OPNET Technologies, Inc.

Network R&D Solutions

for Defense Organizations and System Integrators

OPNET Network R&D solutions provide high-fidelity modeling, scalable simulation, and detailed analysis of a broad range of wired and wireless networks.

Accelerating Network R&D

OPNET Network R&D solutions enable defense organizations and system integrators to optimize their investment in network R&D.

- Develop proprietary network protocols and technologies to support the warfighter
- 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

The Industry De facto Standard for Defense Network Modeling and Simulation

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

- Fastest discrete event simulation engine among leading industry solutions
- 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
- Discrete event, hybrid, and analytical simulation
- 32-bit and 64-bit fully parallel simulation kernel
- Integrated, GUI-based debugging and analysis
- Open interface for integrating external object files, and libraries, and an HLA interface for co-simulation

OPNET Modeler Workflow

HIGH-FIDELITY MODELING

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

SCALABLE SIMULATION

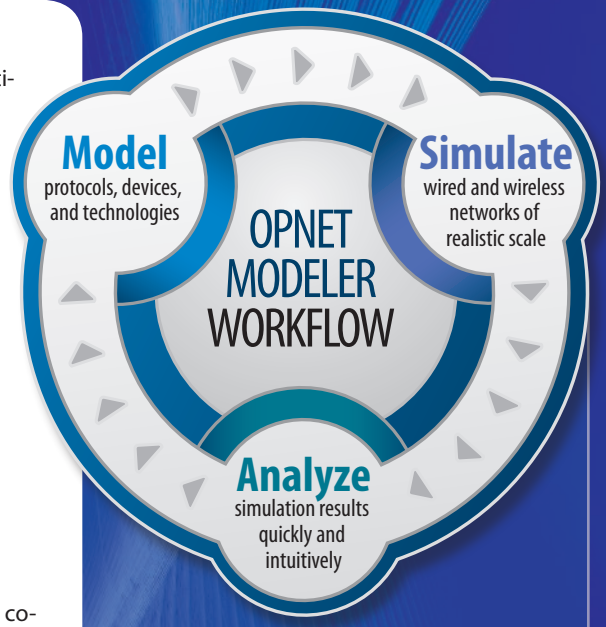
- Reduce simulation runtime by utilizing Modeler's parallel and distributed simulation capabilities
- Leverage three different simulation technologies to efficiently tradeoff simulation detail and speed

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 Modeler's integrated debugging capabilities
- Visualize packet flow to quickly pinpoint and fix errors using the industry's only graphical debugger
- Simplify the execution of simulation excursions with Modeler's checkpoint/restart feature
- Easily upgrade custom models to new releases of Modeler using source code version control



> *"[Using OPNET Modeler] we can quickly design prototype network architectures and then leverage OPNET's scalable virtual environment to accurately predict the performance impact of alternative architectures, topologies, and changes in traffic."*

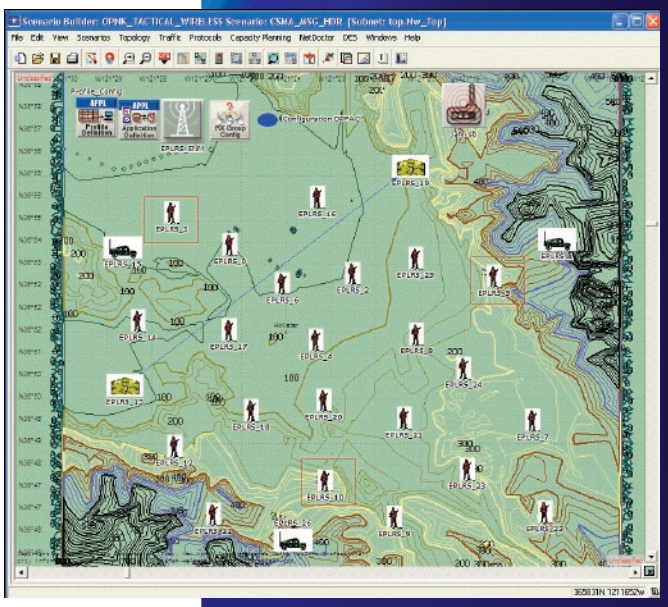
Senior Communications Engineer
ITT Industries

www.opnet.com

OPNET®
Making Networks and Applications Perform®

Network R&D for Next Generation Technologies

OPNET Modeler Wireless Suite for Defense supports modeling and simulation of advanced military protocols and devices,[1] including TCP-PEP; SCPS-TP; Promina multiplexers; EPRLS, SINCGARS, and Link 16 tactical radios; and KG-75 and KIV-19 encryption devices. Modeler Wireless Suite for Defense also enables the analysis of broadband technologies, including UMTS, WiMAX, and LTE. Studies include, for example, customizing standard protocols, designing network architectures, and predicting application performance.



