Rational. software

WIND RIVER

Integrated Device and Systems Development with IBM Rational and WindRiver

Optimizing device software and systems development

IBM Rational Software Development Conference UK 2007

What keeps me **Rational**?

TD3

IBM

Agenda

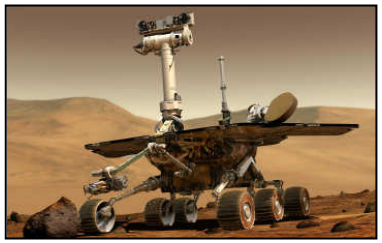
- Complexities of systems and device development
  - Customer challenges & trends
- The Wind River and IBM Rational solution
  - Why are Wind River and IBM Rational teaming up?
- Joint solution: Integrated Device and Systems Development
- Resources to Learn More!

The leader in Device Software Optimization

Wind River enables companies to
develop, run, and manage device software
better, faster, at lower cost, and more reliably.









Leaders in Every Industry Rely on Wind River

Network Equipment

30%

- Alcatel-Lucent
- Cisco
- EMC
- Ericsson
- Hewlett-Packard
- Huawei
- Intel
- Juniper
- LG Electronics
- Marconi
- Motorola
- Nokia-Siemens
- Nortel
- Oki
- UT Starcom
- ZTE

Industrial & Automotive

20%

- ABB
- Agilent
- BMW
- Bosch/Blaupunkt
- Continental
- DaimlerChrysler
- Delphi
- GE
- General Motors
- Honda
- Honeywell
- Hyundai
- Magneti Marelli
- Mitsubishi
- National Instruments
- Nissan
- Rockwell Automation
- Siemens
- Yasukawa

Aerospace & Defense

25%

- BAE Systems
- Boeing
- EADS
- General Dynamics
- Finmeccanica
- Harris
- Honeywell
- ITT
- L3 Communications
- Lockheed Martin
- MHI
- NASA
- NEC
- Northrop Grumman
- Raytheon
- Rockwell Collins
- Smiths Aerospace
- Thales
- US Navy

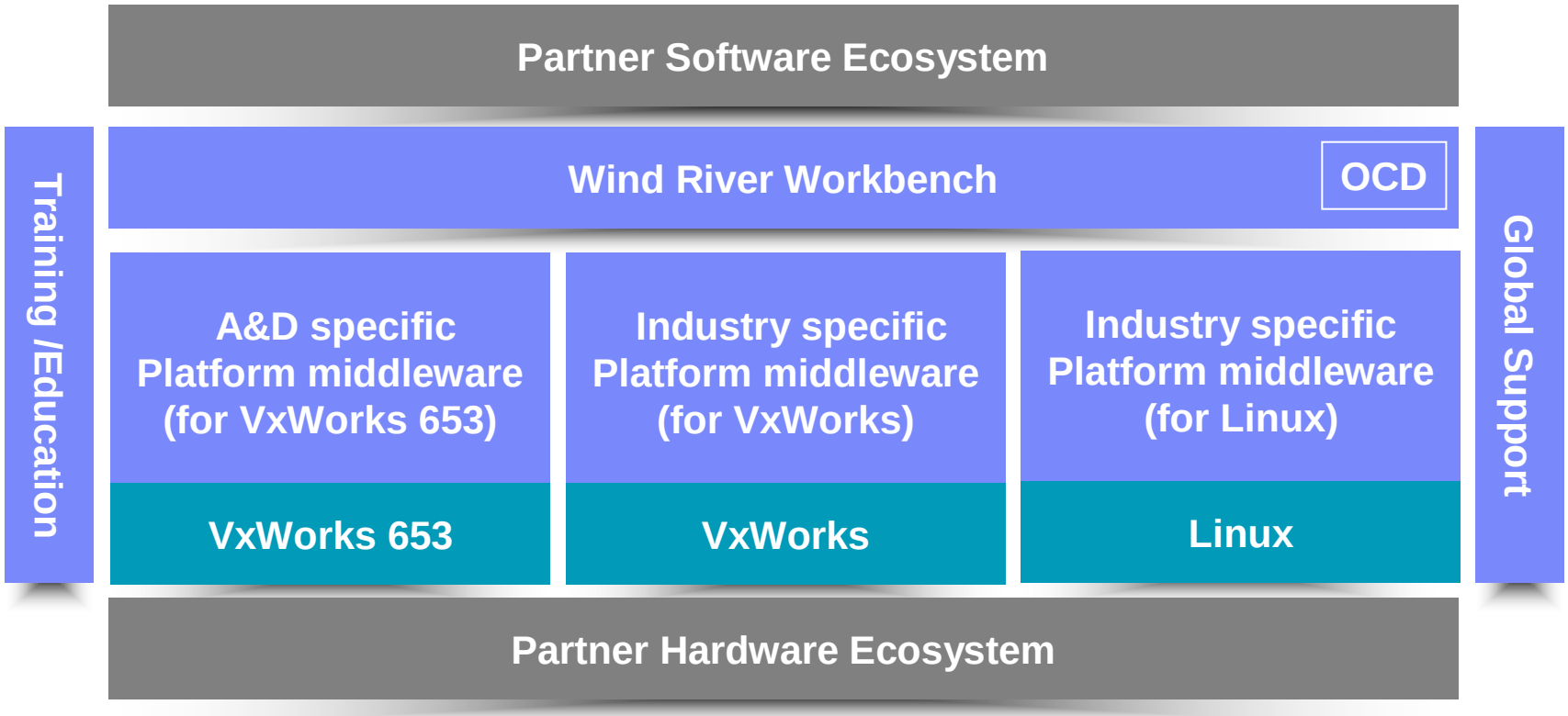
Consumer

25%

- Apple
- Datung
- Epson
- Ericsson
- Hewlett-Packard
- Iwatsu
- LG Electronics
- Motorola
- Philips
- Ricoh
- Samsung
- Sanyo
- Sony
- Thomson
- Toshiba
- Verizon

350+ million devices worldwide use Wind River technology

Wind River Market Specific Platforms



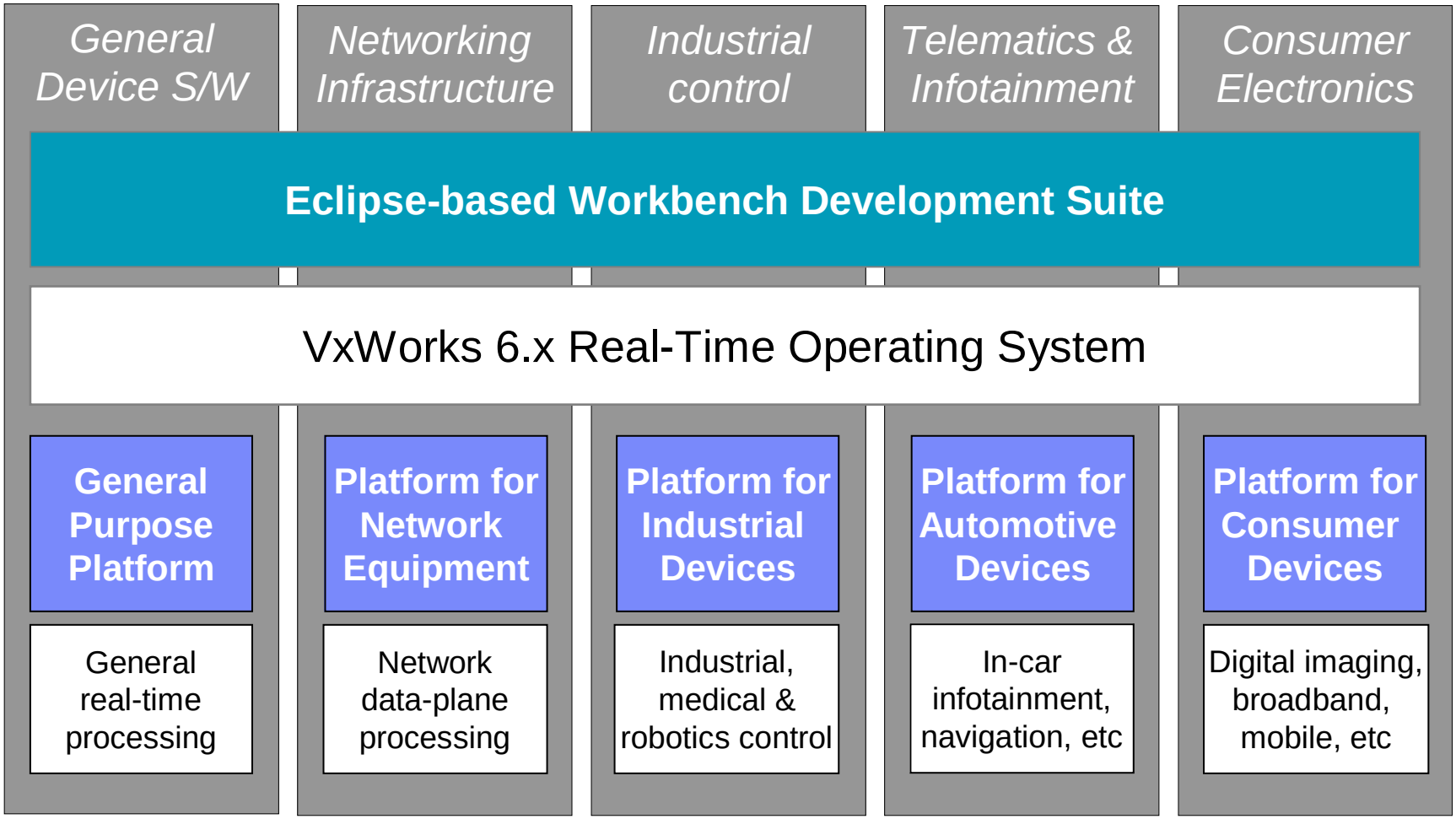
Wind River's Real-Time Solutions

- **VxWorks**
  - **Designed from the ground up to be a real-time operating system giving guaranteed* real-time response times**
- **Wind River Linux** using the PREEMPT kernel routines
  - **Standard Linux provides a level of real-time response suitable—but not guaranteed—for a broad range of applications using widely adopted open-source technology**
- **Wind River Linux** plus **Wind River Real-Time Core**
  - **Linux plus Real-Time Core provides guaranteed real-time for applications that have more stringent Linux requirements**

