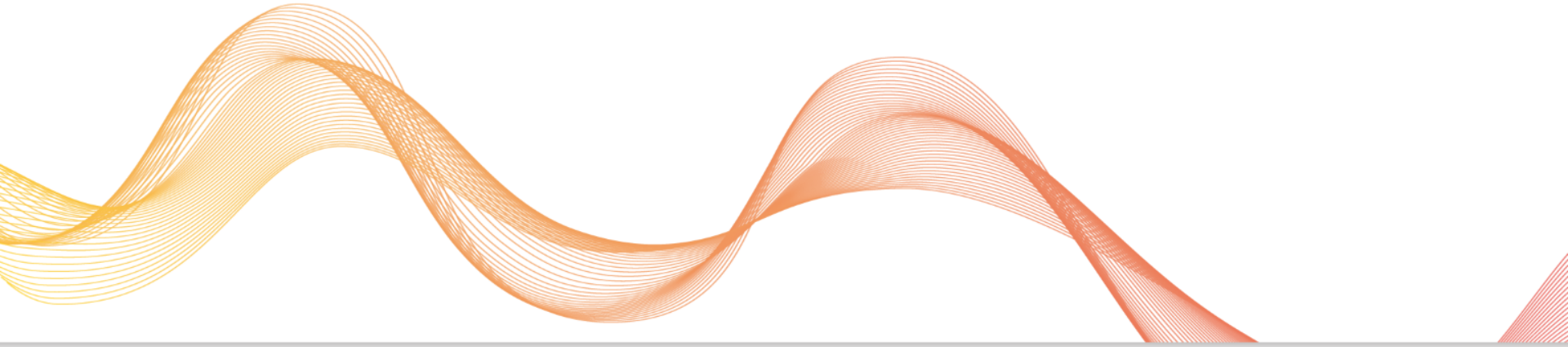
ASAM | Association for standardisation of automation and measuring systems



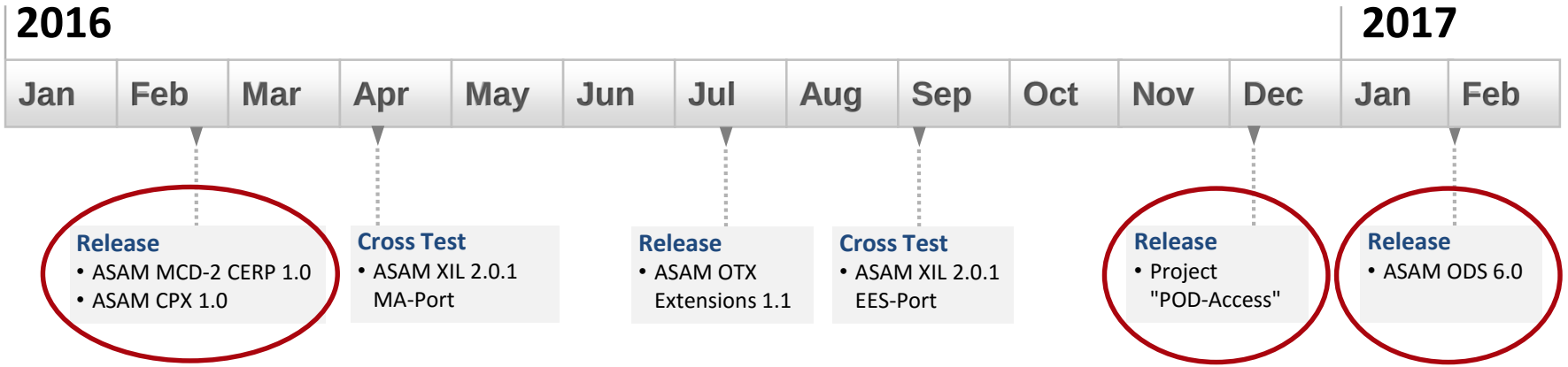
Current and Future Standard Development Projects at ASAM

Thomas Thomsen
Global Technology Manager, ASAM e.V.

