

Rational Suite DevelopmentStudio Real Time Edition

The Embedded Software Development Paradox

Today's software development paradox is more acute than ever before. You're driven to complete projects faster without compromising quality. Developers of the real-time software powering embedded and wireless devices face complex design challenges of concurrency, distribution, and dependability. Yet it's not just the complexity of the software, but the entire development environment. Increasingly distributed development teams, performance demands, development for multiple platforms, shorter and continuous release cycles, all make a difficult job even harder. The cost of failure is high. Often you are "betting the business" on accelerating the delivery of high visibility products to the marketplace ahead of your competitors. You can't afford to fail.

Rational Suite® DevelopmentStudio RealTime Edition was expressly created to address these challenges. The suite contains Rational's market-leading development and diagnostic tools — including Rational® Rose® RealTime — the powerful package you need to succeed. The Rational Suite® Team Unifying Platform unites both individuals and teams into a collaborative force focused on delivering high quality software, on time, and within budget.

Optimized for Real-Time Embedded Development

You've got to have the right tools for the job. An integral part of the suite is Rational Rose RealTime. Rational Rose RealTime is a complete lifecycle Unified Modeling Language (UML™) development environment expressly for real-time embedded software. It supports UML compliant real-time modeling optimized for the unique problems of concurrency and distribution. Rational 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/ C++, and Java 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

HIGHLIGHTS

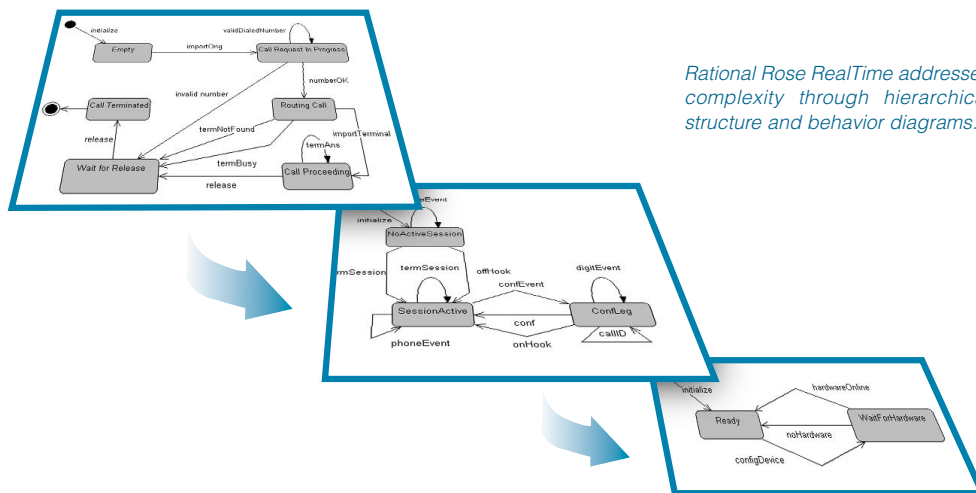
Increase productivity by providing a complete UML development environment optimized for real-time embedded software. The right modeling concepts for the problem domain make developers more effective, and tool capabilities such as complete code generation from UML models eliminate costly and error-prone manual translation between design and implementation.

Reduce project risk by unifying the project team with an environment that facilitates the communication of requirements and status to all team members.

Hassle-free integrations between Rational products and other industry leading RTOS and IDE vendors provide a complete solution tailored to your specific needs. Time to market is reduced, as pre-integration in a suite reduces tool-chain complexity and makes tool adoption easy.

Increase product quality and reduce development risk by adopting a proven approach to development, the Rational Unified Process. The suite supports essential best practices such as developing iteratively, modeling visually and continuously verifying quality.

Identify and eliminate costly reliability errors on the host, before deployment on the target platform.



Rational Rose RealTime addresses complexity through hierarchical structure and behavior diagrams.

Accelerating Embedded Software Development

and target applications. Model execution encourages early design refinement and continuous verification of quality.

