

# RIVERBED MODELER

## FOR DEFENSE ORGANIZATIONS, NETWORK EQUIPMENT MANUFACTURERS, AND RESEARCH ORGANIZATIONS

### BUSINESS CHALLENGE

The R&D process for analyzing and designing communication networks, devices, protocols, and applications can be time-consuming. Riverbed Modeler provides a comprehensive development environment supporting the modeling of communication networks and distributed systems. Both behavior and performance of modeled systems can be analyzed by performing discrete event simulations. The Modeler environment incorporates tools for all phases of a study, including model design, simulation, data collection, and data analysis.

Modeler can be used as a platform to develop models of a wide range of systems, including R&D in communications architectures and protocols, distributed sensor and control networks, on-board systems, and resource sizing using accurate, detailed modeling of a resources request-processing policies to provide precise performance estimates under peak demand.

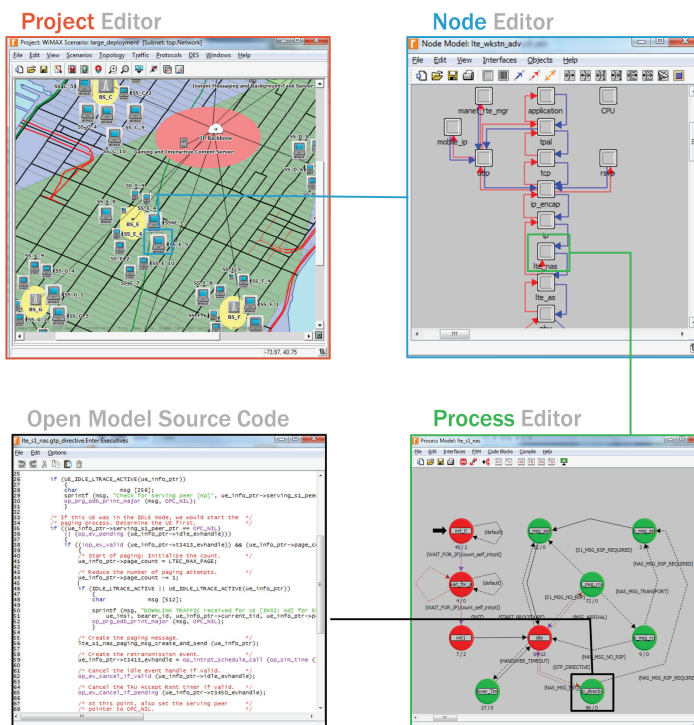
Riverbed® Modeler provides high-fidelity modeling, scalable simulation, and detailed analysis of a broad range of wired and wireless networks. This product enables organizations to optimize their investment in network R&D and to:

- Develop proprietary network protocols and technologies
- Evaluate enhancements to standards-based protocols
- Test and demonstrate technology designs in realistic scenarios before production
- Increase R&D productivity and accelerate time-to-market

### KEY FEATURE HIGHLIGHTS

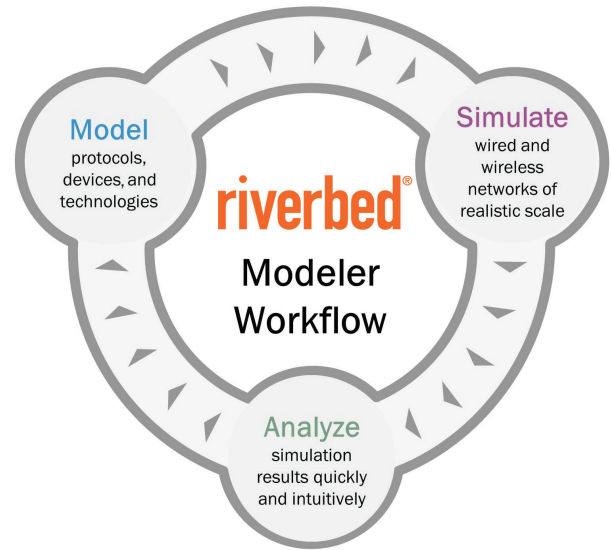
Riverbed Modeler features advanced capabilities for network modeling and simulation, including:

- Hundreds of wired/wireless protocol and vendor device models with source code
- Intuitive, hierarchical modeling environment
- Scalable wireless simulations incorporating terrain, mobility, and path-loss models
- 32-bit and 64-bit fully parallel simulation kernel
- Integrated GUI-based debugging and analysis
- Open interface for integrating external object files, libraries, and other simulators



