AutoSAR Overview

FESA Workshop at KTH 2010-04-12

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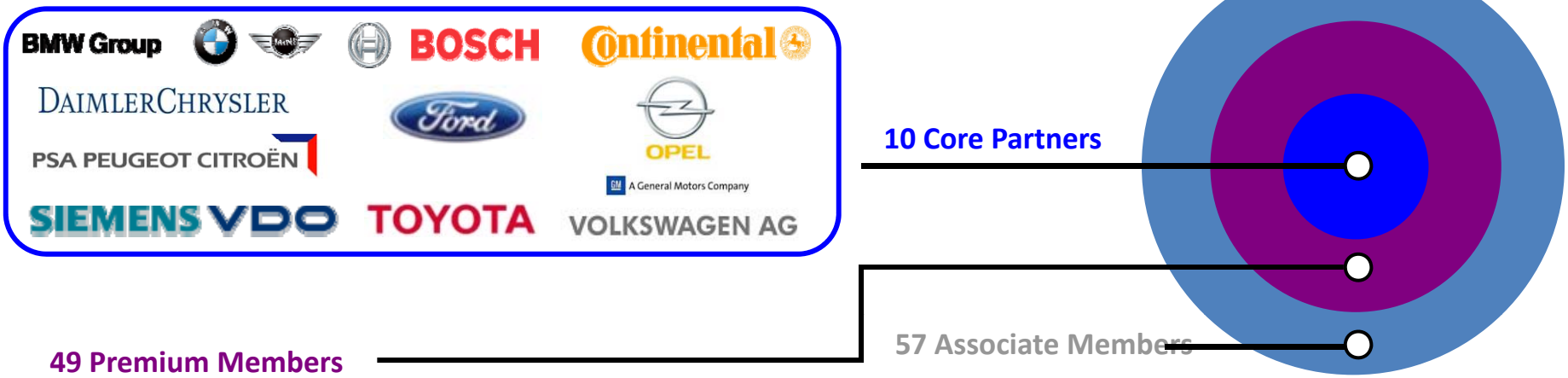
Volvo Cars and
Mälardalen University

