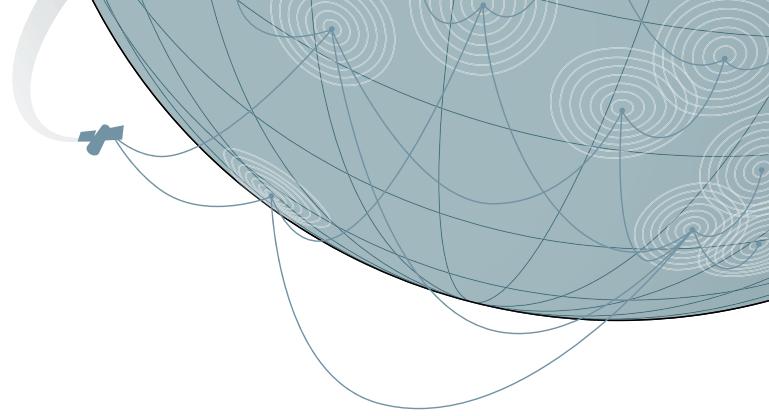


QualNet[®]

Product Family



QualNet Developer is ultra high-fidelity network simulation software that predicts wireless, wired and mixed-platform network and networking device performance.

QualNet is the only modeling and simulation tool that can explore and analyze early-stage device designs and application code in closed, synthetic networks at real time speed or faster. Designed to take full advantage of the multi-threading capabilities of multi-core, multi-processor, cloud computing, cluster and 64-bit processor systems, QualNet supports over thousands of network nodes.

QualNet offers unmatched platform portability and interface flexibility. QualNet runs on sequential and parallel UNIX, Windows, Mac OS X and Linux operating systems, and is also designed to link seamlessly with other modeling and simulation applications.

What Sets QualNet Apart?

Highest Fidelity Simulation: QualNet delivers ultra-high fidelity simulations of network devices, transmitters, antennas, terrestrial characteristics, and human interactions, all at real time speed or greater. How? With a super-efficient parallel kernel and patent-pending, computationally-efficient code. You get the same accurate simulations of wireless and wired networks for 50, 500, or 5,000 nodes.

Eliminates the need for model abstraction: QualNet's fidelity and scalability makes abstraction for computational efficiency obsolete. You no longer need to be concerned about masking the very effects your simulations are meant to analyze.

Reduces simulation time from months to minutes: QualNet's high-speed parallel processing power enables you to run simulations that take months to calculate using sequential processing technology in a

Key Differentiators of QualNet

- Real time evaluation of networks and network-centric systems
- Real time speed
- Real network fidelity
- Real network results at a simulation price

matter of minutes. Multiple analysis iterations in less time means you can solve more design and engineering problems faster than ever before.

The QualNet Product Family

The QualNet Product Family consists of QualNet Developer, which runs in sequential or parallel mode, plus a number of add-on model libraries.

QualNet Developer allows users to set up, develop, and run custom network models. A feature-rich visual development environment allows users to set up models quickly, efficiently code protocols, and then run models that present real-time statistics and helpful packet-level debugging insight.

QualNet Developer provides out-of-the-box support for dual-core processor systems. This means you can achieve faster simulation speeds, even real-time simulation, with the base QualNet product. For additional speedup and scalability through parallel execution, upgrade QualNet Developer to run on multiples of four processors.

QualNet Developer runs on all modern computer platforms, from sequential computers to shared memory multiprocessors, including workstation clusters and supercomputers.

