A Modeling Tool for Design Validation of Renewable Resources and Smart Grids Intelligent Management Systems

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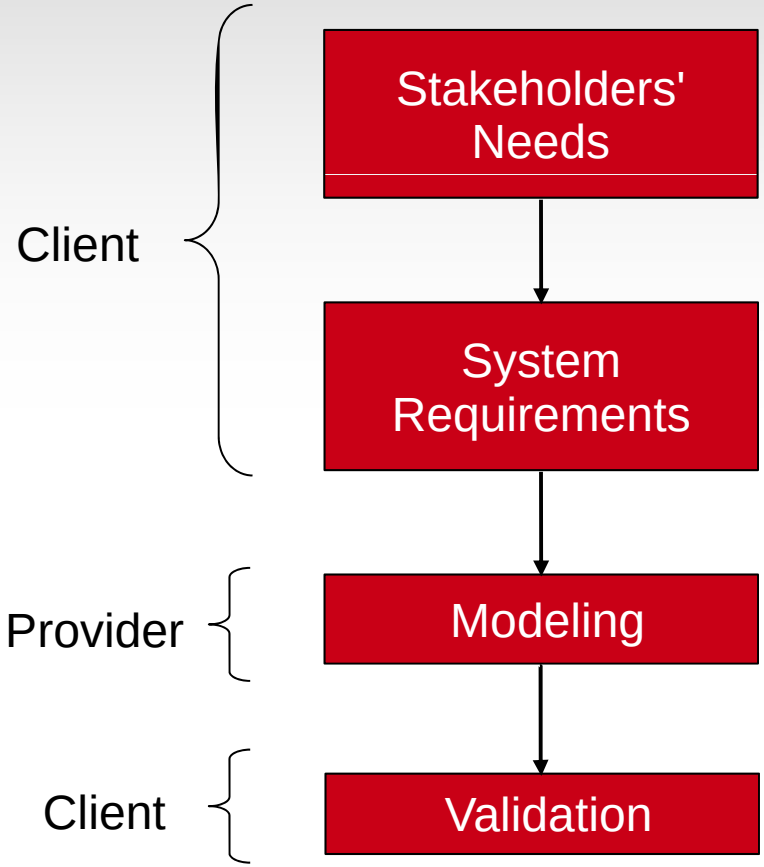
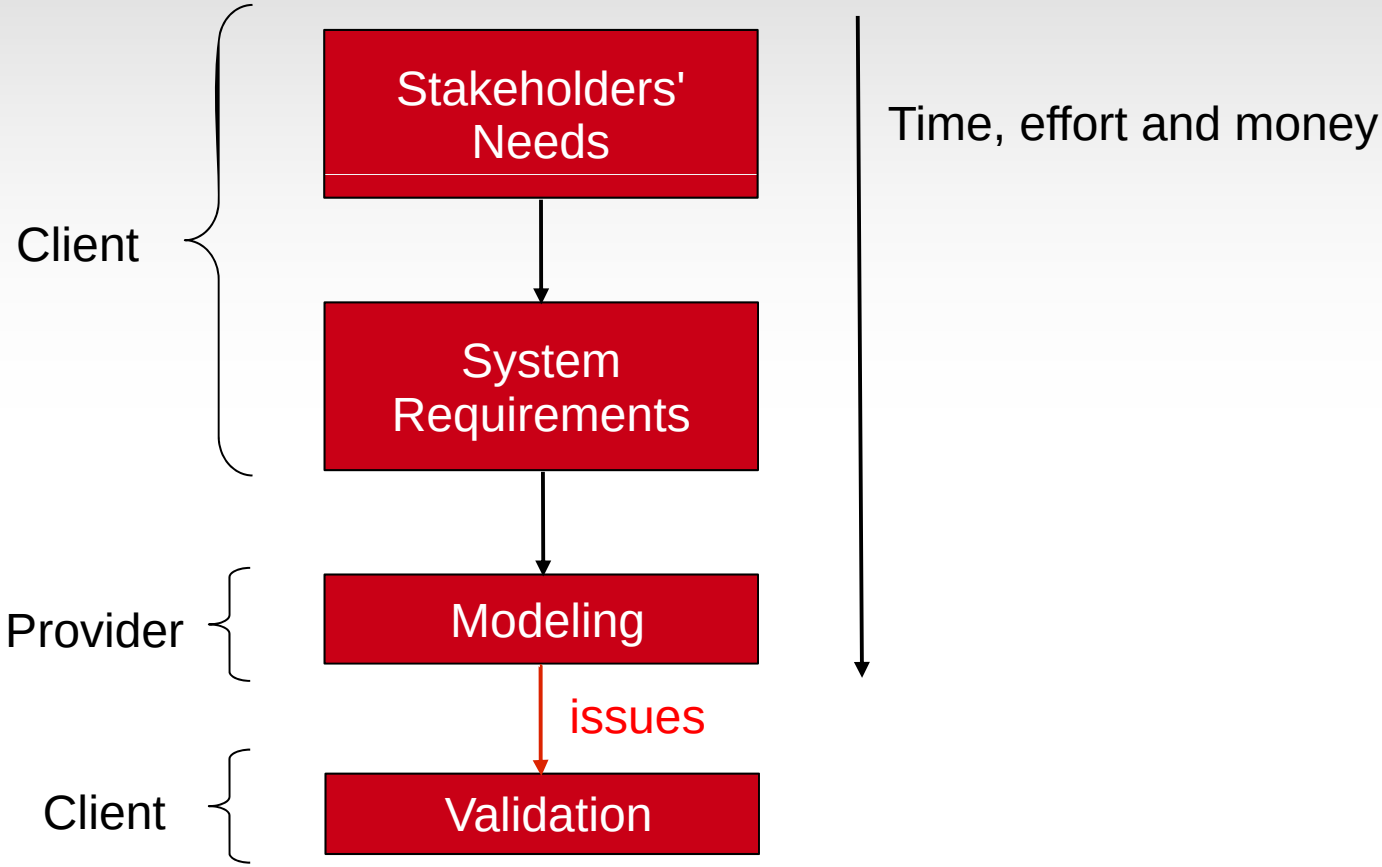
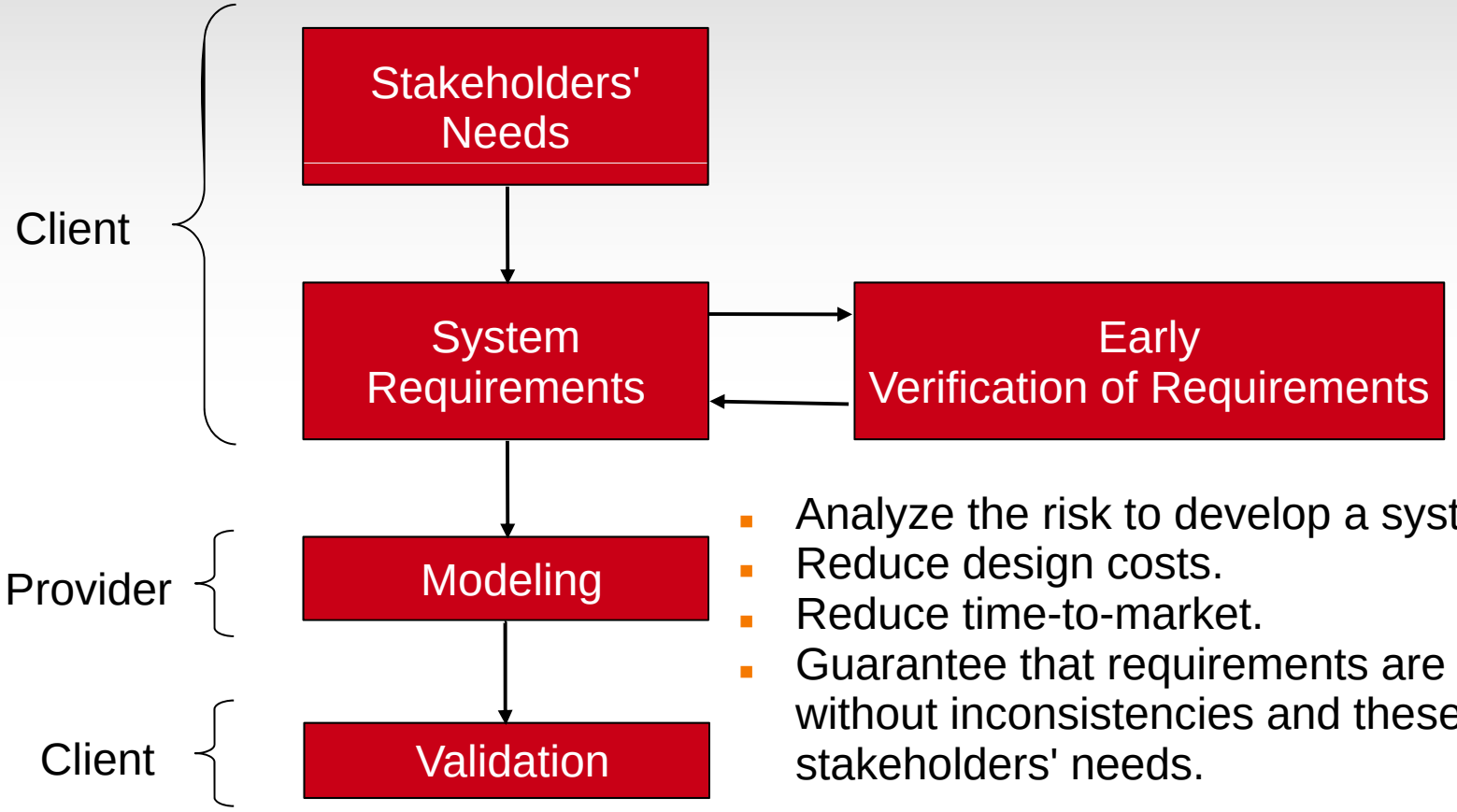
Context


Client
Stakeholders' Needs
System Requirements
Provider
Modeling
Client
Validation

Context


Client
Stakeholders' Needs
System Requirements
Provider
Modeling
issues
Client
Validation
Time, effort and money

Context



- Analyze the risk to develop a system.
- Reduce design costs.
- Reduce time-to-market.
- Guarantee that requirements are complete, without inconsistencies and these fit the stakeholders' needs.