- A complete UML-based testing facility lets the user graphically define system behavior, then automatically generate and execute test cases and test suites for complete or partial models. It supports continuous verification of quality right from the beginning of system implementation.

Handling Concurrency and Distribution

A best practice solution to handling concurrency is the active object design pattern. Active objects encapsulate their own thread of execution and communicate through message-based interface ports, like the pins on hardware integrated circuits. They adapt well to various reuse and distribution situations. In Rational Rose RealTime, active objects are modeled as UML-compliant capsules. 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.

Targets Your Embedded System

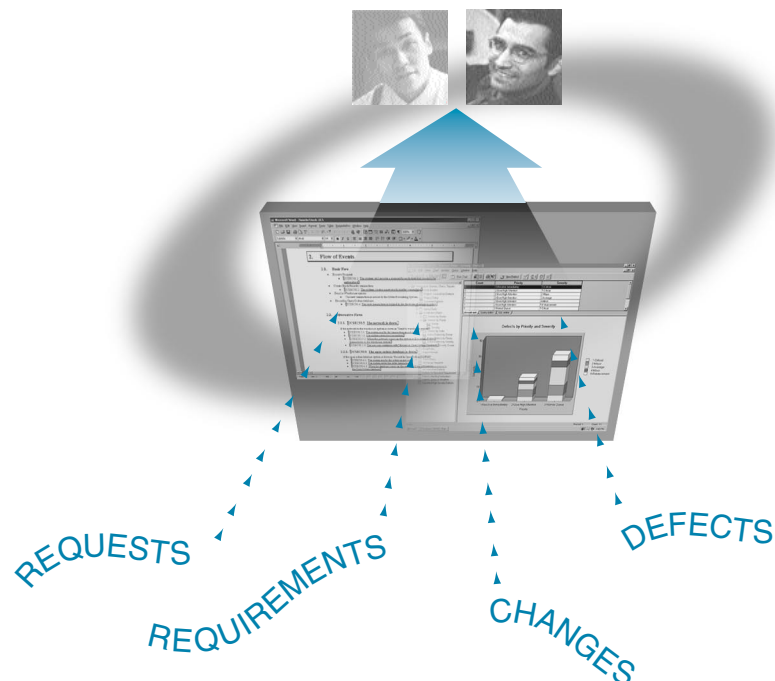
Rational Suite DevelopmentStudio RealTime Edition includes the runtime services library which extends Rational Rose RealTime Professional Edition to provide integrations to Real-Time Operating Systems (RTOS) and source level debuggers. There are in excess of 50 target configurations to choose from out-of-the-box. Each configuration is specific to a combination of RTOS, target compiler, and processor architecture family. The runtime services library includes all source code for the Rose RealTime Run-Time Services, to make it easy to understand, rebuild and customize. With the source code there is no mystery as to how Rose RealTime generates applications with excellent performance and minimal footprint size. See the side bar for an abbreviated list of supported target platforms.

Quality By Design

Run-Time Analysis

Rational Rose RealTime allows you to execute and visually observe UML models, enabling early and continuous validation. However, no matter how good your testing is, some types of defects are just too expensive or difficult to develop tests for or don't seem to show up until the application is in the operational environment.

Early Design Validation and
Testing = Fewer Delays, Higher Quality,
and On Time Delivery.



For the code you write, Rational® Purify® detects runtime errors, exceptions, memory leaks, and other resource problems. Because Rational Purify requires no special builds, you can quickly and easily test the reliability of new code, before checking it in. When Rational Purify is combined with Rational® PureCoverage®, you can see exactly what percentage of source code has been exercised and easily identify untested or insufficiently tested functions, procedures, and methods.

Rational® Quantify® gets to the root of application performance problems quickly and efficiently. You can:

- Identify performance bottlenecks
- Compare accurate and repeatable performance data for multiple versions of a program
- Measure time spent in the application and time spent in system calls, to establish whether the application or the platform is the primary cause of slow performance

Rational's patented Object Code Insertion technology enables Rational Purify, Rational PureCoverage, and Rational Quantify to operate effectively even if no source code is available, providing the only means available to test and certify third-party components.

