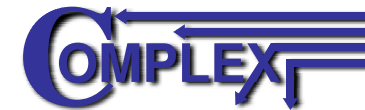


Generation of Abstract IP/XACT Platform Descriptions from UML/MARTE for System-Level Performance Estimation

Towards a MARTE to IP/XACT Generation Framework of HW
Platform Descriptions for a DSE Multilevel Performance
Estimation Framework



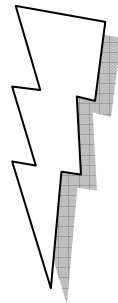
Fernando Herrera
Eugenio Villar



Goal



- Standard Format (in SW)
- Graphical, User Friendly
- Portable (Capture Tools)
- Embedded (MARTE)



- Extract Hw Platform
- Automatic
- Integration in a DSE framework
- Portable (Generation Environments)

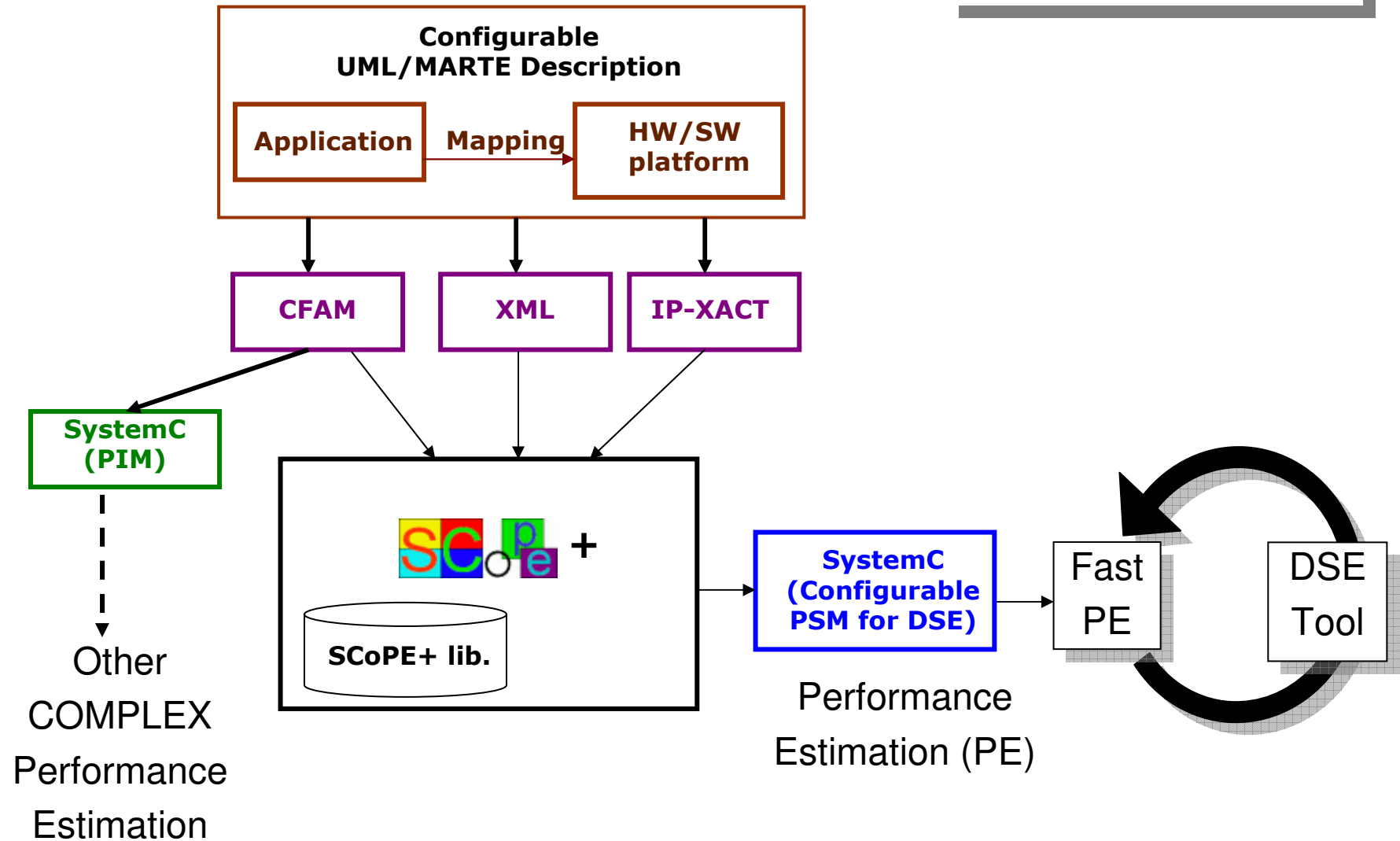


- Standard Format (in HW)
- Traceability
- Potential Scalability

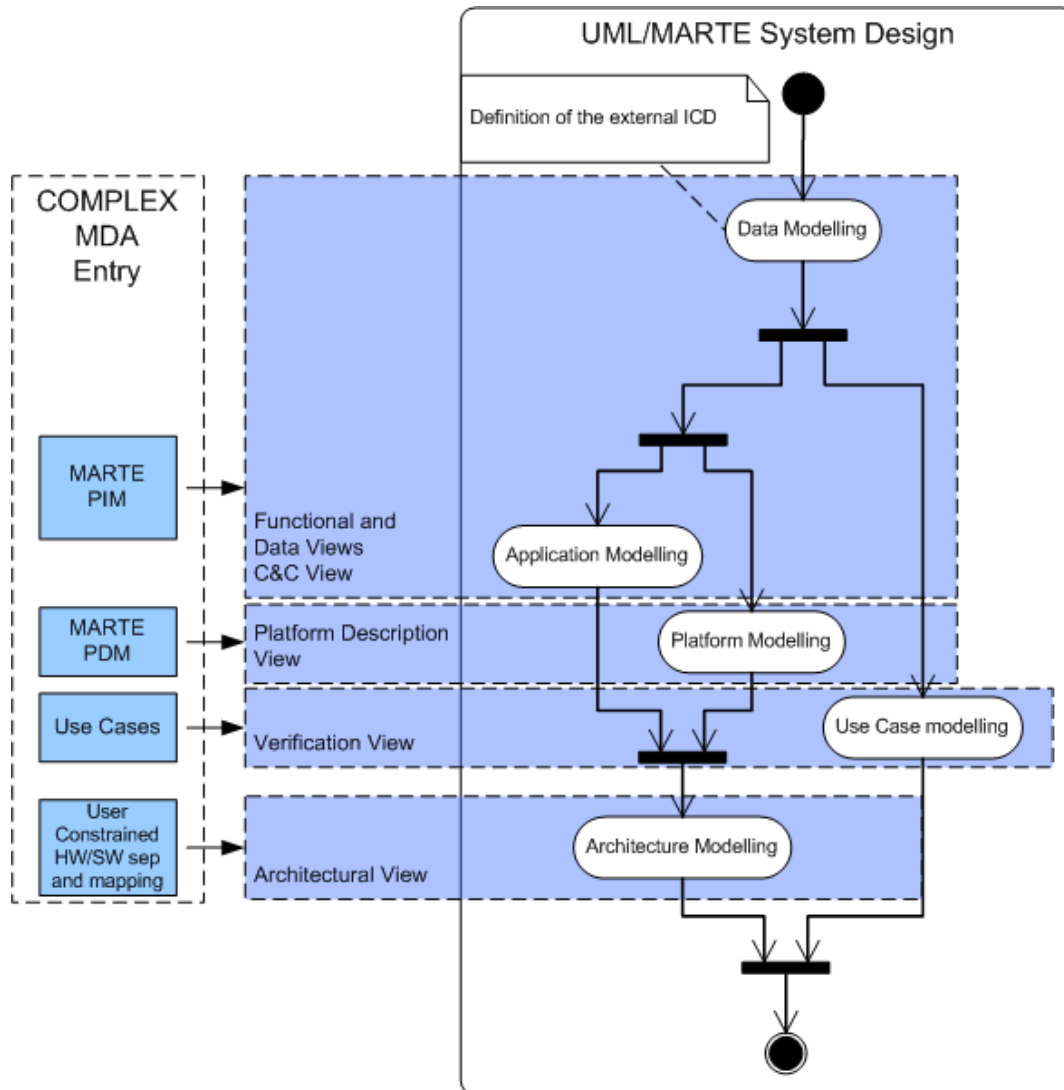
Goal

- “Abstract” Description of HW platform
 - All the component models might not be available (in the IP/XACT library)
 - Then the Generator is able to reference a generic Component
 - The Framework can generate an Executable Platform anyway