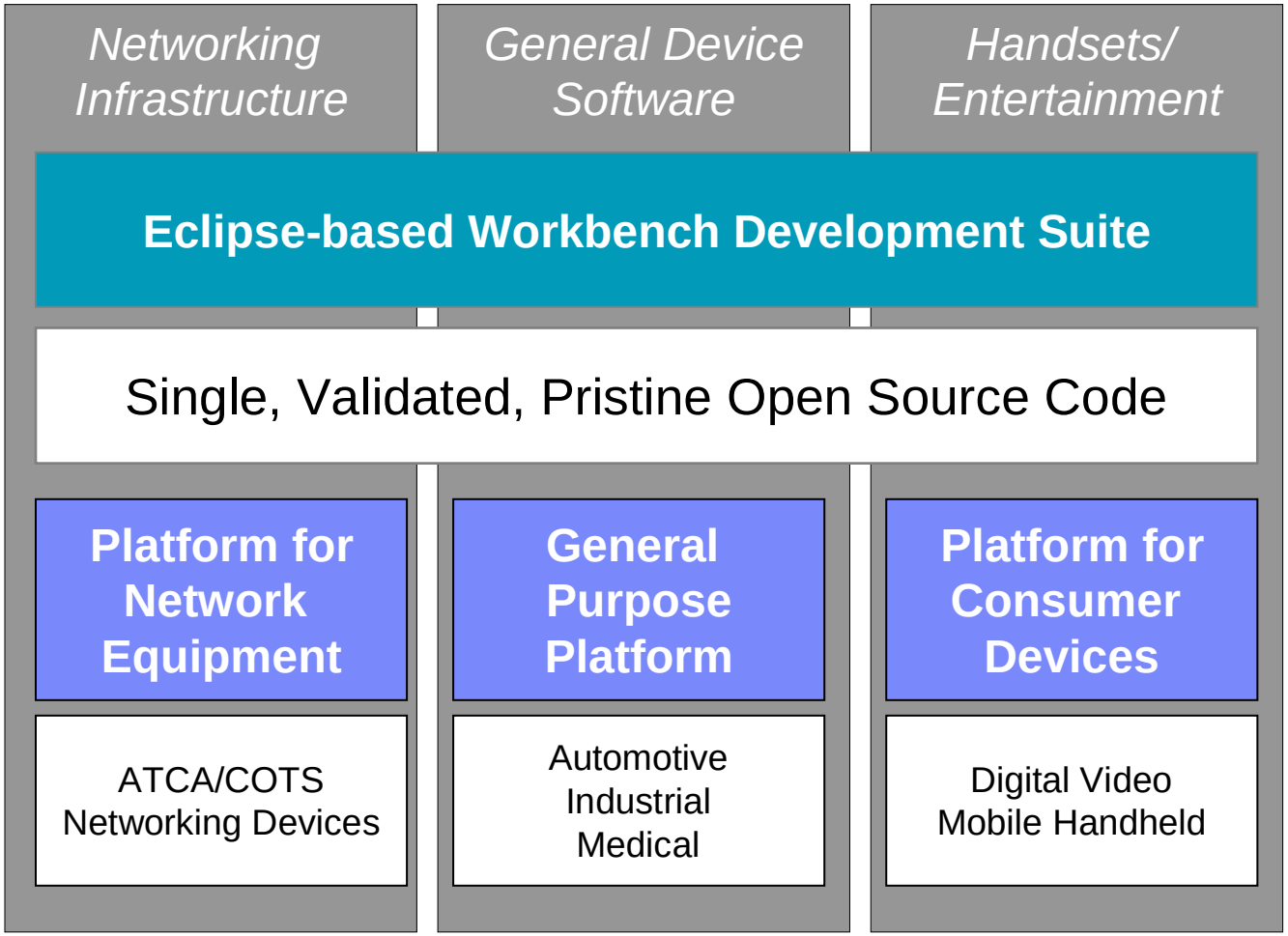
* Guaranteed: Meets required response 100% of the time, regardless of system load.

Wind River delivers the widest choice of real-time solutions

Wind River VxWorks Platforms



Wind River Linux Platforms



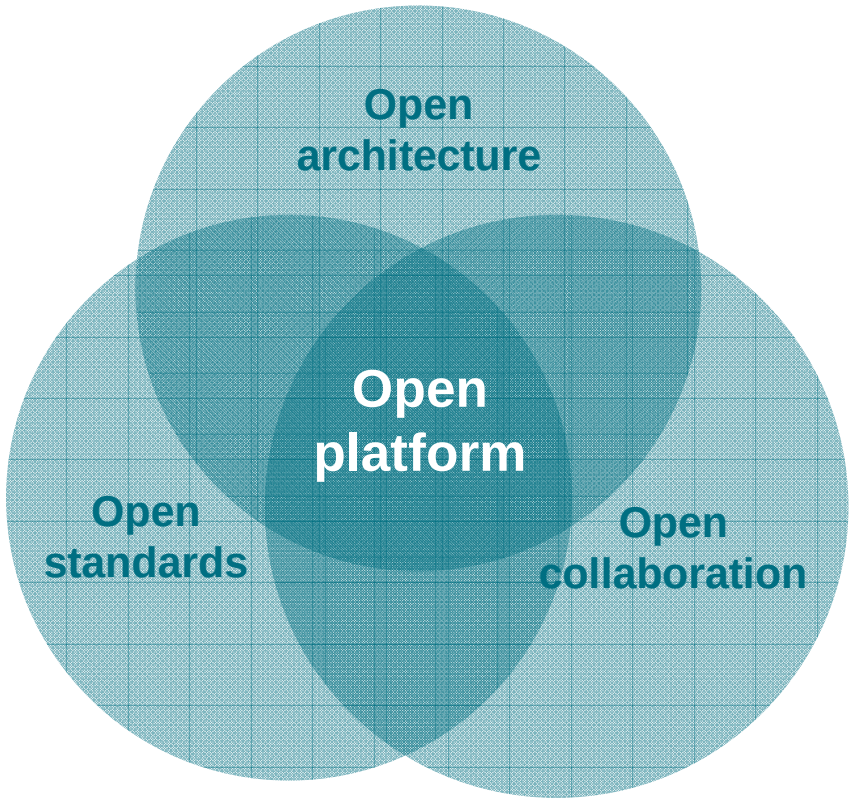
Why are Wind River and IBM teaming up?

- Customers deal with a variety of solutions from many different sources, and often bear the cost of ensuring their tools work together
  - Cost of training, maintenance and customization of tools
  - Hidden cost of overlapping technologies (e.g. multiple editors, debuggers, build systems)
- An integrated lifecycle systems solution is valuable to our customers, to allow them to use one solution to develop both server-side and client-side applications
  - Links enterprise/host side development directly to device software development
  - Better utilizes development tools across a broader set of applications
  - Realize higher productivity gains from better workflow integration
- Many customers have asked that we work together!
  - IBM Rational's top customers in the Systems Development space are the same as Wind River's in the Device Software Optimization space
- Govern system of systems that are using Multicore Technology
  - Help customers design, build and govern complex systems in a multicore environment

Open Platform

A new route to collaboration and innovation

- **Open standards**
  - Improve data sharing by simplifying integration of disparate technologies
- **Open architecture**
  - Increase collaboration by easily extending enterprise processes
- **Open collaboration**
  - Drive integrations and artifact traceability throughout the systems dev. lifecycle



Current complimentary integrated device and systems development solution

Process and Portfolio Management

- IBM Rational Portfolio Manager
- IBM RUP-SE

Change Management

- IBM Rational ClearCase
- IBM Rational ClearQuest
- IBM Rational BuildForge

Design and Construction

- IBM Rational RequisitePro
- IBM Rational Systems Developer
- IBM Rational Rose Technical Developer
- IBM Rational Ada Developer
- Wind River Workbench
- Wind River ScopeTools
- Wind River System Viewer

Software Quality

- IBM Rational Functional Tester
- IBM Rational Manual Tester
- IBM Rational Test Real Time
- IBM Rational PurifyPlus
- Workbench Unit Tester
- Workbench Diagnostics

