Outline

- Motivation
- Organization
- Architecture
- Rollout
Outline

- Motivation
- Organization
- Architecture
- Rollout

The Challenge

- Master complexity
- Flexible E/E architectures
- Flexible exchangeability between supplier’s and manufacturer’s applications
- Keep quality & reliability of E/E systems at high level
- Enable global shared development
- Gain freedom for innovation

Solution:

- Strategy: Standardization of software architecture

Reuse and exchangeability of software
AUTOSAR – Exchangeability

Exchangeability between supplier’s solutions

Exchangeability between manufacturer’s applications

Exchangeability between vehicle platforms

Source: AUTOSAR

OEM: Original Equipment Manufacturer

AUTOSAR @ Bosch – Enable Exchangeability

Standardization

Software Architecture

- Specification of a complete basic software layer as integration platform for hardware independent application software.

Methodology

Application Interfaces

- Specification of standardized interfaces of mature automotive applications from all domains as bases for application software.

Methodology

- Common exchange formats or description templates to enable seamless co-operation during the complete development process.
AUTOSAR @ Bosch

Outline

- Motivation
- Organization
- Architecture
- Rollout

AUTOSAR @ Bosch – Organizational Structure

Status: 15/12/2009

General OEM  Generic Tier 1  Standard Software  Tools and Services  Semi-conductors

8 Core Partner
BMW Group
Continental
PSA Peugeot Citroën
Volkswagen AG

86 Associate Member

16 Attendee

11 Development Member

53 Premium Member

Source: AUTOSAR
Outline

- Motivation
- Organization
- Architecture
- Rollout

Reusing/Exchange of SW Enabled by Architecture

Yesterday
Reuse/Exchange of SW Enabled by Architecture

- Pre-condition for efficient integration of application software
  - Standardized BSW
  - Standardized ASW interfaces
  - Well structured and modular application architecture

Conventional

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Basic Software (BSW) Proprietary</th>
<th>Application Software (ASW)</th>
</tr>
</thead>
</table>

AUTOSAR

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Basic Software (BSW) Proprietary</th>
<th>Application Software (ASW)</th>
</tr>
</thead>
</table>

- Standardized interfaces
- HW-specific
- AUTOSAR RTE
- ECU Abstraction and Complex Drivers
- Microcontroller Abstraction
- Services

BOSCH
**AUTOSAR @ Bosch – Enable Exchangeability**

**Reuse/Exchange of SW Enabled by Architecture**

- Pre-condition for efficient integration of application software
  - Standardized BSW
  - Standardized ASW interfaces
  - Well structured and modular application architecture

**Conventional**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Application Software (ASW)</th>
<th>Basic Software (BSW)</th>
<th>Proprietary</th>
</tr>
</thead>
</table>

**AUTOSAR**

<table>
<thead>
<tr>
<th>Application Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTOSAR RTE</td>
<td></td>
</tr>
<tr>
<td>Standardized interfaces</td>
<td></td>
</tr>
</tbody>
</table>

**Software Components**

- Automotive Software
- Basic Software (BSW)
- Conventional

**Objective:**
- Decoupling of Hardware and Application Software
- Relocation/reuse of SW-C between ECU

**AUTOSAR – Software Architecture/Interfaces**

**Application Software (ASW)**

- Standardization of interfaces
- Not standardized in AUTOSAR

**Basic Software (BSW) +RTE**

- Standardization of interfaces and behavior

**AUTOSAR RTE**

- ECU Abstraction and Complex Drivers
- Microcontroller Abstraction

**Services**

- Standardized Interface
- Standardized Interface
- Communication Interface
- Standardized Interface

**Application Software Components**

- AUTOSAR Interface
- AUTOSAR Software
- AUTOSAR RTE
- AUTOSAR Software
- AUTOSAR Software

**BOSCH**

Confidential | © Robert Bosch GmbH 2010. All rights reserved, also regarding any disposal, exploitation, reproduction, editing, distribution, as well as in the event of applications for industrial property rights.
AUTOSAR @ Bosch

Outline

- Motivation
- Organization
- Architecture
- Rollout

AUTOSAR – Status

**Phase I**
- E2006
  - Release 2.1
    - Resolved release notes
    - Start-up / Wake-up behavior
    - Application interfaces

**Phase II**
- E2007
  - Release 3.0
    - OBDII (On-Board Diagnosis)
  - M2008
    - Error handling
    - Functional safety
    - Libraries
    - Conformance Test
    - Multi-Core

**Phase III**
- E2009
  - Release 4.0
    - Further Application Interfaces

**Status / Achievements**

- AUTOSAR Rel. 2.1
  - AUTOSAR is ready for use in automotive product development

- AUTOSAR Rel. 3.0 / 3.1
  - Product development can take fully advantage of mature AUTOSAR specifications
### AUTOSAR – Planning Phase III

**Objectives of Phase III**
- Maintain the existing AUTOSAR releases
- Add extensions to the existing specifications to further enhance the exploitation of AUTOSAR for automotive applications
- Incorporate experiences from exploitation

**Time plan of AUTOSAR phase III**
- AUTOSAR Phase III is contracted and started 01/2010
- In 2010 concept proposals are analyzed and selected for implementation
- In 2011 selected concepts are implemented
- In 2012 implemented concepts are validated,
  - R4.1 will be released in 12/2010

---

### AUTOSAR Roll Out Plan (2008 - 2012)

**Source:** AUTOSAR

**ECU (Engine Control Unit): EDC(MED)17**

<table>
<thead>
<tr>
<th>Core Partner</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOSCH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continental</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAIMLER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FORD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSA PEUGEOT CITROEN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOYOTA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOLKSWAGEN AG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- ECU (Engine Control Unit): EDC(MED)17
- Powertrain-, Chassis-, Safety-, Body- ECUs use AUTOSAR architecture
- Body Computer with subset of AUTOSAR specs incorporated
- Complete BSW Stack as Product
- AUTOSAR Configuration Tool
Thank You