This presentation is based on a tutorial prepared by the AutoSAR Consortium

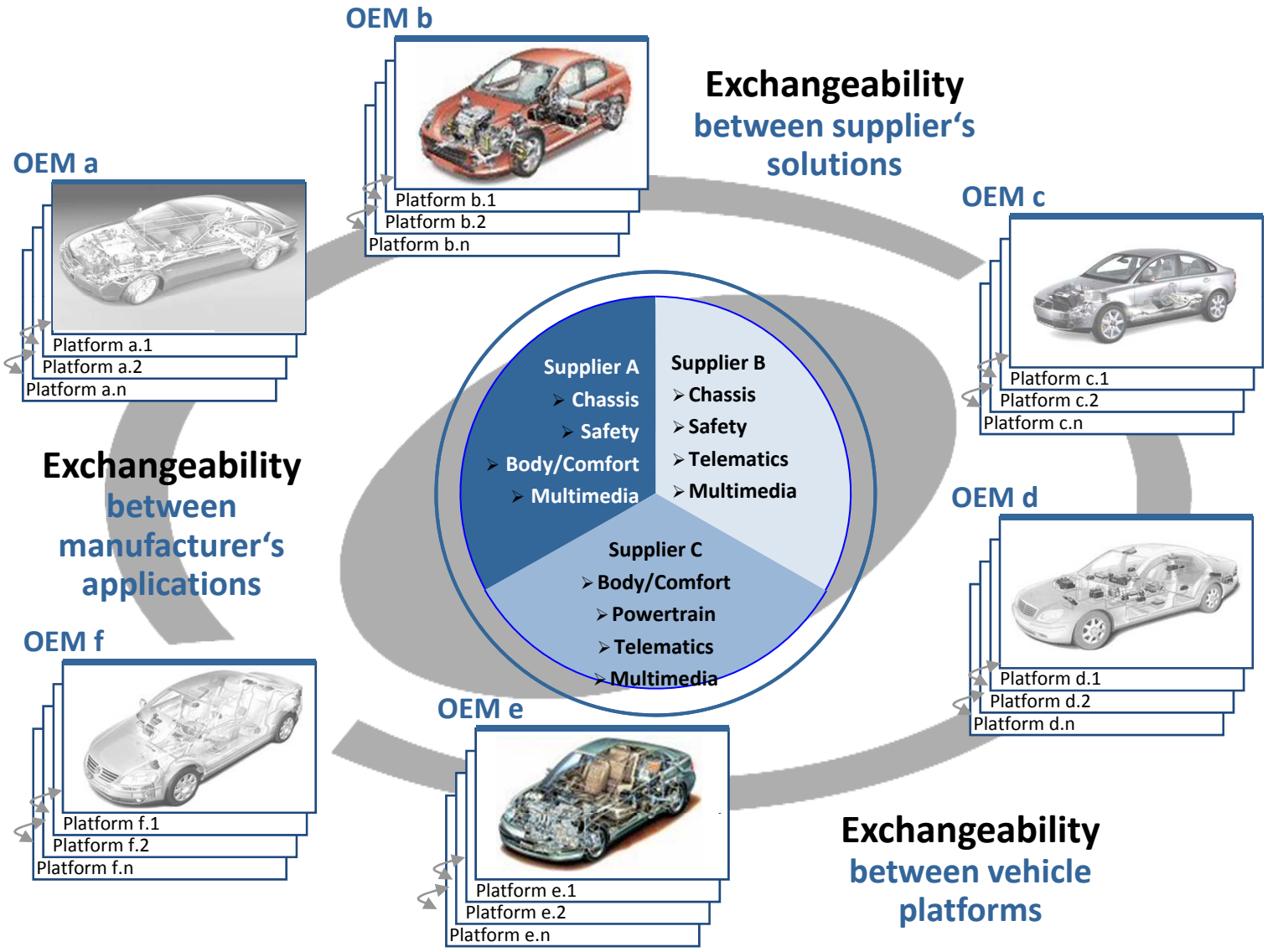
AUTOSAR – Members Status June 2007



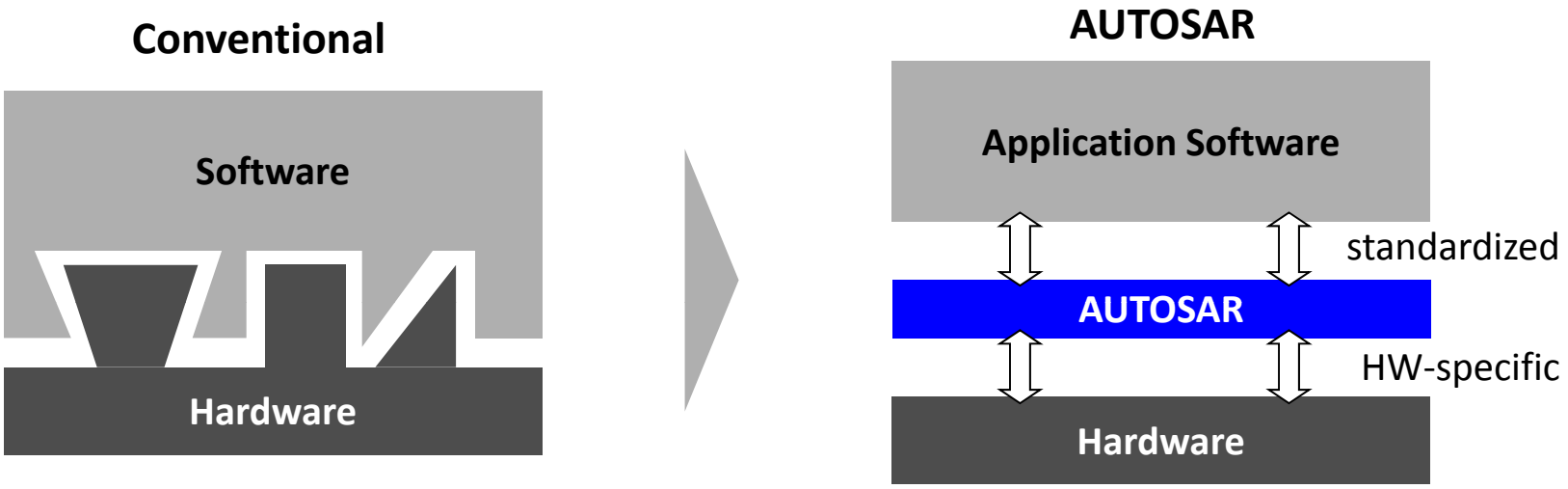
BMW Group
BOSCH
Continental
DaimlerChrysler
Ford
OPEL
A General Motors Company
PSA PEUGEOT CITROËN
SIEMENS VDO
TOYOTA
VOLKSWAGEN AG

JOHNSON CONTROLS
MBtech Mercedes-Benz technology
ESTEREL Technologies
NXP founded by Philips
MAN
MAGNA
Mentor Graphics
ALPINE Car Audio and Navigation Systems
dSPACE
ETAS
ARM
HYUNDAI·KIA MOTORS
HITACHI Inspire the Next
HONDA
TRW
The MathWorks
freescale semiconductor
NISSAN
DELPHI
DENSO
FEV
FUJITSU
DECOMSYS
LEAR CORPORATION ADVANCE RELENTLESSLY
MAGNETI MARELLI
Telelogic
infineon
softing
PORSCHE
HELLA Ideas today for the cars of tomorrow
Autoliv
IAV GmbH
NEC
NEC Electronics Corporation
mazda
tniSOFTWARE
VOLVO
Valeo
ZF
Infosys
RENESAS Everywhere you imagine
KPIT Cummins Infosystems Limited
Visteon
ZF Lenksysteme
vector
TTAutomotive
Fiat Group Automobiles SpA

Exchangeability and Reuse of SW Components



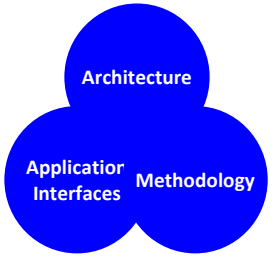
Changing Automotive SW Development



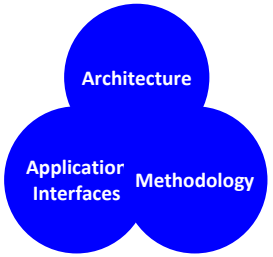
- **Hardware and software** will be **widely independent** of each other.
- **Development processes** will be **simplified**.
  This **reduces development time** and **costs**.
- **Reuse** of **software increases** at OEM as well as at suppliers.
  This **enhances** also **quality** and **efficiency**.

Automotive Software will become a product.