Automated Testing

Quality by design is all about earlier detection and repair of software problems. Traditionally, you didn't discover most of your architectural and implementation problems until late in the project, when you had completed system integration. When you can find and resolve problems earlier in the lifecycle — during concept validation, simulation, you increase your return on investment-delivering high quality software more quickly. We do this through an iterative approach to development that attends to testing and automation to build in quality throughout the iterative development process, across the entire lifecycle.

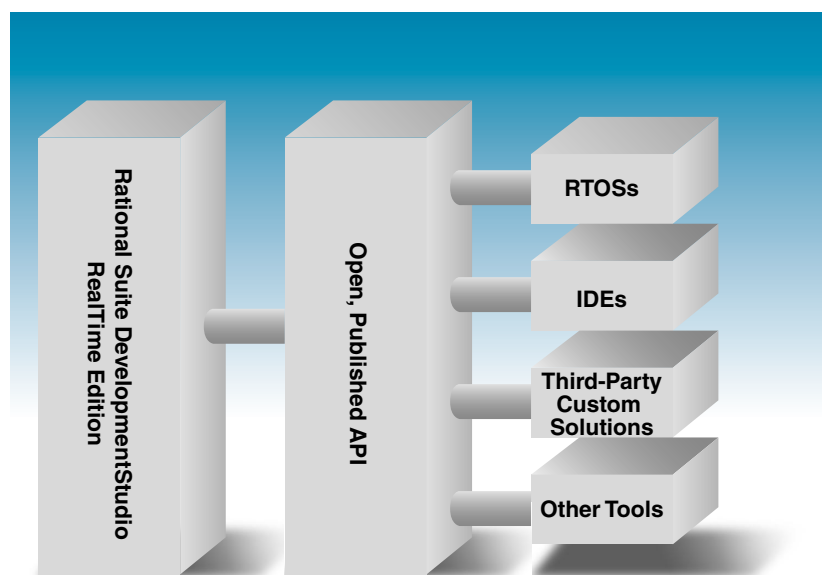
Only Rational provides an open, published API to allow your existing tools, and other third party solutions, to be easily integrated into your environment.

Rational® QualityArchitect RealTime is an extension to the visual modeling capability of Rational Rose RealTime. It enables Rational Suite DevelopmentStudio RealTime Edition users to perform model-based component testing by generating code automatically from within the Rose RealTime model. For the first time you can automatically build stubs and drivers to use in testing components and classes. And, these generated tests can be executed automatically. Rational QualityArchitect RealTime supports a wide range of testing activities from developer scenario-based debugging to full system regression testing.

Unify Your Developers to Increase Productivity

Many studies of software development failure cite that one of the most common problems is requirements that are misunderstood, contradictory, or implied, including incorrect internal and external interfaces. It all boils down to one core problem — lack of clear communication.

Then there is the developer's constant companion — change. Change is a fact of life in software development. Your ability to identify, manage, and control change is key to project success. When will you discover the changes? How will you understand the total impact? How will you integrate and control all these changes?



Clear Communication Avoids Setbacks

Rational Suite DevelopmentStudio RealTime Edition allows you to capture, understand, control, and share the critical elements of development — requirements, designs, changes, and defects — and thereby avoid setbacks on your projects. Feature creep can be controlled using Rational® RequisitePro® which allows you to categorize your requirements by what is important to you — priority, cost, which release, etc. Rational RequisitePro clearly identifies “suspect links” when requirements change.

Changes can then be shared between Rational RequisitePro and Rational Rose RealTime so that nothing falls through the cracks. You can easily see, in Rational Rose RealTime’s visual models, where the impacts exist. Rational Rose RealTime’s Model Integrator can assist you in integrating the changes from parallel modeling streams.

