

Von V2X bis zur IT-Sicherheit - Die Neuerungen in AUTOSAR

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Überblick

Introduction

- Why AUTOSAR?
- AUTOSAR Classic Platform
 - Overview and achievements
 - New AUTOSAR concepts
- Game changers
 - New challenges and use-cases
 - New functions
- Future of AUTOSAR
 - AUTOSAR Adaptive Platform
 - New cooperation model
- Summary



E/E innovations in vehicle development are increasing





AUTOSAR vision

AUTOSAR aims to improve complexity management of integrated E/E architectures through increased reuse and exchangeability of SW modules between OEMs and suppliers.



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Aims and benefits of using AUTOSAR

AUTOSAR aims to standardize the software architecture of Electronic Control Units (ECUs). AUTOSAR paves the way for innovative electronic systems that further improve performance, safety and environmental friendliness.



- Hardware and software will be widely independent of each other.
- > Development can be de-coupled by horizontal layers, reducing development time and costs.
- The reuse of software increases at OEM as well as at suppliers. This enhances quality and efficiency during development.



AUTOSAR – Core Partners and Partners (June 2016)



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Main working topics



Architecture

Software architecture including a complete basic software stack for ECUs – the so called AUTOSAR Basic Software – as an integration platform for hardware independent software applications.

Methodology

Defines exchange formats and description templates to enable a seamless configuration process of the basic software stack and the integration of application software in ECUs. It includes even the methodology how to use this framework.

Application Interfaces:

Specification of interfaces of typical automotive applications from all domains in terms of syntax and semantics, which should serve as a standard for application software.

Acceptance Tests

Specification of test cases intending to validate the behavior of an AUTOSAR implementation with AUTOSAR application software components or within one vehicle network

Interfaces

Applicatior Methodolog

Acceptance

Tests



AUTOSAR achievements and outlook (1/2) Milestones, just to name a few





AUTOSAR achievements and outlook (2/2) Milestones, just to name a few



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AUTOSAR Concepts currently targeting Release 4.3.0

- Remote Event Communication Manager (RECM): Targets distributed architectures where a standardized method to transmit the status of OBD diagnostics over a bus system is needed.
- Profiles for Data Exchange Points (PDEP): Allows the definition of exchange points for AUTOSAR arxml and which data should be available in each exchange points
- Extension of Decentralized Configuration: The concept "Decentralized configuration" introduced an exchange format for diagnostic which is extended within this Release
- Extended Buffer Access: Enhances the existing AUTOSAR support for rapid prototyping (RP) to support the use case where the generated bypass support cannot be regenerated by the bypass user
- Hardware Test Manager for Startup and Shutdown: Optional concept to integrate HW safety checks into the startup/shutdown procedures of an AUTOSAR ECU
- Some/IP Transport Protocol: Extension of Some/IP to allow the communication of a big Some/IP Message via UDP
- Crypto Interface: Develops an abstraction for different security solutions in SW/HW, e.g. SHE, HSM, software libraries...
- V2XSupport: Goal of this concept is to specify common software interfaces for integration of V2X hardware into an AUTOSAR ECU



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Crypto Interface concept



- Abstracts the implementation of the crypto services to the cyber security related applications to support:
 - > SHE
 - > HSMs
 - Crypto software libraries and complex driver
- Enables management of keys



V2X Support concept



Focus:

- Solution possibility for day 1 scenario by integration in the AUTOSAR classic stack
- Supporting the ETSI protocols for Intelligent Transportation Systems

New AUTOSAR modules:

- BTP = Layer 4
- GeoNet = Layer 3
- V2xM manages common information flow (congestion control, security, position and time)
- Facilities V2X specific Interfaces towards the application
- > **WEth** = Wireless Ethernet Driver
- WEthTrcv = Wireless Ethernet Transceiver Driver



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Starting Point: selected main drivers

Main drivers for new automotive software systems have been determined.





