|---|
| ***Definition*** | Code that the Integrator needs to add to an AUTOSAR System, to adapt non-standardized functionalities. Examples are Callouts of the ECU State Manager and Callbacks of various other BSW Modules. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.137 Interface

| | |
|---|---|
| ***Definition*** | A shared boundary between two functional units (→ definition 3.121) defined by various characteristics pertaining to the functions, physical interconnections, signal exchanges, and other characteristics, as appropriate. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | In AUTOSAR the interface has specific meanings:<br>See Standardized AUTOSAR Interface (→ definition 3.217) and Standardized Interface (→ definition 3.218). |
| ***Comment*** | -- |
| ***Example*** | Diagnosis Service |
| ***Reference*** | [ISO 2382-1] |

## 3.138 Interrupt

| | |
|---|---|
| ***Definition*** | Event that enforces the processor to change its state. This interruption causes the normal sequence of instructions to be stopped. Once an interrupt occurred, the |

| | |
|---|---|
| | running software entity is suspended and an interrupt service routine (→ definition 0) (the one dedicated to this interrupt) is called. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | Two sorts of interrupts exists: HW and SW interrupts (→ definition 3.127 and definition 3.212) |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | Translation/Adaptation from [VDI Lexikon] |

## 3.139 Interrupt Frames

| | |
|---|---|
| ***Definition*** | An interrupt frame is the code which handles the entering/leaving of (C written) interrupt service routines. This code is microcontroller specific and often written in assembly language. Interrupt frames are typically generated by the OS generation tool. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR_InterruptHandling_Explanation.doc] |

## 3.140 Interrupt Handler

| | |
|---|---|
| ***Definition*** | In the case of a Category 2 interrupt, the ISR is synonymous with Interrupt Handler. In the case of Category 1 interrupt the Interrupt Handler is the function called by the hardware interrupt vector. In both cases the Interrupt handler is the user code that is normally a part of the BSW module.<br>So the Interrupt Handler is a user level piece of code. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR_InterruptHandling_Explanation.doc] |

## 3.141 Interrupt Logic

| | |
|---|---|
| ***Definition*** | This is the MCU logic that controls all interrupts for all devices. This is normally controlled by the OS. |
| ***Initiator*** | WP Software Architecture and OS |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR_InterruptHandling_Explanation.doc] |

## 3.142 Interrupt Service Routine (ISR)

| | |
|---|---|
| ***Definition*** | A software routine called in case of an interrupt (→ definition 3.138) |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further*** | ISRs have normally higher priority than normal processes and can only be |

| | |
|---|---|
| ***Explanations*** | suspended by another ISR which presents a higher priority than the one running. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [VDI Lexikon] |

## 3.143 Interrupt Vector Table

| | |
|---|---|
| ***Definition*** | An interrupt vector table is a table of interrupt vectors that associates the interrupt service routines (→ definition 3.142) with the corresponding interrupt request (typically by an array of jumps or similar mechanisms). |
| ***Initiator*** | WP Implementation and Integration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.144 Invalid Flag

| | |
|---|---|
| ***Definition*** | For a signal in a PDU an optional invalid flag can be added to the PDU payload layout. This flag indicates the validity of other signals in the payload. In case the invalid flag of a signal is set to true in a PDU instance, the respective signal in the payload of the PDU instance does not contain a valid signal value. |
| ***Initiator*** | WP Gateway |
| ***Further Explanations*** | This mechanism may be used in gateways to indicate that parts of an PDU do not contain valid data. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.145 Invalid Value of Signal

| | |
|---|---|
| ***Definition*** | For a signal in a PDU an optional invalid value can be defined. |
| ***Initiator*** | WP Gateway |
| ***Further Explanations*** | The invalid value is element of the signal value range that can be represented and transported by the signal. The invalid value is the value that is used in all situations where the receiver should be notified that the value in a signal is not valid. |
| ***Comment*** | -- |
| ***Example*** | In case a PDU for a destination network of a gateway is composed from two PDUs of two different source networks, the failure to receive one PDU can be indicated as invalid values in the respective signals of the transmitted PDU in the destination network. |
| ***Reference*** | -- |

## 3.146 Link time configuration

| | |
|---|---|
| ***Definition*** | The configuration of the SW module is done during link time. |
| ***Initiator*** | WP ECU Configuration |
| ***Further Explanations*** | The object code of the SW modules receives parts of its configuration from another object code file or it is defined by linker options. |
| ***Comment*** | -- |

| | |
|---|---|
| ***Example*** | Initial value of a signal. |
| ***Reference*** | -- |

## 3.147 Mapping

| | |
|---|---|
| ***Definition*** | Mapping designates the distribution of elements in the logical view to elements in the physical view. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | In general several entities may be allocated to one container but an entity may be allocated to only one container. |
| ***Comment*** | -- |
| ***Example*** | a) Mapping of AUTOSAR Signals onto Frames (for inter-ECU communication).<br>b) Mapping of SW-C onto ECUs (Distribution of the SW-Components to the ECUs). |
| ***Reference*** | -- |

## 3.148 MCAL Signal

| | |
|---|---|
| ***Definition*** | The MCAL signal is the software representation of the conditioned signal (→ definition 3.51). It is provided by the microcontroller abstraction layer (MCAL) and is further processed by the ECU abstraction. |
| ***Initiator*** | WP ECU Resource Template |
| ***Further Explanations*** | The processing unit is accessing the Conditioned Signal through some peripheral device that typically digitises the Conditioned Signal into a software representation.<br>The transformation from the Conditioned Signal to the MCAL Signal has to take the digitalization error into account in order to provide information about the quality loss between the Technical Signal and the MCAL Signal. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.149 Meta Model

| | |
|---|---|
| ***Definition*** | A Model of a Model, in other words a Model on M2. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | The AUTOSAR Meta Model is an UML2.0 model that defines the language for describing AUTOSAR systems. It is a graphical representation of a template. UML2.0 class diagrams are used to describe the attributes and their interrelationships. Stereotypes and OCL (object constraint language) are used for defining specific semantics and constraints. |
| ***Reference*** | -- |

## 3.150 Metadata

| | |
|---|---|
| ***Definition*** | Metadata is data about data |
| ***Initiator*** | WP Authoring Tools |
| ***Further Explanations*** | Metadata includes pertinent information about data, including information about the authorship, versioning, access-rights, timestamps etc.. |

| | |
|---|---|
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.151 Microcontroller Abstraction Layer (MCAL)

| | |
|---|---|
| ***Definition*** | Software layer containing drivers to enable the access of onchip peripheral devices of a microcontroller and offchip memory mapped peripheral devices by a defined API (→ definition 3.4).<br>Task: make higher software layers independent of the microcontroller. |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | The Microcontroller Abstraction Layer is the lowest software layer of the Basic Software.<br>The Microcontroller Abstraction Layer consists of the following parts:<br>• I/O Drivers<br>• Communication Drivers<br>• Memory Drivers<br>• Microcontroller Drivers<br>Properties:<br>• Implementation: µC dependent<br>• Upper Interface (API): standardizable and µC independent |
| ***Comment*** | -- |
| ***Example*** | Examples of drivers located in the Microcontroller Abstraction Layer are:<br>• onchip eeprom driver<br>• onchip adc driver<br>• offchip flash driver |
| ***Reference*** | [AUTOSAR Software Architecture] |

