

Network Environment Emulation

If you need to know any of the following...

- How will my applications perform when placed in a 'real' network?
- Whether increasing bandwidth will really increase performance?
- How an application will perform when deployed over a long distance (e.g. in a WAN)?
- If I can reduce bandwidth without suffering loss of performance?
- How robust the application is to packet loss/damage or re-ordering?
- Whether it is possible to simulate all of the above without the expense of creating a 'real' network?

...then read on - INE-E can answer your questions.

What is iTrinegy Network Emulator-Enterprise?

INE-E is an extremely cost-effective, feature-rich (Gigabit - 10/100/1000) network environment emulator that offers the best price-to-function performance available.

INE-E is the perfect tool for emulating the conditions likely to be encountered in a live application rollout, reducing the potential for costly failure & embarrassment.



INE is available in both rack-mount and stand-alone formats

INE-E is a 'network in a box' offering the following capabilities:

- Pre-deployment testing, verification and fine-tuning of applications from the safety of an off-line environment prior to implementation on the live network.

- The ability to alter the characteristics of a (LAN) segment in a live network to mimic, for example, a WAN.
- Quick, safe and precise pre-deployment testing and quality assurance of business-critical applications.
- Assistance in network design and capacity planning.
- Ability to perform multiple simultaneous emulations.

INE-E Features

INE-E will enable you to:

- Create a profile of current network characteristics and performance on a single box
- Establish a benchmark model to test and verify against
- Test over the emulated network from an off-line environment
- Identify potential disruptions to application performance by emulating a decreasing quality of connection.
- Fine tune applications and network strategies before implementation
- Develop, save, edit and re-use test templates
- Test using prioritised traffic

How does INE-E benefit my business?

No matter how much "laboratory" testing is performed, it is a reality that a significant proportion of new application implementations initially fail when rolled out into a live environment.

INE-E will reduce testing costs and time to implementation by simulating how new or existing applications or services will be affected in real world network environments.

For example, by using INE-E, you will be able to confidently and accurately predict whether a time-sensitive application will work over a high-latency satellite link before committing the investment.

INE-E can also help in the post-deployment phase by checking the potential for service degradation or failure.

How does the INE-E work?

The INE-E uses the concept of virtual interfaces (VI) to represent different network segments. You can configure a number of parameters that influence the traffic flows to emulate a specific VI. See "What parameters are user configurable" for more details.

Traffic entering any of INE-E's physical interfaces passes through, and is influenced by, each virtual interface defined in a sequence before finally exiting another physical interface.

The diagram overleaf shows an example of a 3 physical interface emulation where, by adjusting VI parameters, each network path can have different characteristics applied to it, in order to create a realistic network.

It is also possible to have VI configurations dynamically change over time to more closely emulate real world conditions (e.g. increased packet loss during morning "rush hour").

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 VI will support.

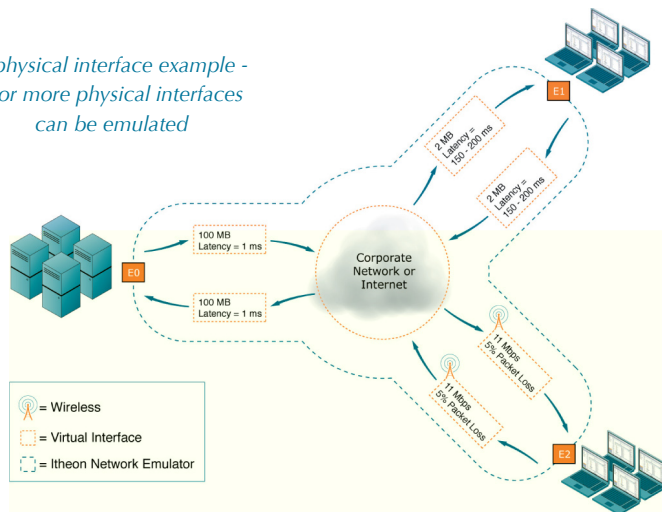
Bandwidth Allocation: Allocates bandwidth to IP Address/port/protocol/QoS combinations permitting emulation of **packet shaping** devices.

Delay (Latency): Sets the time taken for the traffic to traverse the VI boundaries.

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).

iTrinegy Network Emulator-Enterprise (INE-E)

3 physical interface example -
2 or more physical interfaces
can be emulated



Intercepted Dropped: The selected percentage and actual number of packets that will be dropped.

Intercepted Errored: 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:

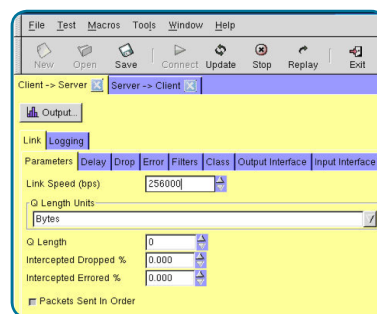
- High latency WANs (national, international and satellite)
- Wireless networks (3G, WiFi, WiMAX)
- Jittery networks, such as cause VoIP deployments a problem
- Networks that lose/damage traffic
- QoS-based networks (i.e. MPLS)
- Point-to-Point (ATM)
- VLANs)
- Routed networks

Is Reporting and Graphing possible?

Graphical and tabular reports are available and INE-E can produce log files of the dataflow through each interface of the Emulator in CSV format, for importing into other applications such as spreadsheets.

Is INE-E easy to configure?

Yes, all you need to do is to configure at least one VI per physical interface. The parameters for each are grouped into five tabs as shown below.



The setting for each VI can be saved for easy retrieval later.

Can I use INE-E to test VoIP?

Yes, you can set any permutation of bandwidth, latency, packet loss & error, to simulate a wide range of network conditions (LAN & WAN). Easy-to-use scripts can even emulate a dynamic environment. INE-E can modify network conditions while real or simulated calls are active.

You can use the INE-E 'Quality' function to investigate the potential improvements possible with prioritised handling of voice calls in a congested network. Thus you can see packet loss improve for simulated calls or experience audio quality improvements for real calls.

Can I use INE-E as part of my network capacity planning strategy?

INE-E allows you to develop and fine tune networks and applications before implementations. For example:

- Discover if you really need the bandwidth you have
- Experience the effects of moving from a high-cost low bandwidth private WAN to a low cost but high latency VPN over Internet solution before actually making the change
- Emulate a WAN bandwidth increase to see if it provides the expected benefits

In Summary:

iTrinegy Network Emulator-Enterprise (INE-E) is a simple, effective and accurate tool to enable users to simulate a wide range of network conditions and test the performance of their applications without investment in a huge array of network equipment.

Key Points:

- Multiple comprehensively configurable Virtual Interfaces
- Network and vendor independent
- Rapid and simple deployment
- Future-proof multi-protocol deployment capability
- Low cost instrumentation
- Built to IETF and ITU International Standards



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