Model battalion scenarios that include EPRLS radios

Integrating Live Network and Application Behavior

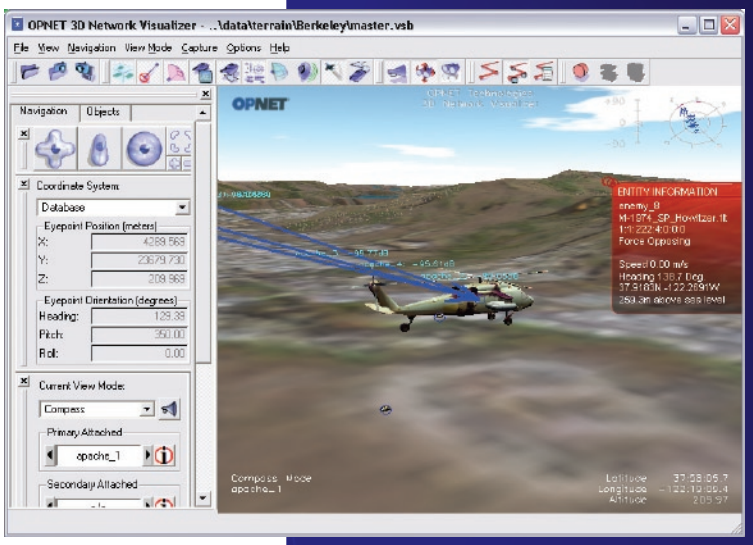
The ACE™ Analyst module enables users to define a more accurate application model within Modeler by using captured packet traces from a production or test environment.

The OPNET System-in-the-Loop (SITL) module provides an interface for connecting live network hardware or software applications to an OPNET discrete event simulation. SITL enables important studies, including interoperability, scalability, and conformance testing of prototype network hardware, studying the behavior of prototype applications on a simulated network infrastructure, and analyzing the performance of a new simulated protocol by injecting real network traffic.

Advanced 3D Visualization and Antenna Modeling

The 3D Network Visualizer (3DNV™) enables three-dimensional displays of Modeler's network simulations that incorporate topology, node relationships, and performance statistics overlaid on realistically rendered terrain. 3DNV is included with the Modeler Wireless Suite for Defense and is designed to facilitate the efforts of wireless engineers and defense network planners to optimize mobile system development and deployment.

Modeler Wireless Suite for Defense provides an advanced antenna modeling interface, enabling 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.



Overlay communications effects onto a dynamic 3D scenario

Accurate Wargaming with Mission-Critical Communications Effects

Traditional wargaming simulators may account correctly for battlefield strategy, but generally make simple assumptions about the availability of communications, which can significantly affect the outcome of a battle.

Simulation engineers can federate Modeler Wireless Suite for Defense with Force-on-Force (FoF) simulators using the HLA interface to incorporate mission-critical network effects such as protocol performance, terrain masking, mobility, and jamming into wargaming simulations. This ensures that battlefield conditions and the reality of modern-day communications are accurately represented in the wargame.

Accelerating Simulation Runtime

Aside from raw performance, Modeler incorporates numerous features to accelerate larger, more demanding simulations, including a 64-bit kernel, general parallel simulation, and grid computing support. Modeler's inherent parallel discrete event simulation kernel leverages multi-core processors or multi-processor machines to accelerate simulation runtime. In grid computing environments, Modeler can distribute a series of simulations to multiple machines for simultaneous execution. This feature is especially useful for validating simulation results and for parametric studies, where one or more model parameter values are varied to analyze their effect on overall network behavior.

LTE Model Development Consortium

The LTE Model Development Consortium will enable R&D organizations to collaborate with OPNET to develop a model for LTE network equipment design, planning, and analysis. Contact OPNET at LTEcons@opnet.com for more information about joining the OPNET LTE Consortium.

www.opnet.com

[1]Available through the Joint Communications Simulation System (JCSS) Program. Contact OPNET for details.

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