## 3.152 Mistake

| | |
|---|---|
| ***Definition*** | Human error |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [DIN 40041] |

## 3.153 Mode

| | |
|---|---|
| ***Definition*** | A Mode is a certain set of states of the various state machines that are running in the vehicle that are relevant to a particular entity, e.g. a SW-C, a BSW module, an application or a whole vehicle.<br>In its lifetime, an entity changes between a set of mutually exclusive Modes. These changes are triggered by environmental data, e.g. signal reception, operation invocation. |
| ***Initiator*** | WP VFB and RTE |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.154 Model

| | |
|---|---|
| ***Definition*** | An M1 - Model, it is an instance of the Meta Model |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | An AUTOSAR Model is an instance of the AUTOSAR Meta Model (→ definition 3.149). The information contained in the AUTOSAR Model can be anything that is representable according to the AUTOSAR Meta Model. The AUTOSAR Model can be stored in many different ways: it might be a set of files in a file system, an XML stream, a database or memory used by some running software tools, etc. |
| ***Reference*** | -- |

## 3.155 Multimedia Stream

| | |
|---|---|
| ***Definition*** | A consistent sequence of digital data versus time which is suited as input for devices which transfer these data into a continuous visible or audible impression to humans. When transferred over a physical link, multimedia stream data typically are produced at the same rate (by the data source), as they are consumed (by the data sinks). |
| ***Initiator*** | -- |
| ***Further Explanations*** | A multimedia stream usually follows a certain standard (e.g. MPEG-x).<br>When transferred over a physical link, a multimedia stream needs a certain minimum bandwidth (in terms of bits/second) in order to allow continuous impressions.<br>A multimedia stream in a car typically exists for several seconds (a warning signal, a navigation hint) up to several hours (a video film, a phone call, playing a radio program). Resources (e.g. bus system channels) needed by the stream have to be allocated continuously over this lifetime (this is a difference to e.g. file transfer, which may be split into several chunks of data).<br>The source of a multimedia stream typically is a specialized device and/or software program (a tuner, a microphone, a text-to-speech engine, etc.). The same holds for the sinks (an audio amplifier or mixer, a voice recognition software, an MPEG decoder, etc.). |
| ***Comment*** | The term “visible or audible impression to humans” should not be taken too literally, because streams can also be used to transfer machine readable data (e.g. modem, encrypted signals). But it is this condition, which defines the standards and technology used in multimedia streams. |
| ***Example*** | Audio stream as output of or input to a telephone (mono, low bandwidth)<br>Audio stream as output of a radio tuner (stereo, high bandwidth)<br>Video stream as output of a television tuner<br>An example for the physical implementation on a multimedia bus is the Firewire isochronous stream. see reference |
| ***Reference*** | [IEEE 1394] |

## 3.156 Multiple Configuration Sets

| | |
|---|---|
| ***Definition*** | A SW module has more than one alternative configuration (parameter) set, which can be selected according to external requirements. The set can ONLY be selected during start-up and it is not allowed to switch the set during runtime. |
| ***Initiator*** | WP ECU Configuration |
| ***Further Explanations*** | Multiple configuration sets reside in the ECU non-volatile memory at the same time, the active configuration is selected at the start-up of the ECU. Only BSW modules can have multiple configuration sets |
| ***Comment*** | Multiple configuration is a kind of data variant coding |

| | |
|---|---|
| ***Example*** | The same ECU can be used for the left and the right window lifter, the actual pin setting determines which configuration set will be used. |
| ***Reference*** | -- |

## 3.157 Multiplexed PDU

| | |
|---|---|
| ***Definition*** | A multiplexed PDU is a PDU with a configurable number of different payload layouts. |
| ***Initiator*** | WP Gateway |
| ***Further Explanations*** | Each instance of a multiplexed PDU has a distinct layout. The set of possible layouts is statically defined. A selector signal defines which layout is used in a PDU instance. The selector signal must reside at the same position in all layouts. Each layout is identified by a unique selector value. The length of each instance of a multiplexed PDU is fixed. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.158 Network Interface (NWI)

| | |
|---|---|
| ***Definition*** | A Network Interface is the sum of all interfaces offered by the Basic Software (→ definition 3.28) towards its connected network. |
| ***Initiator*** | WP Conformance Test Specification |
| ***Further Explanations*** | The interface that the Basic Software shares via the communication lines with other systems that behave like AUTOSAR ECUs in order to<br>- allow distributed SW-Cs (→ definition 3.209) to exchange inter-ECU signals and to<br>- operate the communication lines (the network)<br>is called Network Interface.<br><br>A Network Interface (NWI) denotes the interface between the Basic Software and the physical network (OSI Layer 0) to which the ECU executing the Basic Software is connected to (e.g. CAN, LIN, FlexRay). The NWI therefore transports network data packets between the Basic Software and the physical network.<br><br>The interfaces included within the term NWI are:<br>- Logical interfaces, including<br>o Network Management<br>o Data Management<br>o Data transmission/reception<br>The interfaces excluded from the term NWI are:<br>- The physical network interface (CAN, FlexRay etc).<br><br>Note that, while attention must be given to the physical form of the network, since it is not formally specified by AUTOSAR, it cannot be considered a part of the conformance test of an AUTOSAR cluster.<br>The NWI provided by a given ECU supports the transfer of data to and from the ECU, and management of the network.<br>For the purposes of this definition, the Basic Software can be designed according to ICC1, ICC2 or ICC3. |
| ***Comment*** | The term has been introduced as a short-hand to aid in discussion of the conformance of the content of ICC1 / 2 and to define the backward compatibility between releases and revisions. However, since from the network perspective, the clustering of the Basic Software is invisible, the Network Interface is applicable to all potential Basic Software conformance classes (ICC1, ICC2, ICC3) in the same way. |

| | |
|---|---|
| ***Example*** | -- |
| ***Reference*** | Software Component Interface (SW-CI) |

## 3.159 NM Coordination Cluster

| | |
|---|---|
| ***Definition*** | A discrete set of NM Channels on which shutdown is coordinated. |
| ***Initiator*** | WP COM Stack |
| ***Further Explanations*** | The NM Coordinator will keep all presently awake NM Channels of an NM Coordination Cluster awake until it is possible to coordinate network sleep on all the awake channels. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | AUTOSAR Generic NM Interface |

