

CVL Tutorial

Standardization of Variability
Modeling in languages

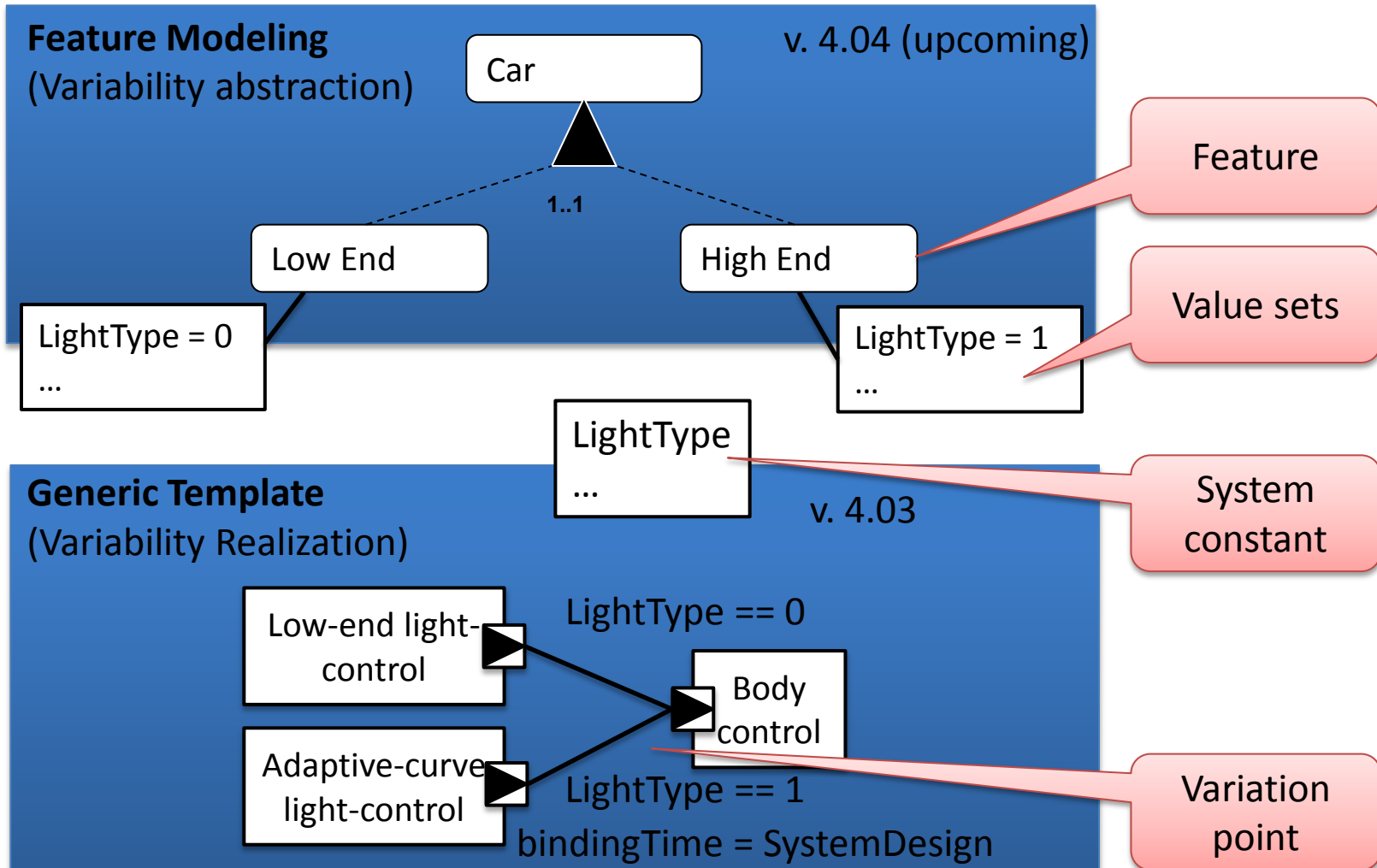
Variability in AUTOSAR

CVL is not alone

AUTOSAR

- An open, standardized software architecture for the automotive industry
- Provides many things...
 - OS (based on OSEK)
 - Component model, incl. middleware, packaging, wiring, deployment, calibration
 - Architecture DSL
 - Common services and interfaces
 - ...
 - Over 5k pages of documentation...

Variability Handling in AUTOSAR



Variation Point Types

- Variability is applied to different parts of the metamodel
 - Aggregation, association, attribute value, property set
- Resulting variability
 - Optional component
 - Optional port
 - Optional connector
 - Parameter variability