Selected main drivers for new automotive software systems (1/4)

Highly automated driving will be on the road.



| Support dependable systems including fail-operational systems |
|---|
| Support of cross domain computing platforms |
| Support of high-performance micro-controllers and computing |
| Distributed and remote diagnostics |
| |
| |



Selected main drivers for new automotive software systems (2/4)

Car-2-X applications will require the interaction of vehicles and off-board systems.



- Support cloud interaction
- Software as product
- Integration of non-AUTOSAR systems

- - - -

Use cases



Selected main drivers for new automotive software systems (3/4)

Vehicle in the cloud will require dedicated means for security.



- Secure on-board communication
- Security architecture
- Secure cloud interaction

> ...

Use cases



Selected main drivers for new automotive software systems (4/4)

Upcoming use cases will lead to a stronger interaction of automotive software systems.



| | Consideration of non-AUTOSAR and off-board systems within methodology |
|-----------|---|
| Use cases | Dynamic deployment of software components |
| | Interaction with non-AUTOSAR and off-board systems |



Technology Drivers

Ethernet

- High bandwidth
- Communication system is not limiting aspect any more
- Switched network
- Efficient point-to-point communication
- Efficient transfer of long messages

Processors

- Switch from microcontroller to processors with external memory (and maybe filesystems)
- Many core processors
- Parallel computing
- "Cheap" availability of computing power

Heterogeneous architectures

Special purpose processors







Another Platform for Different Applications

Real time requirements

Safety criticality



Computing power



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AUTOSAR Adaptive Platform – characteristics





Architecture Adaptive Platform level



Functional Clusters:

- Assemble functionalities of the Adaptive Platform
- Define clustering of requirements specification
- But, do not constrain the SW architecture of a platform implementation
 - ➔ No definition of modules

Adaptive AUTOSAR API: APIs and services exposed to Applications by functional clusters.

Adaptive AUTOSAR specification: Behavior of software platform from Application and Network perspective.

Organized in functional clusters, not specification of internal architecture!

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Architecture Adaptive Platform level – functional clusters



- Collection of diagnostic event data
- Data exchange with the diagnostic backend
- Provision of standardized diagnostic protocols

- Construction and supervision of service based communication
- Local and remote



Architecture Adaptive Platform level – most important technical decisions





The Challenge: Integration of Different Platforms



Software Abstraction

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Common Bus Interface Specification



Standardization process and specification validation

Specifications will be validated in parallel with the standardization.



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The future of AUTOSAR

BB(3--> The next big step of the AUTOSAR partnership Standardization of the AUTOSAR Adaptive Platform AUTOSAR will jointly implement the specifications and release exemplary software for the new platform The exemplary software will be licensed to all AUTOSAR partners for further exploitation A new AUTOSAR Development Agreement will enable the establishment of the Adaptive Platform mref="#" class="brand-logo hide «div class * container

AUTOSAR Core Partners will terminate the current agreement by 31 Dec 2016 and continue from 1 Jan 2017 onwards with the new, extended agreement.



The AUTOSAR Core Partners are fully committed to standardization of AUTOSAR Adaptive Platform. All partners are asked to renew their membership! Number-crunching algorithms and high interconnectivity are the demands of future technologies. The Adaptive Platform is exactly what we need. New requirements call for new solutions. AUTOSAR will provide the optimal standard for car-2-x communication and highly automated driving. AUTOSAR will be a key success factor for future challenges in automotive E/E. **BMW Group** BOSCH AUTOSAR is a key enabler on the way to the self-driving car. Our aim is to provide extensive connectivity to our Continental 🅉 customers. AUTOSAR will be the basis for that. GROUP AUTOSAR is our standard of choice for realizing new technologies DAIMLER such as autonomous driving and interconnectivity. AUTOSAR is in a good position for future developments in the fields of VOLKSWAGEN connectivity as well as highly automated driving. AUTOSAR a worldwide standard, but we don't want to stop there. We see AUTOSAR well prepared for the new demands of the market. AUTOSAR enabled increased flexibility by still decreasing costs. We are fully committed to AUTOSAR and to its existing and new architecture.



Releases and revisions of AUTOSAR





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AUTOSAR will continue to be THE creator of automotive software standards.



More information available online