## 3.160 NM Coordinator

| | |
|---|---|
| ***Definition*** | A functionality of the Generic NM Interface which allows coordination of network sleep for multiple NM Channels. |
| ***Initiator*** | WP COM Stack |
| ***Further Explanations*** | Depending on configuration, different level of synchronous network sleep can be achieved. The NM Coordinator is using a generic coordination algorithm which, by means of individually configured timeout and synchronization indications can coordinate a synchronized shutdown of multiple NM Channels. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | AUTOSAR Generic NM Interface |

## 3.161 Notification

| | |
|---|---|
| ***Definition*** | Informing a software entity about a state change of a hardware and/or software entity which has occurred. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The informing about a state change can be done by an activation of a software part or by setting a flag (→ definition 3.93). |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [OSEK Com] |

## 3.162 OS-Application

| | |
|---|---|
| ***Definition*** | A block of software including tasks, interrupts, hooks and user services that form a cohesive functional unit. |
| ***Initiator*** | Robert Rimkus |
| ***Further Explanations*** | Trusted:<br>An OS-Application that is executed in privileged mode and has unrestricted access to the API and hardware resources.<br>Non-trusted:<br>An OS-Application that is executed in non-privileged mode has restricted access to the API and hardware resources. |
| ***Comment*** | -- |
| ***Example*** | -- |

| | |
|---|---|
| ***Reference*** | [AUTOSAR Specification of OS] |

## 3.163 Partial Model

| | |
|---|---|
| ***Definition*** | This is a part of a model which is intended to be persisted in one particular artifact. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.164 Partitioning

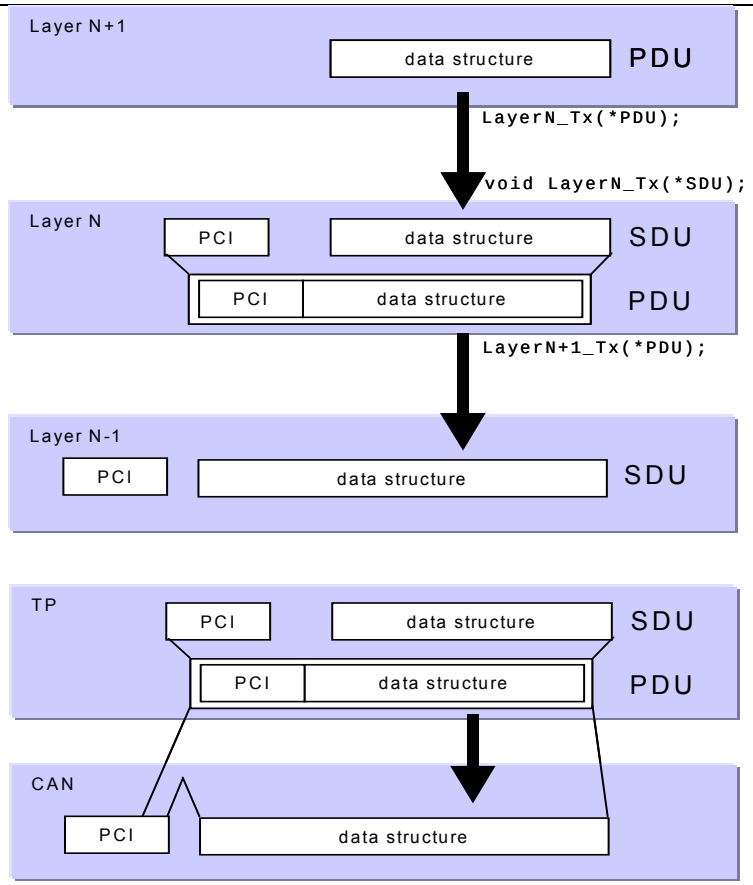
| | |
|---|---|
| ***Definition*** | Decomposition, the separation of the whole system into functional units and further into software components. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | Partitioning has to be done before the mapping in order to identify the components that are to be mapped. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | Based on [IEEE Std.610.12-1990] |

## 3.165 PCI

| | |
|---|---|
| ***Definition*** | PCI is the abbreviation of “Protocol Control Information”. This Information is needed to pass a SDU (→ definition 3.199) from one instance of a specific protocol layer to another instance. E.g. it contains source and target information. |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | The PCI is added by a protocol layer on the transmission side and is removed again on the receiving side. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.166 PDU

| | |
|---|---|
| ***Definition*** | PDU is the abbreviation of “Protocol Data Unit”. The PDU contains SDU (→ definition 3.199) and PCI (→ definition 3.165). |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | On the transmission side the PDU is passed from the upper layer to the lower layer, which interprets this PDU as its SDU. |

| | |
|---|---|
| |  |
| ***Comment*** | -- |
| ***Example*** | OSEK COM specifies an Interaction Layer |
| ***Reference*** | [ISO OSEK Glossary] |

## 3.167 PDU Timeout

| | |
|---|---|
| ***Definition*** | Maximum time between the receptions of two instances of one PDU is exceeded. |
| ***Initiator*** | WP Gateway |
| ***Further Explanations*** | This timeout indicates that the last reception of a PDU instance is too long in the past. As a consequence it can be concluded that the data in the last PDU instance is outdated. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.168 Peripheral Hardware

| | |
|---|---|
| ***Definition*** | Hardware devices integrated in micro-controller architecture to interact with the environment. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Memory, CAN-Controller, ADC, DIO, etc. |
| ***Reference*** | -- |

## 3.169 Personalization

| | |
|---|---|
| ***Definition*** | User-specific and memorized adjustment of SW data or selection of functional alternatives. |
| ***Initiator*** | WP Body and Comfort |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Seat parameters (position, activation status of drive-dynamic seat) can be stored in correlation to a user ID. For a given user ID the seat can be adjusted according to the stored position parameters and the drive-dynamic seat can be activated or deactivated. |
| ***Reference*** | -- |