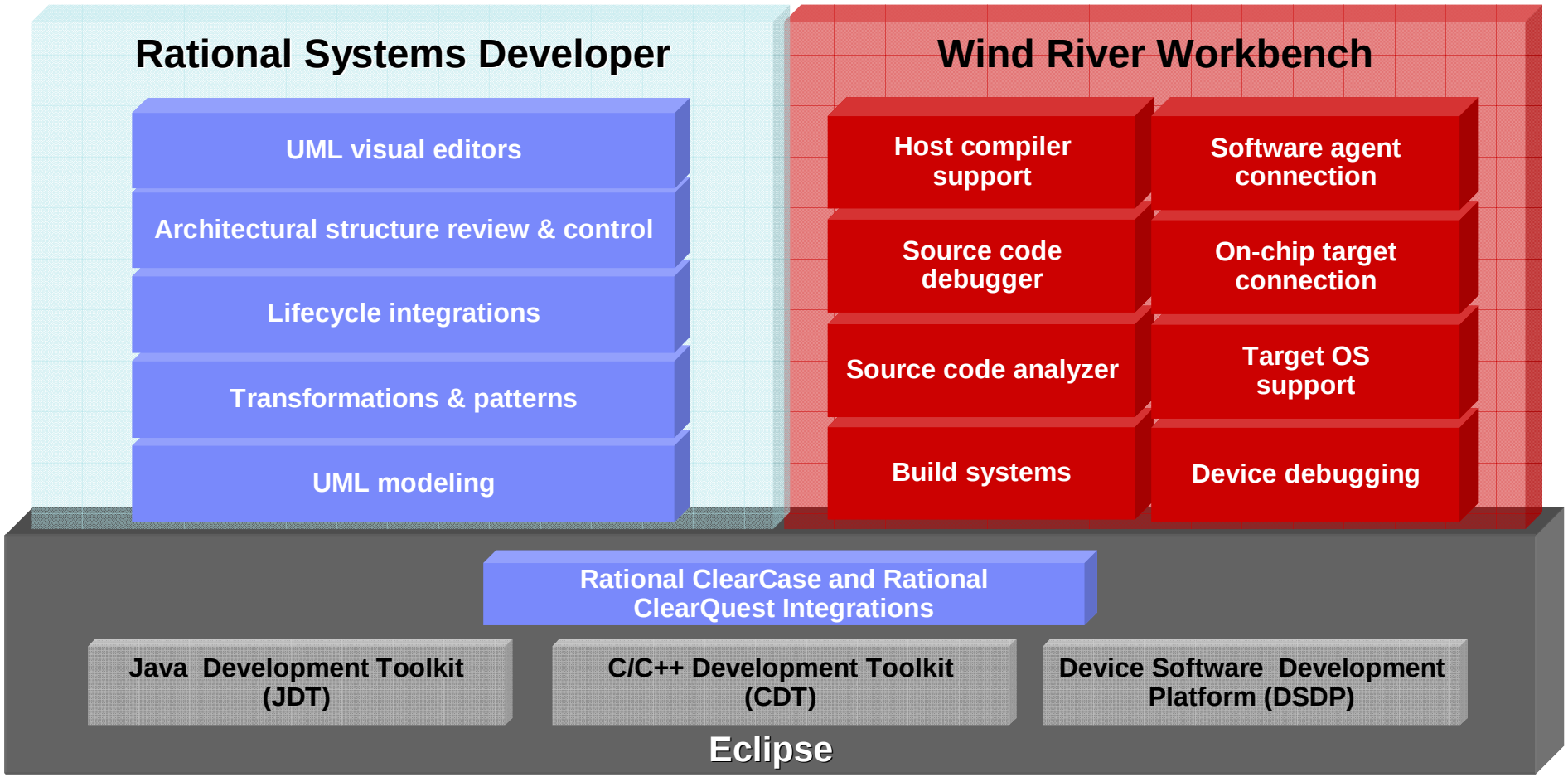
Partner Ecosystem & Open Computing (Eclipse, Linux, UML, SysML)

- IBM Websphere
- IBM Tivoli
- IBM DB2
- Wind River Linux Platforms
- Wind River VxWorks Platforms

Middleware and Runtime Environment

Integrated Device & Systems Development

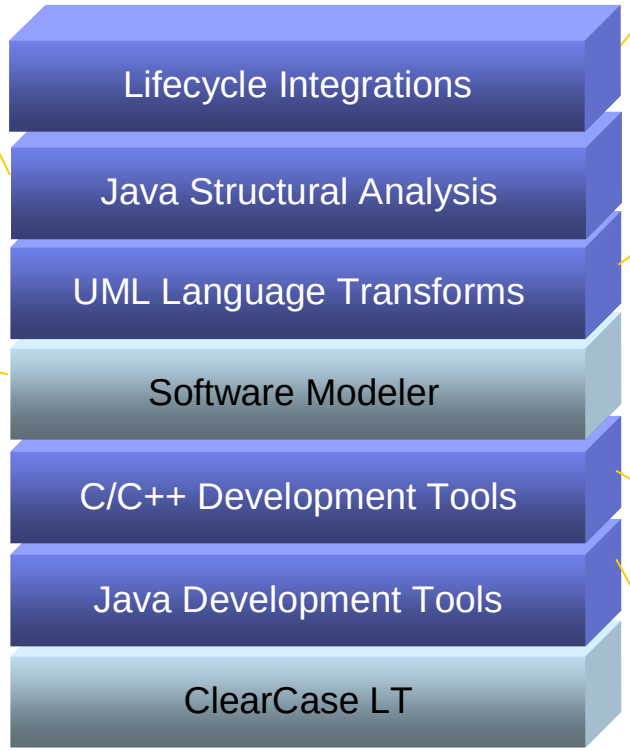
Two industry leaders teaming to help customers and missions be successful



IBM Rational Systems Developer Capabilities

"Architectural Discovery"
- Automatic anti-pattern and pattern detection
- Architectural discovery, analysis, metrics, and stability reporting
- Implementation level architectural rules

"Modeler"
- UML 2.0 Diagrams DoDAF
- OCL Support
- Pattern content
- Extensive open API
- Java-based "scripting" for extensibility
- HTML and XML based data extraction and reporting
- RAS tools
- Rose/XDE Model Import
- Traceability Analysis
- Visual Compare/Merge



"Lifecycle Integrations"
- ClearCase
- ClearQuest
- Requisite Pro
- SoDA
- RUP

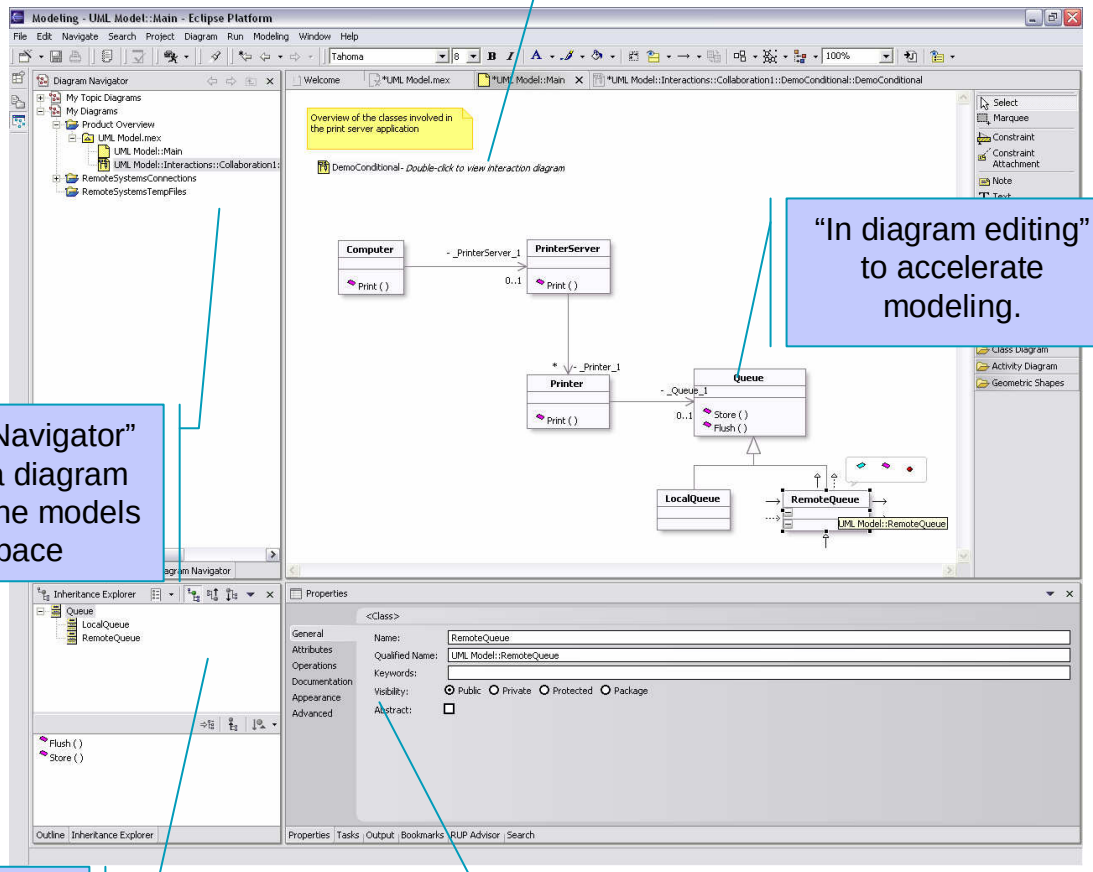
"UML Language Transforms"
- Pattern/Transform authoring framework and services
- UML-to-code transforms for Java and C++
- Selective language to UML harvesting
- UML-to-CORBA IDL transformations

"C/C++ Development Tools"
- C/C++ editors and build management
- Compiler and debugger integration
- UML code editors for C/C++

