AUTOSAR: Were expectations fulfilled?

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Alte Reithalle, December 2, 2010
Were expectations fulfilled?

Long story short:

> Many are.

> Some still need a few steps to go.
Let’s look back in history

Introduction of OSEK OS 10 years ago

▶ Quote:

“I moved my application to OSEK, paid 30kEUR for the license, needed 8kByte more memory, where is the benefit?”

▶ Question:

“How do you use the OS?”

▶ Answer:

“My application runs in a 1ms task”
> What has been accomplished

Areas for Improvement

  Situation

  OEM’s point of view

  Supplier’s point of view

  Standard software provider’s point of view
AUTOSAR

- is a key enabling technology to manage the growing electrics / electronics complexity. ([www.autosar.org](http://www.autosar.org))
- leads to a common "language", "understanding", and "methodology" in the community
- facilitates the exchange of software and hardware ([www.autosar.org](http://www.autosar.org))
- allows an implementation of basic system functions as an OEM wide "Standard Core" solution ([www.autosar.org](http://www.autosar.org))
Agenda

What has been accomplished

> Areas for Improvement

  Situation
  OEM’s point of view
  Supplier’s point of view
  Standard software provider’s point of view
Dimensions of AUTOSAR

Scope & Functionality

Methodology

Business/Cooperation Models
Scope & Functionality: AUTOSAR Versions

- 3.x is mature and fits for series production projects
  - 3.x solution can be enriched by 4.x features where needed
  - 3.x will be in use for many more years
  - Customers, who evaluate AUTOSAR, can use this version as well

- 4.x will be ready to be implemented soon
  - Customers, who plan to use AUTOSAR for series production 2015+ or later, shall evaluate this version

- OEMs: to deal with one version
- Tier1s: to use two different versions in future
- SW-Prov.: have to implement and maintain different versions
OEMs use different scope and functionality
- integration of legacy parts
- features like post-build
- OEM-specific extensions
- OEM-specific compatibility modules
- communication only versus “whole” AUTOSAR

+ OEMs: to deal with one version
- Tier1s: to use different versions
- SW-Prov.: to implement and maintain many different versions
Already version 1 of AUTOSAR increased the complexity dramatically compared to previous solutions.

Version 4.0 and later increase it even more.

- **OEMs:** have to select the scope they like to have
- **Tier1s:** due to different scopes there is a lower level of reuse
- **SW-Prov.:** complexity increases the effort
OEMs use the AUTOSAR-methodology to a different extend
- detailed architecture using SWCs versus just communication matrix
- OEMs have to adjust their processes and tool landscape
- new responsibilities and new roles

- OEMs: change not completed
- Tier1s: change not completed
  have to deal with different approaches
  have to deal with different completeness/maturity
- SW-Prov.: have to assist in filling the gaps
  get many request for trouble-shooting

The process is currently not running smooth at every project!
Methodology: Data Formats

- High variety of data formats
  - System description
  - DBC (different versions)
  - LDF
  - Fibex (different versions)

- Legacy formats have to be converted to the system description format.

- Converted data has different levels of completeness

- OEMs: changes in the tool-chain
- Tier1s: unexpected efforts due to incomplete SD
- SW-Prov.: request for special tools, converters, ...
The AUTOSAR methodology shifts efforts for specification and design to an earlier stage of the process.

- **OEMs:** get new tasks, need new skills, have more effort
- **Tier1s:** have to deal with sometimes incomplete inputs, need tools to fill the gaps
- **SW-Prov.:** tools are requested, which assist to solve the issues due to the changing situation. There are “moving targets”
The OEM selects one SW-Provider, who implements AUTOSAR according to the requirements of the OEM.

**OEMs:** implementation fits to the needs high degree of interoperability of ECUs

**T1s type A:** get a complete package easy start into AUTOSAR

**T1s type B:** have their own platform hard to adapt to the OEMs requirements

**SW-Prov. A:** large project

**SW-Prov. B:** harder to get into a business at Tier1s for that OEM
The OEM defines the requirements and leaves the implementation to the tier1/SW-provider.

- **OEMs:** no investment for the implementation
- **T1s type:** make or buy a solution fitting to the OEMs requirements
- **SW-Prov.:** to implement and maintain many different versions
Today’s Dimensions of AUTOSAR

Scope & Functionality

Methodology

Business/Cooperation Models
Conclusion: Expectations fulfilled?

- Quote: “I thought ECUs based on AUTOSAR are cheaper than the former ones because
  - AUTOSAR is a Standard and
  - we will have a high competition of many SW-providers”

- Unfortunately for the time being
  - it’s a standard with many variants
  - the effort for an AUTOSAR-implementation is very high
  - the market size is limited
  - SW-Provider’s effort is much higher than the money they can realize

We’re on the way !!
If I meet a Christmas Elf who grants me three wishes to improve AUTOSAR:

1. Let’s consolidate, gain experiences, and then do the next steps.

2. The software providers get a chance for a return on investment.

3. Three more wishes, just in case ...
Thank you for your attention.

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