

Aggregate capacity of 40Gbps
Emulate two separate 10 Gbps
full-duplex links



Two Pairs of dual rate SFP+
ports - Simulate up to 15
Different Links



Emulate Terrestrial, Wireless,
Internet, Satellite, or Private
Network Links



Multiple Emulation Engines –
Multi-site Networks



Application Validation,
Benchmarking, Network design



Concurrent, Automated
Testing



Measures Network Latency,
Jitter, Attenuation, Packet
Errors, and Bit Errors



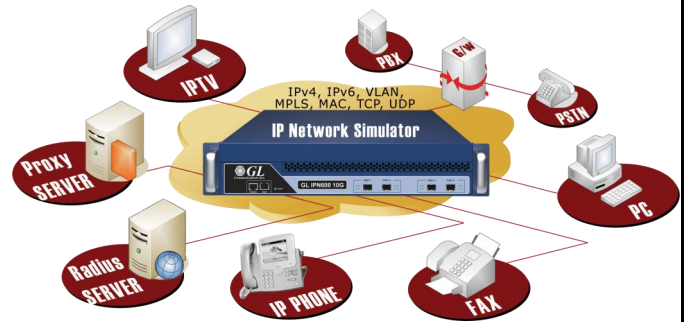
Dynamically Simulates
Changing WAN Conditions



IPNetSim™ IPN600 Series (IPN601 1G / IPN610 10G)

Overview

The IPNetSim™ network emulator attaches to an Ethernet network and simulates the bandwidth, congestion, jitter, delay, loss, bit errors, packet loss, and other conditions of the wide-area network to test the performance of applications in the lab. It can be used to test IP end point devices such as Gateways, IADs, IP phones, Soft phones, & so on for voice, fax,



data, or multimedia transmission over IP. The current IPNetSim™ model, IPN600 series (IPN601 1G / IPN610 10G) offers 1/10 Gbps dual rate capability with four dual rate 1/10 Gbps SFP+ ports , supporting both 10 Gbps SFP+ and 1 Gbps SFP. With a capacity of 40 Gbps, the IPNetSim™ IPN600 series Network Emulator can simulate two separate 10 Gbps full-duplex links.

The IPNetSim™ network emulator is usually configured through the browser-based IPNetSim™ GUI (Graphical User Interface). In addition to the GUI, the IPNetSim™ network emulator includes a command line interface (CLI) that can be accessed via a serial console port or over the network using Telnet or SSH. The CLI can be used to set the IP address of the management interface if the GUI is not accessible over the network, and to modify emulated link conditions for integration with scripting and test automation tools. For more information on IPNetSim, refer to www.gl.com/ipnetsim-10g-network-emulator.html.

Main Features

- Supports aggregate capacity of 40 Gbps - two pairs of SFP+ ports - can simulate two separate 10 Gbps full-duplex links - each emulation engine can simulate up to 15 different links.
- Accurately simulate links from 100 bits per second up to 10 Gbps. Also available in a 1 Gbps version for users who need to emulate many lower speeds links or want the flexibility to upgrade to 10 Gbps later
- Supports 10 Gbps SFP+, 1 Gbps SFP, 1/10 Gbps dual-rate SFP+ transceiver, as well as 1 or 10 Gbps direct attach cables
- Each emulation port is limited to a packet processing rate of 4.25 million packets per second and an aggregate limit of 17 million pps.
- Easy-to-use GUI provides the responsiveness of an application with the convenience of a standard web browser.
- Packets assigned to individual link by any combination of IP address, VLAN, MPLS label, port number, or any other packet field.
- Emulate latency in constant, normal or uniform distribution in either direction. Emulate jitter using either the normal or uniform distribution.
- Emulate Packet loss in each direction can be specified in a single value, periodic loss, burst loss, or as bit errors (BER) of values of 1×10^{-18} or greater; supports packet duplication, re-ordering, corrupting the contents of received Ethernet frames
- Emulates dynamically changing WAN conditions like link outages, variable bandwidths links, route flapping, satellite rain fade, and wireless interference with high-flexibility
- View and download up to 24 hours of throughput graphs and link statistics; self monitoring indicators to verify resources.
- Capture and reproduce the conditions of a live network link with record / playback functionality



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Link Emulation - Emulation Engines, Paths

The IPNetSim™ functions as a **layer 2 bridge** connecting two LAN segments, forwarding packets received on one port across to the other port and applying the configured emulation conditions between a pair of Ethernet ports.