## 3.170 Port

| | |
|---|---|
| ***Definition*** | A port belongs to a software component (→ definition 3.209) and is the interaction point between the component and other components. The interaction between specific ports of specific components is modeled using connectors (→ definition 3.56). A port can either be a p-port (→ definition 3.178) or an r-port (→ definition 3.183). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | For more information see AUTOSAR Specification of VFB |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.171 Port Interface

| | |
|---|---|
| ***Definition*** | A Port Interface characterizes the information provided or required by a port (→ definition 3.170) of a software component (→ definition 3.209). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A Port Interface is either a Client-Server Interface (→ definition 3.43) in case client-server communication (→ definition 3.42) is chosen or a sender-receiver Interface (→ definition 3.202) in case sender-receiver communication (→ definition 3.201) is used. |
| ***Comment*** | For more information see: AUTOSAR Specification of VFB |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.172 Post-build time configuration

| | |
|---|---|
| ***Definition*** | The configuration of the SW module is possible after building the SW module. |
| ***Initiator*** | WP ECU Configuration |
| ***Further Explanations*** | The SW may either receive elements of its configuration during the download of the complete ECU software resulting from the linkage of the code, or it may receive its configuration file that can be downloaded to the ECU separately, avoiding a re-compilation and re-build of the ECU SW modules. In order to make the post-build time re-configuration possible, the re-configurable elements shall be stored at a known position in the ECU storage area |
| ***Comment*** | -- |
| ***Example*** | Identifiers of the CAN frames |
| ***Reference*** | -- |

## 3.173 Pre-Compile time configuration

| | |
|---|---|
| ***Definition*** | The configuration of the SW module is done at source code level and will be effective after compile time. |
| ***Initiator*** | WP ECU Configuration |
| ***Further Explanations*** | The source code contains all the ECU configuration data and when compiled together, it produces the given SW. |
| ***Comment*** | -- |
| ***Example*** | Preprocessor switch for enabling the development error detection and reporting |
| ***Reference*** | -- |

## 3.174 Private Interface (API 3)

| | |
|---|---|
| ***Definition*** | A private interface is an interface within the Basic Software (→ definition 3.28) of AUTOSAR which is neither standardized nor defined within AUTOSAR. |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | The goal of the private interface is to enable a more efficient implementation of basic software modules. Basic software modules sharing a private interface have to be distributed as one package. This package has to behave exactly the same as separate modules would. It must provide the same standardized interfaces to the rest of the basic software and/or RTE as separate modules would. It has to be configured exactly the same as separate modules would be configured. |
| ***Comment*** | Private interfaces contradict the goal of exchangeability of standard software modules and should be avoided. |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.175 Probability of failure

| | |
|---|---|
| ***Definition*** | Probability of the occurrence of a failure in a system or functional unit. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.176 Procedure Call

| | |
|---|---|
| ***Definition*** | A simple statement that provides the actual parameters for and invokes the execution of a procedure (software function). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A synchronous communication mechanism can be implemented by a procedure call. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO 2382-15] |

## 3.177 Process

| | |
|---|---|
| ***Definition*** | An executable unit managed by an operating system scheduler that has its own name space and resources (including memory) protected against use from other processes. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A process consists of n Task (n>=1) |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.178 Provide Port

| | |
|---|---|
| ***Definition*** | Specific Port (→ definition 3.170) providing data (→ definition 3.59) or providing a service of a server (→ definition 3.204). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The Provide Port is sometimes abbreviated as PPort or P-Port. |
| ***Comment*** | -- |
| ***Example*** | • Server Port<br>• Sender Port |
| ***Reference*** | -- |

## 3.179 Rate Conversion

| | |
|---|---|
| ***Definition*** | Operation to change the timing between two transmissions of the same PduId on one physical Network. |
| ***Initiator*** | WP COM Stack |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.180 Redundancy

| | |
|---|---|
| ***Definition*** | Existence of means in addition to the means that would be sufficient for an element to perform a required function or to represent information. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | Redundancy is used in ISO 26262 with respect to achieving a safety goal, a specified safety requirement, or representing safety-related information. |
| ***Comment*** | -- |
| ***Example*** | Duplicated functional components can be an instance of redundancy for the purpose of increasing availability or allowing fault detection.<br>The addition of parity bits to data representing safety-related information provides redundancy for the purpose of allowing fault detection. |
| ***Reference*** | [ISO DIS 26262, Part 1] |

## 3.181 Reliability

| | |
|---|---|
| ***Definition*** | Probability of a system or functional unit to perform as expected under specified |

| | |
|---|---|
| | conditions within a time interval. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.182 Relocatability

| | |
|---|---|
| ***Definition*** | Capability of a software part being executed on different hardware environments without changing the code of the software part. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.183 Require Port

| | |
|---|---|
| ***Definition*** | Specific Port (→ definition 3.170) requiering data (→ definition 3.59) or requiering a service of a server. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The Require Port is sometimes abbreviated as RPort or R-Port. |
| ***Comment*** | -- |
| ***Example*** | • Client Port<br>• Receiver Port |
| ***Reference*** | -- |

## 3.184 Required property

| | |
|---|---|
| ***Definition*** | A *required* property or quality of a design entity (e.g. SW component or system) is a property or quality which has to be fulfilled by the environment of this design entity. |
| ***Initiator*** | WP Body and Comfort |
| ***Further Explanations*** | A property or quality can be required by a stakeholder (e.g. customer) or another design entity. |
| ***Comment*** | -- |
| ***Example*** | 1) In order to meet its functionality, a SW component A requires a minimum temporal resolution of a signal (information on a required port) which has to be fulfilled by SW component B.<br>2) SW component requires to be activated by the runtime environment every 100ms with a jitter of 10ms. |
| ***Reference*** | Compare term asserted property (→ definition 3.8) |

## 3.185 Residual Error Rate

| | |
|---|---|
| ***Definition*** | The ratio of the number of bits, unit elements, or blocks incorrectly received and undetected, to the total number of bits, unit elements, characters, or blocks sent. |
| ***Initiator*** | WP Functional Safety and Processes |

| | |
|---|---|
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.186 Resource

| | |
|---|---|
| ***Definition*** | A resource is a required but limited hardware entity of an ECU (→ definition 3.73), which in general can be accessed concurrently, but not simultaneously, by multiple software entities. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | The OSEK definition [OSEK BD] cannot be used, due to the specific usage in OSEK OS. |
| ***Example*** | CPU-load, interrupts (mechanism itself and the resulting CPU-load), memory, peripheral hardware, communication, … |
| ***Reference*** | -- |

## 3.187 Resource-Management

| | |
|---|---|
| ***Definition*** | Entity which controls the use of resources (→ definition 3.186). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The main functionality of resource management is the control of simultaneous use of a single resource by several entities, e.g. scheduling of requests, multiple access protection. |
| ***Comment*** | -- |
| ***Example*** | OS-scheduler (CPU-load management) |
| ***Reference*** | -- |

## 3.188 Response Time

| | |
|---|---|
| ***Definition*** | Time between receiving a stimulus and delivering an appropriate response or reaction. |
| ***Initiator*** | WP SW Component Template |
| ***Further Explanations*** | The response time describes the time between a stimulus like e.g. the state change of hardware or software entity and the expected reaction of the system (e.g. response, actuator activation).<br>Synonym: reaction time<br>See also: execution time, worst case execution time and worst case response time. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.189 Risk

| | |
|---|---|
| ***Definition*** | Combination of the probability of occurrence of harm and the severity of that harm. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | -- |

| | |
|---|---|
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO DIS 26262, Part 1] |