Binding Time



System
Design

Code
Generation

Pre-
Compile

Link
Time

Post
Build

M1 model
variant
creation

RTE
generation

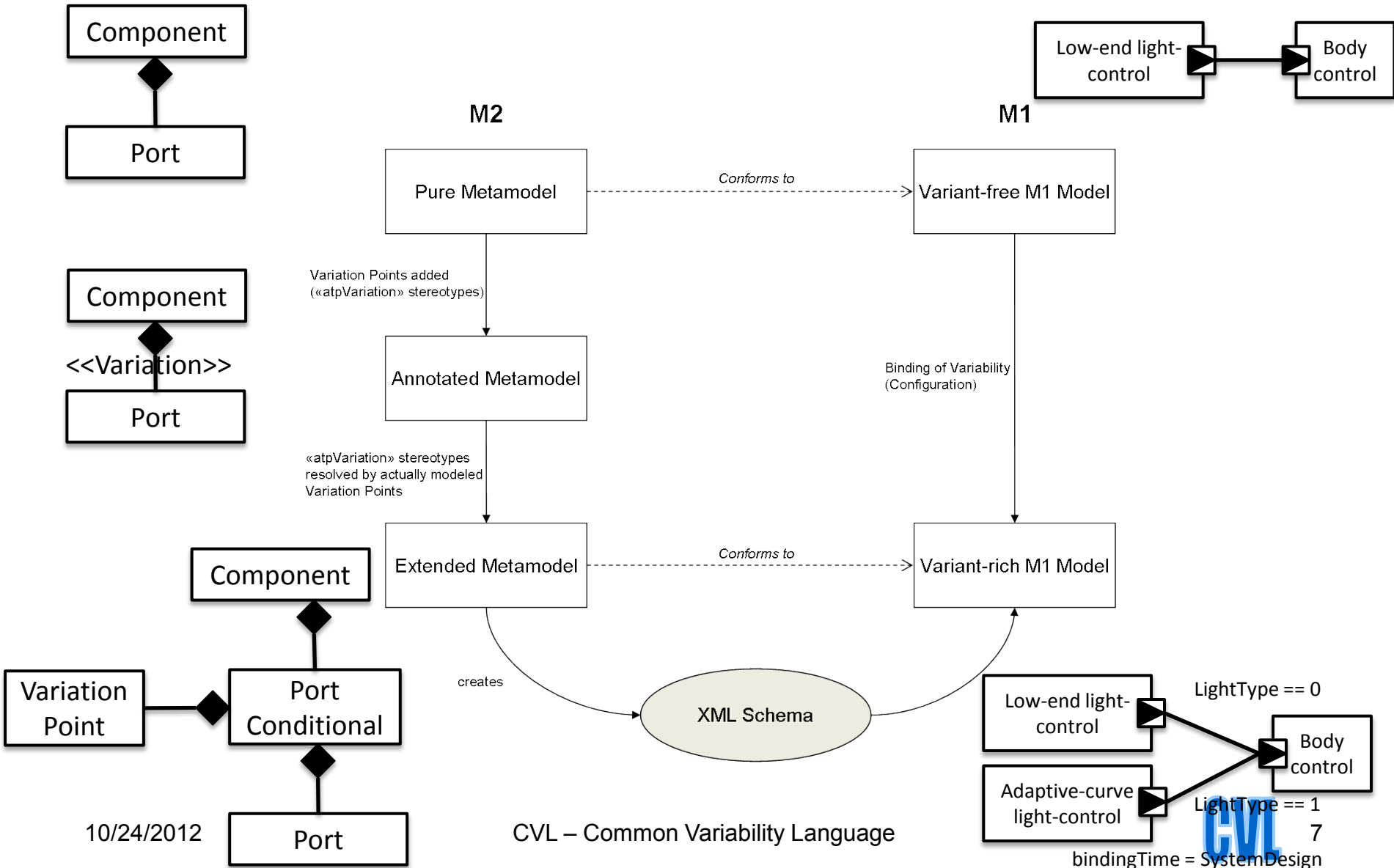
CPP

Linker

ECU boot

No runtime variability

Variability Realization



Comparison

	AUTOSAR	CVL
Abstraction	Feature models	Cardinality-Based Feature Models
Realization	Options, alternatives, parameters Metamodel extension	Options, alternatives, parameters, substitution External references
Modularization	Basic feature model referencing	Configurable Units

Variability in MATLAB Simulink

CVL is definitely not alone ...

New Dedicated Constructs

- Model referencing (introduced in 2009)
 - realized using so-called "model-reference block"
 - supports "model variants"
 - variant models can be kept in separate .mdl files, allowing them to be version controlled separately
- Variant Subsystems (introduced in 2010)
 - realized using so-called "configurable subsystem block"
 - provides a template with variable subsystems, called "alternatives"
 - can define selection rules for selecting/configuring subsystem

Summary other initiatives

- Variability modeling and realization is a key capability for automotive engineering
- “Bill of features” concept requires integration across complete tool chain
- Multiple parallel standardization efforts
 - CVL – generic
 - AUTOSAR – AUTOSAR specific
 - SysML – has its own effort
 - Mathworks, ...
- CVL can provide a general set of concepts for more specialized efforts

What happens now with CVL?

Date: August 13, 2012



Common Variability Language (CVL)

OMG Revised Submission

OMG document: ad/2012-08-05

Submitters

IBM
Fraunhofer FOKUS
Thales
Tata Consultancy Services

Supporters

SINTEF
University of Oslo
Tecnalia Research & Innovation
University of Waterloo
IT University of Copenhagen
INRIA
CEA
Atego
Pure-systems

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CVL in the OMG process

- CVL Revised Submission exists
- In 3 months it is possible that CVL will be "adopted technology"
 - This depends on the reviews in OMG
- When adopted the FTF phase starts
 - FTF = Finalization Task Force
 - Tool vendors will implement CVL tooling and find problems
- After successful FTF then CVL will be "available technology"

Potential tool vendors for CVL?

- Research/experimental tools
 - from SINTEF, INRIA
- Internal proprietary tools
 - potentially from TCS
- Commercial tool vendors in consortium
 - IBM, pure-systems, Atego
- Commercial tool vendors outside:
 - Big Lever, NoMagic, Sparx, ...