Each of two 10 Gbps Emulation Engines can be turned on or off independently. When emulation is off, all packets are forwarded directly between the Emulation Engine's two ports, bypassing any emulation.

Up to 15 separate paths (emulated WAN links) may be configured within each Emulation Engine. Each path consists of three components: a WAN link and a WAN access device on either side of the WAN link. The WAN access device is usually a router, but can also be a cable or DSL modem or other type of device that connects an entire site or a single user to the wide-area network. The WAN link can be any type of wide-area network connection between two sites including terrestrial private lines, shared networks such as the Internet, and specialized satellite or wireless networks.

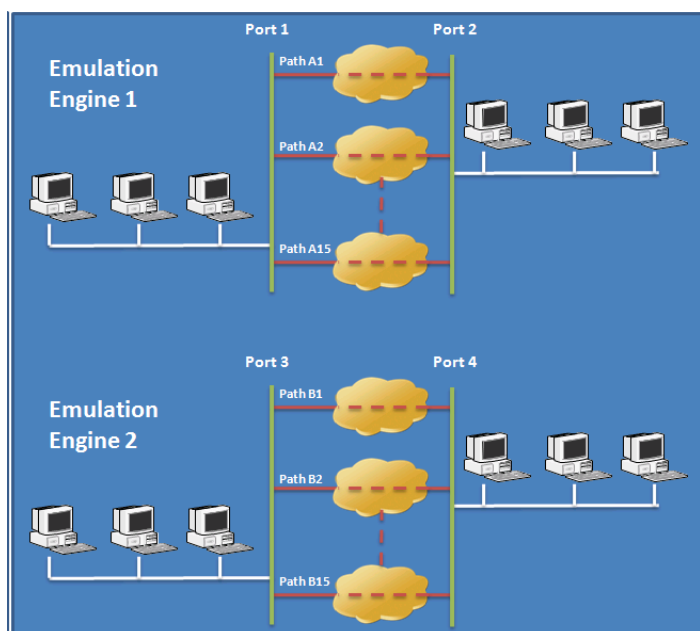


Figure: Two separate Emulation Engines

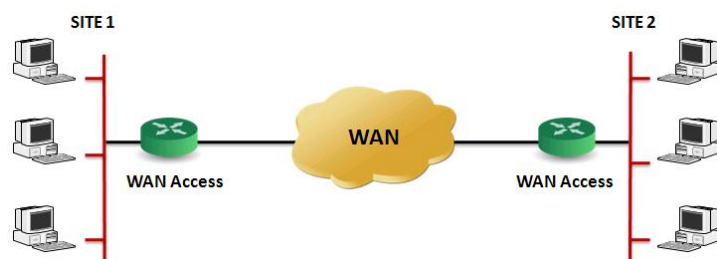


Figure: Path Components

Packet Classifier

Classifiers are set of rules that specify which packets are sent over which paths. Each port has its own classifier to direct the packets that arrive on that port. Each classification rule includes an action that specifies whether matching packets are sent over one of the configured paths, dropped, or forwarded without emulation.

One can classify packets by

- IP source and destination address range,
- IPv6 address
- VLAN ID and PCP (priority code point) value in the IEEE 802.1Q VLAN tag
- MPLS label
- MAC address
- TCP or UDP port number
- or Raw Data classification based on any part of packet contents or combination of well-known fields

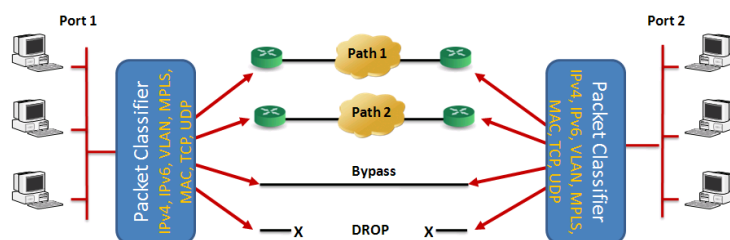


Figure: Packet Classification

Command Line Interface

The IPNetSim™ provides a command line interface (CLI) in addition to browser-based graphical user interface that can be accessed via the CONSOLE interface or through a Telnet or SSH connection. CLI allows integration with test automation tools.