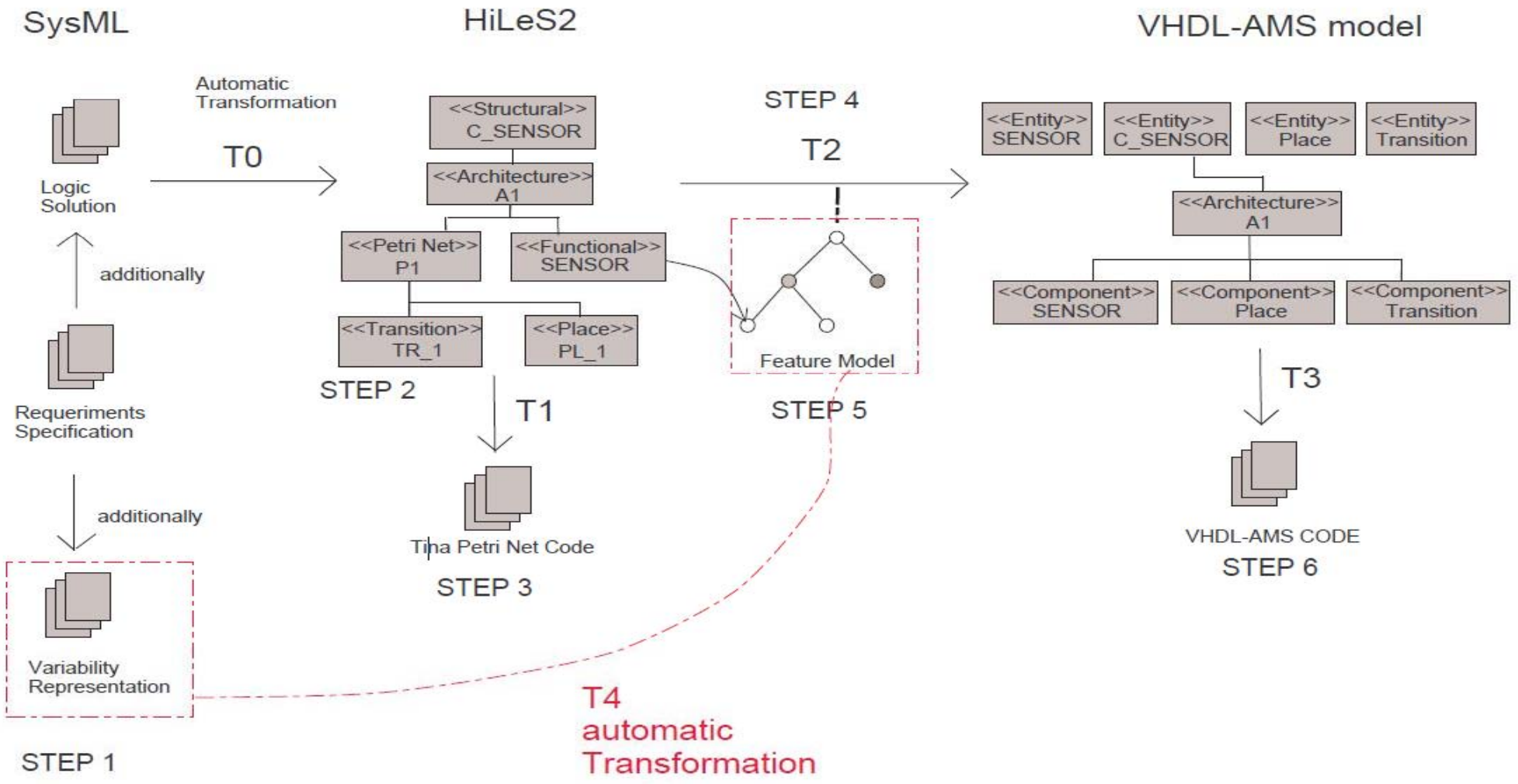
Outline

- Gomez 2008
- Grandas 2009
- Hoyos 2010
- Carrejo-Paja 2011
- Future work

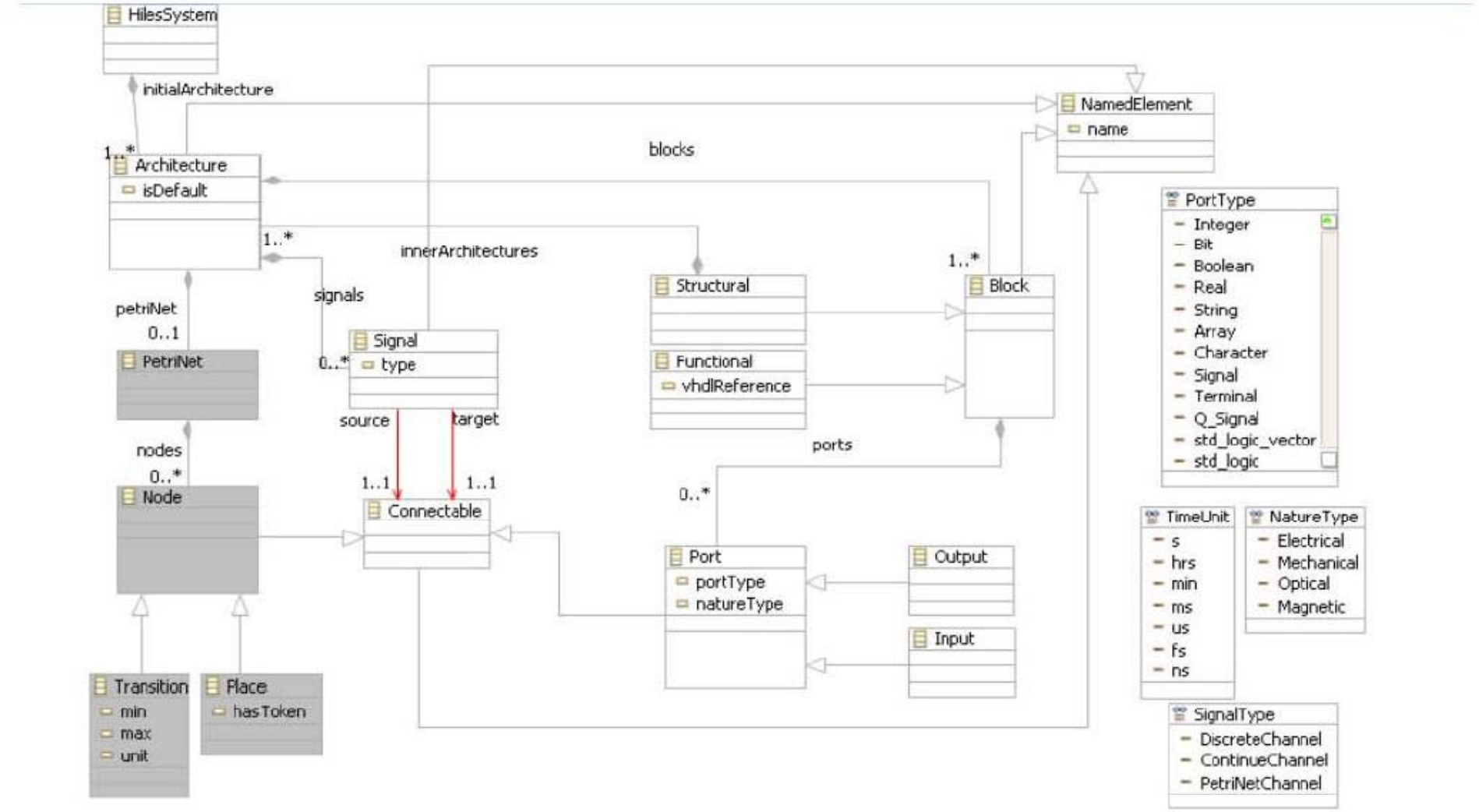
Intelligent Management Modeling needs

- Heterogeneous System of Systems. Meet-in-the-middle Methodology.
- Virtual Prototype. Product Lines. System-level.
- Architectural design space is multi-domain (VHDL-AMS).
- Specification requirements verification.

