

RT DRUID

a tool for architecture level design of embedded systems

Overview

The RT-Druid Toolset provides support for the architectural design stage of typical design flows of embedded software. The design flow of embedded systems typically includes two stages of fundamental importance. The first stage, at the logical level, produces a model of the software application providing a solution to the functional requirements. In the second stage of the design process, at the architecture level, software engineers map the functions/components developed in the previous stage to software threads, select the scheduler and the resource managers by exploiting the services of a Real-Time Operating System (RTOS) and ultimately check the correctness of the timing requirements upon the target (HW) architecture.

Unfortunately, even in state-of-the-art processes, the last step is performed relying solely on the skills or the experience of project developers. As a consequence, projects often suffer from design errors that show up only after deployment with obvious economic losses. The separation of the design environments for functionality and for time, together with the limited support (feedback) provided by the existing tools make the process quite inefficient. Trial-and-error iterations are often performed without a clear knowledge of what should be modified and how.

RT-Druid helps the design process of embedded software, allowing designers to explicitly annotate timing properties and application constraints, and providing formal validation of the timing behavior of architecture-level solutions at the highest possible level in the flow. Using timing back annotation, designers can derive the run-time properties of their application from real execution patterns allowing a proper analysis of the applicatio behavior.

Benefits

By using RT-Druid, embedded designers can:

- describe the application behavior from the functional and the architectural point of view;
- import functional models described using modern third-party modeling tools;
- analyze the temporal behavior of applications, getting information to guide the software architecture design process;
- automatically generate RTOS configuration source code;
- reduce development costs anticipating design choices dependent on the timing behavior of the applications.



RT-Druid 1.0 features

These are the features available on the current version of RT-Druid (see Figure 1):



- support for Eclipse.org 3.0
- support for Apache ANT scripting and command line execution
- support for the specification of the functional behavior, software architecture and temporal constraints
- advanced fixed priority schedulability analysis techniques
- detailed report and feedback information wizard for automating common usage patterns
- table view for quick interaction with architectural parameters

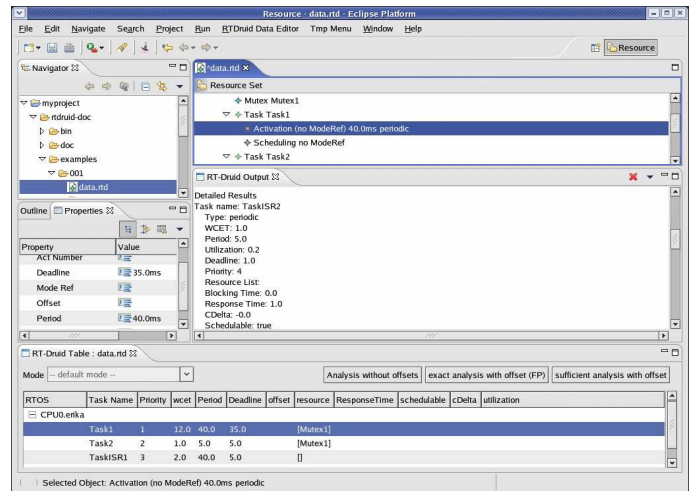


Figure 1: A screenshot of RT-Druid 1.0

RT-Druid Roadmap

RT-Druid is an ambitious project in continuous evolution. Thanks to the open platform provided by the Eclipse Project, new features can be added, and further integration can be reached easily with third-party tools.

The following is a short list of some innovative features that RT-Druid will support in the next releases:

- Support for analysis and tools for multiprocessor and distributed embedded systems;
- Allocation algorithms and performance evaluation for multiprocessor-on-a-chip;
- Support for code generation for Evidence Srl ERIKA Enterprise RTOS;
- Import of behavioral description from Matworks Simulink and UML 2 modeling tools;
- Import of architectural description from architectural descriptions such the OSEK/VDX OIL language;
- Back-annotation from real target hardware execution for reliable execution time estimation;
- Integration with real-time scheduling simulation tools;
- Code generation for OSEK compliant RTOSes;
- Advanced scheduling techniques for dynamic and multimedia systems;

- Optimization algorithms for stack memory footprint reduction in constrained single chip embedded systems;
- Integration with automatic source code generation tools for commercial third-party RTOS.

More information

For more information on RT-Druid and other Evidence Products, please send an e-mail to info@evidence.eu.com, or visit the web site at <http://www.evidence.eu.com>.

About Evidence Srl

Evidence is a spin-off company of the ReTIS Lab of the Scuola Superiore S. Anna. People at Evidence are experts in the domain of embedded and real-time systems with a deep knowledge of the design and specification flow of embedded SW, especially for the automotive market. We keep providing significant advances in the state of the art of real-time analysis and multiprocessor scheduling.

Our solutions aims at bringing new approaches to conventional embedded systems as well to the frontier of embedded computing, such as multiprocessor-on-a-chip, reconfigurable hardware, dynamic scheduling and much more!