## KEY BENEFITS

- Model network protocols, resources, algorithms, applications, and queuing policies in detail – Accelerate model design with more than 400 out-of-the-box protocol and vendor device models from Modeler's library
- Reduce simulation runtime – Leverage three different simulation technologies to efficiently tradeoff simulation detail and speed by utilizing Modeler's parallel and distributed simulation capabilities
- Easily interpret simulation results using intuitive charts, tables, and graphs – Quickly correlate graphical results with network behavior and drill into performance trade-offs



## KEY FEATURES IN-DEPTH

### High-Fidelity Modeling and Workflow

- Model network protocols, resources, algorithms, applications, and queuing policies in detail using Riverbed Modeler's powerful object-oriented modeling approach
- Accelerate model design with more than 400 out-of-the-box protocol and vendor device models from Riverbed Modeler's library, including BGP, IPv6, MPLS, Satellite technology, TCP, UMTS, VoIP, WiMAX, WLAN, and ZigBee
- Model all aspects of wireless communication, including RF propagation, antenna modeling, signal modulation, node mobility, and interference, using Riverbed Modeler Wireless Suite with real terrain data

### Scalable Simulation

- Reduce simulation runtime by utilizing Riverbed Modeler's parallel and distributed simulation capabilities
- Leverage three different simulation technologies to efficiently tradeoff simulations detail and speed

### Sophisticated Analysis

- Easily interpret simulation results using intuitive charts, tables, and graphs
- Quickly correlate graphical results with network behavior by replaying simulations

### Powerful Development Environment

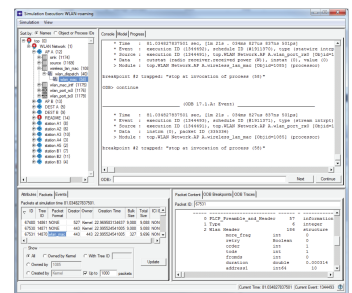
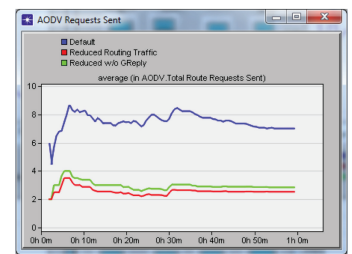
- Eliminate the need for a third-party debugger by using Riverbed Modeler's integrated debugging capabilities
- Visualize packet flow to quickly pinpoint and fix errors using the industry's only graphical debugger
- Easily upgrade custom models to new releases of Riverbed Modeler using source code version control

### Network R&D for Next Generation Technologies

Riverbed Modeler Wireless Suite supports modeling and simulation of advanced network technologies, including UMTS, WiMAX, and LTE. Studies include, for example, designing next generation network architectures, predicting application performance, and developing base station and subscriber station scheduling schemes.

### Integrating Live Network and Application Behavior

Riverbed Modeler integrates with SteelCentral™ AppTransaction Expert to enable users to define a more accurate application model within Modeler by using captured packet traces from a production or test environment.



## Advanced Antenna Modeling and Visualization

Advanced antenna modeling interface enables users to accurately specify antenna position and orientation, incorporate dynamic antenna patterns into network scenarios, and visualize antenna location, orientation, and coverage in a rich 3D environment. Evaluate the performance of proprietary or customized antenna patterns, visualize the signal strength from cellular base stations in a geographical area, and determine the variation in antenna gain due to terrain impairments.

## Accelerating Simulation Runtime

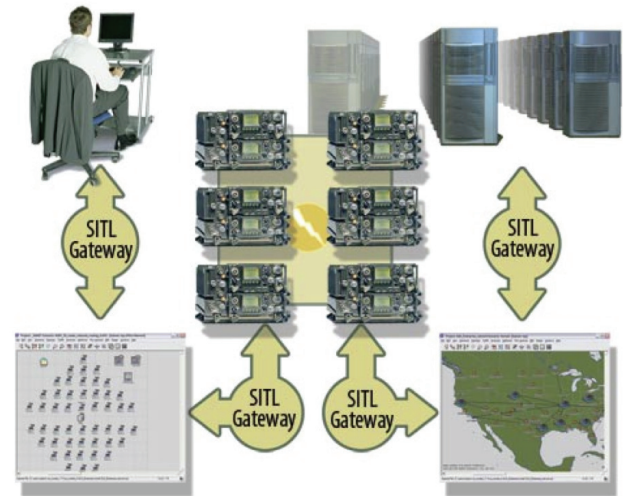
Riverbed Modeler incorporates numerous features to accelerate larger, more demanding simulations, including a 64-bit kernel, general parallel simulation, and grid computing support. Riverbed Modeler's inherent parallel discrete event simulation kernel can distribute a series of simulations to multiple machines for simultaneous execution. This allows validating simulation results and parametric studies, where one or more model parameter values are varied to analyze their effect on overall network behavior.