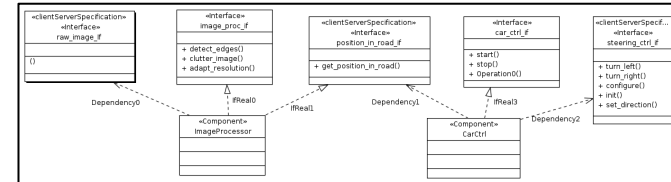
UML/MARTE related flow in



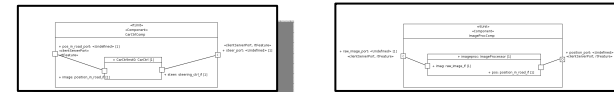
COMPLEX UML/MARTE Model



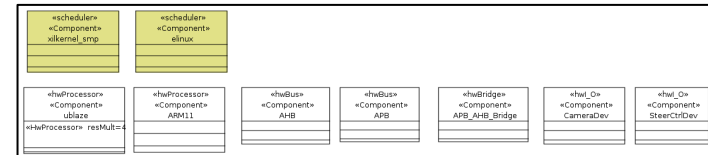
- Data view
- Functional view



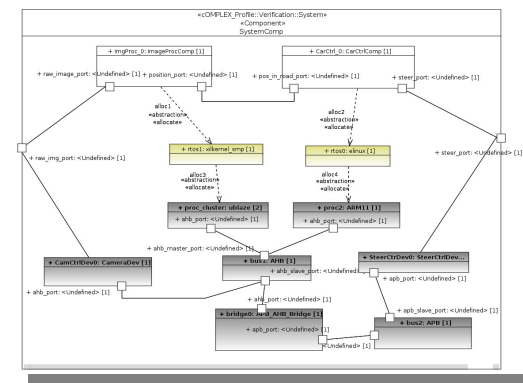
- C&C view



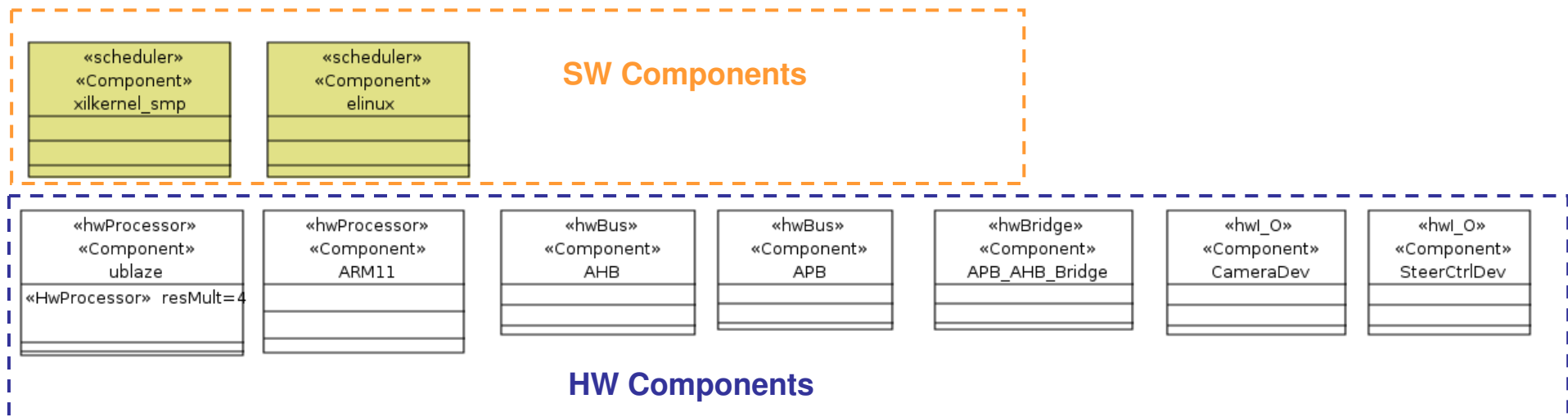
- Platform view