Are you receiving enhancement requests, defects, and changes via phone calls, meetings, email, and chance hallway discussions? Rational Suite DevelopmentStudio RealTime Edition includes Rational Team Unifying Platform. As part of that platform, Rational® ClearQuest® allows you to track enhancement requests, bug fixes, and documentation changes across a continuously changing project baseline.

Rational ClearQuest enables you to easily:

- Categorize and prioritize all these changes based on the factors that are important (severity, project, priority, etc.)
- Assign enhancements and fixes to specific releases and people
- Establish a repeatable workflow, easily tailored to your development environment
- Define and customize queries to assess progress or uncover problem spots
- Communicate all these changes to your team via email and the Web

UML Modeling

Rational Suite DevelopmentStudio RealTime Edition provides unparalleled support for the Unified Modeling Language, optimized for the unique problems of concurrency and distribution. By providing a common “language” for speaking about a complex system, the UML allows many different contributors with diverse perspectives to communicate on common ground. Key Rational scientists, including Grady Booch, Ivar Jacobson, Jim Rumbaugh, and Brian Selic led the authoring of the UML standard. The Object Management Group (OMG) has adopted the submission lead by Rational of the UML as the official standard for software design notation.

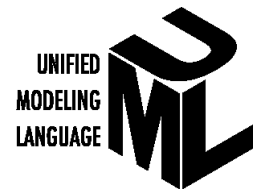
Full Team Support

Whatever the size of your development team, Rational Suite DevelopmentStudio RealTime Edition can help you coordinate their efforts effectively. When used with a configuration management and version control system such as Rational ClearCase®, each individual can check out and privately modify a copy of the model until it is ready to be shared with the rest of the team. Changes are identified with Rational’s Model Integrator and then automatically merged back into one model. Rational Rose RealTime also supports full load building driven by ClearMake.

Simplify Your Tool Chain and Ease Adoption

Real-time embedded development provides enough challenges. You don’t need non-integrated tools and tool incompatibilities to slow you down. You don’t need the extra work of integrating tools yourself. You don’t need the ongoing hassles with coordinating multiple product releases, performing multiple installs, calling various support lines, managing multiple licenses, and dealing with numerous vendors.

Now, with Rational Suite DevelopmentStudio RealTime Edition, you don’t need to be a tool integrator. You can focus on solving your technical problems while Rational provides you with the only completely integrated tool set. With Rational’s pre-tested, integrated Suite, you can ease your acquisition, lower your cost, and speed your deployment.



Rational Suite DevelopmentStudio Realtime Edition includes:

And also features tools optimized for the real-time and embedded developer:

- Rational Rose RealTime – provides a complete lifecycle UML development environment expressly for real-time embedded development
- Rational QualityArchitect-RealTime – offers automated test generation and execution
- Rational Purify – automatically pinpoints hard-to-find bugs
- Rational Quantify – highlights performance bottlenecks
- Rational PureCoverage – helps avoid shipping untested code

the Rational Suite Team Unifying Platform

- Rational Unified Process – improves team process with easy, browser-based access to industry-proven best practices
- Rational RequisitePro – offers team-based requirements management that allows your team to fully understand the impact of change
- Rational® TestManager – provides a single focal point for managing test activities and assessing quality
- Rational ClearQuest – provides comprehensive defect and change tracking that easily adapts to the way you work
- Rational ClearCase LT – manages your evolving software with the world's leading software configuration management solution
- Rational SoDA – automates the creation and maintenance of project documentation
- The Rational Developer Network – keeps you informed of the latest industry topics with a wealth of white papers, articles, book reviews, FAQs, industry news, and more

Open Solutions

Rational uniquely provides open APIs allowing other companies and customers to build value-added products that integrate into the Rational platform. There are hundreds of Rational Partners creating a broad range of high-quality innovative products designed to address your special software development challenges. This includes numerous leading Real-Time Operating System (RTOS) and IDE vendors.