Content

Content

ASAM Road Map for 2016 (prelim.)



Other ASAM Projects in 2016

(with releases in 2017 or later)

- ASAM ODS 6.0
- ASAM MCD-1 XCP 1.4
- ASAM MCD-2 CERP 1.0.1
- ASAM CPX 1.0.1
- ASAM XIL 2.0.3 and 2.0.4

ASAM Concept Projects

- Big-Data Technologies for ODS

New Standard
Just Released

ASAM MCD-2 CERP

Title: Calibration Expert System Rule and Product Model Format
Release: February 2016

Goal: Define a data model and language to express complex calibration parameter dependencies.

Use-Cases:

Standard is the basis for a new class of tools: Calibration Expert Systems.

- Define system parameters (e.g. hardware, legal values)
- Check parameter consistency
- Check parameter plausibility
- Future: Calculate calibration parameters from defined parameters and system model data

Benefits:

- Capture business-critical expert knowledge
- Improve calibration quality and detect errors early
- Improve communication between controls engineering, software development, calibration, test and quality assurance
- Future: Speed-up calibration process via parameter calculation

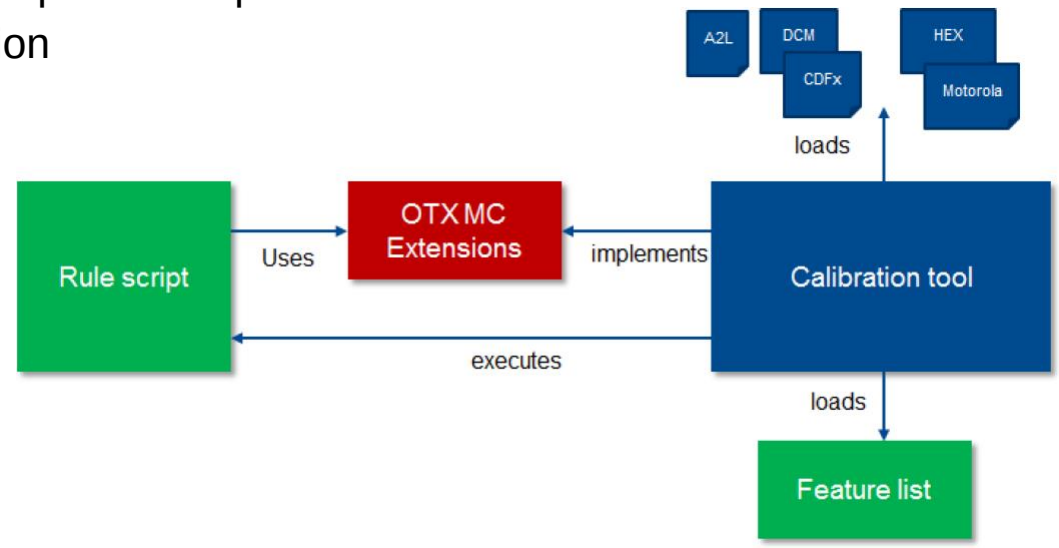
New Standard
Just Released

ASAM MCD-2 CERP

Title: Calibration Expert System Rule and Product Model Format
Release: February 2016

Technical Content:

- Turing-complete rule language to express complex calculations
- ASAM MCD-2 CERP is an extension of OTX (ISO 13209)
- 9 extensions are shared with ASAM MCD-2 CERP
  - access to calibration and measurement data
  - access to A2L data
  - mathematical functions
- ASAM MCD-2 CERP defines 3 additional extension:
  - Feature: distinct property of the device to be calibrated (i.e. number of cylinders, power of engine, valid emission standard, etc.)
  - RuleProcedure: definition of rules
  - TermProcedure: definition of pre-conditions for rules
- Standard allows the definition of calibration variants



New Standard
Just Released

ASAM CPX

Title: Calibration Process Exchange Format
Release: February 2016

Goal: Define an exchange format for sequences of ECU calibration, based upon ISO OTX.

