

Rational Rose RealTime

The Real-Time Embedded Challenge

Software development teams all face the same e-software paradox — how to develop applications sooner without compromising quality. Developers of real-time embedded software face additional challenges. Such software is highly event driven, concurrent, and often distributed. Stringent requirements must be met for latency, throughput, and dependability. The capture and effective communication of designs for such systems is a daunting task.

Rational Rose RealTime

Rational Rose® RealTime is a complete lifecycle Unified Modeling Language development environment expressly created to meet these real-time embedded challenges. It enhances the power of industry standard UML with a real-time profile optimized for the unique problems of concurrency and distribution. Rose RealTime unifies the project team by providing an extensive set of tool integrations to meet the needs of the entire team, from requirements capture through to high-performance code generation and debugging for

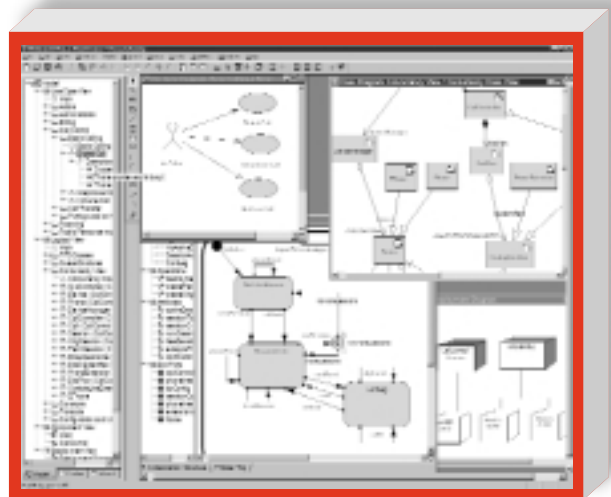
real-time operating system targets. In combination with the Rational Unified Process™, your project has a proven pragmatic approach to reducing development risk.

- ▶ A UML model compiler generates complete C and C++ applications for UNIX, Windows NT/2000, and real-time operating system targets. This automated code generation eliminates the need for manual translation and avoids costly design interpretation errors
- ▶ An associated visual UML model debugger enables observation and validation of host and target applications. Model execution encourages early design refinement and continuous verification of quality

The Real-Time Embedded Development Choice

Rational Rose RealTime is based on market-leading technology that extends Rational Rose, the world's leading visual modeling tool, with field-proven UML model code generation and visualization acquired from ObjecTime Limited, the technical leader in real-time embedded development tools.

- ▶ UML supports the entire software development lifecycle



"Rational Rose RealTime's strengths are in modeling, code generation and the visualization of models during execution. IDC's opinion is that these key features coupled with the full complement of industry-standard UML support makes Rose RealTime a major contender as the de facto standard for real-time embedded system development."

Steve Garone, research director for International Data Corporation (IDC)

Iterative Development

Rational Rose RealTime supports an iterative development strategy that reduces your development risks. Reverse engineering enables you to understand your existing systems. Code generation technology lets you compile and execute your designs at the earliest stages of product inception. Early execution on the host or target platform provides you with the feedback you need to discover and correct design flaws earlier, lower costs, and minimize risk.

Optimized Design Concepts

With Rational Rose RealTime, you model architectures and designs in a natural way that mirrors how real-time embedded systems actually work. For example, concurrency is inherent in such systems, and the resultant interaction among concurrent threads of execution raises many design challenges. A best practice solution to handling concurrency is the active object design pattern. Active objects encapsulate their own thread of execution thus preventing thread interaction problems. Since they communicate through message-based interface ports, like the pins on hardware integrated circuits, they adapt well to various reuse and distribution situations. Active objects can be flexibly mapped to operating system threads and processes.

In Rational Rose RealTime, active objects are modeled as Capsules, captured in a real-time profile described in UML 1.4. Capsules can be hierarchically decomposed into collaborating sub-capsules, and thus can be used throughout the development cycle — from executable architectures to lowest-level design elements. Capsules enable your team to design real-time embedded systems the way they really operate.

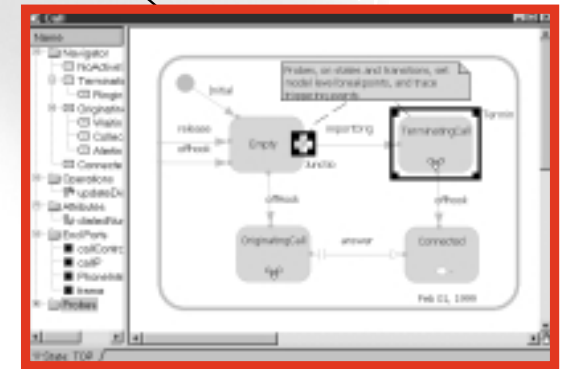
▶ *Standard UML with a real-time profile delivers the most powerful solution to your needs in the industry*



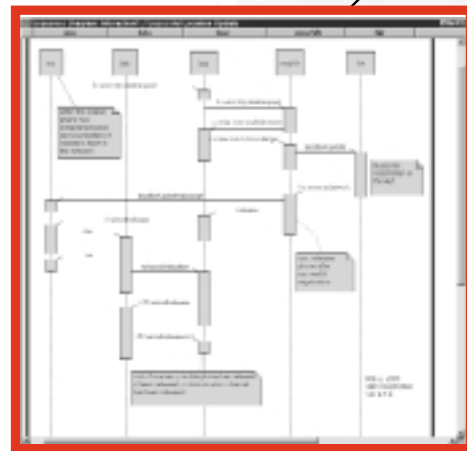
▶ *Advanced model compiler generates complete real-time C++ and C executables directly from your design models*



