UML-MAST

Modeling and Analysis Methodology for Real-Time Systems Developed with UML CASE Tools

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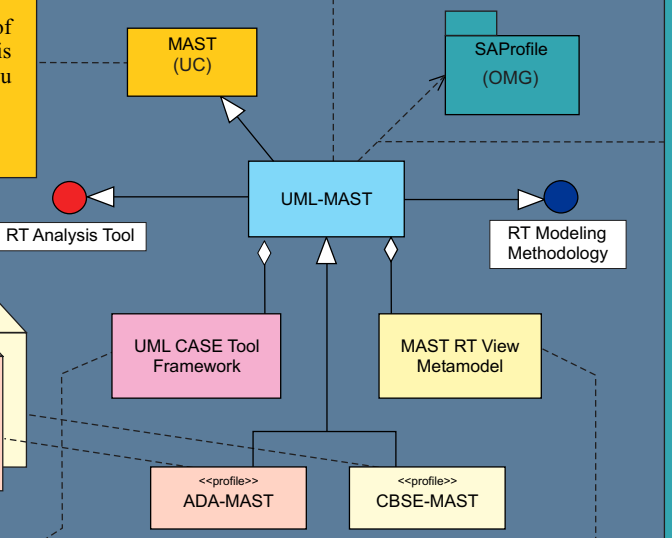
UML_MAST is a methodology and a modeling framework for building analyzable real-time models of object-oriented systems developed using UML CASE tools.

The Modeling and Analysis Suite for Real-Time Applications: MAST, is a very rich event-driven model and a set of advanced real-time analysis tools. It is open source and is fully extensible. You can download it from:

http://mast.unican.es



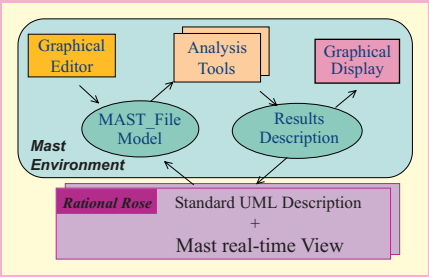
Profiles like ADA_MAST and CBSE_MAST are conceptual refinements that implement higher modeling abstraction levels adapted to specific methodologies or environments.

The proposal to the OMG for a "UML Profile for Schedulability, Performance and Time" shares its modeling philosophy, domain viewpoint and most concepts, with UML_MAST, but among others it has these limitations:

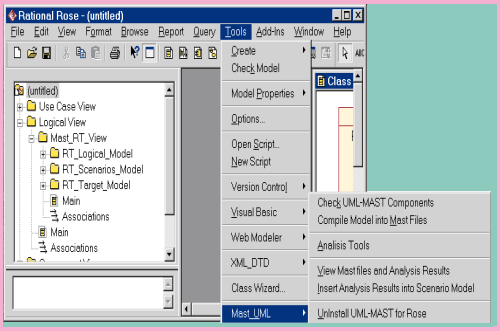
- It can not handle distributed systems analysis models: communication resources have no scheduling properties and a scheduling job has a single execution engine.
- SAction has a single Schedulable resource (multi-threaded or distributed methods are not modeled)
- Since it is strictly instace-based, it looses reusability. Also Sactions can not connect with branch or merge.
- SAction does not have a best-case execution time attribute, so offset-based analysis can not exploit it.

Besides, it suggests annotating the UML user model; there is not a view that collects all the real-time aspects.

- UML-MAST models and tools can be used in combination with most of the available UML CASE tools. At present, we have a framework implemented for Rational Rose.



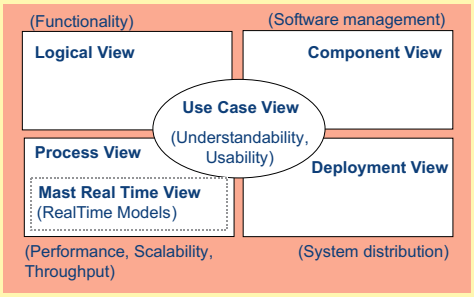
- The MAST suite is invoked directly from the UML CASE design tool. Once the RT_situation has been built and compiled, it can be fed into the analysis tools and the results can be returned to the MAST_RT_View.



- The tools have been added to the Rose menus and are installed like if they were an Add-in. A starting Rose-framework creates a blank MAST_RT_View to be filled and a wizard tool helps to insert the model with a minimum of typing.The checking tool and the compiler generate a valid MAST input File.

- As MAST, this is open source and it is available under the GNU General Public License. Please feel free to download it and give us your feed-back. Pick it up from :

http://mast.unican.es/umlmast



- "MAST_RT_View": UML view for the real-time behavior model of the system.

- The model is used to analyze the real-time properties of the system.

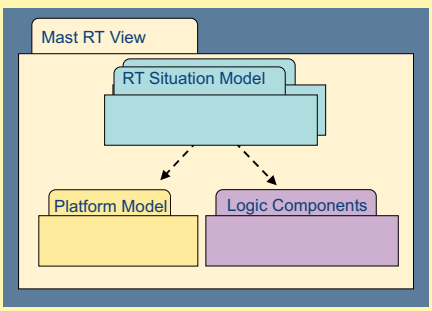
- At the early phases of the development cycle, analysis is done by using estimations. In the later ones, by modeling the generated code.

- The MAST_RT_View has three sections described by means of a metamodel:

a) Platform: models the hardware and software where the application runs.

b) Logical Components: model the operations or methods and the usage of synchronization primitives..

c) RT_Situations: models the workload of the system in each RT mode of operation and the timing requirements that must be met.



KEY NOTES :

- UML-MAST supplies a methodology for modeling and analyzing a large set of real-time systems, RT operating systems, and languages.
- Its methodology is independent of the design methodology.
- It allows modeling the logical classes and the real-time situations independently from the hardware platform or the operating system details.
- It is available as open source software.