## 3.190 Robustness

| | |
|---|---|
| ***Definition*** | Ability of a system or functional unit to perform as expected also under unexpected conditions. |
| ***Initiator*** | WP Safety Aspect |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.191 RTE Event

| | |
|---|---|
| ***Definition*** | An RTE Event encompasses all possible situations that can trigger execution of a runnable entity (→ definition 3.192) by the RTE. Thus they can address timing, data sending and receiving, invoking operations, call server returning, mode switching, or external events. RTE Events can either activate a runnable entity or wakeup a runnable entity at its waitpoints. |
| ***Initiator*** | Stefaan Sonck Thiebaut |
| ***Further Explanations*** | Note 'event' in this context is not necessarily synonymous with 'RTEEvent' as defined in the VFB specification. In particular, RTE Events that result from communication are handled by communication-triggered runnable entities. |
| ***Comment*** | Events can have a variety of sources including time. |
| ***Example*** | Scheduling of runnable entities from angular position, e.g. a crankshaft, that are used to trigger an interrupt and hence an RTE notification.<br>A software component needs to perform a regular interval, e.g. flash an LED, reset a watchdog, etc. |
| ***Reference*** | -- |

## 3.192 Runnable Entity

| | |
|---|---|
| ***Definition*** | A Runnable Entity is a part of an Atomic Software-Component (→ definition 3.12) which can be executed and scheduled independently from the other Runnable Entities of this Atomic Software-Component. It is described by a sequence of instructions that can be started by the RTE (definition→ 3.191). Each runnable entity is associated with exactly one Entry Point (definition→ 3.76). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A Runnable Entity contains at least two points for the Scheduler (→ definition 3.198):<br>1 Entry Point (→ definition 3.76) and 1 Exit Point (→ definition 3.81).<br>Due to the reason that an Atomic Software Component is not dividable, all its Runnable Entities are executed on the same ECU. |
| ***Comment*** | In general a task in the runtime system consists out of n Runnable Entities of m Atomic Software-Components. |
| ***Example*** | Server function of a Software Component. |
| ***Reference*** | -- |

## 3.193 SAE J1939

| | |
|---|---|
| ***Definition*** | SAE J1939 is a vehicle bus standard created by the SAE (Society of Automotive Engineers, a USA standards body) for car and heavy duty truck industries. |
| ***Initiator*** | WP COM Stack |
| ***Further Explanations*** | The J1939 standard encompasses the following areas:<br>- bus physics (J1939/11, J1939/15)<br>- CAN message layout (J1939/21)<br>- request/response and multi packet transport protocols (J1939/21)<br>- network management used to assign a unique address to each node (J1939/81)<br>- diagnostics layer comparable to UDS in complexity (J1939/73)<br>- standardized application signals and messages (J1939/71) |
| ***Comment*** | The J1939 standard is used by most truck manufacturers worldwide and is prescribed for OBD in some states of the USA. It is also used as a base for other standards for maritime (NMEA 2000), agricultural (ISO 11783), and military (MilCAN A) applications. |
| ***Example*** | -- |
| ***Reference*** | http://www.sae.org/ |

## 3.194 Safety

| | |
|---|---|
| ***Definition*** | Absence of unreasonable risk. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [ISO DIS 26262, Part 1] |

## 3.195 Safety Protocol

| | |
|---|---|
| ***Definition*** | A communication protocol defining the necessary mechanisms to ensure the integrity of transmitted data and to detect any communication related error. |
| ***Initiator*** | WP Functional Safety and Processes |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.196 Sample Application

| | |
|---|---|
| ***Definition*** | Defined system used for evaluation purposes. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The application may be simplified for better understanding within the evaluation phase. |
| ***Comment*** | -- |
| ***Example*** | Diagnosis Application<br>Exterior Light Management |
| ***Reference*** | -- |

## 3.197 Scalability

| | |
|---|---|
| ***Definition*** | The degree to which assets can be adapted to specific target environments for various defined measures. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | Target environment introduced compared to EAST-Glossary. |
| ***Example*** | -- |
| ***Reference*** | [EAST-Glossary] |

## 3.198 Scheduler

| | |
|---|---|
| ***Definition*** | The scheduler handles the scheduling of the tasks/runnable entities (definition→ 3.227 / 3.192) according to the priority and scheduling policy (pre-defined or configurable). It has the responsibility to decide during run-time when which task can run on on the CPU of the ECU. |
| ***Initiator*** | WG System Team |
| ***Further Explanations*** | There are many strategies (priority-based, time-triggered, round-robbin, …) a scheduler can use, depending of the selected and/or implemented algorythms |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.199 SDU

| | |
|---|---|
| ***Definition*** | SDU is the abbreviation of “Service Data Unit”. It is the data passed by an upper layer, with the request to transmit the data. It is as well the data, which is extracted after reception by the lower layer and passed to the upper layer. |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | A SDU is part of a PDU (→ definition 3.166). |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.200 Security

| | |
|---|---|
| ***Definition*** | Protection of data, software entities or resources from accidental or malicious acts. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | Slightly adapted norm. |
| ***Example*** | -- |
| ***Reference*** | [ISO 2382-8] |

## 3.201 Sender-Receiver Communication

| | |
|---|---|
| ***Definition*** | A communication pattern which offers asyncronous distribution of information where a sender communicates information to one or more receivers, or a receiver receives information from one or several senders. |

| | |
|---|---|
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The process of sending data does not block the sender and the sender usually gets no response from the receivers |
| ***Comment*** | Often used for data or event distribution |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.202 Sender-Receiver Interface

| | |
|---|---|
| ***Definition*** | A sender-receiver interface is a special kind of port-interface (→ definition 3.171) used for the case of sender-receiver communication (→ definition 3.201).<br>The sender-receiver interface defines the data-elements which are sent by a sending component (which has a p-port providing the sender-receiver interface) or received by a receiving component (which has an r-port requiring the sender-receiver interface). |
| ***Initiator*** | Stefaan Sonck Thiebaut |
| ***Further Explanations*** | -- |
| ***Comment*** | A special kind of Port-Interface |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.203 Sensor/Actuator SW-Component

| | |
|---|---|
| ***Definition*** | SW-Component (→ definition 3.209) dedicated to the control of a sensor or actuator. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | There will be several Sensor/ Actuator SW-Cs in each ECU. In general there will be one Sensor/Actuator SW-C for each sensor and one for each actuator (=> number of Sensor/Actuator SW-C = number of sensors + number of actuators). |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.204 Server

| | |
|---|---|
| ***Definition*** | Software entity which provides services for clients (→ definition 3.41). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The server (→ definition 3.204) and the clients using its service might be located on one ECU or distributed on different calculation units (e.g. ECU). |
| ***Comment*** | Adapted from Balzert. |
| ***Example*** | -- |
| ***Reference*** | [Balzert99] |