You can avoid the “mess of many”, ease adoption, and lower your total cost of ownership — and you can do it all with Rational.

A Foundation for Development SuccessThe Rational Suite Team Unifying Platform

Because software development is a team sport, every Rational Suite® features the Rational Suite Team Unifying Platform. More than a collection of disparate tools, this open, integrated platform speeds development at every stage of the software lifecycle.

One Team, One Platform

The Rational Suite Team Unifying Platform breaks down the artificial barriers that too often separate cross-functional teams. Now your entire team can share access to common requirements information, process guidance, defect and change request data, test results, and up-to-the-minute project metrics. It's never been easier to access critical project data, share information, or improve the visibility of your project to all stakeholders.

Streamline Everyday Activities

With Rational Suite, you get more than easy access to project data. You also get unprecedented automation that speeds everyday tasks. Easily transform requirements into test cases — and automatically verify that the functionality you are building meets user needs. Append

test results to bug reports — and save hours of time trying to recreate user errors. Analyze trends based on actual software artifacts — and make projections with confidence. Lifecycle integration lets you spend more time on critical development activities, and less time on tedious and time-consuming administration.

An Open and Extensible Foundation

Best of all, the Rational e-development platform is open, extensible, and supported by over 600 independent development and system integration partners. The Rational platform supports both Windows and UNIX operating systems and is closely integrated with leading programming environments. We work closely with strategic partners including IBM, Microsoft, Sun Microsystems, and others to ensure broad compatibility with .NET, J2EE, J2ME, and embedded system environments, extending your development and deployment options. An open API (Application Program Interface) ensures maximum flexibility now — and in the future.

The Rational Developer Network

With so much information available on the Web, how do you get to the right information at the right time? Are you spending more time searching than solving? Rational can help. Available exclusively to Rational Suites users, the Rational Developer NetworkSM, is your one-stop resource for white papers, articles, artifacts, book reviews, topical discussions, and more. Organized by expert editors and arranged by process and technology topics relevant to the worldwide community of Rational Suites users, Rational Developer Network delivers the information you need to succeed.

More Rational Suite Solutions

- Rational Suite® AnalystStudio® – a complete requirements management, system definition and data modeling solution
- Rational Suite ContentStudio® – integrated code and content management for e-business
- Rational Suite TestStudio® – comprehensive functionality, reliability, and performance testing
- Rational Suite Enterprise – Includes all tools in Rational Suite AnalystStudio, DevelopmentStudio, and TestStudio.

Accelerate Success with Rational Services

Turn to Rational Services to bring your projects in on time and under budget. Our service offerings accelerate success through training and mentoring programs, consulting services, and technical support. An investment in services pays off immediately through faster technology deployment and accelerated project delivery. Long term, our services raise the skill level of your entire project team, laying the foundation for continuous productivity improvement.

Service Offerings Include:

- Rational University, our professional training organization, offers more than 60 courses spanning the software lifecycle. Courses are available on site or at dozens of classrooms worldwide.
- Consulting and mentoring support, with a focus on knowledge transfer of tools and best practices.
- Project or Technology Assessment packages that provide an independent assessment of your organization's capabilities.
- QuickStart and Deployment Packages, combining installation, training, and consulting, offer a proven path to efficient technology adoption.
- Convenient Hotline Access for speedy resolution of tool and technology issues that could delay progress.

SPECIFICATIONS

Support for leading RTOS targets including:

- Tornado/VxWorks
- Linux
- OSE
- pSOSystem
- VRTX
- LynxOS
- AIX
- QNX
- UnixWare
- ITRON3
- Chorus Classix
- Nucleus
- WinCE
- Support for other targets available

Product Integrations:

- Rational ClearCase
- Rational Test RealTime
- Tri-Pacific RapidRMA
- TimeSys TimeWiz

Supported Platforms:

- Windows NT
- Windows 2000
- Windows XP
- Solaris
- HPUX

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