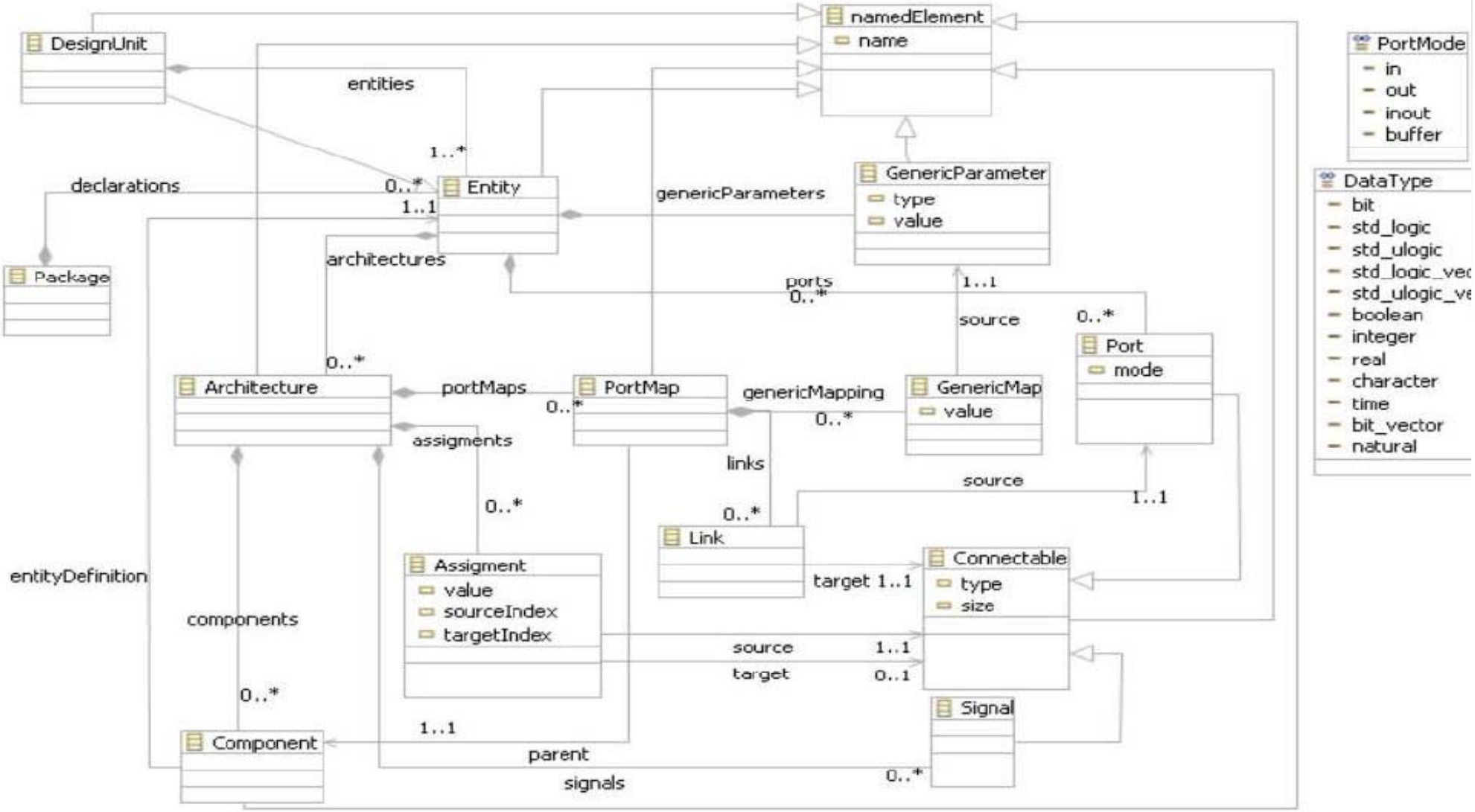
Transformation chain to produce a virtual prototype