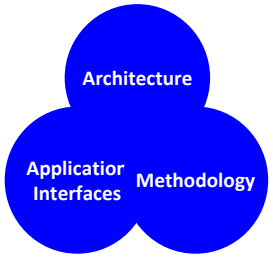
AUTOSAR Main Working Topics



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



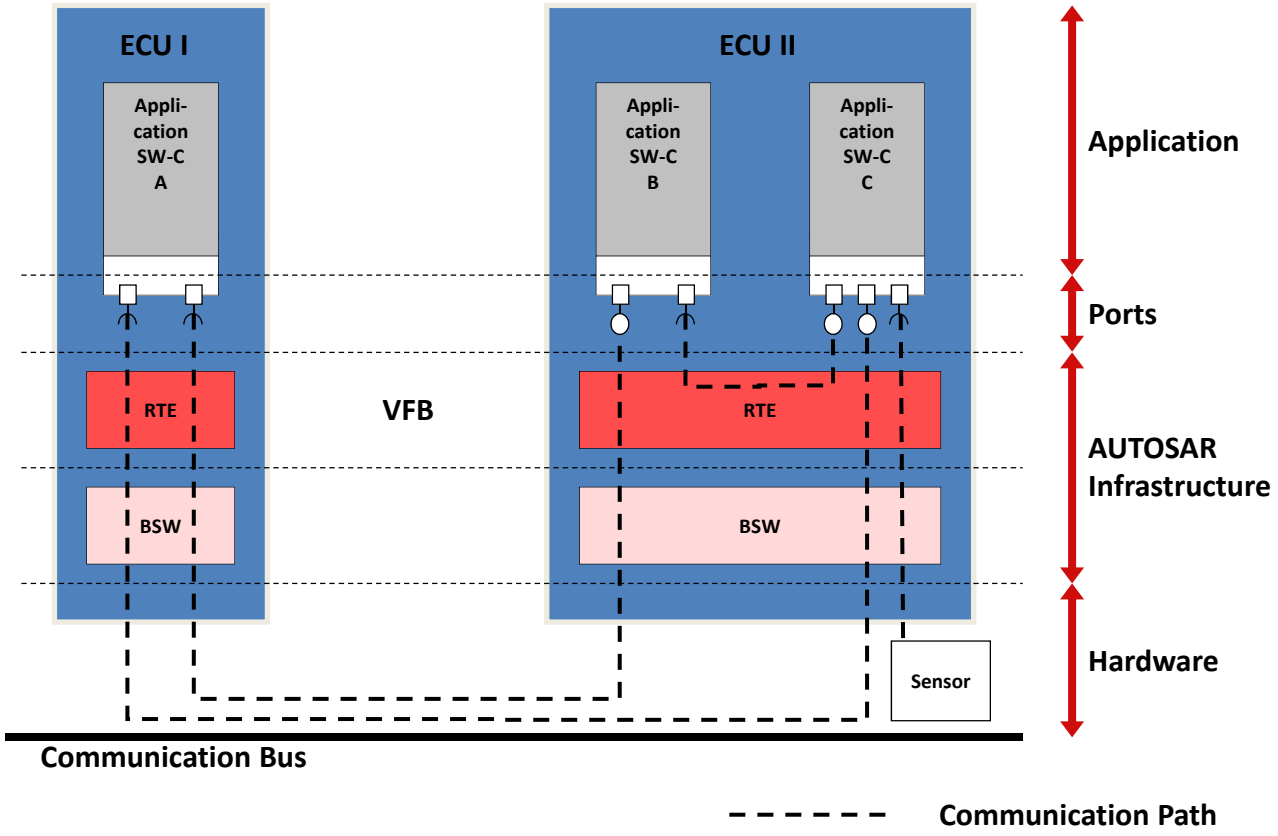
- Methodology:
  Exchange formats or description templates to enable a seamless configuration process of the basic software stack and the integration of application software in ECUs and it includes even the methodology how to use this framework.