"Java Development Tools"
- Advanced Java tooling - editors, projects, refactoring, etc.
- UML code editors for Java
- Code Review

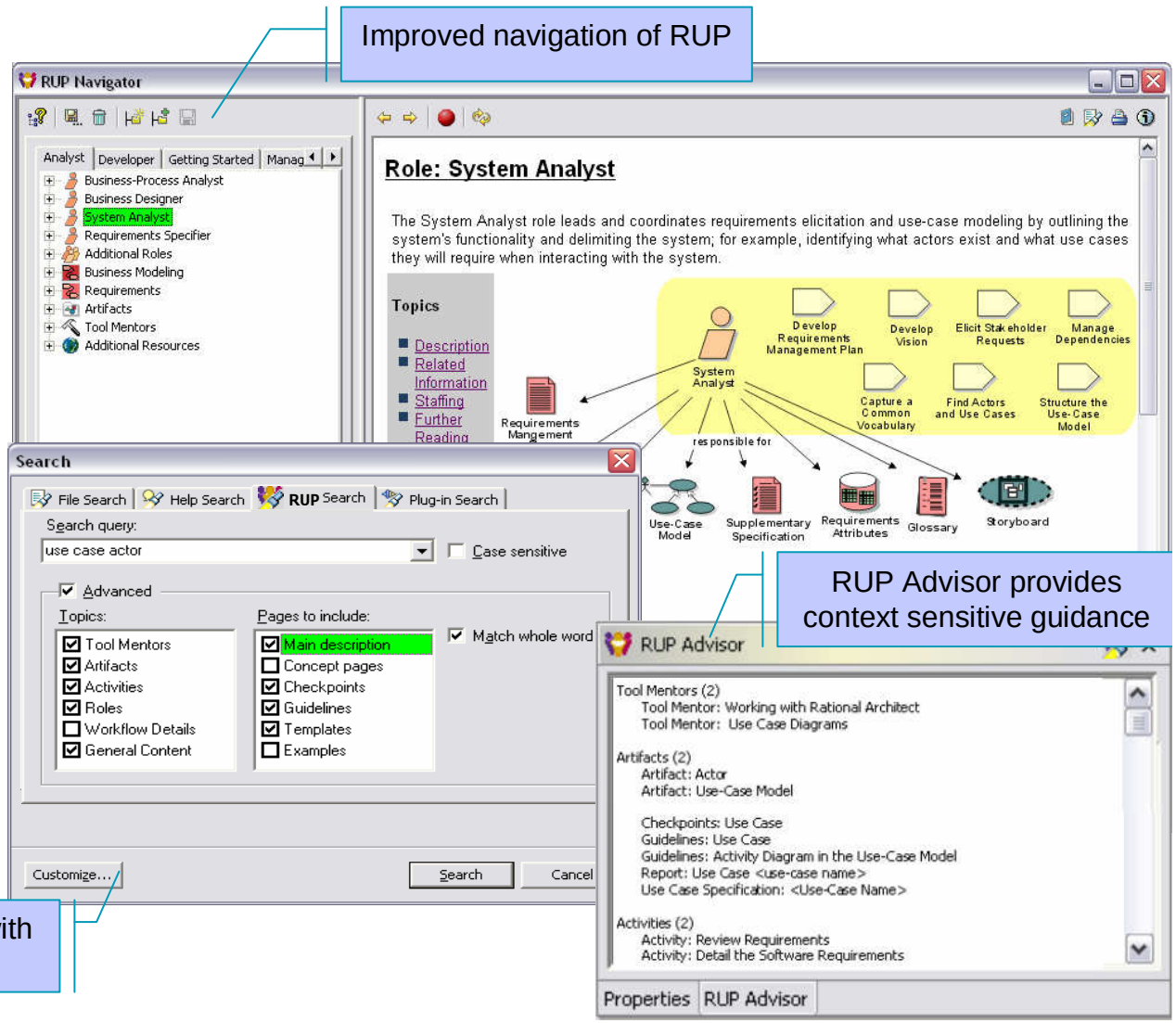
Model Driven Development:
Model your application using UML

- Simplify the capture of UML models during Analysis and Design
- Pattern content & authoring support
- New custom views improve the editing experience
- Support for UML 2 diagrams:
  - Activity
  - Class
  - Communication
  - Component
  - Composite Structu
  - Deployment
  - Sequence
  - Use Case



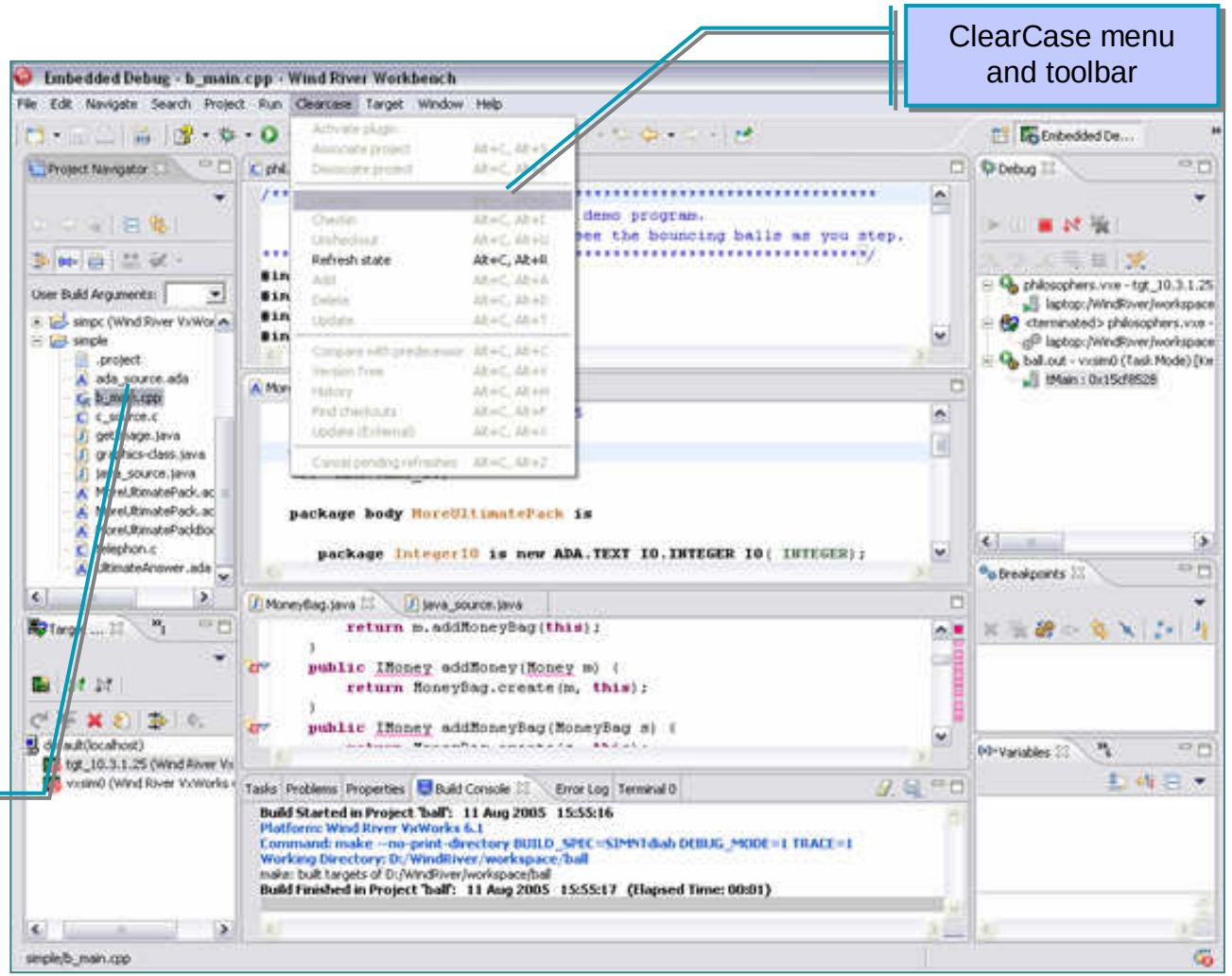
Process Guidance in Rational Systems Developer

- Integration with Rational Unified Process
- Tool Mentors provide guidance for activities
- User customizable views with user defined content
- Includes process guidance for Systems Engineering (RUP SE)



