SPIRENT INE

HIGH SPEED, HIGH VOLUME NETWORK EMULATION FOR LARGE SCALE TESTING

ULTRA

The technology partnership between Spirent Communications and iTrinegy provides tools and services to enable you to adopt a proven procedure to analyse/predict, test and monitor networked application performance throughout the project lifecycle.

Spirent – INE Ultra is a Next Generation network emulator that replicates high speed, high volume networks for large scale testing.

INE Ultra is the latest addition to the range of network emulators that enable you to realistically recreate a wide variety of network conditions like latency, jitter, packet loss/error/reordering and bandwidth restrictions so that you can simulate environments such as Wide Area Networks (WANs), Wireless LANs, GPRS, 3G, LTE/4G, Satellite or MPLS networks. It is then possible to test the performance of new (or existing) applications in these replicated networks.

Using these products from development, through testing to pre-deployment ensures your application will work and perform in its target network without the requirement for painful and expensive fixing, re-coding or re-designing.

INE ULTRA FEATURES INCLUDE:

- Sophisticated, but easy to use drag-and-drop GUI for Network Modelling and set-up.
- Sophisticated multi-platform command line (useful for automated testing)
- Every user /device and/or application can have an individual experience
- Sophisticated Internal Routing provides support for many different forms of QoS
- Control of link speed, bandwidth, delay (latency), errors and loss by class.

SCALABILITY

Utilising an industry standard server, INE Ultra can handle upwards of 1.4 million packets per second and in excess of 100,000 individual streams or unique end points (e.g. users or network devices) per emulation, with performance of up to 10 gigabits per second. This makes it ideal for the testing of converged networks carrying data, VoIP and Video streams.

NETWORK MODELLING GUI

INE Ultra has a simple, yet sophisticated drag-and-drop multi-platform GUI, where users can configure and control the emulator through a rich pallet of objects such as buildings, people, computers, routers etc which will build the scenario needed with the added ability to connect these objects by lines representing the network paths.

MULTI–PLATFORM COMMAND LINE

The INE Ultra can be controlled using a multi-platform command line based application. As a result, it is well suited for use in automated testing situations.

AUTO-CLASSIFICATION

INE Ultra's rule system can automatically control network conditions for multiple and/or individual IP streams, TCP/UDP ports or network interfaces, without laborious manual setup. This approach eliminates the need to manually create specific rules for each stream, typically encountered with other network emulator products and which does not lend itself to large scale testing.

As an example, INE Ultra can generate a rule to allocate a maximum bandwidth of 100 megabits per second to all http traffic on Port 80 or it could create multiple filters such that each separate http connection was limited to 100k bps.
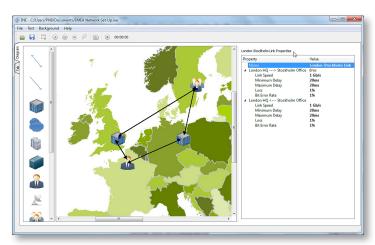
INE Ultra gives you precise control over bandwidth conditions for each end user or device e.g. game console, set-top box, IP Phone, application etc, within the test environment.

REAL-TIME ADJUSTMENTS

INE Ultra enables you to make adjustments to the network parameters in the middle of a running emulation reflecting the changes in network conditions over time that are typically encountered when an application travels over the production network.

SOPHISTICATED INTERNAL ROUTING

INE Ultra handles sophisticated internal routing and switching of packets based on TCP/UDP ports, IP addresses, protocols, Ethernet protocols, etc. This enables the emulation of MPLS/QoS based networks.

The drag & drop GUI makes setting up a replicated network easy

WHAT PARAMETERS ARE USER-CONFIGURABLE?

To reflect real-world conditions the uplink and downlink parameters can be configured independently. These parameters include:

- **Link Speed (Bandwidth):** Sets the maximum speed (as bits per second) that the Virtual Interface or VI will support.
- **Bandwidth Allocation:** Allocates bandwidth to IP Address/ port/protocol/QoS combinations permitting emulation of packet shaping devices.
- **Delay (Latency):** Sets the time taken for the traffic to traverse the network.
- **Queue Length:** Sets the size of the buffer. If data is constrained by the emulation so that it cannot pass through quickly enough, packets will be dropped once the queue is full (as they would in the real world).
- **Loss:** The selected percentage and actual number of packets that will be dropped.
- **Error:** The selected percentage and actual number of packets that will be errored.
- **Packets sent in order:** Packets can be transported in the same order they were sent or the order can be jumbled.
- **Quality:** Selected traffic can be prioritised for preferential delivery

WHAT TYPES OF NETWORK CAN BE CREATED?