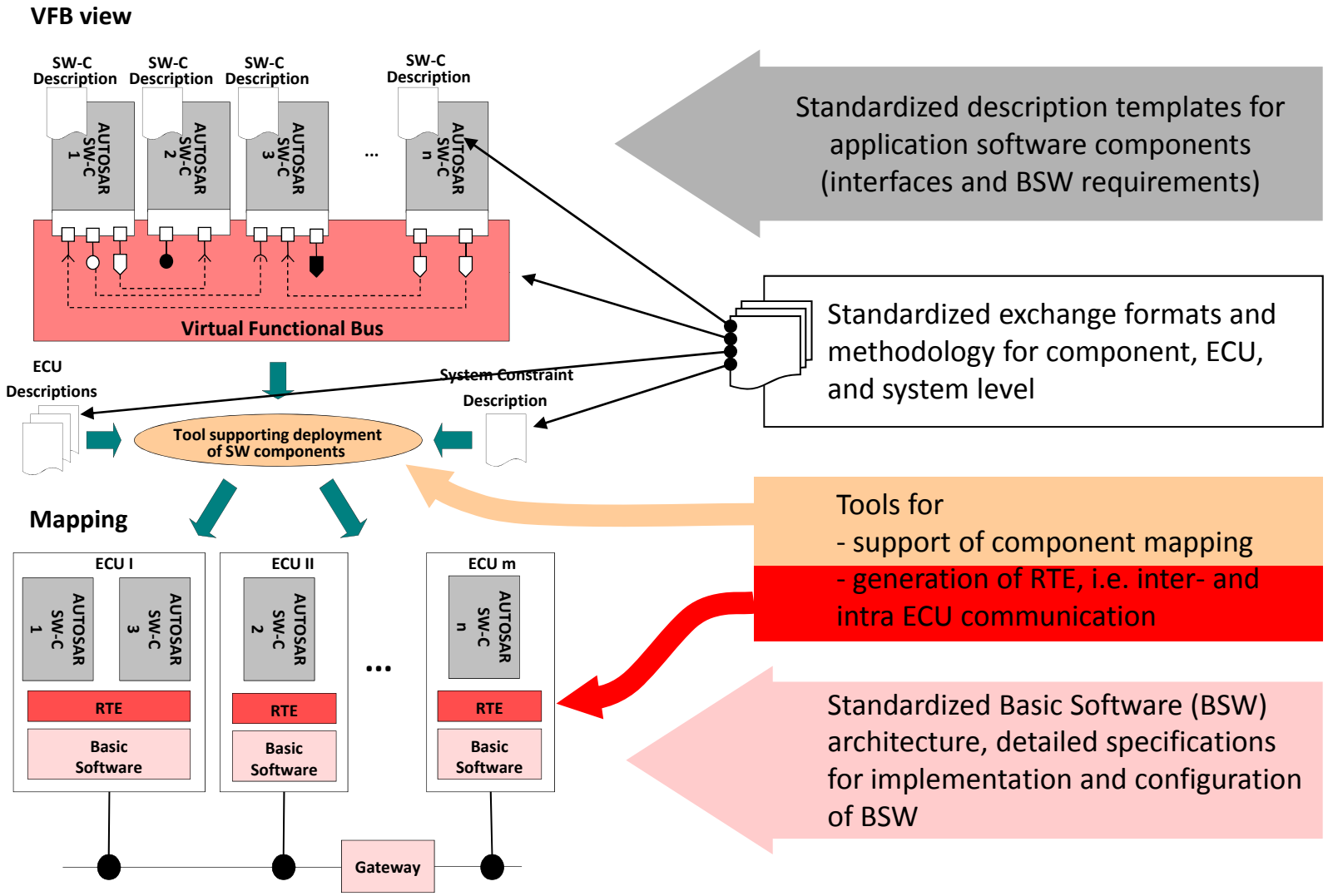
- Application Interfaces:
  Specification of interfaces of typical automotive applications from all domains in terms of syntax and semantics, which should serve as a standard for application software.

Intra- and Inter-ECU Communication

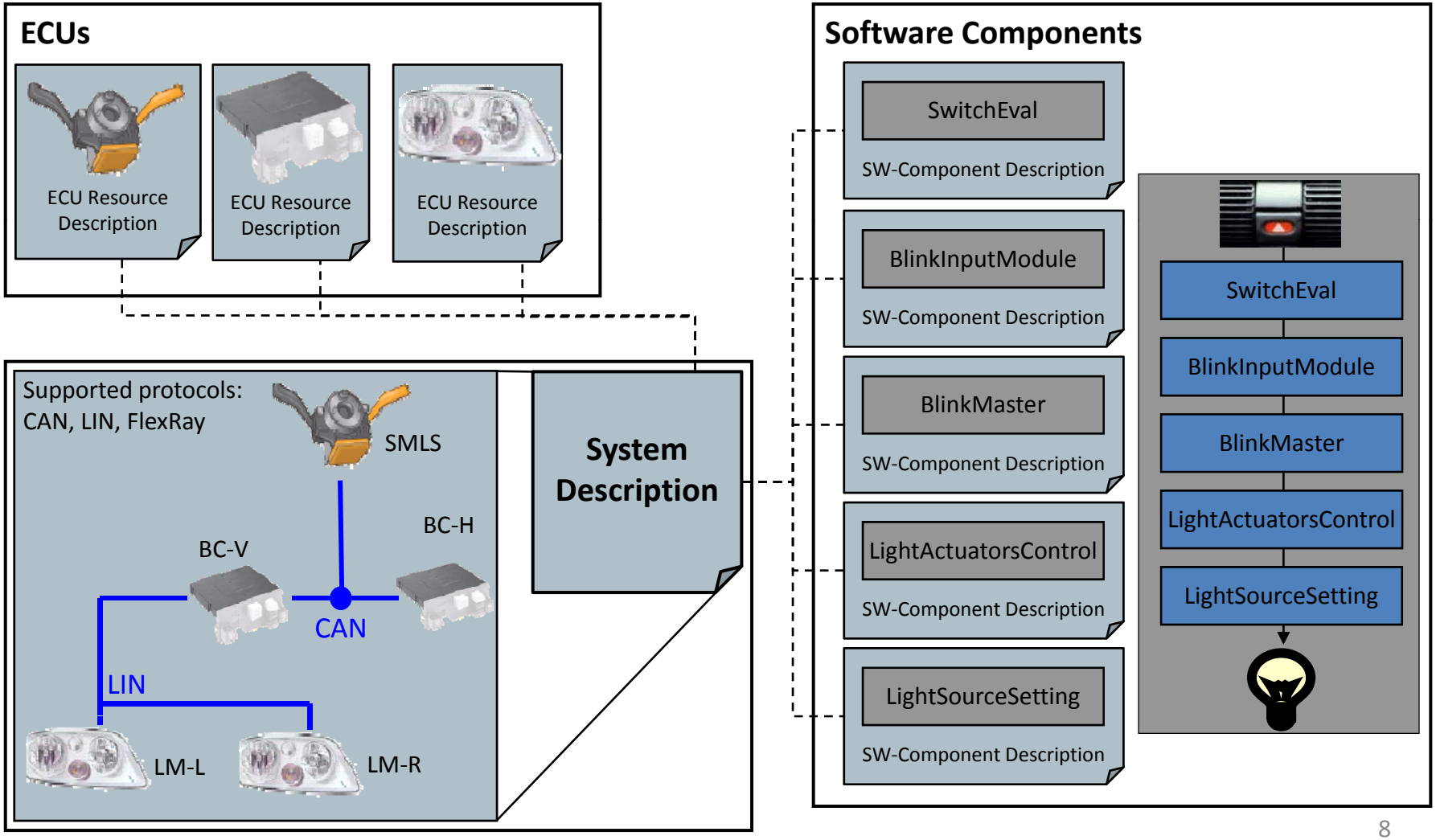
- Ports implement the interface according to the communication paradigm (here client-server based).
- Ports are the interaction points of a component.
- The communication is channeled via the RTE.
- The communication layer in the basic software is encapsulated and not visible at the application layer.