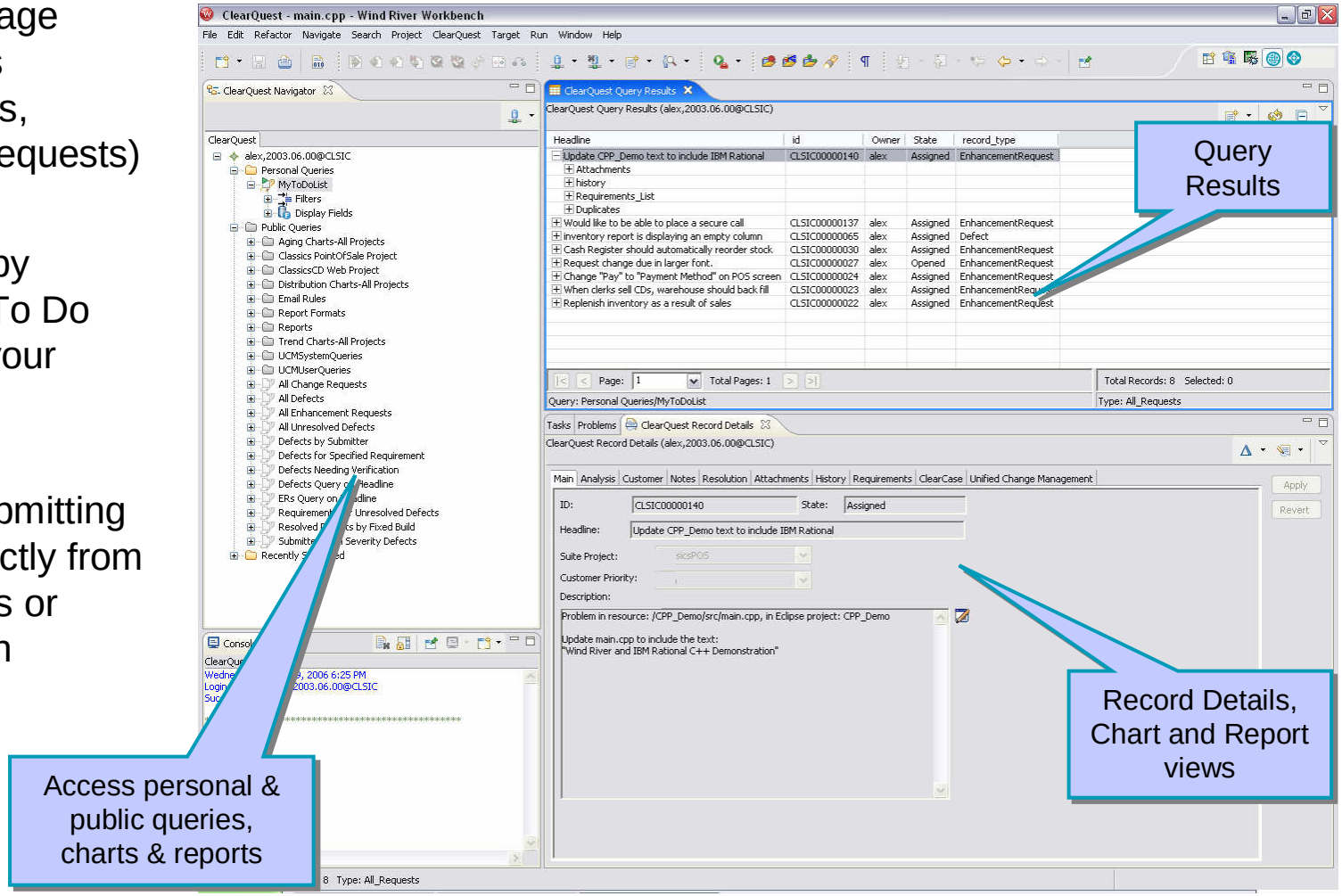
Rational ClearCase Integration with WindRiver Workbench

- Store and manage all of your software development assets, including your DSO source code
- Easily check in, check out, compare and merge your artifacts from within Workbench
- Integrates with both native ClearCase client and the new ClearCase Remote Client



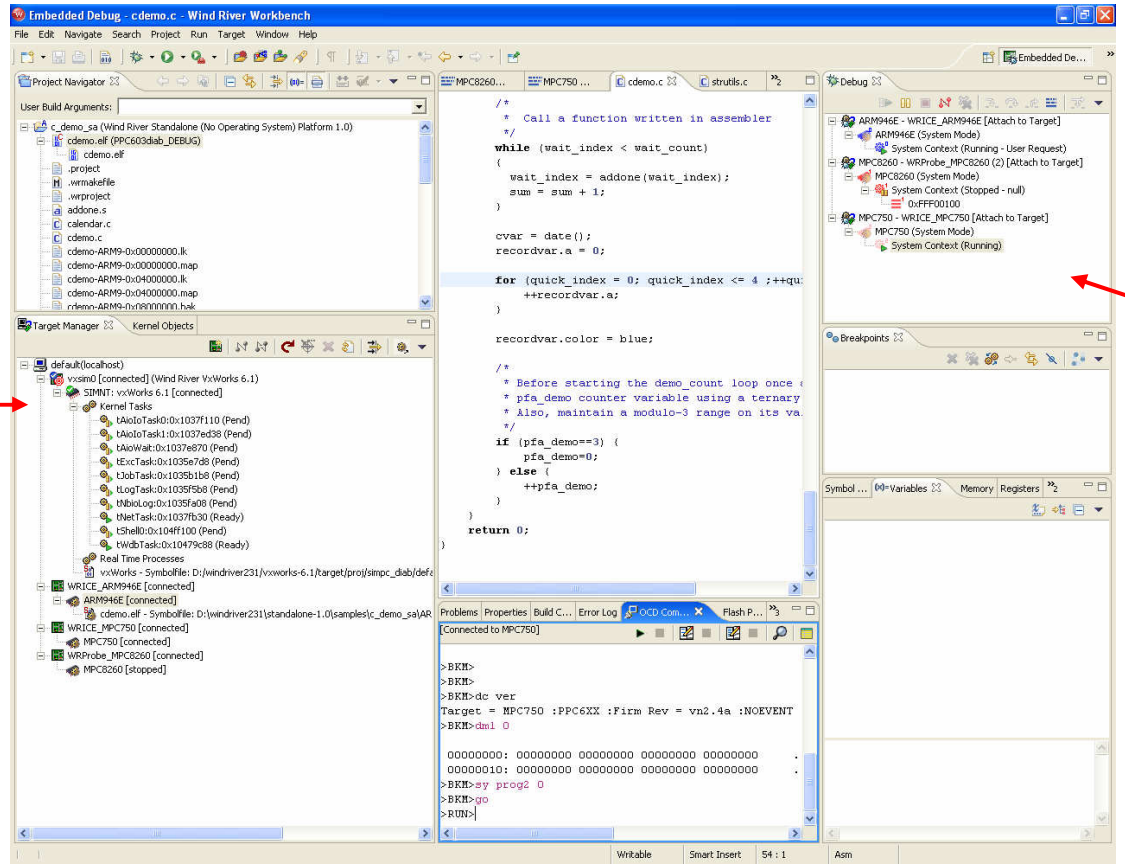
Rational ClearQuest Integration with WindRiver Workbench

- Create and manage change requests (including defects, enhancements requests) in Workbench.
- Stay up to date by accessing your To Do Lists within the your development environment
- Save time by submitting new defects directly from application errors or other Workbench resources



Workbench Multiple Session and Multiple Core

- Multiple Sessions/ Connections:
  - Software Agent Based
  - Wind River ICE
  - Wind River Probe
- Multiple CPUs or Boards:
- Multiple Contexts
  - System
  - Processes
  - Threads
- Linux Debugging
  - KGDB over Ethernet
  - KGDB over Serial
  - Usermode over Ethernet
  - Usermode over USB
- VxWorks Debugging
  - System mode debug
  - Task mode debug
  - Multiple connection types (ethernet, serial, JTAG)



Wind River On-Chip Debugging Tools

Debugging enhanced with the addition of On-Chip Debugging support

- **Support for Board and Operating System Bring-up**
- **CPU and Board initialization**
- **Analyze and debug system crashes**
- **Program Flash devices in-circuit**
- **Built-in diagnostics for board testing**
- **Kernel mode debugging with OS Awareness**
  - VxWorks
  - Linux
  - Express Logic ThreadX

Hardware supported

Wind River ICE

- **High Speed Ethernet connectivity**
- **Wind River JTAGServer™ support for multiple JTAG/EJTAG/BDM devices**
- **Target Console Interface for backhaul of serial data from target to host development environment**
- **Easy migration from one processor family to another**

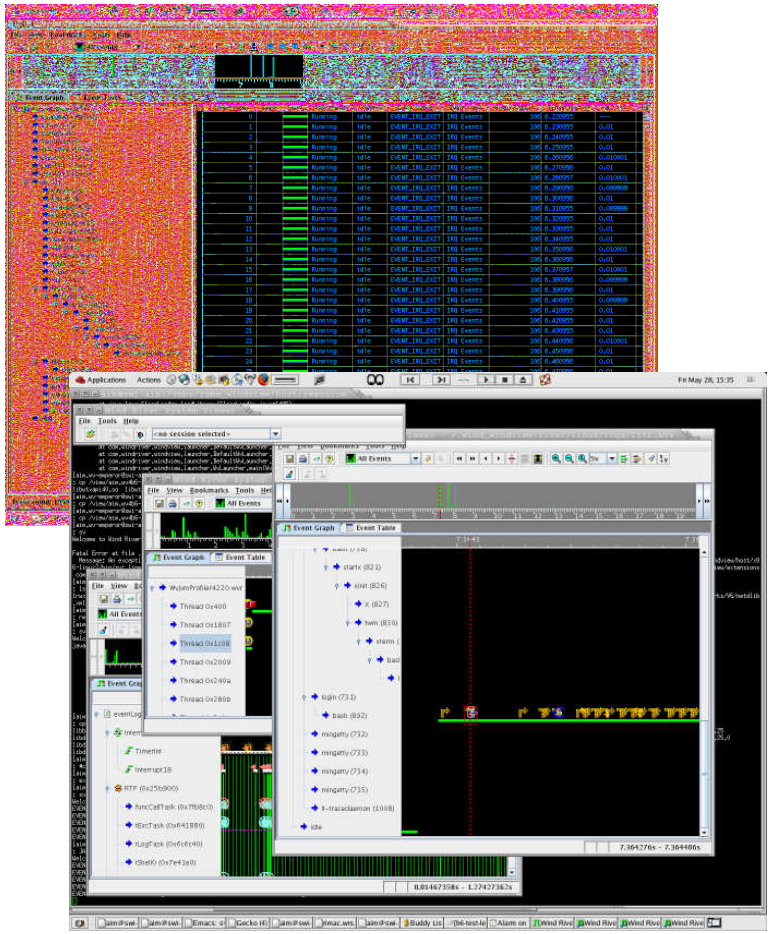
Wind River Probe

- **USB 2.0 Compatible**
- **USB Windows Device Driver Certified**
- **USB Powered, no additional power supplies required**
- **Easy migration from one processor family to another**
- **100MHz JTAG Clock support**

