

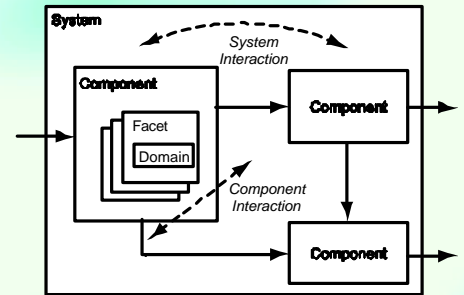
Modelling the Semantics of Rosetta

What is Rosetta?

Rosetta is an emerging language and semantic standard architected to enable designers to tackle system-level issues within practical, commercial EDA design flows. The specific issue that Rosetta is enabling is the integration of multiple subsystems that cross implementation technologies in such a way that systems engineer can manage both functional and non-functional performance requirements during the design process. An Accellera technical subcommittee is defining Rosetta prior to planned international standardisation via the IEEE.

Using Rosetta

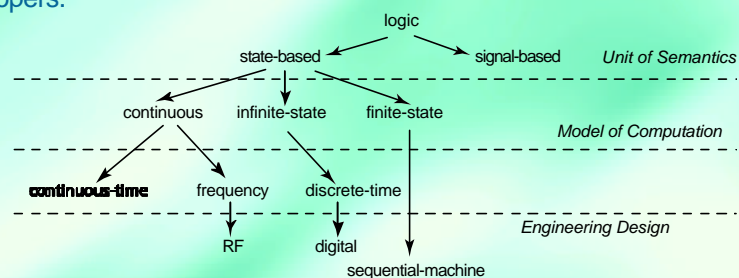
Rosetta is intended to allow engineers to write and combine specifications using heterogeneous semantics, i.e. it acts as a model integration framework. The basic Rosetta unit of specification is the *facet* that describes a system or component from one engineering perspective. Each facet has an associated *domain* which defines the computational model and vocabulary of that engineering perspective.



By composing views of different components horizontally, the assembly defines a system architecture. Vertical compositions define different views of the same component, e.g. energy consumption, function and timing. To support systems level analysis, *interactions* define when and how information from one domain impacts another.

Rosetta Domains

Individual Rosetta domains can extend previously defined domains, c.f. object-oriented approaches. This leads to a lattice of domain definitions, such as that shown below (on this arrows indicate the *extends* relationship). Engineering design domains provide the vocabularies for engineering specification. Most engineers will work with these. The modules of computation and unit of semantic domains provide the semantic basis needed by tool developers.



Rosetta and Traditional Design Languages

Rosetta complements both traditional design languages such as VHDL and Verilog, and emerging languages such as SystemC and SystemVerilog. These languages capture function and provide excellent simulation based analysis capabilities. Rosetta adds to this the ability to describe performance constraints, heterogeneous semantics and system level modelling.

Modelling the Semantic of Rosetta

The base Rosetta language draws concepts from a variety of sources, including unified algebra, PVS and the electronic engineering domain. To ensure that it has a set of consistent and well defined semantics, these are being captured in the EXPRESS information modelling language. A feasibility study was undertaken in Manchester as part of an EPSRC fellowship. The success of this led to the Rosetta subcommittee adopting EXPRESS as the mechanism for formally defining Rosetta, modelling of Rosetta is continuing at Manchester..

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 The support of the UK EPSRC (Grant GR/R45697) is gratefully acknowledged

developing a well found language that integrates system level issues into design flows