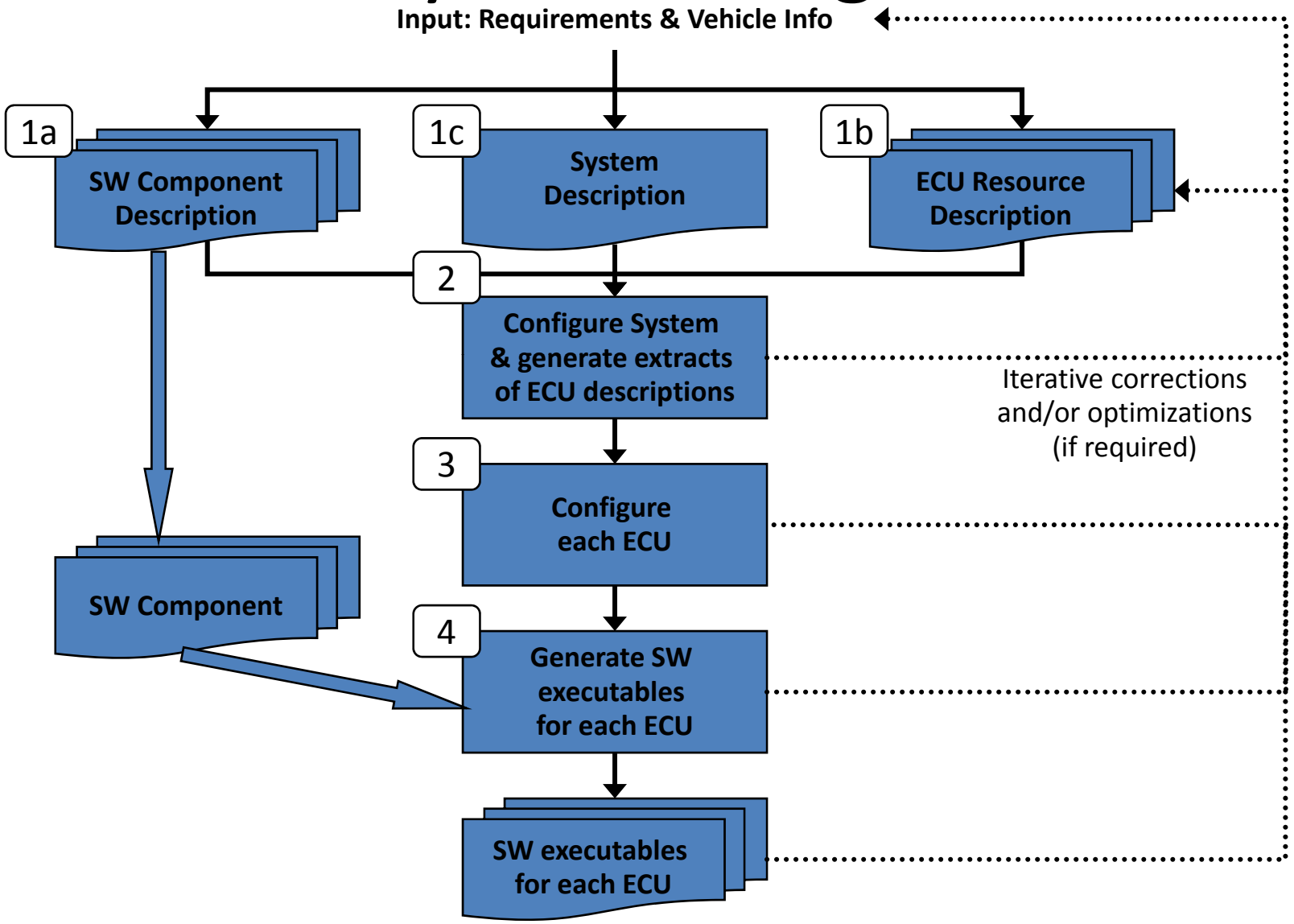
AUTOSAR Methodology



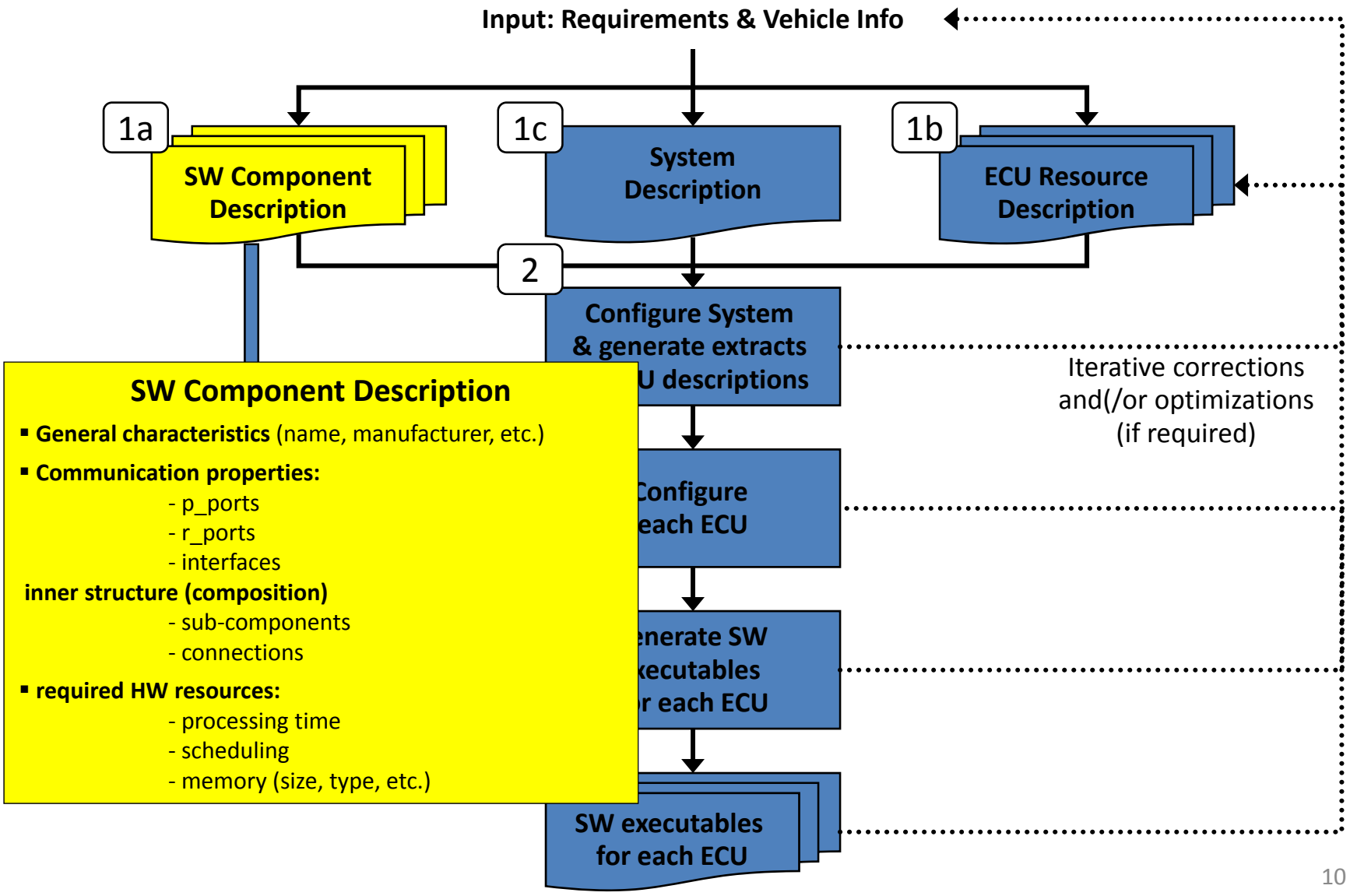
AutoSAR Descriptions



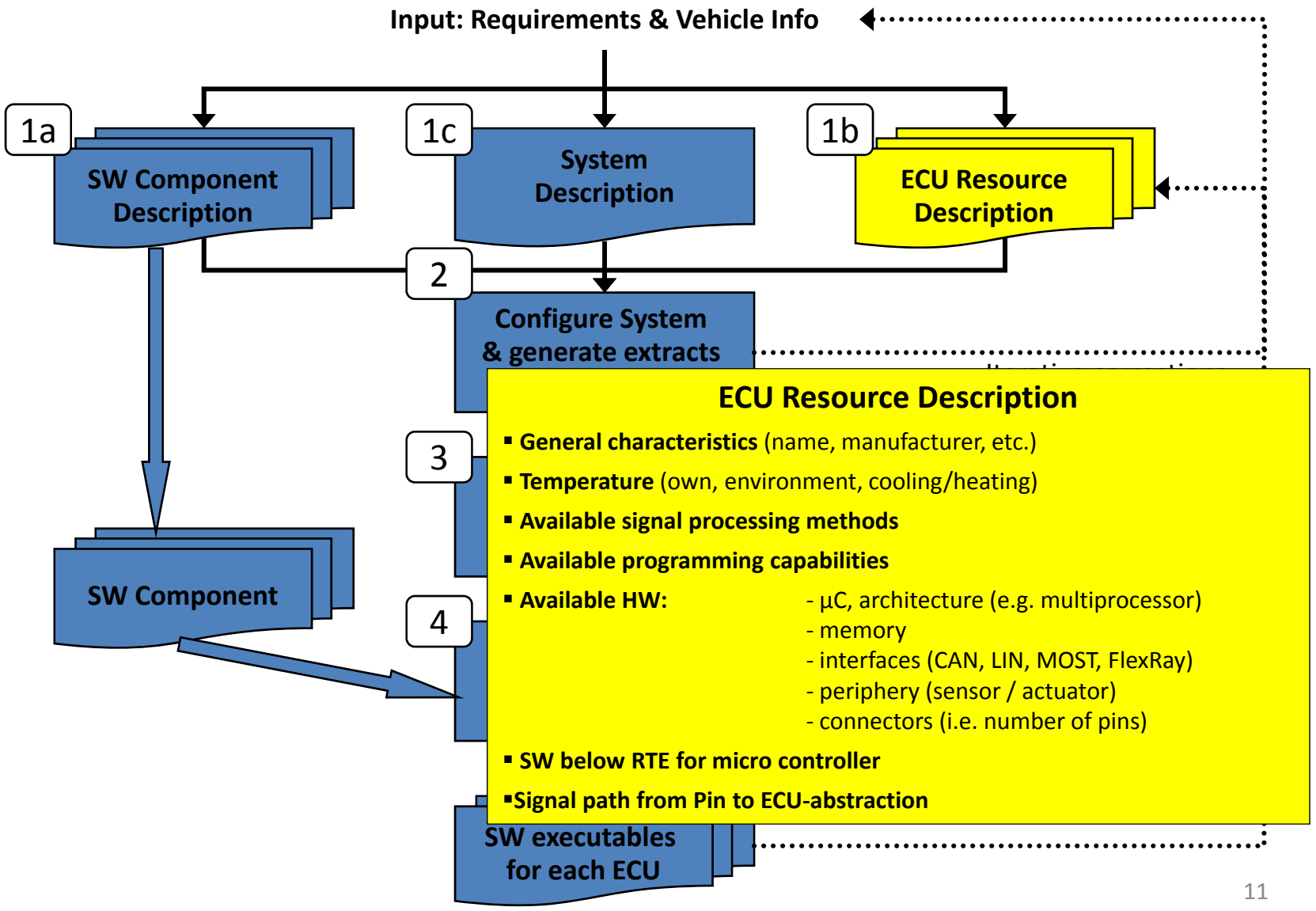
AUTOSAR System Design Process



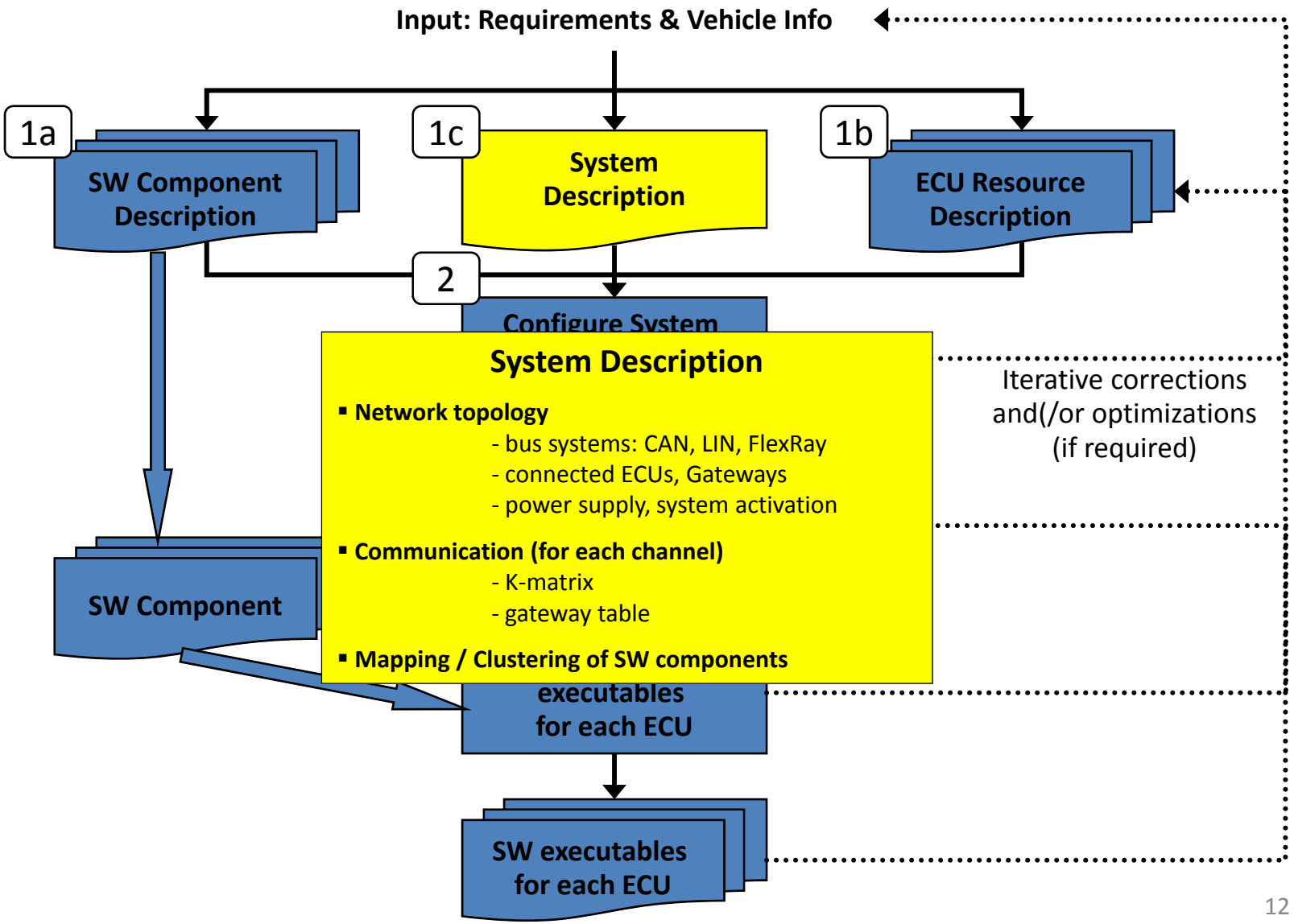
AUTOSAR System Design Process



AUTOSAR System Design Process