## 3.205 Service

| | |
|---|---|
| ***Definition*** | A service is a type of operation that has a published specification of interface and behavior, involving a contract between the provider of the capability and the potential clients. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |

| | |
|---|---|
| ***Comment*** | -- |
| ***Example*** | Diagnosis service, … |
| ***Reference*** | [EAST-Glossary] |

## 3.206 Service Port

| | |
|---|---|
| ***Definition*** | A Service Port is a Port (→ definition 3.170) of an SW-C (→ definition 3.209), Complex Driver (→ definition 3.48) and/or ECU Abstraction (→ definition 3.70) connected to an AUTOSAR Service (→ definition 3.23). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The interface of a Service Port has to be a Standardized AUTOSAR Interface (→ definition 3.18 and 3.217).<br>A Service Port does not need to be connected to another Port in the VFB View (→ definition 3.243). |
| ***Comment*** | If a service is provided by the ECU where a specific Atomic Software Component is located the VFB View is sufficient.<br>If a service is provided by another ECU the connection of the service call to the service has to be done explicitly during the mapping step. |
| ***Example*** | Write data to non volatile memory. |
| ***Reference*** | -- |

## 3.207 Services Layer

| | |
|---|---|
| ***Definition*** | The Services Layer is the highest layer of the Basic Software which also applies for its relevance for the application software: while access to I/O signals is covered by the Hardware Abstraction Layer, the Services Layer offers<br>Operating system services<br>Vehicle network communication and management services<br>Memory services (NVRAM management)<br>Diagnosis Services (including KWP2000 interface and error memory)<br>ECU state management<br><br>Task: Provide basic services for application and basic software modules |
| ***Initiator*** | WP Architecture |
| ***Further Explanations*** | The Services Layer consists of the following parts:<br>Communication Services<br>Memory Services<br>System Services |
| ***Comment*** | -- |
| ***Example*** | Network Management, NVRAM Manager, ECU State Manager |
| ***Reference*** | [AUTOSAR Software Architecture] |

## 3.208 Shipping

| | |
|---|---|
| ***Definition*** | Component shipment refers to the action of a supplier releasing a software component (also a composition) to the system integrator. The integrator will gather all shipments of the components that make up the whole system and then map them to ECUs. |
| ***Initiator*** | WP SW Component Template |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.209 Software Component (SW-C)

| | |
|---|---|
| ***Definition*** | Software-Components are architectural elements that provide and/or require interfaces and are connected to each other through the Virtual Function Bus to fulfill architectural responsibilities. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A Software Component has a formal description defined by the software component template (→ definition 3.229).<br>Software Components can be abbreviated as SW-Cs. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.210 Software Component Interface (SW-CI)

| | |
|---|---|
| ***Definition*** | A SoftWare-Component Interface is the sum of all interfaces offered by the Basic Software (→ definition 3.28), towards the SW-Cs (→ definition 3.209). |
| ***Initiator*** | WP Conformance Test Specification |
| ***Further Explanations*** | A SW-CI denotes the interface between an SW-C and the underlying Basic Software cluster including the RTE. The SW-CI therefore comprises all API (→ definition 3.4), functions (→ definition 3.119) and Callbacks (→ definition 3.35) that the SW-C requires from and provides to the Basic Software (generally by means of RTE mechanisms). It includes also the mechanisms allowing SW-Cs sharing the SW-CI to communicate with one another.<br>For the purposes of this definition, the Basic Software clustered on an ECU can be designed according to ICC1, 2 and 3. |
| ***Comment*** | The term has been introduced as a short-hand to aid in discussion of the conformance of the content of Basic Software clusters of conformance class ICC1 / 2 and to define the backward compatibility between releases and revisions. However, since from the SW-C perspective, the clustering of the Basic Software is invisible, the Component Interface is applicable to all potential Basic Software conformance classes (ICC1, ICC2, ICC3) in the same way. |
| ***Example*** | -- |
| ***Reference*** | Network Interface (NWI) |

## 3.211 Software Configuration

| | |
|---|---|
| ***Definition*** | The arrangement of software elements in a SW system. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A software element is a clearly definable software part. A software configuration is a selection version of software modules, software components, parameters and generator configurations. Calibration and Variant Coding (→ definition 3.236) can be regarded as subset of Software Configuration. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [EAST-Glossary] |

## 3.212 Software Interrupt

| | |
|---|---|
| ***Definition*** | Interrupt triggered by SW event. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further*** | SW events are for example calling an operating system service, starting a process |

| | |
|---|---|
| ***Explanations*** | with higher priority. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | Translation/Adaptation from [VDI Lexikon] |

## 3.213 Software Module

| | |
|---|---|
| ***Definition*** | A collection of software files (code and description) that define a certain software functionality present on an ECU. |
| ***Initiator*** | WP ECU Configuration |
| ***Further Explanations*** | A software module may be an Atomic SW-C (→ definition 3.12), or a Basic Software module (→ definition 3.29), or the RTE (RunTimeEnvironment). |
| ***Comment*** | This term shall be used if both basic software modules and Application software Components are addressed. |
| ***Example*** | A Digital IO Driver, Complex Driver, OS are examples of software modules. |
| ***Reference*** | -- |

## 3.214 Software Signal

| | |
|---|---|
| ***Definition*** | A Software Signal is an asynchronous event transmitted between one process and another. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A SW Signal is the software implementation of an (control-) information. Additionally it may have attributes (e.g. freshness, data type, …). It is exchanged between SW-Components. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.215 Special Periphery Access

| | |
|---|---|
| ***Definition*** | Special functions to standard peripheral devices or special peripherals. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | Is only used when, because of technical issues, no standard periphery access can be used |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [HIS API IO Driver version 2.1] Interaction with [Hardware v0.3] |

## 3.216 Standard Periphery Access

| | |
|---|---|
| ***Definition*** | Standard functions to typical standard peripheral devices that is available on an ECU (most microcontroller integrated) used in automotive embedded applications. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Digital Input/Output, Analog/Digital Converter, Pulse Width (De)Modulator, EEPROM, FLASH, Capture Compare Unit, Watchdog Timer |
| ***Reference*** | [HIS API IO Driver version 2.1] Interaction with Hardware v0.3 |