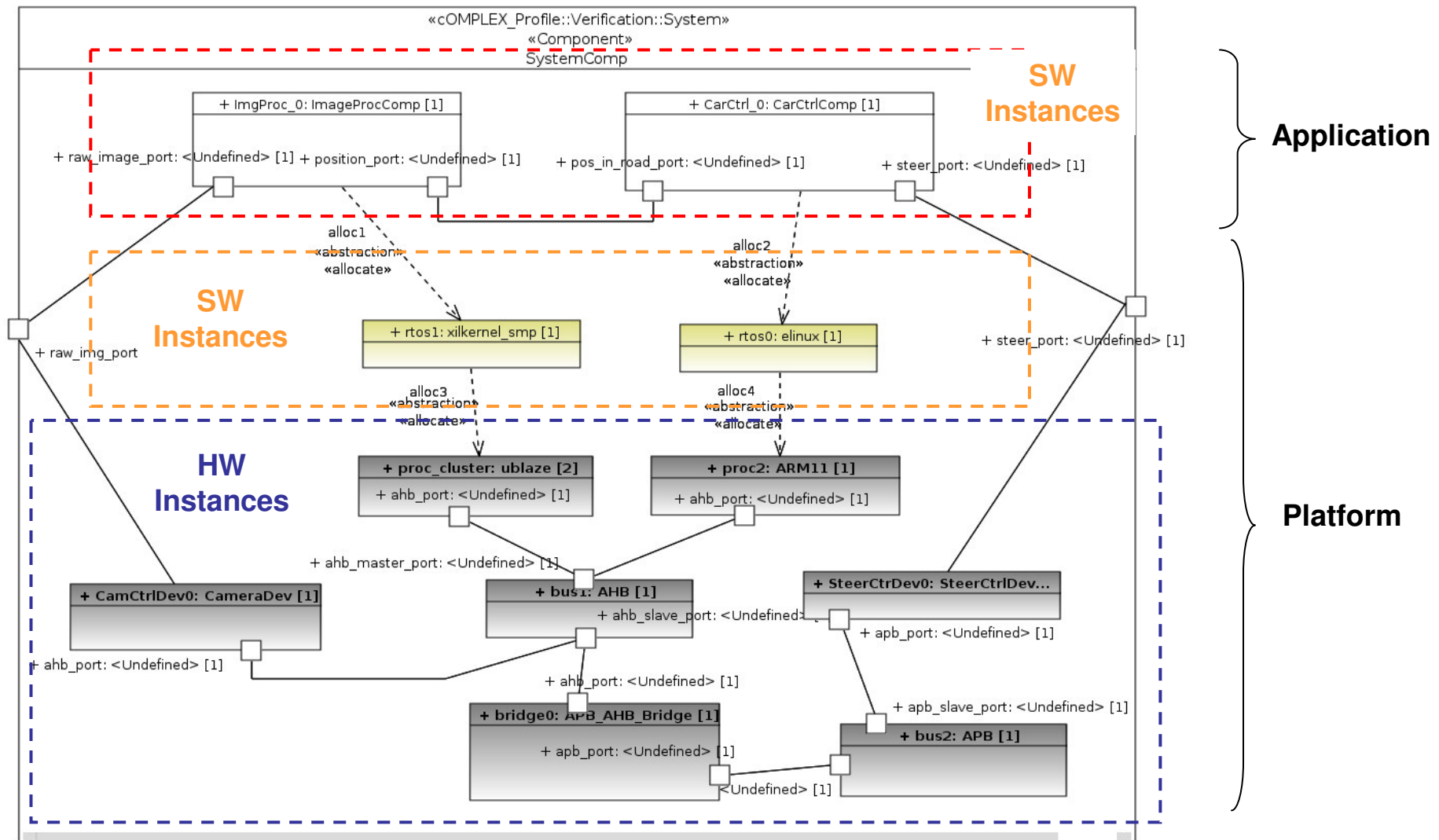
- Architectural view



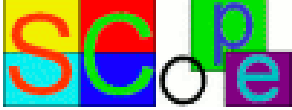
UML/MARTE Model: Platform View

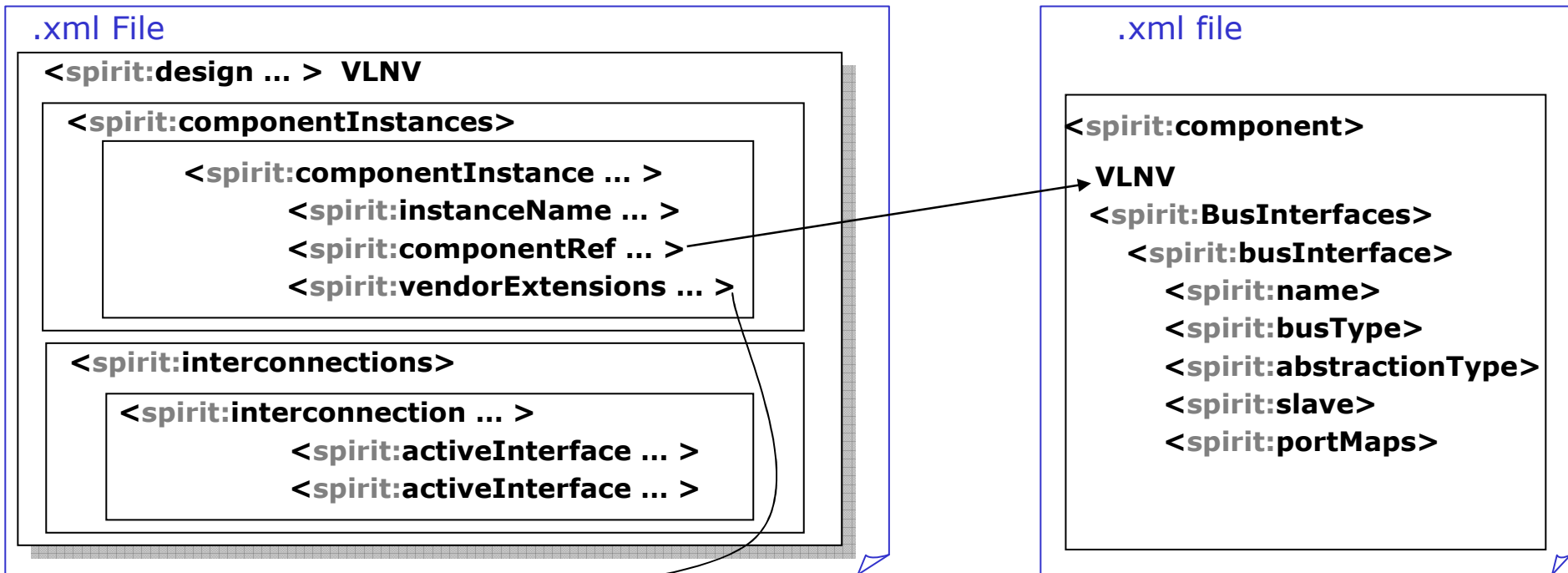


UML/MARTE Model: Architectural View



SCoPE

- www.teisa.unican.es/scope 
- Performance Estimation of MPSoC with NoC
 - Native Source Simulation
- Main Features
 - Output:
 - Performance Figures: Time, Power, CPU usage, Temperature,...
 - FAST:
 - Time estimation speed-up = 5 vs Virtualization / 100 vs ISS
 - Power estimation speed-up = NA vs Virtualization / 500 vs ISS
 - Input:
 - Application
 - HW/SW architecture, MPSoC with NoC
 - Output Metrics
 - **IP/XACT description of HW Platform**