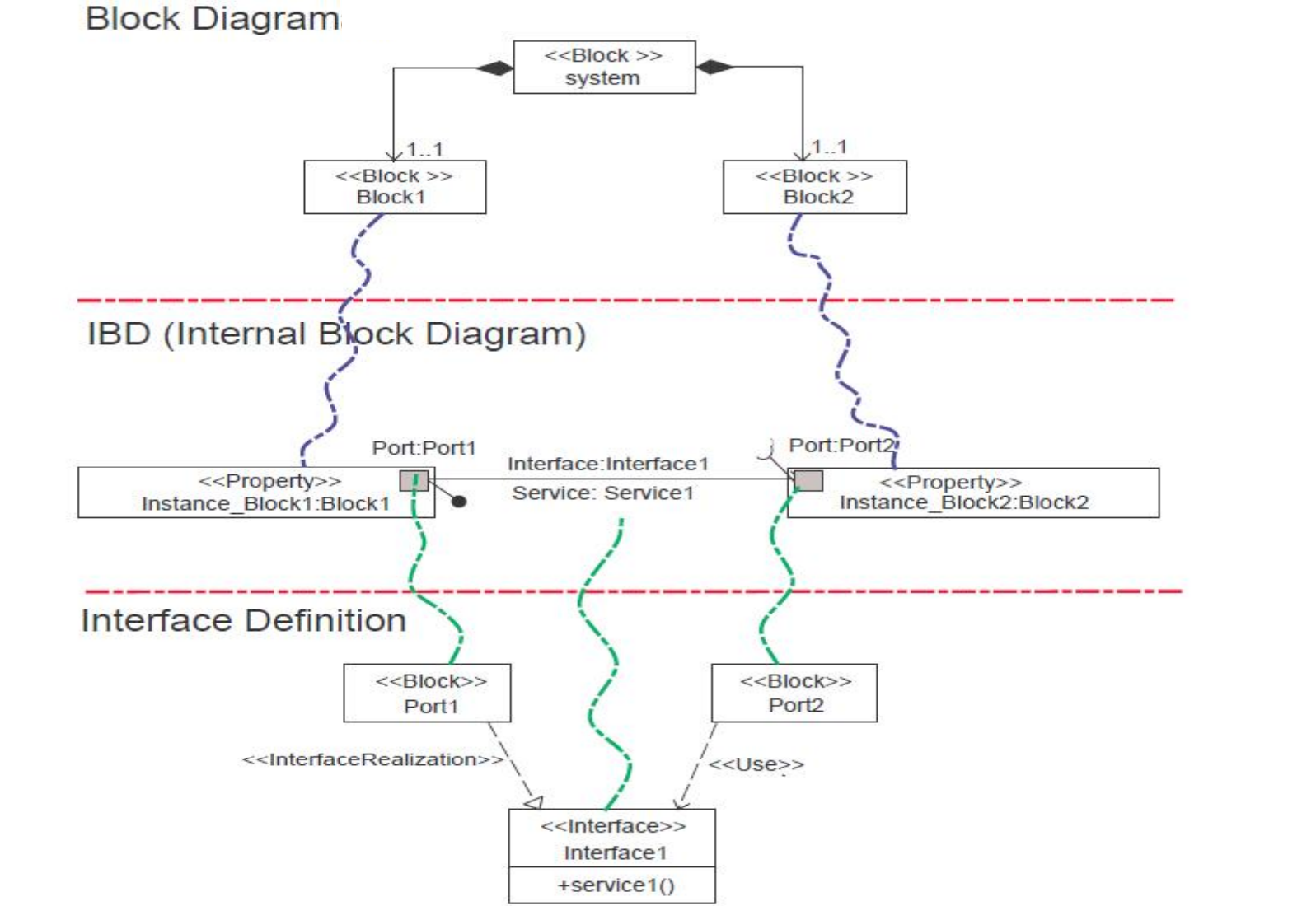
HiLeS2 Meta-model



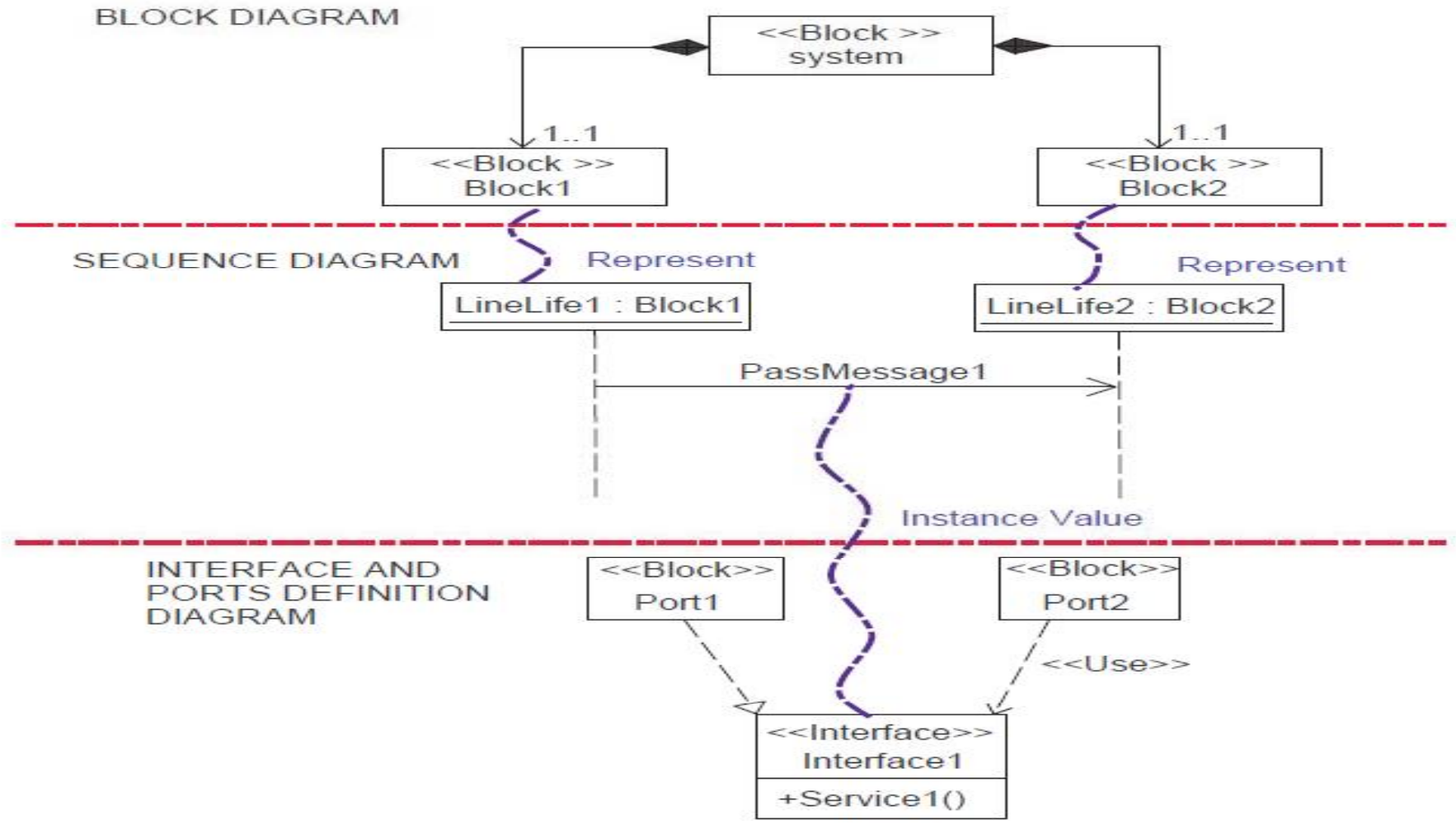
VHDL-AMS Meta-model



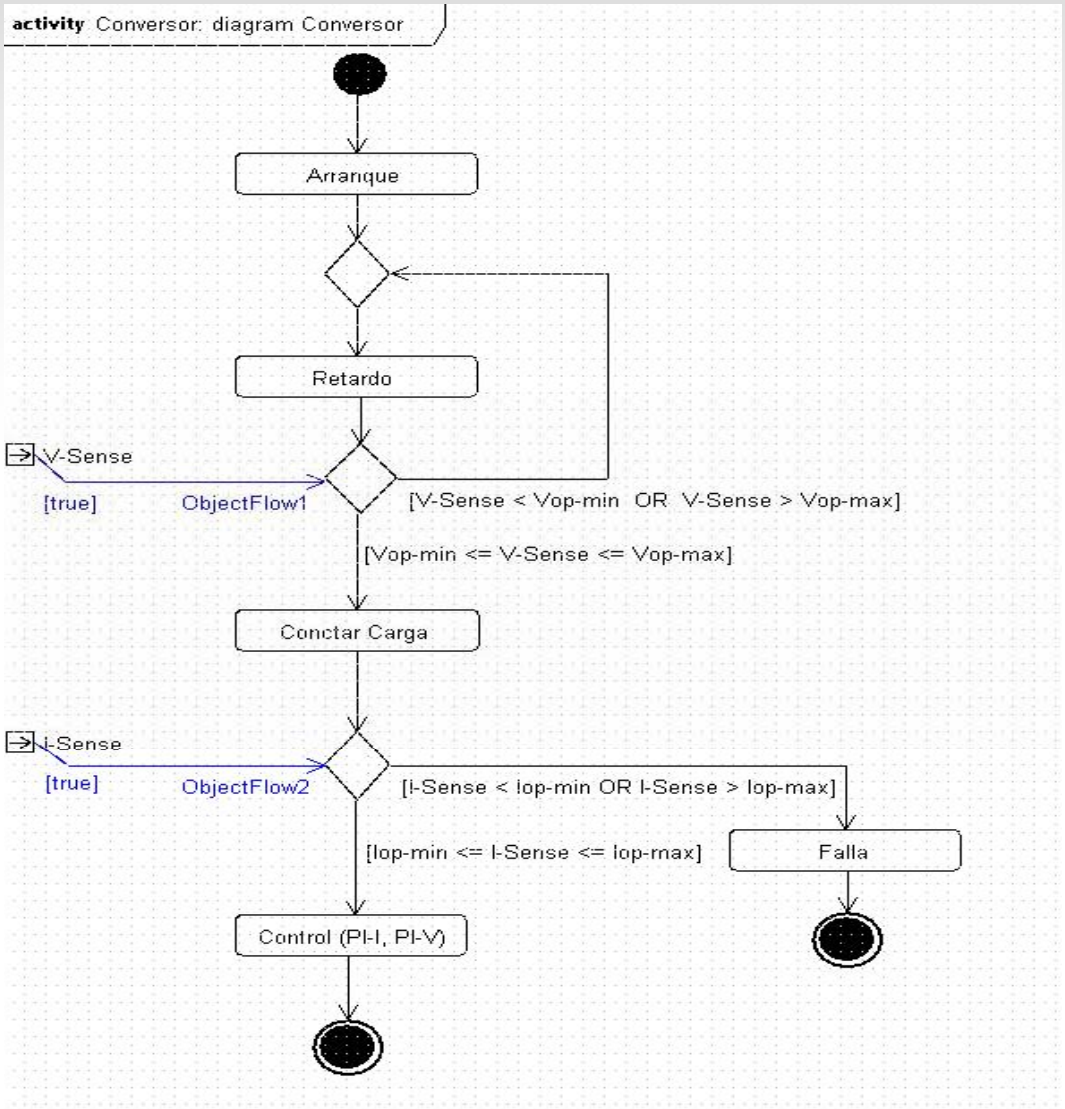
SysML Structural model



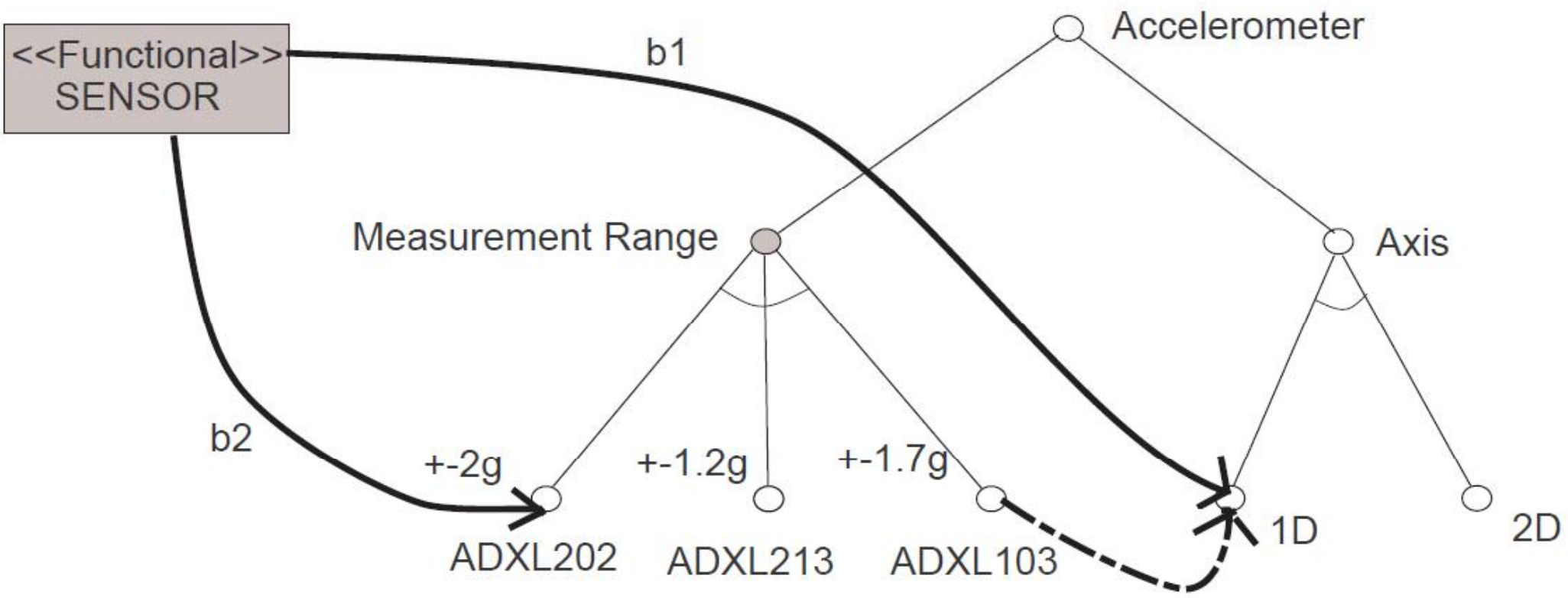
SysML Operational model



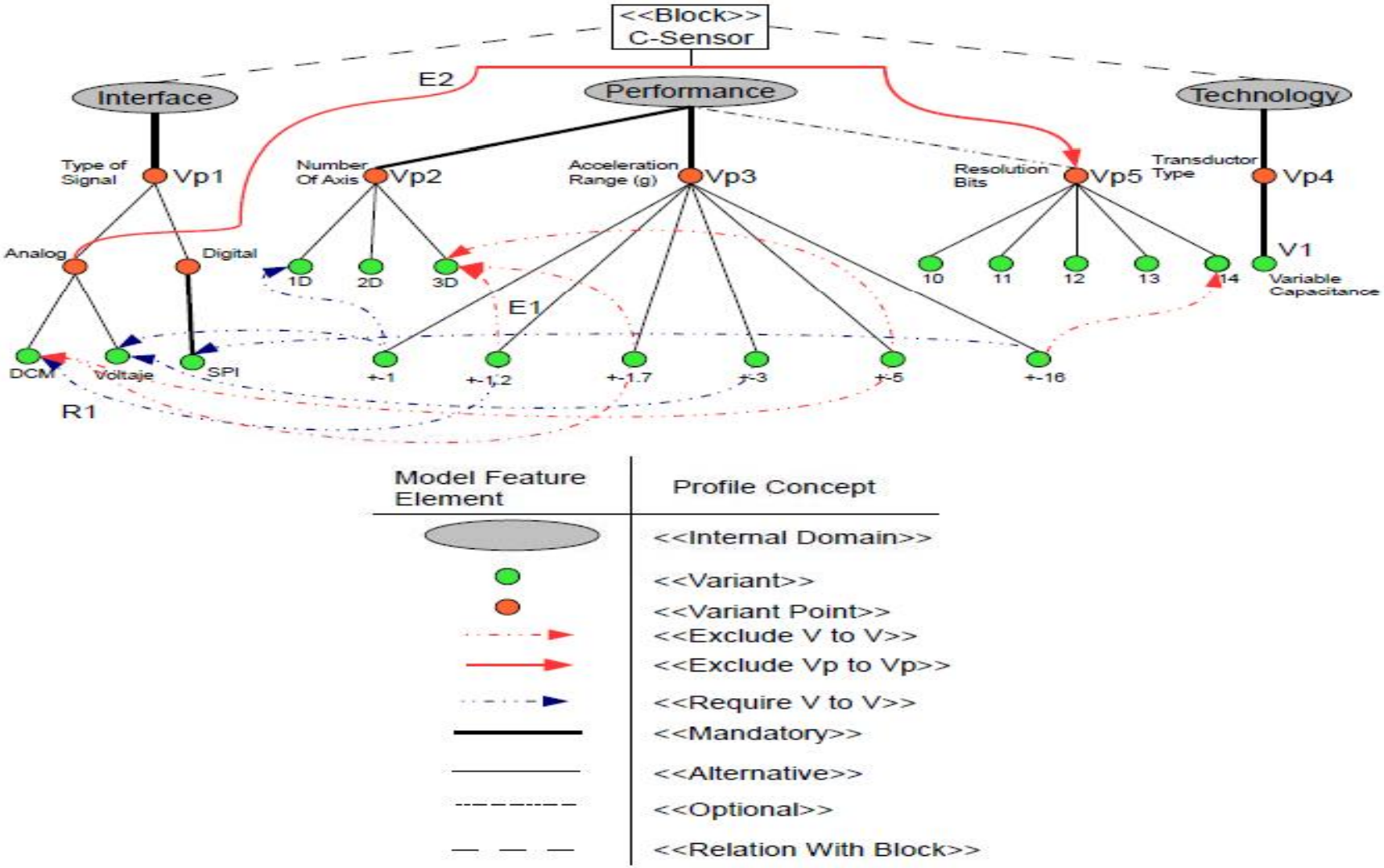
SysML Activity Diagram



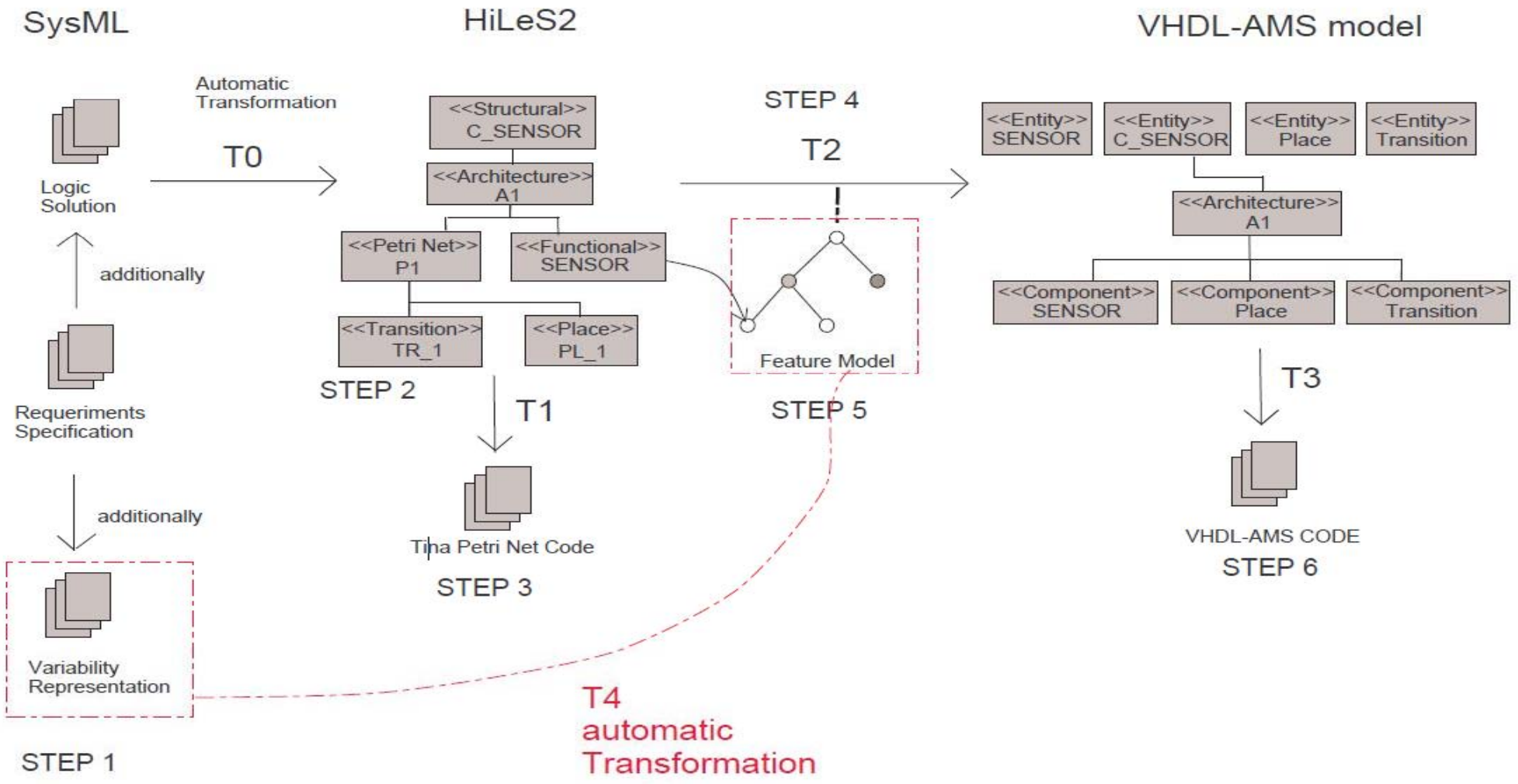
Product Feature model