## Connect Simulations to Live Devices

Modeler's System-in-the-Loop (SITL) module provides an interface for connecting live network hardware or software applications to a discrete event simulation.

Using SITL users can:

- Perform developmental, interoperability, scalability, and conformance testing of prototype hardware and software applications
- Create a virtual training facility for devices or applications interfacing directly with simulated network infrastructure containing numerous simulated devices
- Study the behavior of prototype applications by deploying them on a simulated network topology
- Analyze the performance of a new protocol deployed in a simulated network environment by injecting real network traffic



## TESTIMONIALS

*"By modeling our cutting-edge technology in [Riverbed] Modeler we are able to cut costs and accelerate time-to-market. We can thus concentrate our R&D resources on the differentiating aspects of our projects where we can realize true competitive advantage."*

- Project Leader, NEC Network Laboratories

*"[Riverbed] Modeler has proven itself an essential tool for system design."*

- Senior Product Engineer, Communication Systems, Technology Department, Indra

*"Modeling with [Riverbed Modeler] means that we can confidently deliver design specifications that save time and money right from the beginning of the design lifecycle. [Riverbed] has now become an acknowledged tool for assessing the performance implications when delivering advanced services over BT's new 21st Century Broadband Network."*

- Broadband/21C Performance Lead Designer, BT

*"Booz Allen has been using [Riverbed] products for over 10 years. The Booz Allen SAFECOM team selected [Riverbed] because of the high fidelity of its products, which is a paramount consideration for matters of public safety."*

- Program Manager, Booz Allen Hamilton

*"Modeler serves as a catalyst in our R&D process and enables us to deliver advanced WiMAX solutions to the marketplace months before our competition."*

- Director, Systems Engineering, Aperto Networks

*"[Riverbed Modeler] eliminates the need to build real test setups to design and evaluate our protocols and algorithms, saving us time and money. Modeler includes a broad library of models supported out-of-the-box while giving us the ability to quickly develop custom protocol and application models, significantly accelerating our network research."*

- Director, Middle East Mobile Innovation Center, Intel Corporation

*"[Riverbed Modeler's] extensive model library saves us from having to develop our models from scratch. We can quickly design prototype network architectures and then leverage [Riverbed's] scalable virtual environment to accurately predict the performance impact of alternative architectures, topologies, and changes in traffic."*

- Advanced Engineering & Sciences, ITT Industries

*"We have optimized our war game simulations ... with Modeler's high-fidelity communications effects simulation. We can now represent the reality of battlefield communications in our defense project simulations, enabling us to better support our customers."*

- Technology Manager, Mission Systems, Large International Defense Contractor

*"[Riverbed Modeler] provides us the flexibility to develop real time models of military communication systems for application within larger synthetic environments and test beds."*

- Chief Systems Engineer, Communications Modeling, Large International Systems Integrator

## RELATED PRODUCTS

### SteelCentral Transaction Analyzer Expert

Track user transactions throughout the application infrastructure. Troubleshoot application problems in production, or validate readiness prior to deployment. A single transaction can have a very hard life traversing your network, and all the databases and applications it must run through.

## ABOUT RIVERBED

Riverbed Technology, Inc., at more than \$1 billion in annual revenue, is the leader in Application Performance Infrastructure, delivering the most complete platform for location-independent computing. Location-independent computing turns location and distance into a competitive advantage by allowing IT to have the flexibility to host applications and data in the most optimal locations while ensuring applications perform as expected, data is always available when needed, and performance issues are detected and fixed before end users notice. Riverbed's 25,000+ customers include 97% of the *Fortune* 100 and 96% of the *Forbes* Global 100. Learn more at [www.riverbed.com](http://www.riverbed.com).

### GARTNER MAGIC QUADRANT RECOGNITION

We're the ONLY leader in both the Gartner Magic Quadrant for Application Performance Monitoring (APM) and Network Performance Monitoring and Diagnostics (NPMD).\*

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