It provides the following subset of the functionality available in the IPNetSim™ GUI:

- Configure emulation parameters of any path
- Turn emulation on or off for any engine
- Configure the management IP address, subnet mask, and default gateway

Following management and troubleshooting features are only available through the CLI:

- ARP and PING commands
- Reinitialize the unit to factory settings



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Recorder

The IPNetSim™ Recorder is a Windows-based utility available at no charge to IPNetSim™ users. The IPNetSim™ Recorder sends ICMP Echo Requests from the PC on which it is running to a specified destination on the other side of the network, then records the reported delay and loss values to a recording file. It can probe the link up to ten times per second and record up to 100,000 data points. It is used in conjunction with the IPNetSim™ (WAN emulator) recording playback functionality. The data saved by the Recorder can be reviewed and edited.

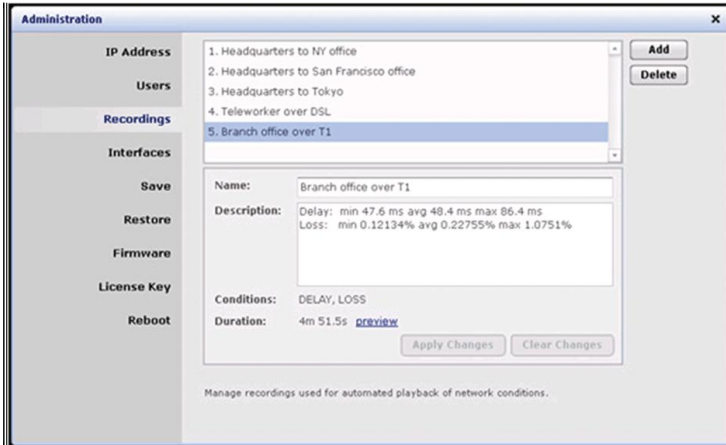


Figure: Recording Administration

Graphs

Throughput graphs of traffic over any path are shown in the main window. The graph can show the throughput in either direction of a path or both directions together. Throughput for traffic that bypasses emulation can also be graphed.

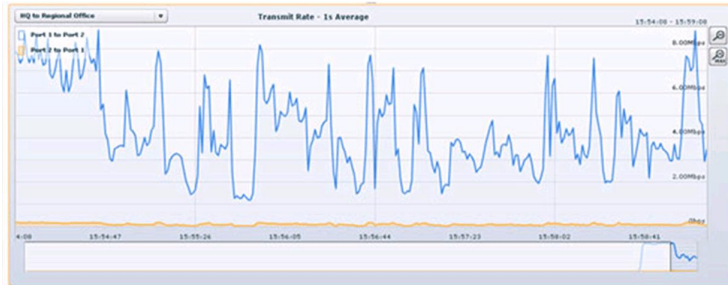


Figure: Throughput Graphs

Statistics

It displays statistics for each path, as well as for bypass traffic.

Path	Overall Tx Rate	WAN Access - Port 1		WAN Loss Drops	WAN Access - Port 2	
		Queue Frames/Bytes	Queue Drops		Queue Frames/Bytes	Queue Drops
[Egress]	0					
[Egress]	0			88	0/0	0
HQ to Regional Office	1,800,344	0/0	0	337	0/0	0
HQ to Remote Office via DSL	45,480	0/0	0	0	0/0	0
HQ to Remote Office via DSL	0	0/0	0	0	0/0	0
HQ to Remote Backup	0	0/0	0	0	0/0	0
HQ to Remote Backup	0	0/0	0	0	0/0	0

Figure: Statistics

Buyer's Guide

[IPN601](#) – IPNetSim™ – 4 x 1000 /100 /10 ports

[IPN610](#) – IPNetSim™ – 4 x 10,000 / 1000 / 100 / 10 ports

Related Hardware

[IPN010](#) – IPNetSim™ – 100 Mbps, 2 ports (1 Link)

[IPN100](#) – IPNetSim™ – 1 Gbps, 2 active ports (1 Link)

[IPN400](#) – IPNetSim™ – 4 x 1 Gbps, 8 active ports (4 Links)

[IPN800](#) – SFP for GigE Optical

[IPN801](#) – SFP for GigE Electrical

Related Software

[PKV100](#) – PacketScan™ (Online and Offline)

[PKV101](#) – PacketScan™ - Offline

[PKS100](#) – PacketGen™ (includes PacketScan™)

[PKS110](#) – Packet H.323

[PKB100](#) – RTP ToolBox™

[PKS101](#) – SIP Core (additional)

[PKS102](#) – RTP Soft Core (additional)

[PKS201](#) – RTP Hardware Core (120 Port)

[PKV105](#) – SIGTRAN Analyzer

[PKS120](#) – MAPS SIP™

[PKS122](#) – MAPS™-MEGACO

[PKS124](#) – MAPS™-MGCP

[PKS126](#) – MAPS™-SIP-I



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