## 3.217 Standardized AUTOSAR Interface

| | |
|---|---|
| ***Definition*** | This is an AUTOSAR Interface which is standardized within the AUTOSAR project. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | AUTOSAR Services interact with other components through a Standardized AUTOSAR Interface. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.218 Standardized Interface

| | |
|---|---|
| ***Definition*** | A software interface is called Standardized Interface if a concrete standardized API exists. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | Modules in the Basic Software interact which each other through Standardized Interfaces. |
| ***Comment*** | -- |
| ***Example*** | OSEK COM Interface |
| ***Reference*** | -- |

## 3.219 Standard Software

| | |
|---|---|
| ***Definition*** | Standard Software is software which provides schematic independent infrastructural functionalities on an ECU. It contains only Standardized Interfaces (→ definition 3.218), Standardized AUTOSAR Interfaces (→ definition 3.217) and/or Private Interfaces (→ definition 3.174). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | OSEK COM, MCAL, Services, OSEK OS |
| ***Reference*** | -- |

## 3.220 Static Configuration

| | |
|---|---|
| ***Definition*** | A setup where the routing configuration cannot be changed during normal operation of the gateway. |
| ***Initiator*** | WP Gateway |
| ***Further Explanations*** | Static configuration doesn't allow reconfiguration of the routing during normal operation e.g. during driving.<br>Static configuration does not restrict the update of the configuration in specific maintenance operation modes (e.g. programming mode). |
| ***Comment*** | -- |
| ***Example*** | A software update may change a routing configuration such that a PDU is routed into two instead of one destination networks. |
| ***Reference*** | -- |

## 3.221 Surveillance

| | |
|---|---|
| ***Definition*** | Systematic iteration of a reduced full-set assessment (→ definition 3.9) as a basis |

| | |
|---|---|
| | for maintaining the validity of the full-set assessment. |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | Within AUTOSAR context, reduced set surveillances of the accredited party are scheduled yearly between the full-set assessments. |
| ***Comment*** | Supplementary full-set assessments are scheduled. |
| ***Example*** | -- |
| ***Reference*** | [ISO/IEC 17000] |

## 3.222 Synchronize

| | |
|---|---|
| ***Definition*** | To make two or more events or operations to occur at the same predefined moment in time. |
| ***Initiator*** | WP COM Stack |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | Two NM Channels can enter Bus Sleep Mode at the same time ("synchronized network sleep") or they can be ordered to go to sleep at the same time ("synchronized shutdown initiation"). |
| ***Reference*** | AUTOSAR Generic NM Interface |

## 3.223 Synchronous Communication

| | |
|---|---|
| ***Definition*** | A communication is synchronous when the calling software entity is blocked until the called operation is evaluated. The calling software entity continues its operation by getting the result. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | Synchronous communication between distributed functional units has to be implemented as remote procedure call. |
| ***Comment*** | Are further mechanisms possible? |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.224 System

| | |
|---|---|
| ***Definition*** | An integrated composite that consists of one or more of the processes, hardware, software, facilities and people, that provides a capability to satisfy a stated need or objective. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | ITEA EAST uses IEEE 14407 standard. Here not applicable because of problem with the definition of function.<br>One correct interpretation is:<br>- it might be a composition of one or more ECUs |
| ***Example*** | Braking system |
| ***Reference*** | [ISO 12207] |

## 3.225 System Constraint

| | |
|---|---|
| ***Definition*** | Boundary conditions that restrict the Design-Freedom of the (cars E/E-) System. |
| ***Initiator*** | WP System Constraint Template |

| | |
|---|---|
| ***Further Explanations*** | The design of ECU Networks and the distribution of functionalities to ECUs are limited by several constrains. These constraints result mostly by the communication matrix and safety requirements |
| ***Comment*** | -- |
| ***Example*** | An existing communication matrix that restricts the distribution of signals to frames is a system constraint. Another system constraint is a safety requirement that does not allow to map a specified Software component to specific ECU. |
| ***Reference*** | -- |

## 3.226 System Signal

| | |
|---|---|
| ***Definition*** | 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 (at least) one system signal defined for each data element sent or received by a SW component instance. If data has to be sent over gateways, there is still only one system signal representing this data. The representation of the data on the individual communication systems is done by the cluster signals. |
| ***Initiator*** | WP System Constraint Template |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.227 Task

| | |
|---|---|
| ***Definition*** | A Task is the smallest schedulable unit managed by the OS. The OS decides when which task can run on the CPU of the ECU. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | A runnable entity (→ definition 3.192) of a software component runs in the context of a task. Also the Basic Software Modules runs in the context of a task. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.228 Technical Signal

| | |
|---|---|
| ***Definition*** | The technical signal is the physical value of an external event coupled to an AUTOSAR system. Technical signals are represented in SI units (e.g. pressure in PA). |
| ***Initiator*** | WP ECU Resource Template |
| ***Further Explanations*** | The term Technical Signal is used when we are referring to the "real world" signal that is under consideration. So typical Technical Signals are temperature, velocity, torque, force, electrical current and voltage, etc. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.229 Template

| | |
|---|---|
| ***Definition*** | A template is a structured collection of attributes that are required to formally |

| | |
|---|---|
| | describe AUTOSAR artifacts like e.g. software components or configurations of ECUs. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The term "Template" stresses the fact that the collected attributes still need to have actual values assigned in order to describe a particular artifact. Those values are collected in a Description.<br>Templates are independent of the technology used for serialization of their respective descriptions. Possible serializations include XML, databases tables and so on. |
| ***Comment*** | -- |
| ***Example*** | The templates defined by AUTOSAR are represented as an UML2.0 model (→ definition 3.19) and an W3C XML Schema (→ definition 3.26).<br>Models and descriptions created according to the templates can be exchanged using the language defined in the AUTOSAR XML Schema). |
| ***Reference*** | -- |

## 3.230 Third party

| | |
|---|---|
| ***Definition*** | An organization that is independent of the organization that provides automotive products, which are subject to AUTOSAR conformance testing. |
| ***Initiator*** | WP Exploitation |
| ***Further Explanations*** | Criteria for the independence of conformity assessment (→ definition 3.9) bodies and accreditation (→ definition 3.1) bodies are provided in the International Standard and Guides applicable to their activities. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | ISO/IEC 17000] |

## 3.231 Timeout

| | |
|---|---|
| ***Definition*** | Notification with respect to deadline violation of an event or task (e.g. while working on/with information: receiving, sending, processing,...). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.232 Use Case

| | |
|---|---|
| ***Definition*** | A model of the usage by the user of a system in order to realize a certain functional feature of the system. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | -- |
| ***Comment*** | Added certain compared to EAST-glossary. |
| ***Example*** | -- |
| ***Reference*** | [EAST-Glossary] |