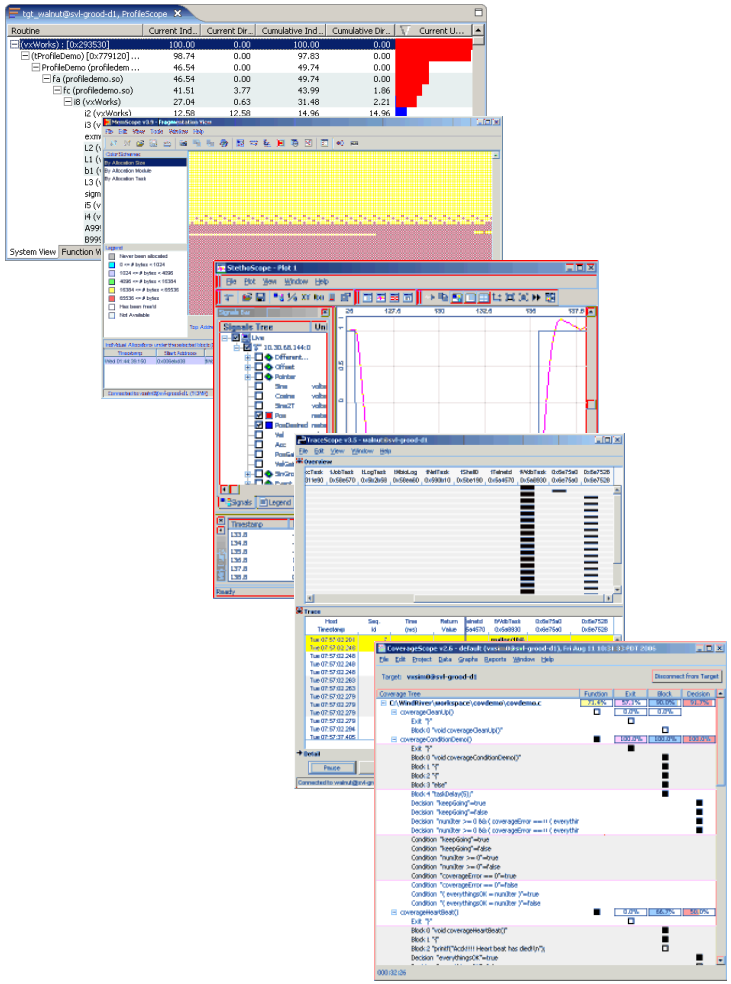
Wind River System Viewer

Graphical visualization of all system activity over time

- Reveals complex interactions of tasks, threads, interrupts, and system objects
- Detect deadlocks, starvation, and race conditions
- Understand performance problems due to wrong priorities or resource contention



Wind River ScopeTools

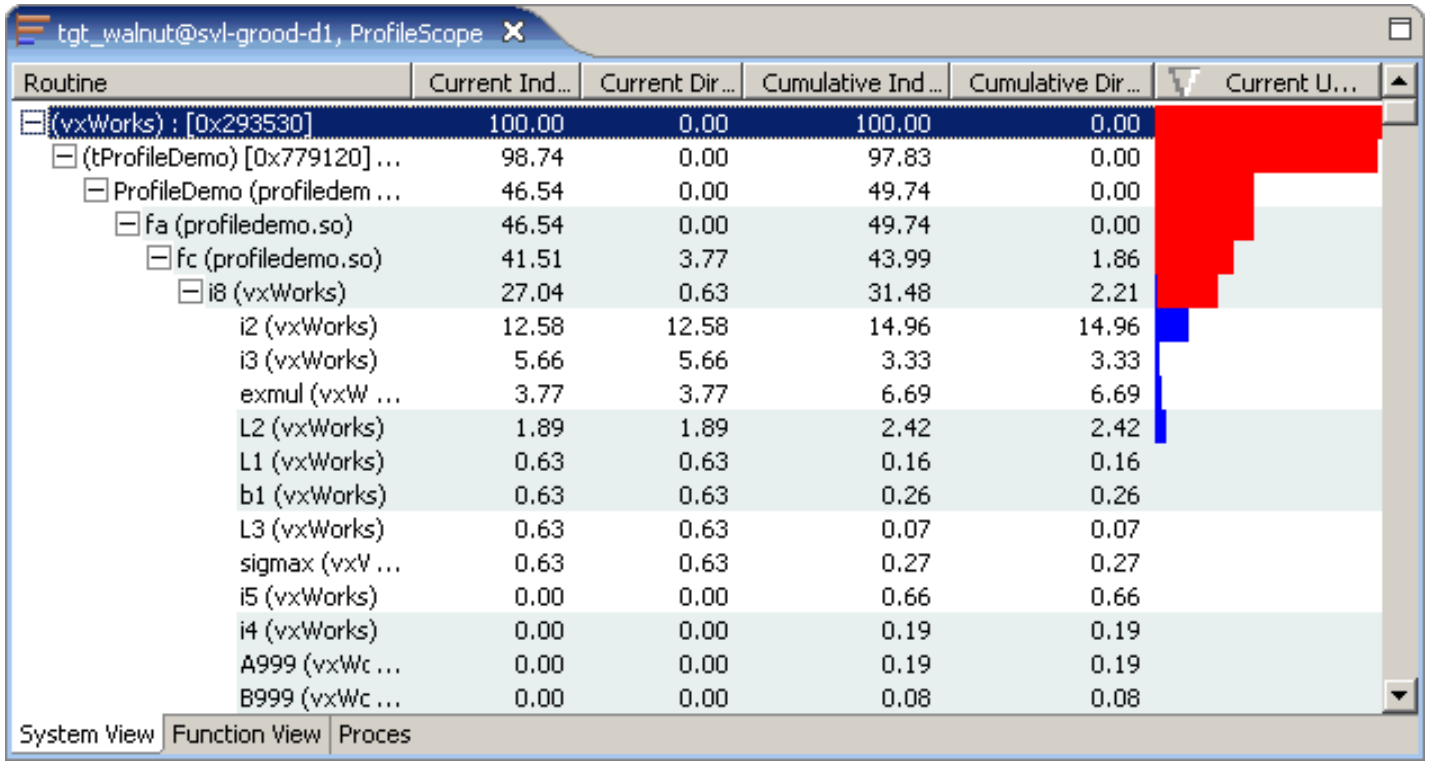


A set of **dynamic visualization** and **analysis** tools that help developers uncover software issues from **memory leaks**, to **performance analysis**, and **execution trace**

- Memory leak detection and visual analysis
- Execution flow tracing tool
- Statistical Profiling of threads and functions
- Graphical visualization of system variables over time