▶ *State machine model debugger with state change animation and model-level breakpoints lets you diagnose UML designs directly*

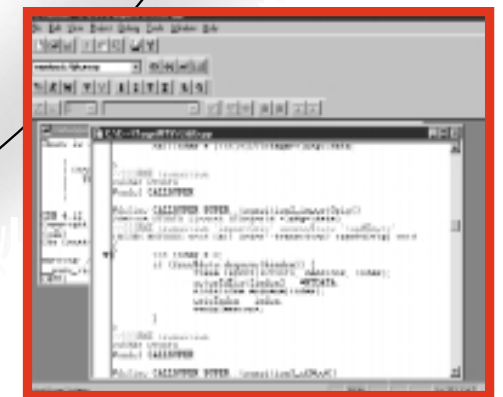


▶ *Use sequence diagrams to specify design behavior*

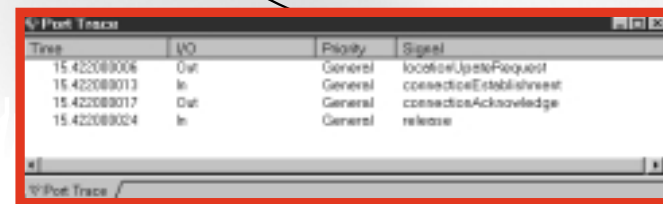


Analyze, Design, Compile, Execute, Debug and Test

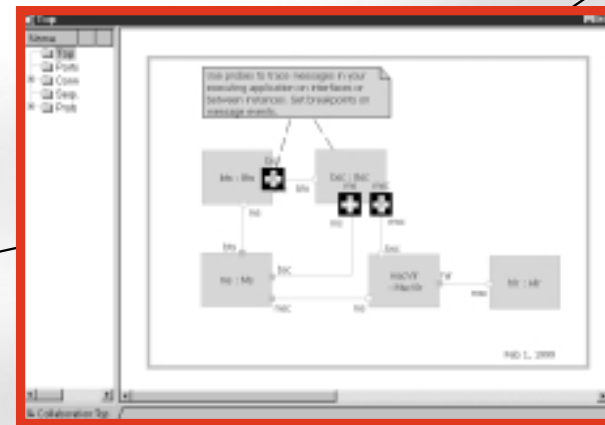
▶ *Integrated symbolic debugging on host and target*



▶ *Behavior can be verified by comparing design time sequence diagrams, with runtime sequence diagrams automatically generated from runtime event traces*



▶ *Observe model execution, with integrated symbolic debugging, on host and target*



▶ *Model debuggers let you trace messages exchanged between model elements to get a high-level view of model runtime behavior*

SPECIFICATIONS

Support for leading RTOS targets including:

- ▶ Tornado/VxWorks
- ▶ Linux
- ▶ OSE
- ▶ pSOSystem
- ▶ VRTX
- ▶ LynxOS
- ▶ AIX
- ▶ QNX
- ▶ UnixWare
- ▶ IRIX
- ▶ Chorus Classix
- ▶ Nucleus
- ▶ XEC
- ▶ Support for other targets available

Product Integration

- ▶ Rational ClearCase
- ▶ Connexis
- ▶ Rational RequisitePro
- ▶ Rational SoDA

Supported Platforms

- ▶ Windows NT/2000
- ▶ UNIX

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Productivity Depends on Clear Communication

Real-time embedded systems often require large-scale development teams to handle the complexities of design and construction. Without good communication and the clear capture of system architecture, developing in such an environment can be disastrous. Rational Rose RealTime can help you avoid such pitfalls.

- ▶ Improve communication between all members of your team through the power of the UML
- ▶ Integration between Rational Rose RealTime and Rational RequisitePro® ensure that no requirements get lost in translation from requirements to design
- ▶ Capture your architecture more effectively and make it part of the implementation
- ▶ Publish your designs to the Web using Rational Rose RealTime's Web Publisher. You can automatically generate documents via the integration between Rational Rose RealTime and Rational SoDA®
- ▶ Software Configuration Management and Version Control tool integration allows you to use products like Rational ClearCase® to more effectively manage your UML application development

An Open Platform Eases Integration and Adoption

Rational Rose RealTime is designed for simplified and streamlined insertion into your software development environment, processes, and workflows. Seamless integration with other Rational® Software products and support for a diverse set of commercial real-time operating systems offers development teams a complete solution that no other vendor can match. Why? Because only Rational publishes the Rose Extensibility Interface (REI) and other open interfaces — allowing customers and vendors to integrate directly with Rational Rose.

Support for leading compilers and symbolic debuggers keeps you in control of your design. These integrations let you focus on the design of your software, rather than on the development environment or on tool interoperability issues.

Rational Unified Solutions Program

The Rational Unified Solutions Program offers tightly coupled integrations and complementary products for Rational products. There are over 90 partners providing complementary solutions interoperable with Rational Rose, creating a wide range of high-quality, innovative products designed to help you meet your software development challenges.

To learn more about our partners' products and services for Rational Rose RealTime, or to learn how you can become a Partner for Rose RealTime, please visit www.rational.com/corpinfo/partners

Rational Suite and Rational ClearCase — A Winning Combination

Rational Rose RealTime is a member of Rational Suite™ DevelopmentStudio RealTime Edition. Rational Suite, combined with both Rational ClearCase the market-leading configuration and change management solution, and Rational Software's world-class training and support is a winning combination.

Rational Rose RealTime and Connexis for Distributed Applications

Connexis is a software development framework that extends Rational Rose RealTime for distributed system development. It enables the deployment and visualization of distributed Rose RealTime applications, and provides patterns for high-availability applications.

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