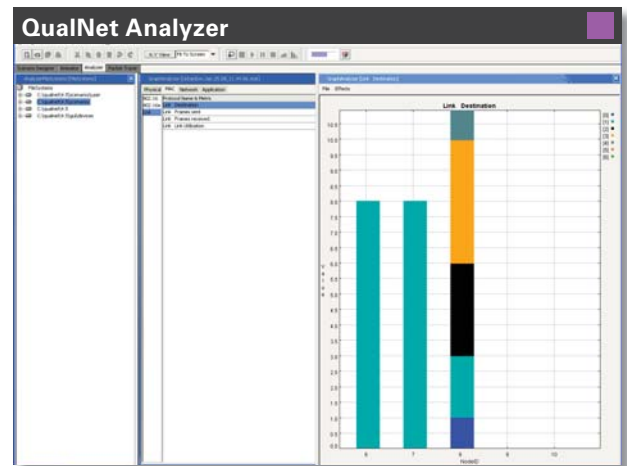
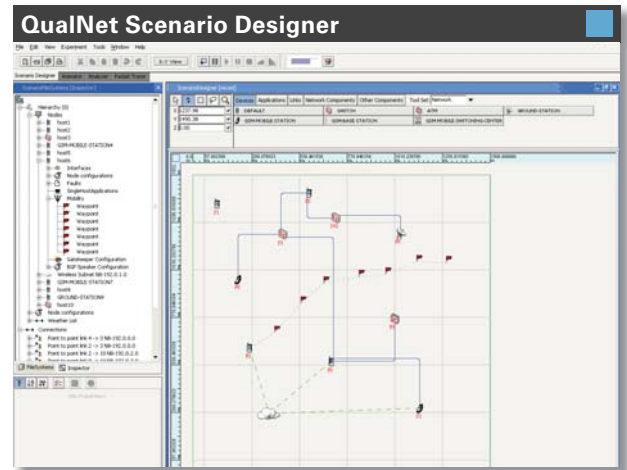
QualNet Model Libraries greatly extend the base capabilities of QualNet. From supporting specialized networks, such as WiFi, sensor networks, cellular, MANET, WiMAX, and satellite, to enabling powerful 3-D visualization, QualNet Model Libraries add significant capabilities to QualNet Developer 4.5.

The QualNet Model Libraries consist of the following:

- Developer Library,
- Wireless Library,
- Multimedia and Enterprise Library,
- Advanced Wireless Library,
- Cellular Library,
- Military Radios Library ‡,
- Network Security Library,
- Propagation Library: ALE/ASAPS ‡,
- Propagation Library: TIREM** ‡,
- Propagation Library: Urban
- Satellite Library,
- Sensor Networks Library,
- Standard Interfaces Library, and
- UMTS Library.

‡ These libraries are subject to export restriction under the International Traffic in Arms Regulations (ITAR) 22 CFR 120-130. International sales of these modules require authorization from the US Department of State.

** These libraries require code from a third party.



Key Features of QualNet Developer in Parallel Mode

Real-time Simulation. Models can speed up and scale on parallel computing environments. For instance, a cluster of 16 dual 2GHz Opteron systems connected by an Infiniband switch achieved real-time speed for 3,500 nodes*.

Support for a Variety of Parallel Computing Environments. QualNet Developer with additional processor licenses runs on modern multi-core, multi-processor, cluster and 64-bit processor systems.

Protocol Models are Pre-optimized for Parallel. There's no need to re-write code for parallel execution; all models come optimized for small and mid-size parallel processors and supercomputers.

Parallel Since Day One. QualNet was designed for parallel execution since the first line of code was written in 1999. Parallelizing a legacy sequential simulator has been shown to be difficult and ineffective.

* This scenario was designed for optimum performance in terms of traffic, mobility, and partitioning.