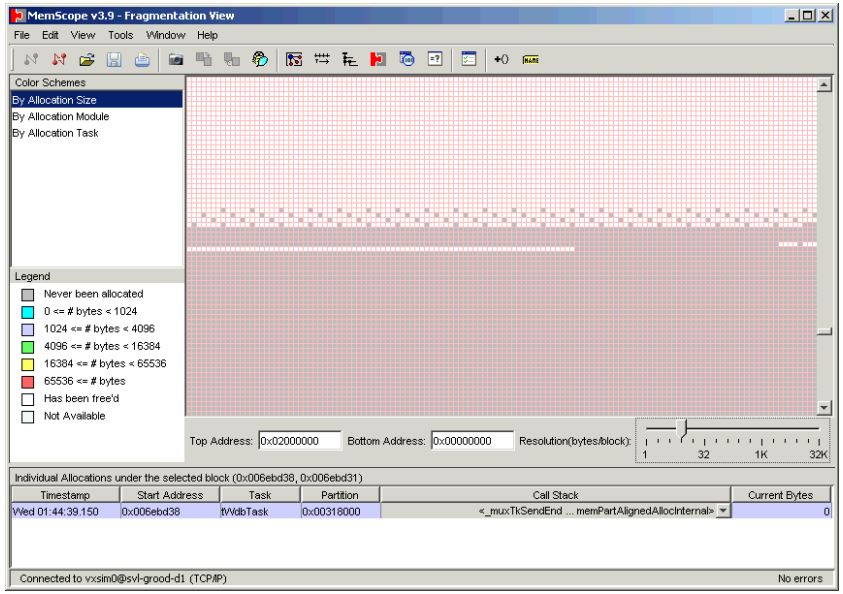
ProfileScope Finds the Hotspots

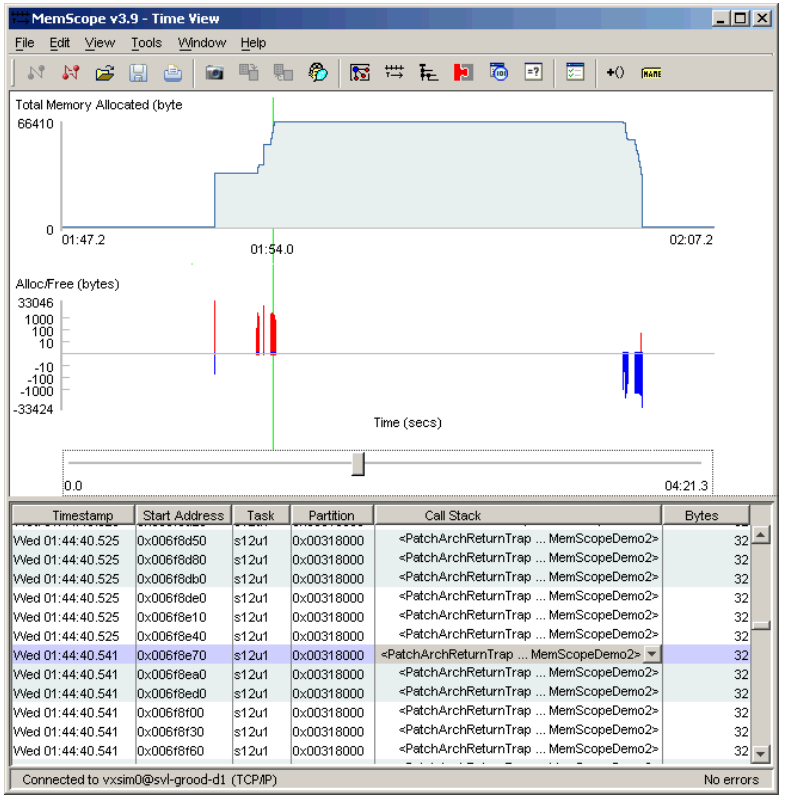
Analyze CPU usage of all threads and functions executing on the processor



MemScope Catches Memory Leaks

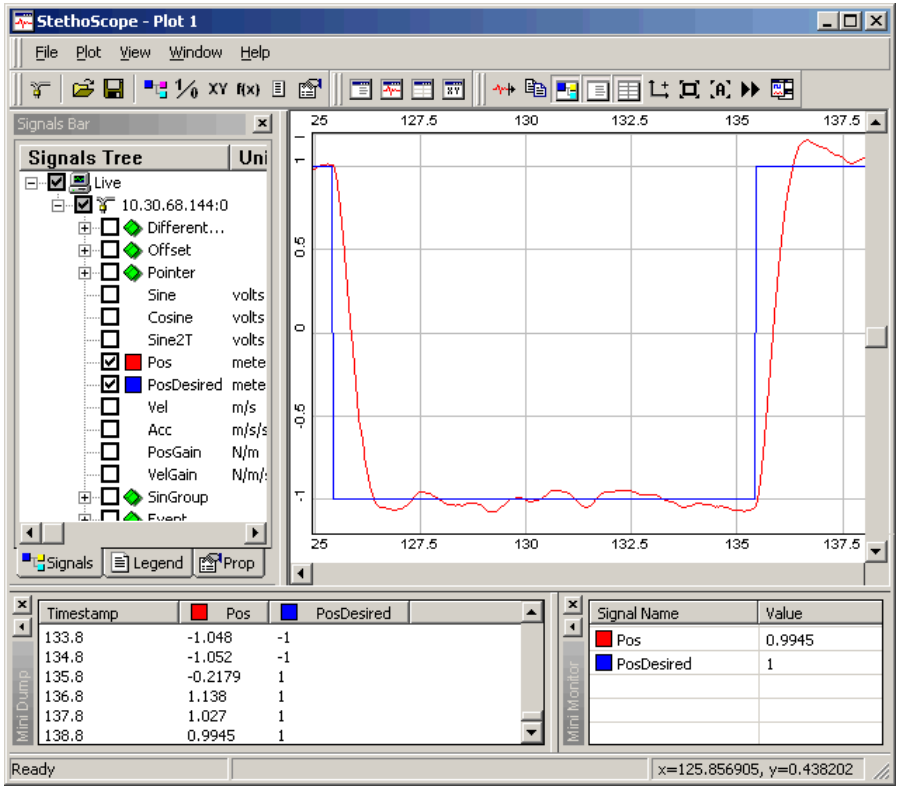
Capture memory allocations and frees across ENTIRE system

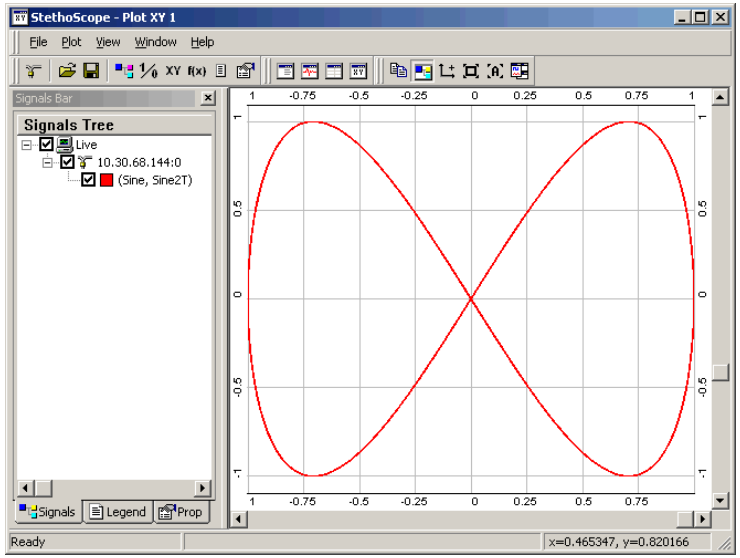




StethoScope Reveals System Behavior

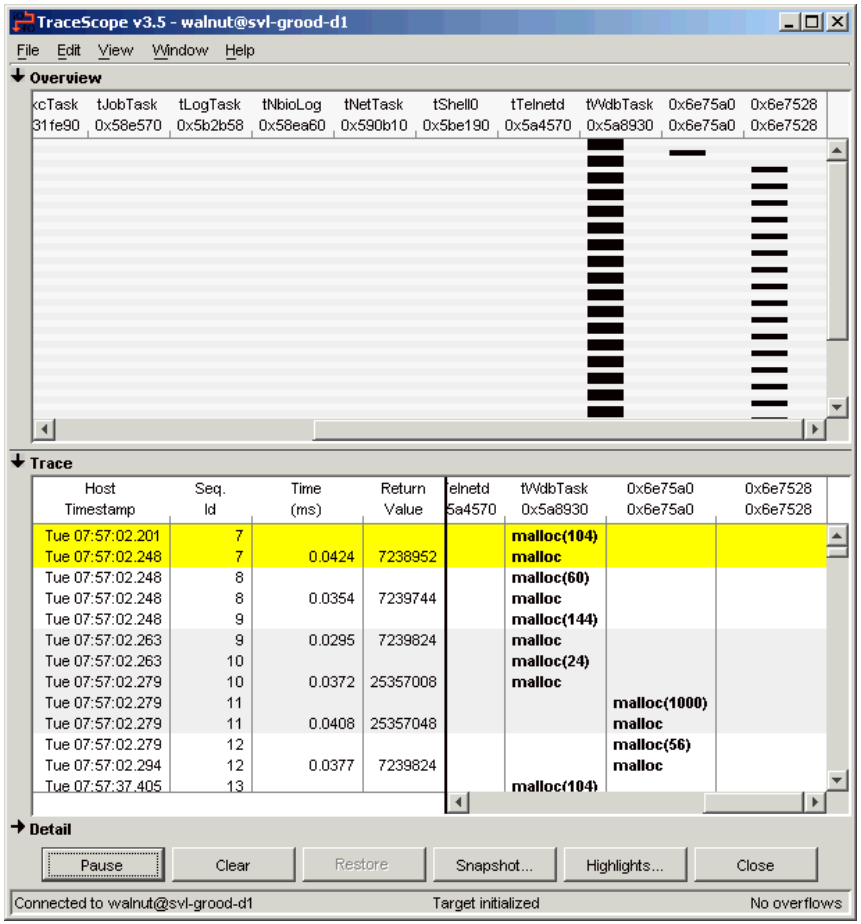
Variables graphed in real time help you tune your system