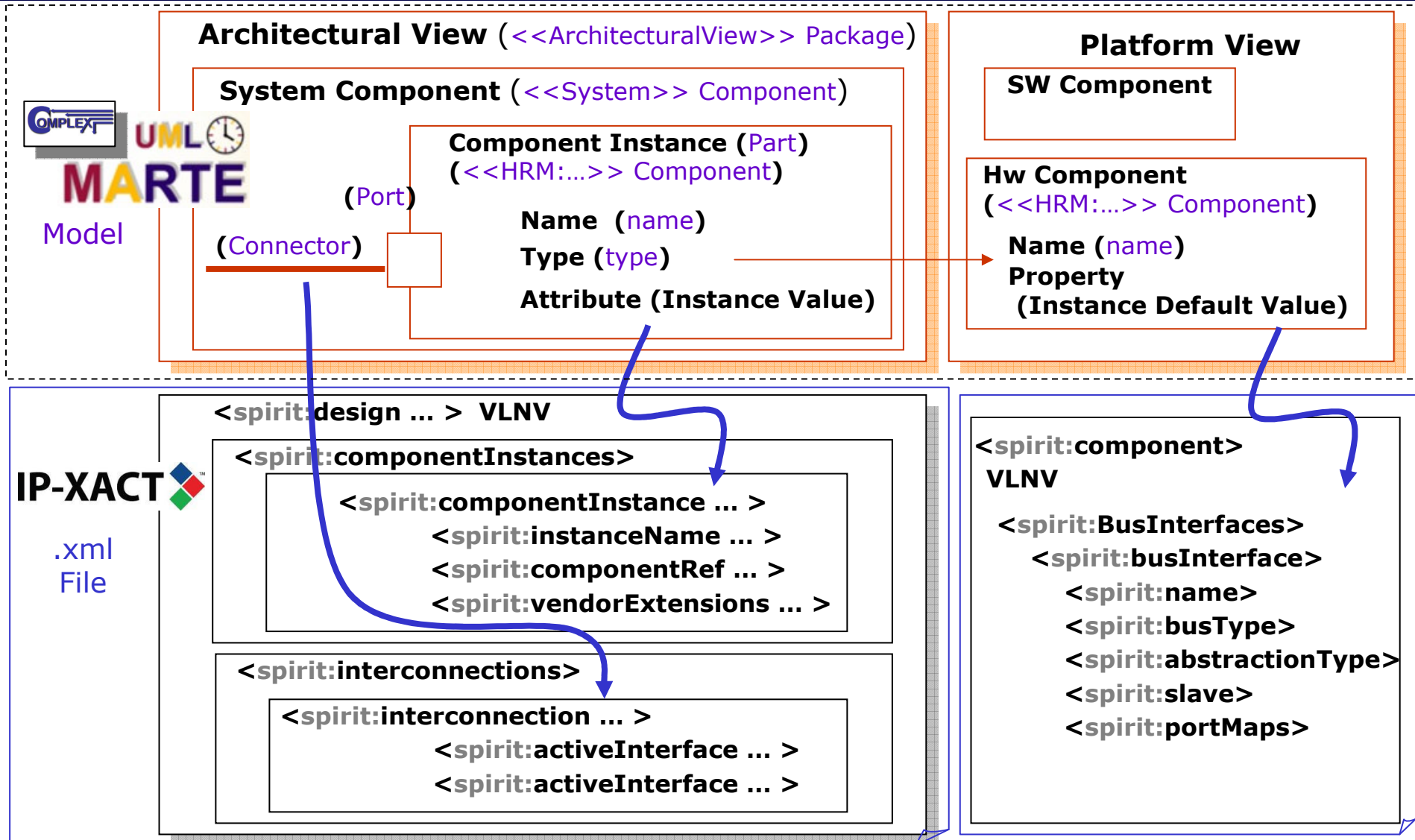
```

<spirit:vendorExtensions>
  <context:instanceClass>
    <context:isInternalComponent>
  ...





```

- Functional Information: vendorExtensions
 - SPRINT (SCIPV) context labels
 - isProcessorComponent
 - isBusComponent
 - isInternalComponent