## 3.233 Validation

| | |
|---|---|
| ***Definition*** | Confirmation by examination and provisions of objective evidence that the particular requirements for a specific intended use are fulfilled. |

| | |
|---|---|
| ***Initiator*** | WG System Team |
| ***Further Explanations*** | In design and development, validation concerns the process of examining a product to determine conformity with user needs.<br>Validation is normally performed on the final product under defined operating conditions. It may be necessary in earlier stages.<br>“Validated” is used to designate the corresponding status.<br>Multiple validations may be carried out if there are different intended uses. [ISO 8402: 1994] |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [IEEE 1012:1998] |

## 3.234 Variability

| | |
|---|---|
| ***Definition*** | Variability of a system is its quality to describe a set of variants. These variants are characterized by variant specific property settings and / or selections. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | As an example, such a system property selection manifests itself in a particular “receive port” for a connection. |
| ***Reference*** | -- |

## 3.235 Variant

| | |
|---|---|
| ***Definition*** | A system variant is a concrete realization of a system, so that all its properties have been set respectively selected. The software system has no variability anymore with respect to the binding time. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.236 Variant Coding

| | |
|---|---|
| ***Definition*** | Adaptation of SW by selection of functional alternatives according to external requirements (e.g. country-dependent or legal restrictions). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The major difference with calibration is that this later doesn’t aim to adapt the SW functionality itself but only aims to adjust the SW to the HW/SW environment, e.g. the calibration of engine control SW that is adjusted to the physical parameters of every engine.<br>Variant Coding also includes vehicle-specific (not user-specific) SW adaptation due to end-customer wishes (e.g. deactivation of speed-dependent automatic locking). Variant Coding is always done after compile time. Used techniques to select variants include end-of-line programming and garage programming. |
| ***Comment*** | -- |
| ***Example*** | Country related adaptation of MMI with respect to speed and/or temperature unit (km/h vs. mph, °C vs. F). |
| ***Reference*** | -- |

## 3.237 Variation Binding

| | |
|---|---|
| ***Definition*** | A variant is the result of a variation binding process that resolves the variability of the system by assigning particular values/selections to all the system's properties. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.238 Variation Binding Time

| | |
|---|---|
| ***Definition*** | The variation binding time determines the step in the methodology at which the variability given by a set of variable properties is resolved. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.239 Variation Definition Time

| | |
|---|---|
| ***Definition*** | The variation definition time determines the step in the methodology at which the variation points are defined. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.240 Variation Point

| | |
|---|---|
| ***Definition*** | A variation point indicates that a property is subject to variation. Furthermore, it is associated with a condition and a binding time which define the system context for the selection / setting of a concrete variant. |
| ***Initiator*** | WP General Methodology and Configuration |
| ***Further Explanations*** | -- |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.241 Vendor ID

| | |
|---|---|
| ***Definition*** | A vendor ID is a unique identification of the vendor of a software component. All basic software modules (→definition 3.29) conformant to the AUTOSAR standard shall provide a readable vendor ID. |
| ***Initiator*** | WP Architecture |
| ***Further*** | AUTOSAR Vendor IDs are used to determine vendors of basic software modules |

| | |
|---|---|
| ***Explanations*** | before and during runtime. The mechanism is used to improve bug handling. AUTOSAR currently only provides Vendor IDs to members of the AUTOSAR partnership. |
| ***Comment*** | To apply for an AUTOSAR vendor ID the possible member has to send an E-Mail to request@autosar.org. Within the request name of the company, company address and contact person should be listed.<br>In order to keep administrative overhead low, AUTOSAR and the HIS initiative run a joint list of vendor IDs. |
| ***Example*** | Vendor ID for EEPROM driver is called: EEP_VENDOR_ID |
| ***Reference*** | BSW00374 |

## 3.242 Verification

| | |
|---|---|
| ***Definition*** | Confirmation by examination and provisions of objective evidence that specified requirements have been fulfilled. |
| ***Initiator*** | WG System Team |
| ***Further Explanations*** | In design and development, verification concerns the process of examining the result of a given activity to determine conformity with the stated requirement for that activity.<br>“Verified” is used to designate the corresponding status. [ISO 8402: 1994] |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [IEEE 1012:1998] |

## 3.243 VFB View

| | |
|---|---|
| ***Definition*** | The VFB View describes systems or subsystems in the car independently of these resources; in other words, independently of:<br>• what kind of and how many ECUs are present in the car<br>• on what ECUs the entities in the VFB-View run<br>• how the ECUs are interconnected: what kind of network technology (CAN, LIN,…) and what kind of topology (presence of gateways) is used |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | In the VFB-View, the system or subsystem under consideration is a Composition which consists out of Connectors and Components. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | [AUTOSAR Specification of Virtual Functional Bus] |

## 3.244 Virtual Functional Bus (VFB)

| | |
|---|---|
| ***Definition*** | The Virtual Functional Bus is an abstraction of the communication between Atomic Software Components (→ definition 3.12) and AUTOSAR Services (→ definition 3.23). This abstraction is such that specification of the communication mechanisms is independent from the concrete technology chosen to realize the communication. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | After compilation and linking of software for a dedicated ECU (→ definition 3.73) the Virtual Functional Bus interfaces are realized by the AUTOSAR Runtime Environment. |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.245 Virtual Integration

| | |
|---|---|
| ***Definition*** | The simulated, modeled and/or calculated (not real) combination of software entities forming a system (→ definition 3.224). |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | By virtual integration several constraints and/or requirements are checked without the need of real hardware units, like needed CPU load, needed memory, completeness of interfaces, fulfillment of timing requirements etc.). |
| ***Comment*** | -- |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.246 Worst Case Execution Time

| | |
|---|---|
| ***Definition*** | Maximum possible time during which a program is actually executing |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The worst case execution time of a piece of software is the maximum possible time during which the CPU is executing instructions which belong to this piece. The worst case execution time is often identified by analytical methods. It is required to determine if a schedule meets the overall timing requirements.<br>Abbreviation: WCET<br>See also: response time, execution time, worst case response time |
| ***Comment*** | This definition has been extended by WP COM |
| ***Example*** | -- |
| ***Reference*** | -- |

## 3.247 Worst Case Response Time

| | |
|---|---|
| ***Definition*** | Maximum possible time between receiving a stimulus and delivering an appropriate response or reaction. |
| ***Initiator*** | WP Virtual Functional Bus |
| ***Further Explanations*** | The worst case response time describes the maximum possible time between a stimulus like e.g. the state change of hardware or software entity and the expected reaction of the system (e.g. response, actuator activation).<br>Typically: worst-case execution-time + infrastructure-overhead + scheduling-policy = worst-case reaction time<br>Synonym: worst case reaction time<br>See also: response time, execution time, worst case execution time |
| ***Comment*** | Worst case reaction time was renamed to worst case response time because response time is the more common terminology.<br>This definition has been extended by WP COM. |
| ***Example*** | -- |
| ***Reference*** | -- |

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