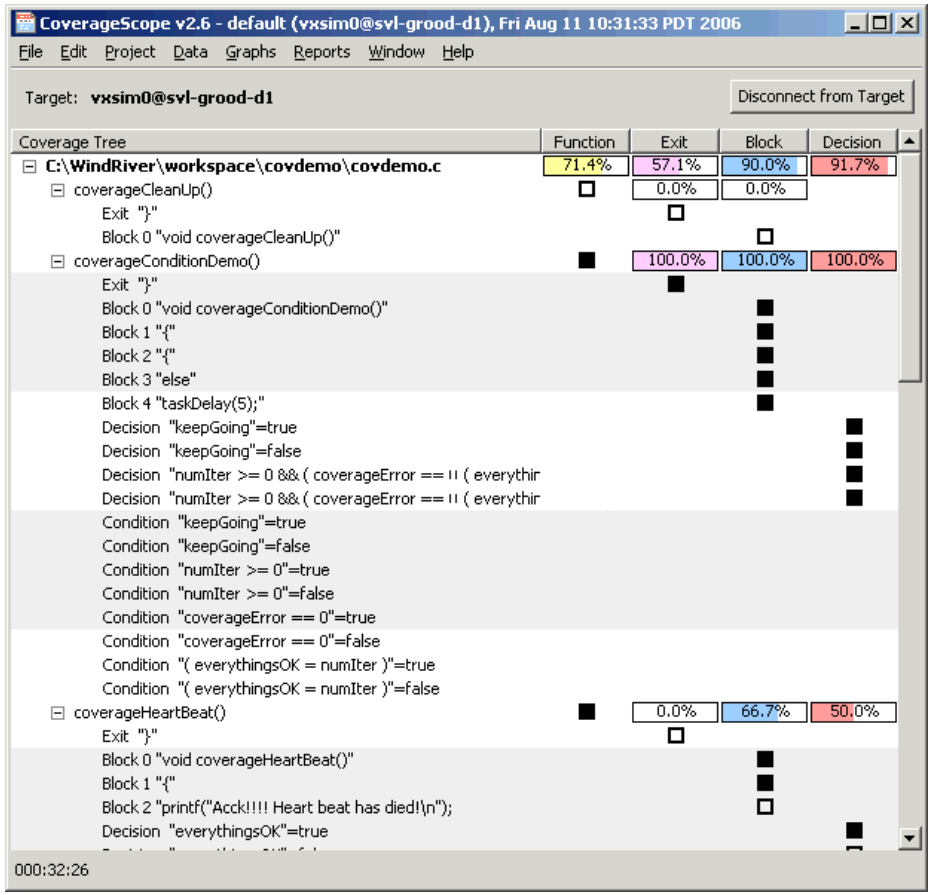
TraceScope Unmasks Integration Issues

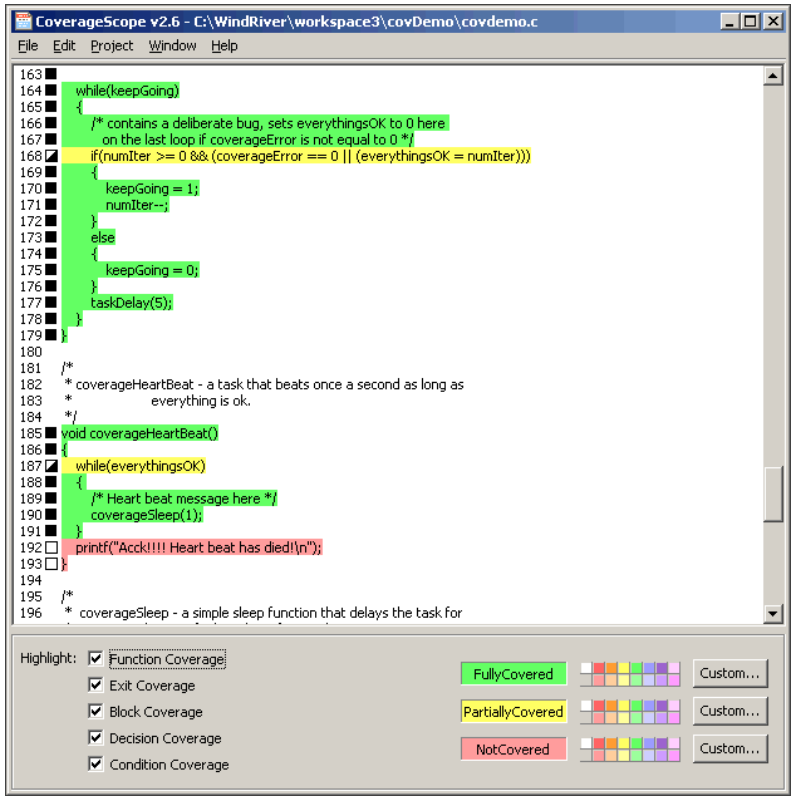
Chart function call sequences and
entry & exit parameter values



CoverageScope Highlights Untested Code

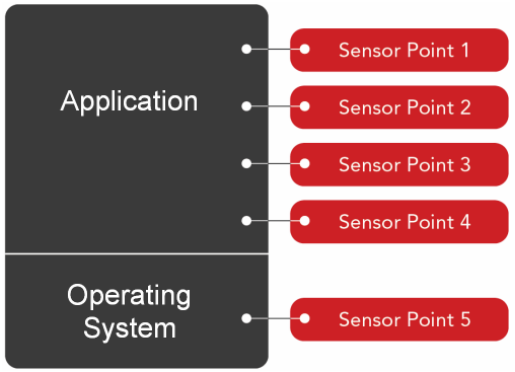
Helps complete your test suite by showing
what's been tested and what hasn't





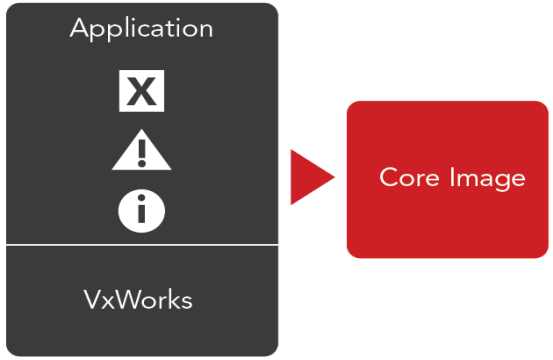
Workbench Diagnostics

A root-cause analysis tool set that enables development and test engineers to securely record, isolate, diagnose and correct device software defects in a running system



Diagnostics Device Connect | Diagnostics Server Connect | Sensorpoint Log Viewer

Tag	Value	Time	Time Delta	Task ...
parameter	"Zip" (parameter) =94501	2811.10444434	0	tShell0
parameter	"Street" (parameter) =0x744eb8, *"Street" (parameter) ="500 Wind River Way"	2811.10444434	0	tShell0
parameter	"City" (parameter) =0x744ecc, *"City" (parameter) ="Alameda, CA"	2811.10444434	0	tShell0
parameter	$return =0	2811.10455498	0.00011064	tShell0
subprogram_exit	Exiting SetRecord()	2811.10455498	0	tShell0
subprogram_exit	Exiting demo()	2811.1045695	0.00001452	tShell0
subprogram_entry	Entering demo()	2811.10458378	0.00001428	tShell0
parameter	"City" (parameter) =0x744ecc, *"City" (parameter) ="Alameda, CA"	2811.1045959	0.00001212	tShell0
parameter	"Zip" (parameter) =94501	2811.1045959	0	tShell0
parameter	"mr" (parameter) =0x9327b8, *"mr" (parameter) =00744e9800744eac0000560e	2811.1045959	0	tShell0
parameter	"Street" (parameter) =0x744eb8, *"Street" (parameter) ="500 Wind River Way"	2811.1045959	0	tShell0
subprogram_entry	Entering SetRecord()	2811.1045959	0	tShell0
subprogram_exit	Exiting SetRecord()	2811.10468164	0.00008574	tShell0
parameter	$return =0	2811.10468164	0	tShell0
subprogram_exit	Exiting demo()	2811.10469688	0.00001524	tShell0
subprogram_entry	Entering demo()	2811.1047093	0.00001242	tShell0
parameter	"Zip" (parameter) =94501	2811.10472034	0.00001104	tShell0
parameter	"Street" (parameter) =0x744eb8, *"Street" (parameter) ="500 Wind River Way"	2811.10472034	0	tShell0
parameter	"City" (parameter) =0x744ecc, *"City" (parameter) ="Alameda, CA"	2811.10472034	0	tShell0
subprogram_entry	Entering SetRecord()	2811.10472034	0	tShell0
parameter	"mr" (parameter) =0x9327b8, *"mr" (parameter) =00744e9800744eac0000560e	2811.10472034	0	tShell0
parameter	$return =0	2811.10480662	0.00008628	tShell0
subprogram_exit	Exiting SetRecord()	2811.10480662	0	tShell0



Benefits for Systems Development Teams

- **Complete, end to end support for architecting, building and governing device and systems development**
  - Manage your requirements and link to model artifacts
  - Model your DSO application with extensive UML 2.0 support
  - UML-to-code transformations to Java & C++
  - Visualize and edit existing C/C++ source code in UML diagrams
  - Comprehensive source code editing, compilation and debug capabilities
  - Target management, deployment and remote debugging support
  - Faster, multi-language static code analysis
  - Entirely data file driven Managed Build System
  - Improve team productivity and collaboration
  - Manage all development assets in Rational ClearCase, including RSD models and Workbench source code artifacts
  - Stay up to date on current change requests & other activities in Rational ClearQuest
  - Context sensitive process guidance and tool mentors for systems & device development

Key Takeaways

IBM and Wind River

provide a complete lifecycle solution for

integrated device and systems development

- Build devices and systems faster with higher quality of products
- Address a broader set of applications with a single toolset
- Realize higher productivity gains from better workflow integration
- Allows for data integration across the enterprise and deployed devices
- Cuts out the sometimes hidden cost of overlapping technologies
- Drive improved program management and team productivity across systems development efforts

The power of Eclipse

Resources to Learn More!

- IBM Rational Systems Development Solution on ibm.com
  - http://www-306.ibm.com/software/info/developer/solutions/systems/index.jsp
- IBM Rational Systems Development Solution eKit (for whitepapers and on demand webcasts)
  - http://www-306.ibm.com/software/info/sdp/systems/index.jsp
- IBM Rational Ready for Rational Partner Plug-ins:
  - http://www-128.ibm.com/developerworks/rational/downloads/ready.ht
- WindRiver WorkBench
  - http://www.windriver.com/products/development_suite/

Thank You