Use-Cases:

- Define and document the steps of specific calibration processes
- Create comprehensive libraries for ECU calibration
- Automated calibration

Benefits:

- Capture business-critical expert knowledge
- Improve calibration process efficiency and repeatability

New Standard
Just Released

ASAM CPX

Title: Calibration Process Exchange Format
Release: February 2016

Technical Content:

- Process language based upon OTX (ISO 13209)
- ASAM CPX is an extension of OTX
- 9 extensions are shared with ASAM MCD-2 CERP
- ASAM CPX defines 3 additional extension:
  - MeasurementRead: functions to control the execution of measurements, e.g. start, stop, access to recorded data
  - Model: functions to control the execution of models, e.g. start, stop, access to model data
  - ControlMath: mathematical functions
- Future: definition of flow charts and state machines to describe workflows
  (could potentially become part 5 of ISO 13209)

New Standard

Project "POD-Access *)"

Title: - to be determined -
Release: Q4 2016

Goal: Standardize POD configuration and software interface between the POD hardware and ECU software.

Technical Use-Cases:

- Integration of POD-driver into the ECU software
- Configuration of the POD

Benefits:

- Easier integration of a POD into an ECU
- Easier connection and configuration of multiple tools to one POD
- Use of multiple PODs for one ECU development project

➢ Enables OEMs and Tier-1s to select best-in-class calibration tools

*) POD: Plug-On-Device

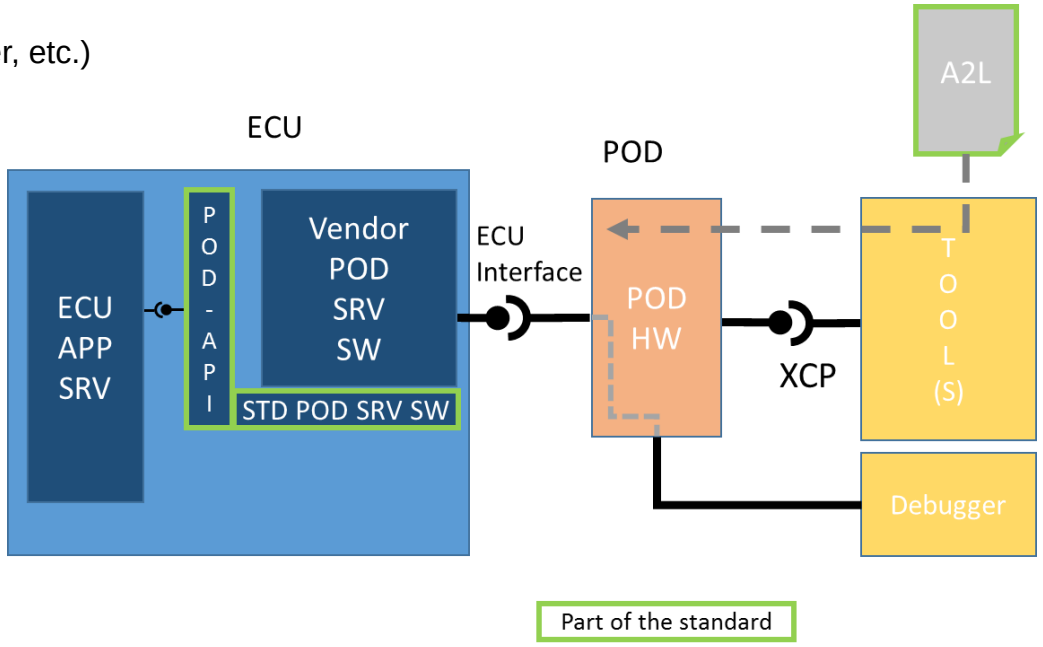
New Standard

Project "POD-Access"

Title: - to be determined -
Release: Q3 2016

Technical Content:

- Definition of POD topologies
  (e.g. single POD / single tool, multiple PODs / multiple tools, etc.)
- Definition of POD resources
  (e.g. memory, CPU core, execution time, timer, etc.)
- ECU & POD startup
- POD state model
- API for common technical use-cases
  (e.g. detection, initialization, measurement, etc.)
- AML*)-definition for POD



*) AML: A2L Meta Language

Other Projects

ASAM MCD-1 XCP 1.4

- Improvements for fast data acquisition, e.g. packed DAQ lists, optimized methods for DAQ configuration
- Enhancements for DAQ on multicore processors
- Features needed by the upcoming POD-Access standard

ASAM XIL 2.0.3 and 2.0.4

- Standard is in maintenance mode: bug-fixing and minor improvements, only
- Two cross test events with major HIL system vendors
- Cross tests supported by ASAM-developed test-cases and report generator
- April 2016: focus on model access port
- September 2016: focus on electrical error stimulation port

Content

Major Release

ASAM ODS 6.0

Title: Open Data Services
Release: Q1 2017

Goal: Replace CORBA with state-of-the-art technology for client-server communication, and modernize the ODS API.

Phase 1 - Client-Server Technology Research Project: finished

- Requirements, benchmarking and feasibility study
- Supported by two research companies, paid by ASAM
- Investigated multiple open-source technologies: REST, Thrift, Protobuf

➢ Result: Project group accepted two technologies as foundation for the future ODS API
- W3W REST (standard for API specification)
- Google Protobuf (data serialization)

Phase 2 - API Specification: started

- Specification of new ODS API based upon REST and Protobuf
- API is consolidated and shall become easier to use
- Special focus on performance and IT security

Concept Project: Big-Data Technologies for ODS

Goal: Evaluation of open-source Big-Data technologies for use with ODS servers.

Phase 1 - Use-Case Analysis: ongoing

- Collect end-user use-cases for automotive Big-Data
- Determine next steps of the concept project

Phase 2 - Technology Analysis and Prototyping: future

Potentially evaluated technologies (depending on phase 1 results)

- Database: NoSQL
- File management: Hadoop & HDFS
- File format: Parquet
- Search & visualization: Spark / Tableau

➢ Expected result: Concept paper with recommendations for the further development of ASAM ODS

Content

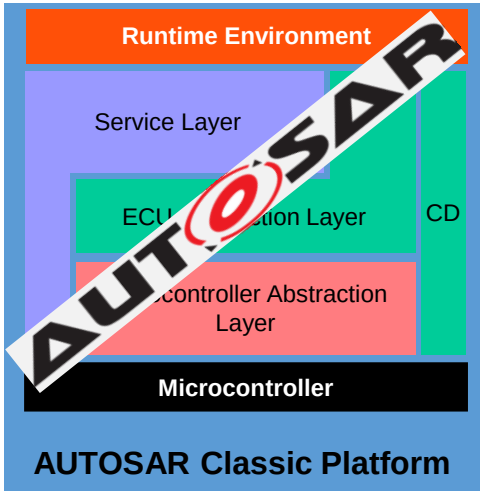
Positioning of the Adaptive Platform (AP)

Market Analysis

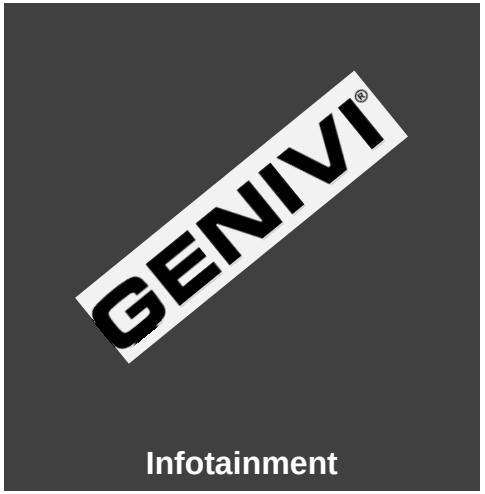
Gap: No standard solution, yet
➔ New AUTOSAR product: AP