Components of QualNet Developer

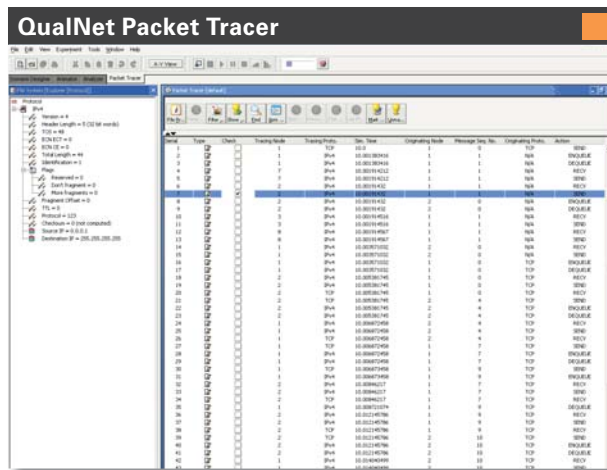
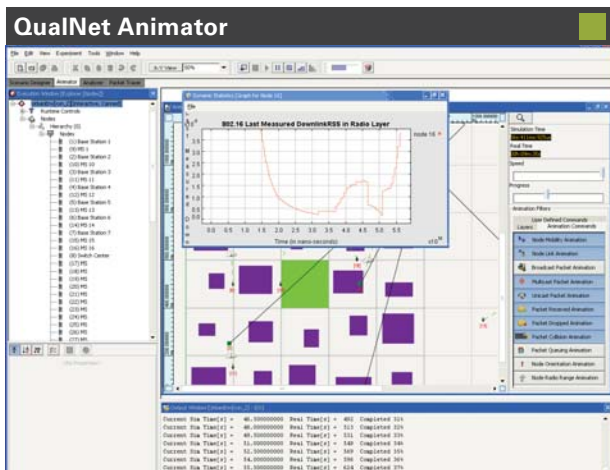
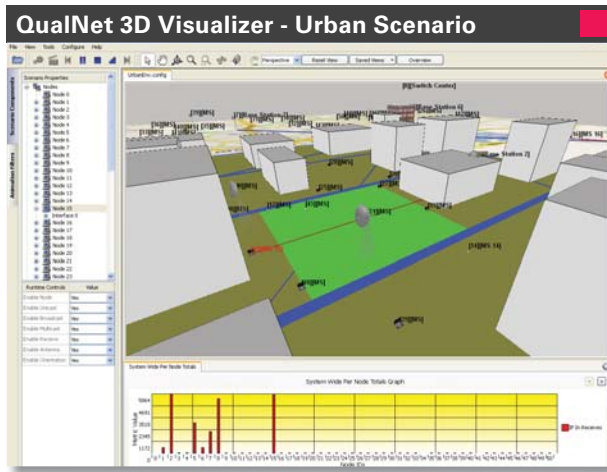
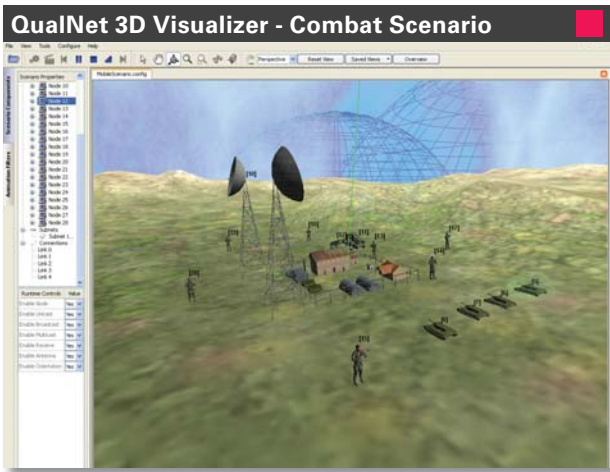
QualNet is a comprehensive set of tools with all the components for custom network modeling and simulation. The QualNet simulation engine is extremely scalable and can accommodate high fidelity models of networks of thousands of nodes.

QualNet makes good use of computational resources and models large scale networks with heavy traffic and mobility in reasonable simulation times. QualNet Developer in parallel mode takes speed and scalability to new levels through the use of dual-core systems, clusters, and supercomputers.

Even on laptop and desktop computers, QualNet has unrivaled speed and scalability. QualNet produces fast results for a thorough exploration of networking options. Real-time simulation is another powerful option with QualNet.