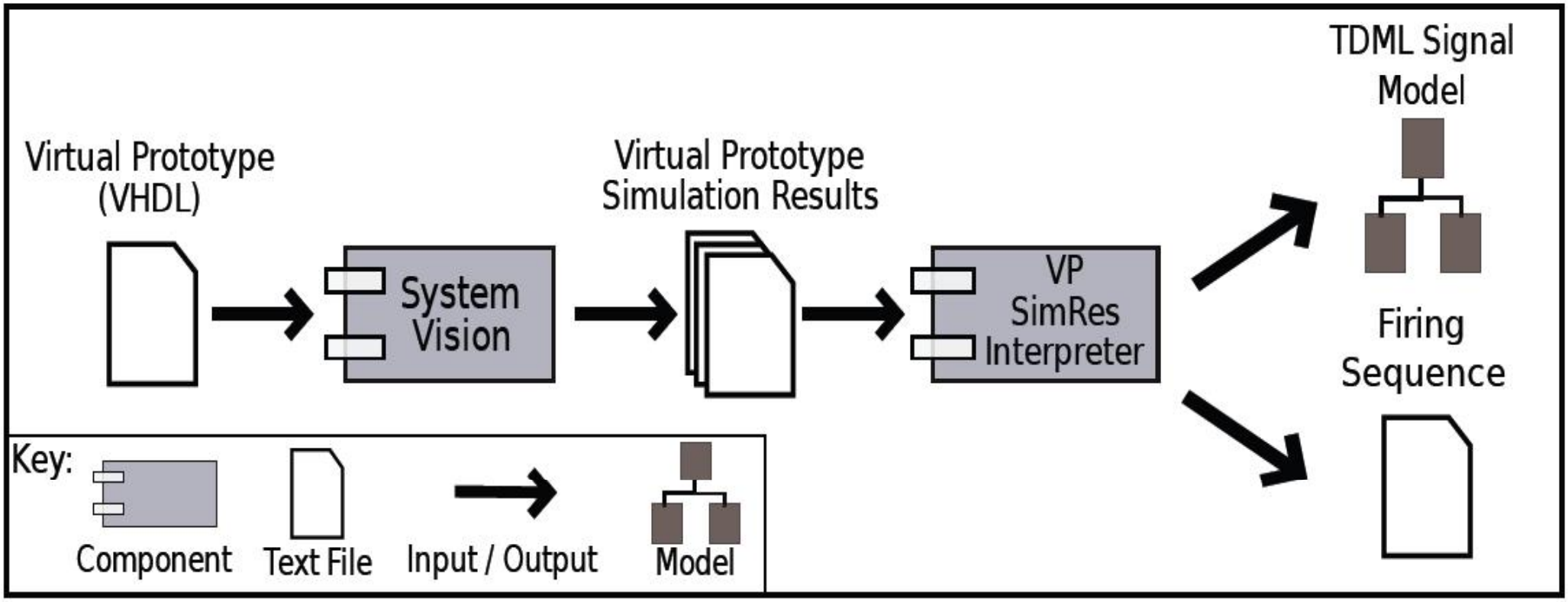
Analog Devices Feature model



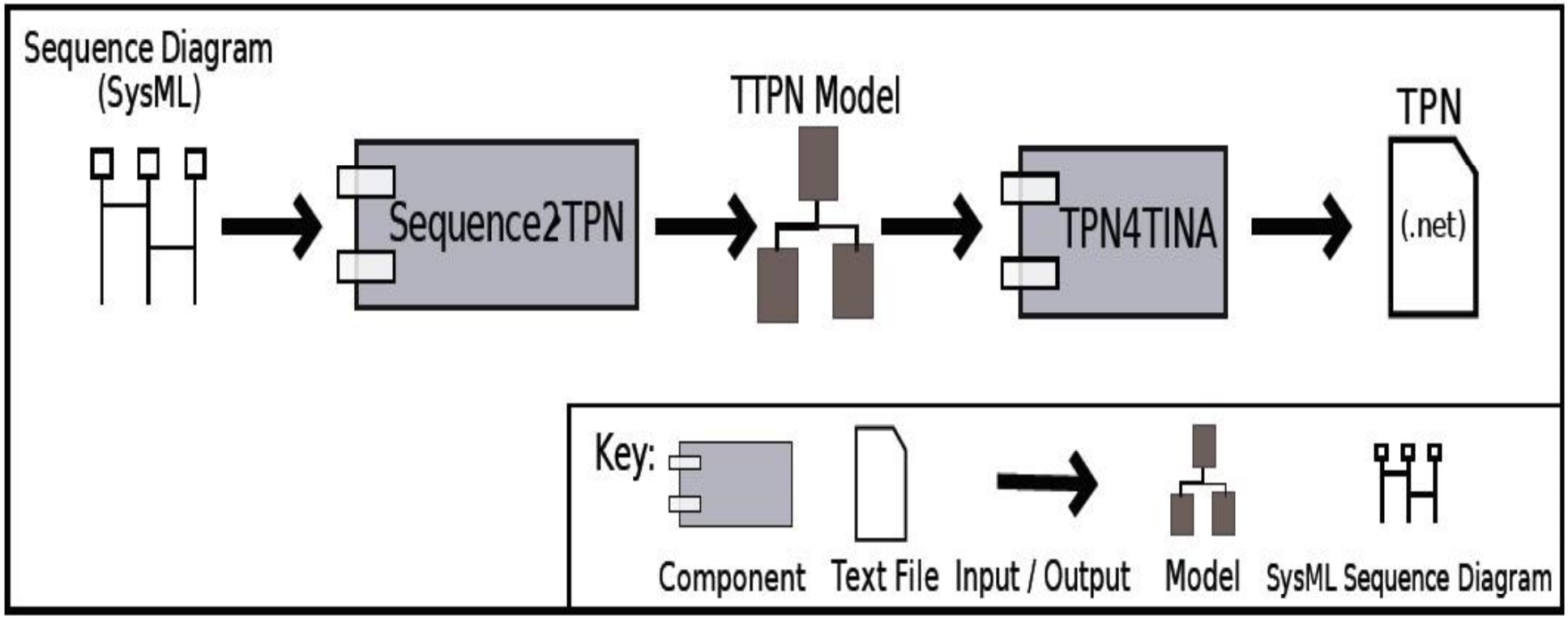
Virtual Prototype users



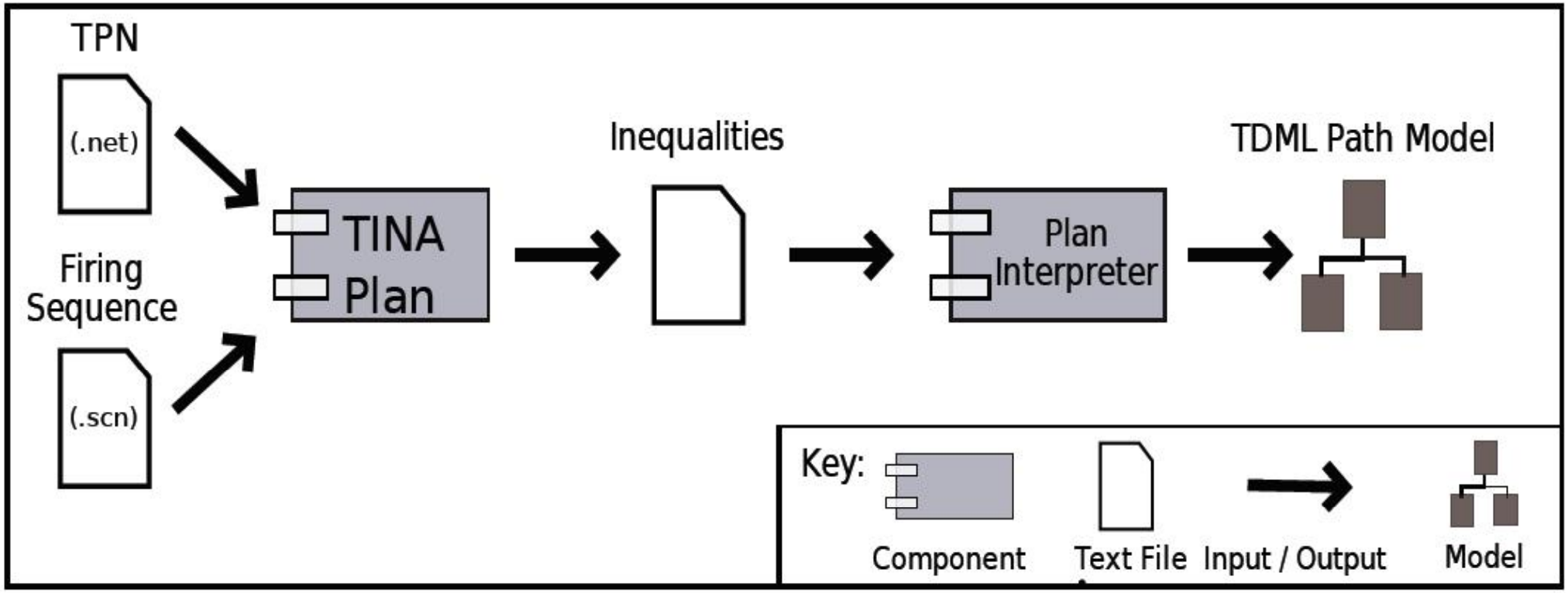
VP results capture support



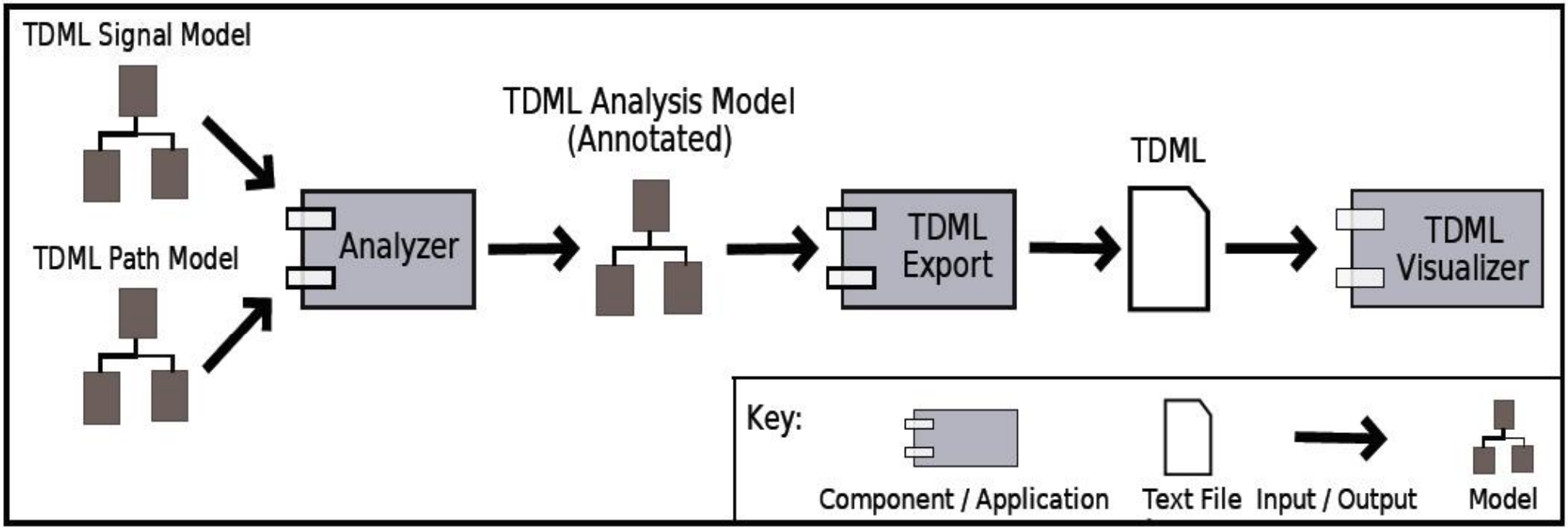
Time Petri Net generator



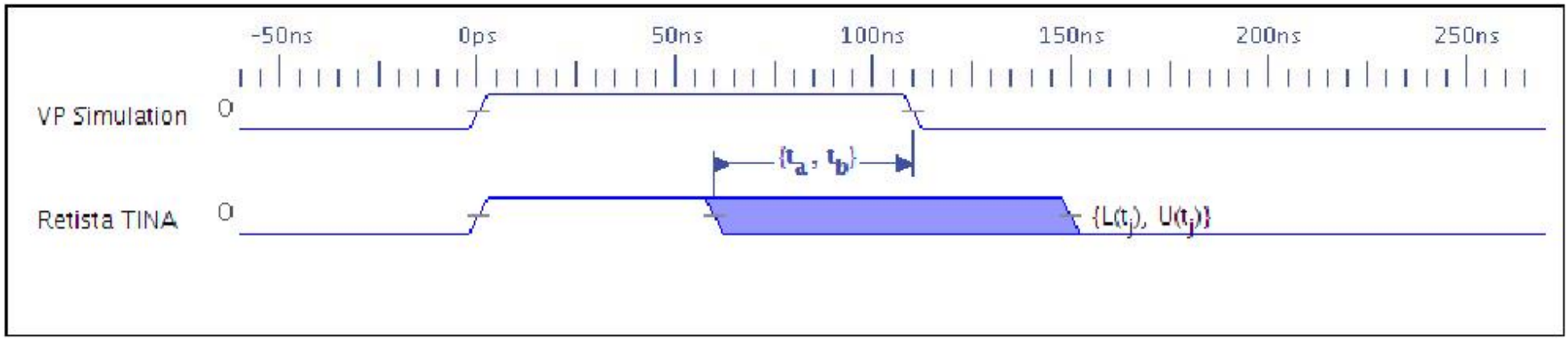
TPN results capture support



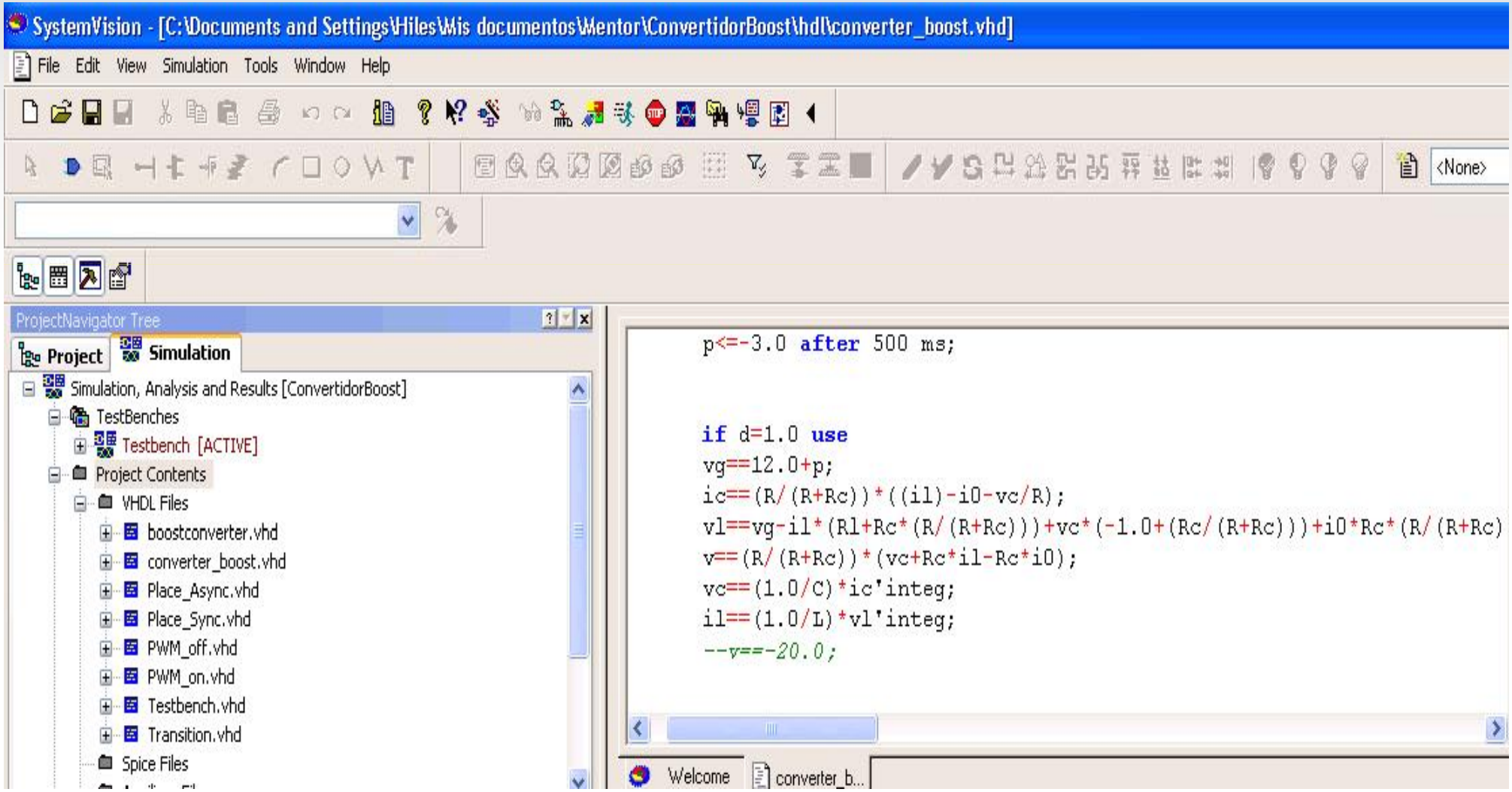
