



Network Emulator Application for Hammer PacketSphere XG™

FEATURES

- True wire speed operation - Running at 2.8 million packets per second
- Apply Real IP network impairments - Latency, jitter, dropped packets, duplicate packets, reordering, reroute delay, bandwidth restriction with flow control and packet modification
- Programmable packet filtering and modification - Groups defined by packet attributes or payload data
- Repeatable and controllable tests - PacketSphere's network processor architecture provides consistent and repeatable test results
- Real time throughput analysis - Detailed metrics on packets/bytes and impairments performed
- Intuitive, easy to use GUI and/or Tcl Scripting Interface - PC client GUI application. Remote Tcl and PERL scripting via the CLI
- Multi-application and multi-user platform - Up to 8 simultaneous users can access both NetEm and other PacketSphere applications
- Web-based administration interface - Supports configuration and downloading of the Windows-based PC client

BENEFITS

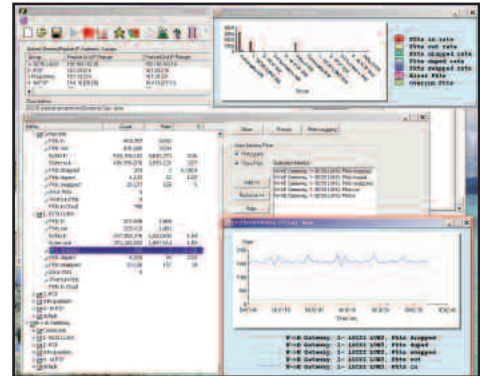
- Accelerate time to market - By testing VoIP gateways, next-gen switches, routers/content switches, firewalls, video servers and applications that operate under real wire speed network conditions
- Reduce product test time and risk - Less than 15 minutes to a 'real- world' network environment
- Reliable and Repeatable Network effects - The application of impairments and throughput does not introduce additional non-deterministic loss
- Real time metrics expose hard to find problems
- Save lab space expense and maintenance - By replacing racks of devices in test networks
- Increase test coverage - Use network emulation in all test scenarios without increasing test equipment cost



Overview

NextGen Network Equipment Manufacturers (NEMs) and Service Providers (SPs) that are testing components for deployment in the network have been challenged to accurately simulate the target customer's networks and their operating conditions. Not having the 'right network' simulation for lab testing increases the risk that the end customer will find product or service performance to be unacceptable. Creating an accurate representation of any given network deployment is difficult if not impossible. Building one that is flexible and controllable is next to impossible. Based on these constraints tests occur on 'clean' networks, where performance is "perfect", which differs greatly from real-world customer networks.

The Network Emulator Application for Hammer PacketSphere XG is the only cost effective test system available that can emulate all the key network impairments in nextgen networks, latency, jitter, lost packets, reordered packets, re-routed packets, duplicate packets, bandwidth restrictions, and packet modification at wire speed on Gigabit and Fast Ethernet interfaces. An easy to use PC based Network Emulator client application allows multiple users access to test a product or service with a large number of network conditions quickly and controllably. As a result, test users can see exactly which devices will work, provide degraded performance, or fail.

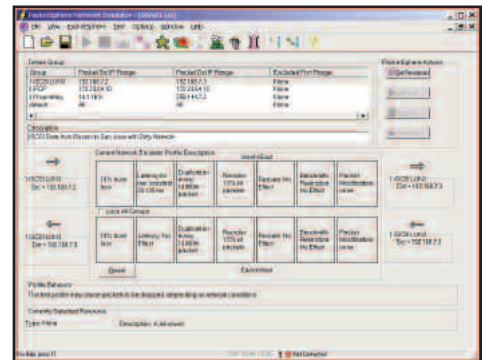


Intuitive Easy to Use GUI

- Less than 15 minutes to productive testing
- Simple UI provides easy access to most common network impairments
- Real time analysis and statistics for network throughput

Real-Time Throughput Analysis

Detailed metrics are available including packets/bytes in and impairments performed. Composite or "Group" metrics are available. Users may define specific custom groups based on address, or pre-defined packet types including protocol or payload types such as TCP or and UDP and RTP.



User Capabilities

- Define impairment parameters to create network profiles
- Refine IP groups based on IP addresses, ports, packet types, or packet attributes (ex. TOS, Diffserv, VLAN, MPLS, Pause Frame, Packet size)
- Assign unique network profiles to up to 32 unique network clouds per chassis
- Control and stop test execution remotely
- Select metrics to be monitored, displayed and charted
- Log metrics for subsequent analysis
- On-line context sensitive help
- Tcl and PERL scripting support - remote interpreter support, local Tcl support
- Execute a sequence of test profiles
- Vlan, IPv4, IPv6 and jumbo packet support
- Packet modification - change a single bit, a sequence of bits, or up to 4 bytes with optional ethernet or TCP CRC correction
- Packet Filtering - isolate targeted packets into their own groups - user-defined groups - packet types such as ping or UDP or RTP filter on packet size or any other data contained in a packet
- Auto-negotiation support when connecting to the system under test

Impairments Supported

- Latency and jitter (fixed, uniform, normal, random distribution)
- Packet Loss (1 of N, N%, Burst loss)
- Packet Duplication (1 of N, N%)
- Packet Reordering (1 of N, N%)
- Congested router/Packet re-route (re-route rate, re-route duration)
- Bandwidth Restriction w/flow control (% of bandwidth, buffering down to 32K bits/sec.)
- Bit Error Insertion via packet modification (1 of N, N%, Offset, and mask)

Speed

- Fast and Gigabit Ethernet support at full wire rate
- Over 1.4 million packets per second (pps) can be processed per direction, total 2.8 million per PacketSphere
- Under 100 microsecond device latency for gigabit interfaces under 400 usec, for fast ethernet interfaces

Interfaces Supported

- Fast ethernet, 8-100 mbps interfaces per blade, 2 blades per chassis
- Two full-duplex gigabit ethernet port pairs (single mode, multi mode)



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