QualNet Scenario Designer

QualNet Scenario Designer is a model setup tool that allows users to set up geographical distribution, physical connections, and the functional parameters



of the network nodes. Using intuitive click and drag operations, the user can also define network layer protocols and traffic characteristics down to each node.

QualNet Animator

QualNet Animator offers in-depth visualization and analysis. As simulations are running, users can watch traffic flow through the network and view dynamic graphs of critical performance metrics. Users can also assign jobs to run in batch mode on a faster server and view the animated data later.

QualNet 3D Visualizer

The 3D Visualizer is a QT-based tool for rich animations of network simulations. Users set up QualNet scenarios in QualNet Scenario Designer and then send the simulation to the 3D Visualizer for animation.

QualNet Analyzer

QualNet Analyzer is a statistical graphing tool that displays hundreds of metrics. Users can choose to see pre-designed reports or customize graphs with their own statistics. Real-time statistics are also an option, where users can view metrics as they are generated while a simulation is running. Multi-experiment reports are also available. All graphs are exportable to spreadsheets.

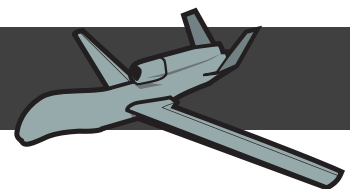
QualNet Packet Tracer

QualNet PacketTracer is a packet-level visualization tool for viewing the contents of a packet as it goes up and down the network stack. This is a valuable debugging tool.

Interface to STK/Connect*

QualNet has the ability to connect to Satellite Tool Kit and other 3D visualization tools to enable very realistic 3D visualization.

* STK and Satellite Tool Kit are copyrights of Analytical Graphics Incorporated (AGI).



Minimum System Requirements for QualNet Developer

CPU

- x86 compatible (including Intel Core, Pentium, Xeon and AMD Athlon)
- amd64 compatible (including AMD Opteron, Athlon 64, and Intel Core 2, Pentium/Xeon with EM64T)
- Sun UltraSPARC family
- IBM PowerPC family

Operating Systems

Microsoft

- Windows 2000/XP
- Windows XP x64 Edition

Linux

- Fedora Core 4, Red Hat Enterprise Linux 4, SUSE Linux Versions 9.3, 10.1, and Ubuntu 6.06 are officially supported on amd64 and x86 compatible systems
- Other distributions of Linux with GNU C Library (glibc) version 2.3 are known to work with QualNet

Sun

- Sun Solaris 10 on UltraSPARC systems

Apple

- Mac OS X 10.4 on PowerPC and Intel systems

Video

- A 3D graphics card is needed to run 3D Visualizer.

Memory

- 64 MB free for LAN-size simulations without GUI
- 256 MB free for LAN-size simulations with GUI
- 2-4 GB free for a large network (1,000+ nodes)

Disk space

- 300-500 MB free disk space depending on installation options

Java

- Sun Java 2 SDK, Standard Edition 1.4.2 is officially supported. The SDK, not the JRE, is required to run QualNet GUI tools.
- Versions of Java from vendors other than Sun are not officially supported.

Compiler

Windows

Microsoft Visual C++ 2002 and later is required if you modify source code or include add-ons.

UNIX

The GCC version that matches your operating system is required to install QualNet.

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Antycip Simulation
<http://www.antycip.com/simulation>

India

Nihon Communication Solutions, Ltd.
<http://www.ncs-in.com>

Israel

Synergy Integration Ltd.
<http://www.synergy.co.il>

Japan

Kozo Keikaku Engineering, Inc.
<http://www.kke.co.jp>

Latin America

Latinmedia
<http://www.latinmedia.com.ec>

Malaysia

Ofisgate Sdn Bhd
<http://www.ofisgate.com>

Middle East, Turkey and North Africa

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South Korea

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<http://www.altsoft.co.kr>

Taiwan

Pitotech Co., Ltd.
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