Time Constraints Analysis



Time constraint verification



Boost Converter VP

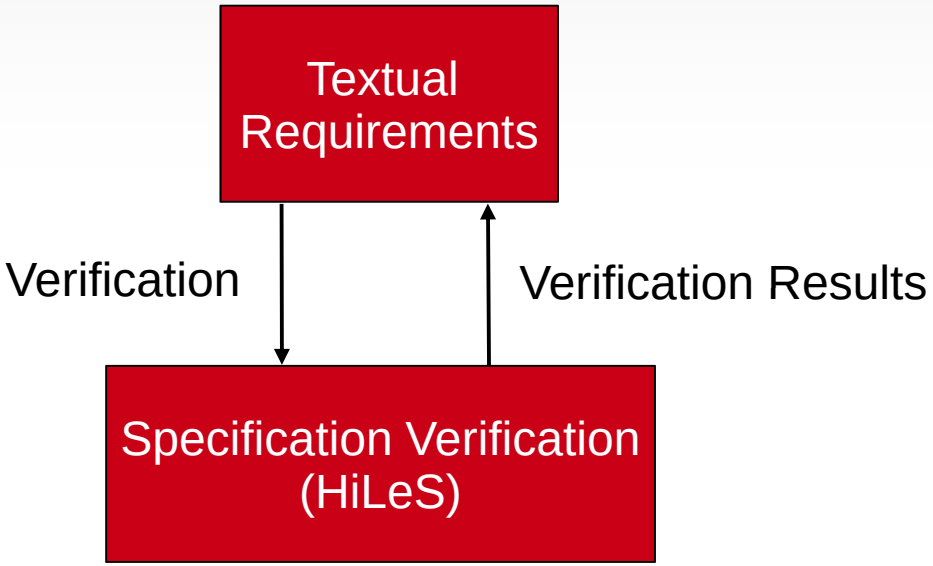


Boost Converter VP results

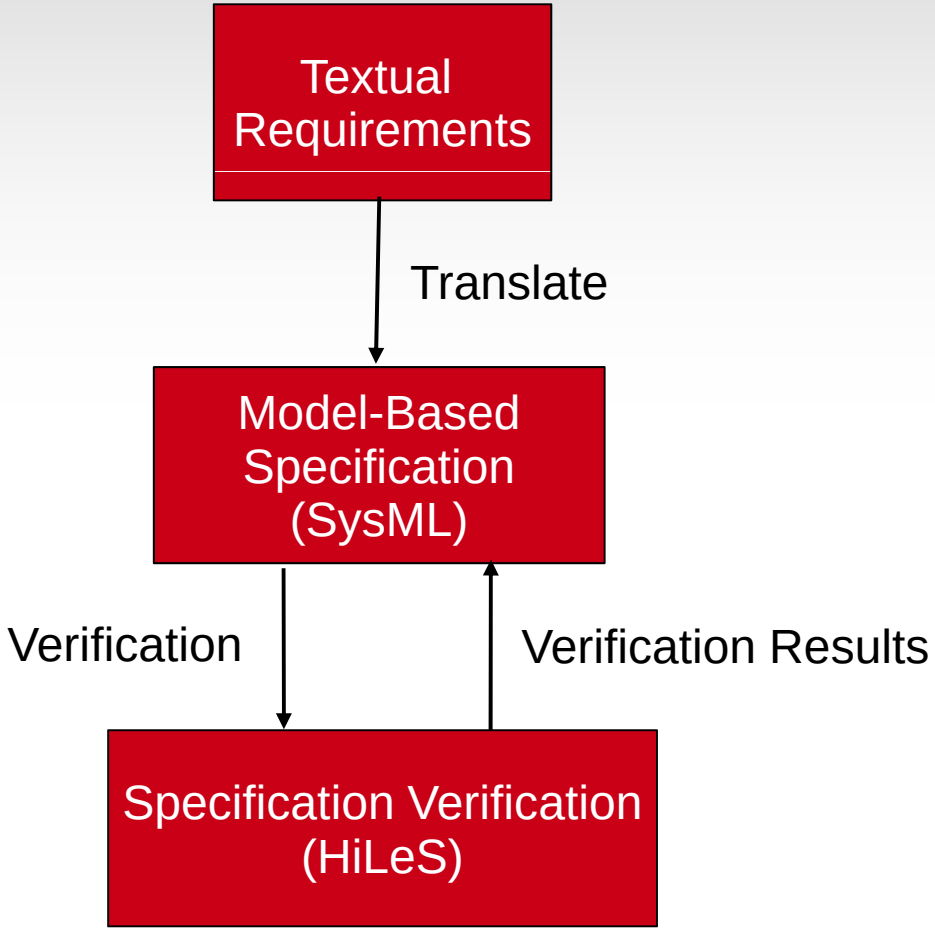
Conclusions

- Tool allows:
  - Modeling the behavior and the structure of system requirements.
  - Verifying the logic behavior of the system requirements' model by formal analysis using TINA.