Real time requirements

Safety criticality



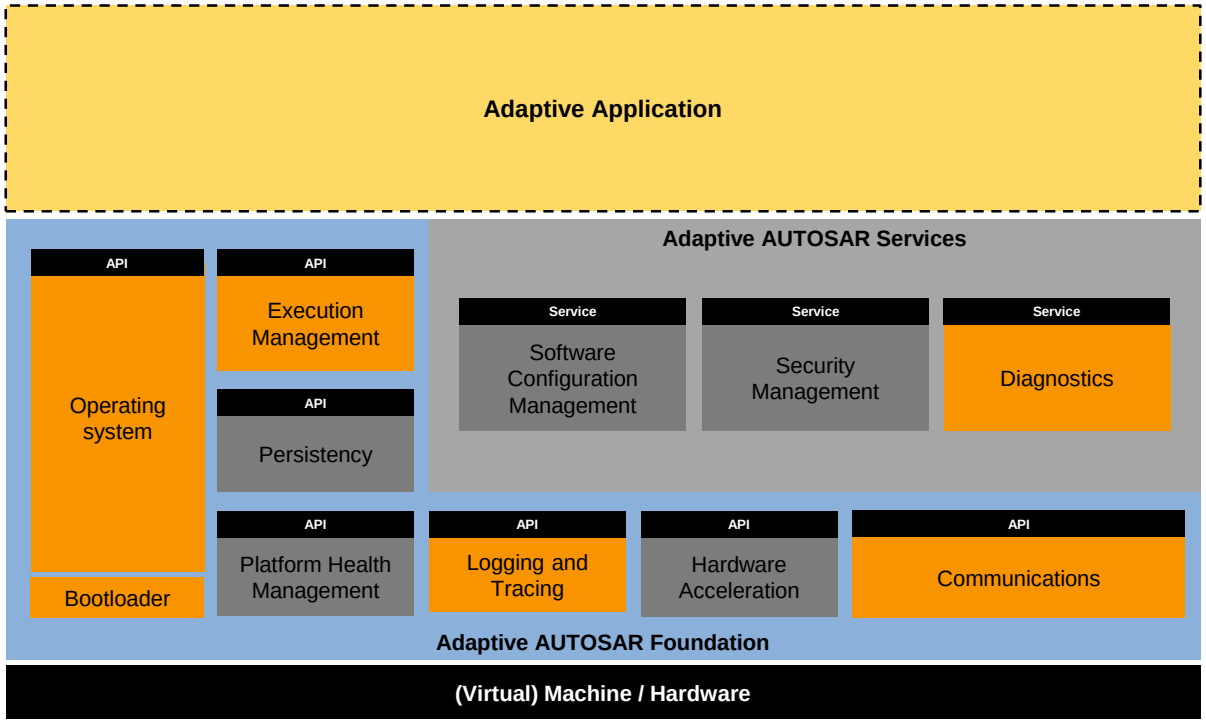
Platform supporting „Planned dynamics“



Computing power

Source: AUTOSAR All-WP Meeting, 17.11.2015

Architecture of the Adaptive Platform



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!

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**

In scope of R1.0.0

Planned for future releases

Potential Impact for ASAM Standards

- **OS and EM with dynamic memory allocation: No static memory addresses any more.**
  → most likely requires changes in:
  - ASAM MCD-1 XCP
  - ASAM MCD-2 MC (ASAP2)
  - ASAM CDF
- **Communication Cluster: Service-based communication via SOME/IP.**
  → most likely requires changes in:
  - ASAM MCD-1 XCP
  - ASAM MCD-2 NET (FIBEX)
- **Logging and Tracing Cluster: Security-related events.**
  → probably requires changes in:
  - ASAM MCD-1 XCP
  - ASAM MCD-2 MC (ASAP2)
- **Diagnostic Cluster: New features, potential bi-directional communication.**
  → potentially requires changes in:
  - ASAM MCD-2 D (ODX)

Thank you
for your attention

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