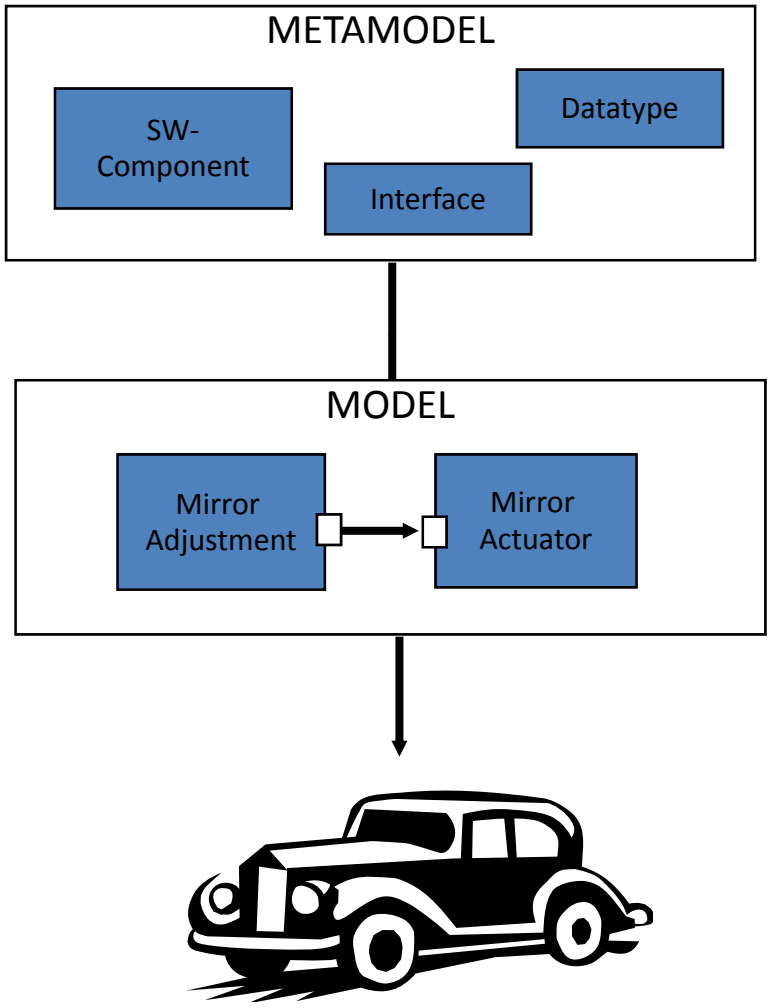


AUTOSAR System Design Process

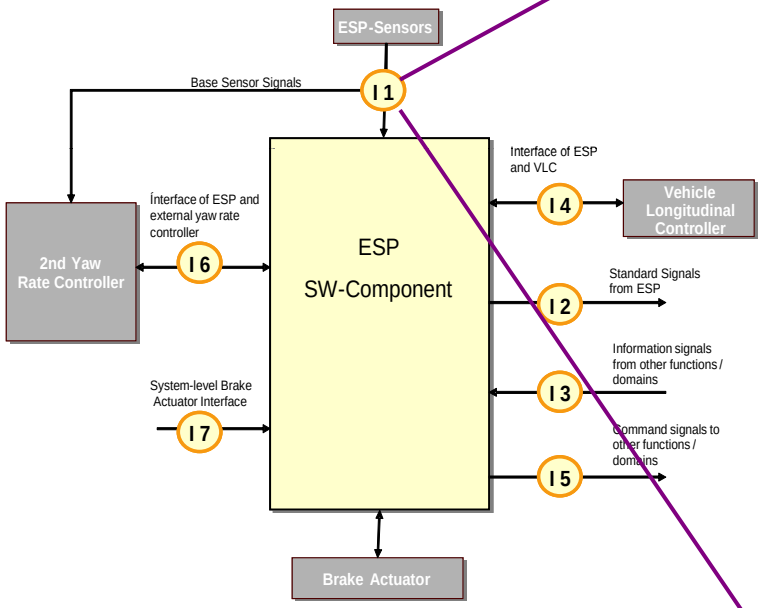


AUTOSAR Metamodel

- The metamodel is modeled in UML
- The structure of the information can be clearly visualized
- The consistency of the information is guaranteed
- Using XML, a data exchange format can be generated automatically out of the metamodel



Application Interfaces to Ease Reuse



Standardized application interfaces on system level
(ESP-system, chassis domain)

Data Type Name	**LongAccBase**
…	
Data Type Name	**YawRateBase**
Description	Yaw rate measured along vehicle z- axis (i.e. compensated for orientation). Coordinate system according to ISO 8855
Data Type	S16
Integer Range	-32768..+32767
Physical Range	-2,8595..+2,8594
Physical Offset	0
Unit	rad/sec
…	….
Remarks	This data element can also be used to instantiate a redundant sensor interface. Range might have to be extended for future applications (passive safety).
…	
Data Type Name	**RollRateBase**