A variety of networks can be emulated, such as:

- High latency WANs (national, international and satellite)
- Wireless networks (3G, LTE/4G, WiFi, WiMAX)
- Jittery networks, such as cause VoIP deployments a problem
- Networks that lose/damage traffic
- QoS-based networks (i.e. MPLS)
- Routed networks

THE INE PRODUCT RANGE

INE Ultra is part of Spirent's comprehensive range of INE network emulator products designed to suit the needs of Application Developers, QA and Test Specialists, Network Professionals, IT Purchasers and Infrastructure Architects.

The range includes:

- **INE for Windows –** Network Emulation software for installation on to your Windows desktop.
- **INE Enterprise –** A high-end, multi-site, multi-path, multi-user network emulator

SPECIFICATIONS			
INE Feature Description	**INE Windows**	**INE Enterprise**	**INE Ultra**
NETWORKING INTERFACES			
10/100/GigE Copper (RJ45) Ports	2	22	22
GigE Fibre (Multi-mode SFP, LC connector)	2	22	22
10 GigE Copper	0	0	4
10 GigE Fibre (Multi-mode SFP, LC connector)	0	0	4
BANDWIDTH EMULATION			
0.1 Kbps to 10 Mbps (including T1/E1, T3 rates)	Yes	Yes	Yes
10 Mbps to 1 Gbps (including OC3/12, STM1/4 rates)	No	Yes	Yes
1 Gbps to 10 Gbps (including OC48/192, STM16/64 rates)	No	No	Yes
Auto Classification	No	No	80000
Symmetrical and Asymmetrical Bandwidth	Yes	Yes	Yes
Dynamic Mobile Bandwidth (2.5G/3G/WiFi/WiMax)	Yes	Yes	Yes
Background Traffic Emulation	Yes	Yes	Yes
Dynamic Production Network Bandwidth Utilization Record/Playback (INE Network Profiler)	Yes	Yes	Yes
Number of SubNets per Port	0	Unlimited	Unlimited
Selective Traffic Passthrough	Yes	Yes	Yes
Routes per Virtual Interface (VI)	0	Unlimited	Unlimited
Packet Shaping	No	Yes	Yes
Switch/Router Queue Emulation	No	Yes	Yes
Packet Processing Performance (varies based on WAN Model Complexity)	10 Mbps	20 Gbps	›30 Gbps
OPERATING MODES			
Tunnel Mode, Bridge Mode, Routing Mode, Passthrough	Yes	Yes	Yes
Routing Mode	Yes	Yes	Yes
VLAN Switching/Trunking	No	Yes	Yes
LATENCY OPTIONS			
Fixed, Uniform Distribution/Jitter	Yes	Yes	Yes
WAN Latency Playback (using INE Network Profiler)	Yes	Yes	Yes
PACKET LOSS OPTIONS			
Periodic Loss, Random Loss, Burst Loss, Congestion	Yes	Yes	Yes
WAN Packet Loss Playback (using INE Network Profiler)	Yes	Yes	Yes
PHYSICAL ERROR OPTIONS			
Bit Errors	No	Yes	Yes
Link Faults (e.g. Routing Protocol Fail Over)	No	Yes	Yes
DYNAMIC PACKET EFFECTS			
Out–of–Order Packets, Duplicate Packets, IP Fragmentation, TTL Effects	No	Yes	Yes

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SPECIFICATIONS (CONTINUED)			
INE Feature Description	**INE Windows**	**INE Enterprise**	**INE Ultra**
NETWORKING FEATURES			
Traffic Filtering	Yes	Yes	Yes
Multicast/Broadcast Emulation	No	Yes	Yes
MAC/VLAN/MPLS-based WAN Emulation	No	Yes	Yes
User–configurable Bit Pattern Match–based WAN Emulation	No	Call	Call
IPv6	Call	Yes	Yes
IPv4	Yes	Yes	Yes
Dynamic Backup Routes based on Link Failure or Link Utilization Level	Call	Yes	Yes
Dynamic Path Selection (Probability, Time, Filter)	No	Yes	Yes
Multipoint Internet User Class Simulation	No	Yes	Yes
QoS Emulation	No	Yes	Yes
Deterministic Packet Erroring	Call	Call	Call
Real-time Packet Modification	No	Call	Call
Built-in Packet Capture Buffers	No	Yes	Yes
Load Tool & Test Automation Tool Integration	Call	Yes	Yes
Integration with Spirent Automation	Call	Yes	Yes
Virtual Interfaces	2	440	Unlimited
MANAGEMENT			
Console, Serial, Ethernet, Web GUI	No	Yes	Yes
Native Windows GUI	Yes	Yes	Yes
Advanced Multi-User Emulation Testing	No	Yes	Yes
Appliance Capacity Monitoring	Yes	Yes	Yes
Dynamically Configurable Parameters	Yes	Yes	Yes
Scenario Server	Yes	Yes	Yes

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