Generation Fundamentals



Implementation

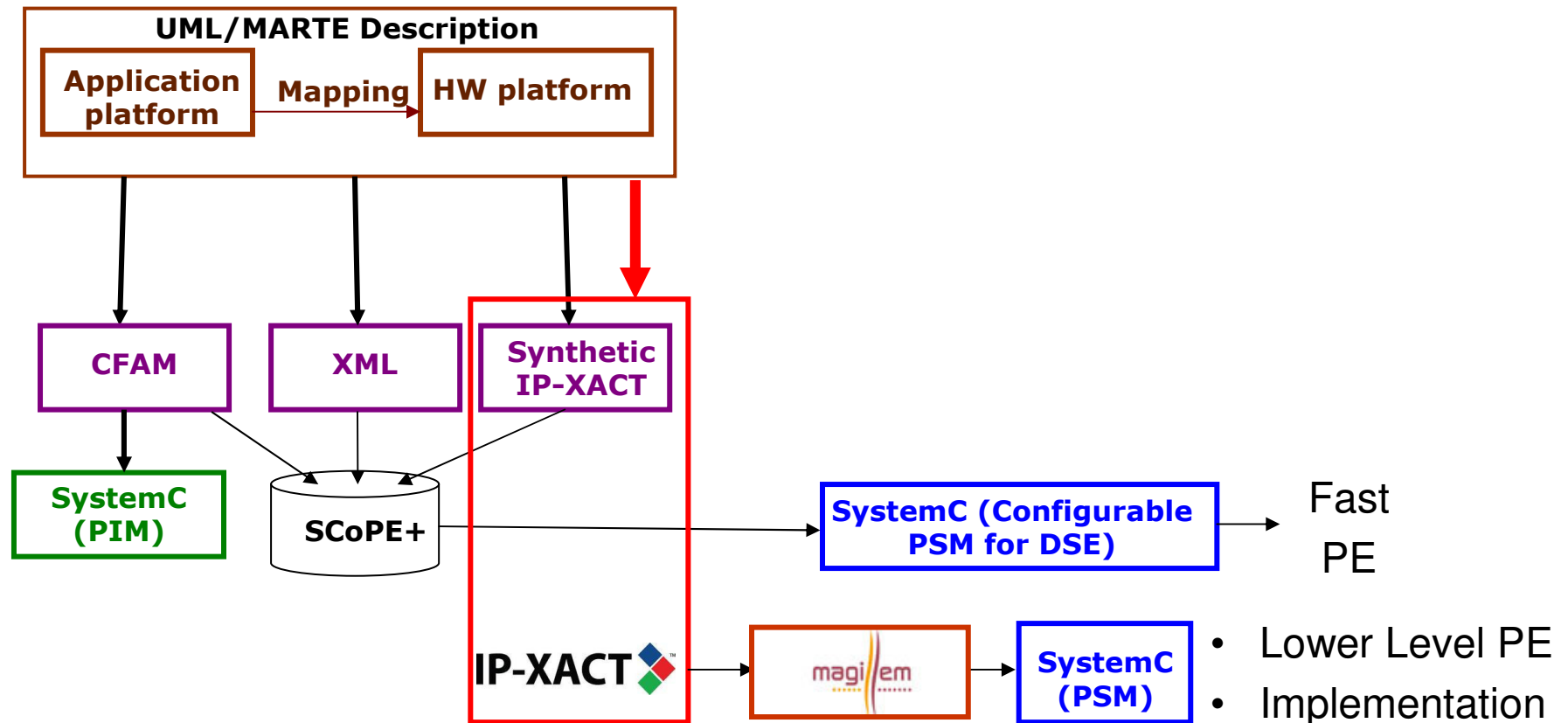
- Development Language: MTL / M2T  OBJECT MANAGEMENT GROUP
- Development Framework: Eclipse Helios 
 - AcceleoMTL 
 - Integrated with Papyrus MDT (UML/MARTE Specification) 
- Features:
 - XML Comments for tracking Generation
 - Checks of error conditions: Dump to COMPLEX console
 - Integration as standalone plug-in and within COMPLEX plugin

Conclusions

- Tool for Automatic Generation from (COMPLEX) UML/MARTE models of generic and synthetic IP/XACT descriptions for fast DSE
- Features
 - Integrated in (COMPLEX) Eclipse DSE Environment
 - Portable to different generation environments (supporting MTL)
 - Concise and traceable IP/XACT descriptions

Future Work

- Complete IP/XACT generation



- Integration on the COMPLEX multi-level DSE framework

Thanks

- For your attention
- More Information:
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 - UC/GIM: www.teisa.unican.es/gim
 - Complex: <http://complex.offis.de>