  - Verifying the behavior of the system requirements' model by simulation, generating a virtual prototype in VHDL-AMS.

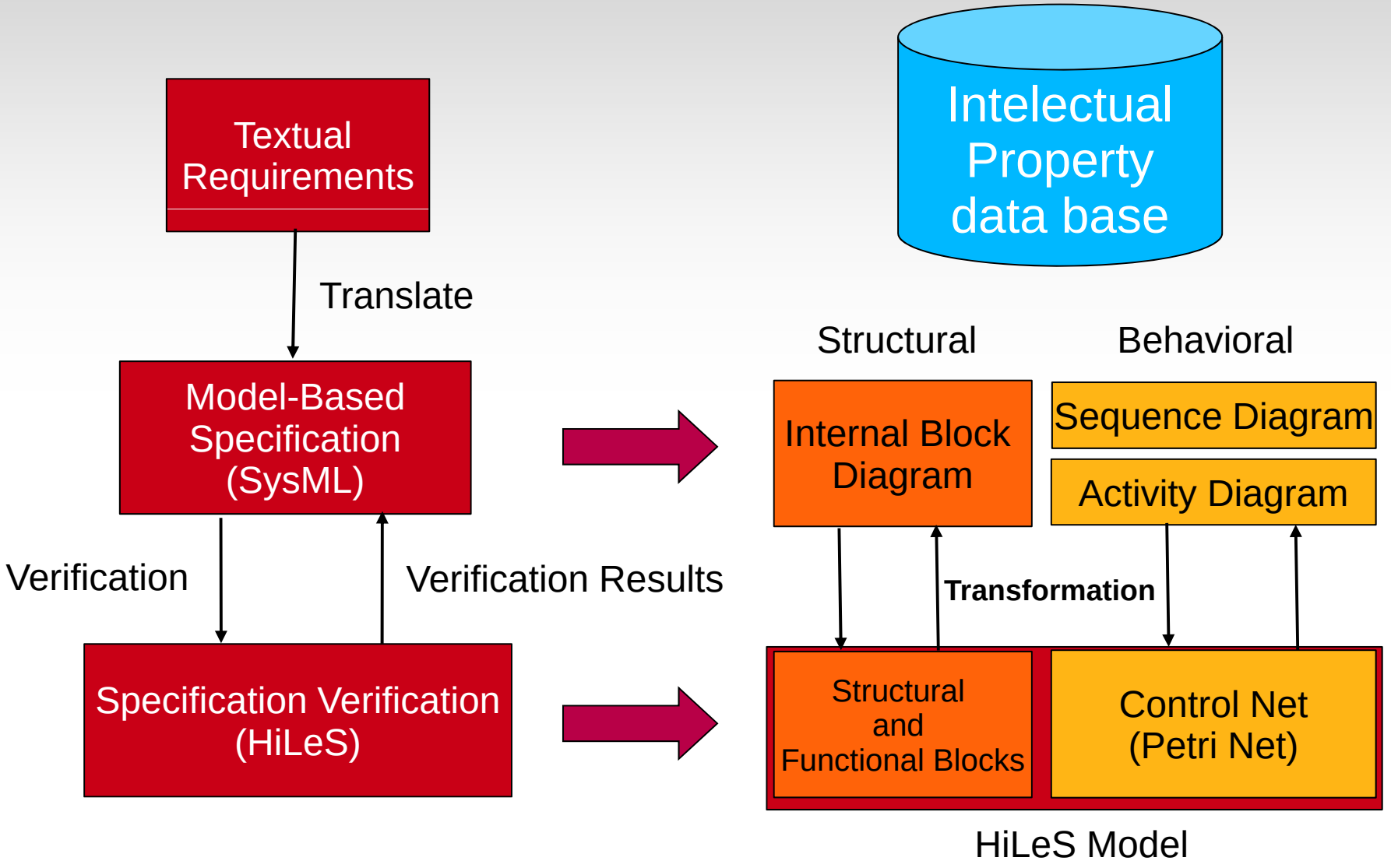
Future Work


Textual Requirements
Verification
Verification Results
Specification Verification (HiLeS)

Future Work


Textual Requirements
Translate
Model-Based Specification (SysML)
Verification
Verification Results
Specification Verification (HiLeS)

Future Work


Intelectual Property data base
Textual Requirements
Translate
Model-Based Specification (SysML)
Verification
Verification Results
Specification Verification (HiLeS)
Structural
Behavioral
Internal Block Diagram
Sequence Diagram
Activity Diagram
Transformation
Structural and Functional Blocks
Control Net (Petri Net)
HiLeS Model

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