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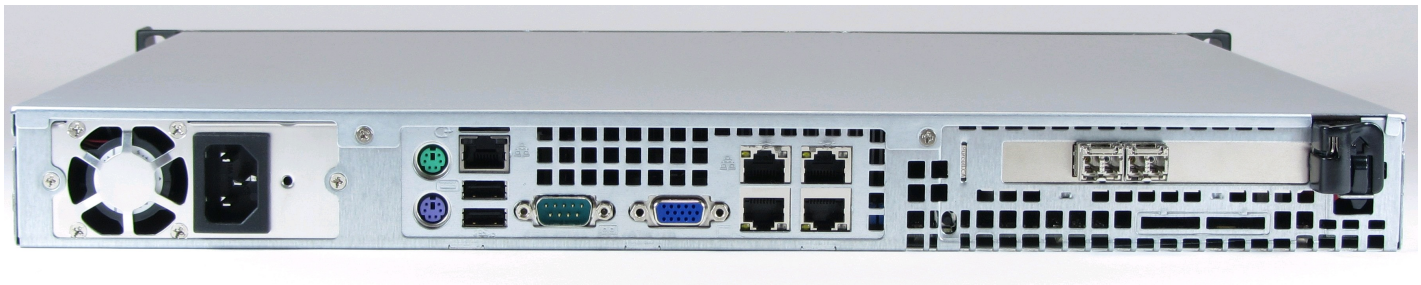
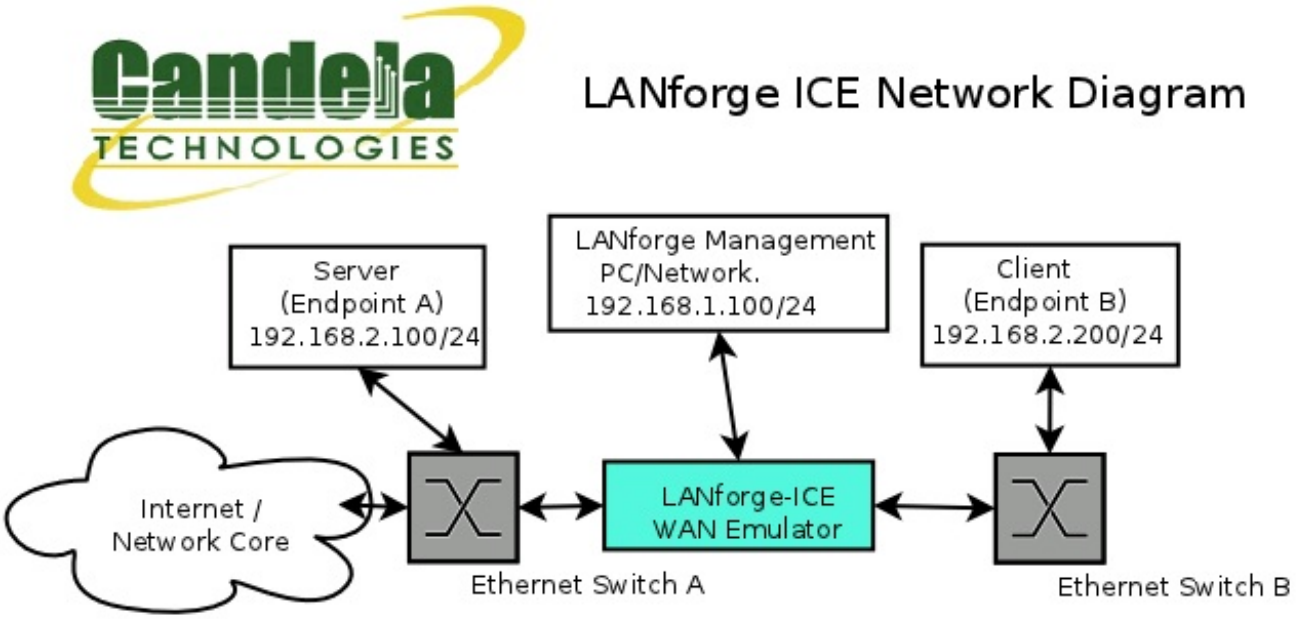
# CT964 LANforge-ICE 1Gbps WAN Emulator - 8GB RAM

The CT964 is an excellent choice for a 1U rack-mount network emulator supporting speeds up to 990Mbps (bi-directional) on multiple ports. The CT964 comes standard with 8GB RAM to support multiple seconds of latency. The CT964 fits into a standard rack and is 14 inches deep. It supports standard VGA, Keyboard, and Mouse interfaces for easy console/desktop access to the system. The CT964 is relatively noisy, so it is better for a data center deployment than a desktop environment. The CT964 hardware can support up to 4 WAN emulations with each emulation running at near 1Gbps bi-directional. Contact your sales representative if you prefer more than a single WAN emulation. No additional hardware or software is required, but you may wish to manage the system using the LANforge-GUI on a separate machine.



NOTE: This product may have a different hardware configuration than the system pictured above.
Refer to your official quote for details.

# Example Network Diagram




This diagram shows how one might use LANforge ICE to emulate a Wide Area Network between a Server and Client. When the Client communicates with the Server, the traffic will flow through the Ethernet switches and then through LANforge ICE. LANforge ICE will enforce the rate limitation and other network emulation as configured. The Client and Server are on the same subnet. For a simpler configuration, the Client and Server can be directly connected to the LANforge ICE system.

# Quick Start Guide

1. Connect Management Ethernet port to Management network or management PC. Or, connect VGA, Keyboard, and Mouse to the chassis and manage it locally.
2. Connect Client to one WAN emulation port and Server to the other. The two interfaces will be bridged and this bridge will inject the network emulation.
3. Connect power plug to a standard US or European AC power source.
4. If managing remotely, install the LANforge-GUI on a separate management PC or Laptop. Windows and Linux GUIs are supported: Select the correct one from the CDROM or Candela Technologies Download page and install it.
5. The CT964 should now boot. If DHCP is enabled on the Management network, the CT964 will automatically acquire an IP address. If DHCP is not available, the IP address will be set to 192.168.1.101 by the LANforge scripts.
6. Start the LANforge-GUI on the management PC, or the CT964 server if managing locally, and click the 'Discover' button. It should find the CT964 appliance and add the IP address to the drop-

down box in the Connect widget. Press 'Connect' and you will be connected to the CT964.

7. Select the WanLinks tab in the GUI. One of the pre-configured tests should already be running. You may double-click the row in the top section to modify the configuration. You can also view a real-time report of the test with the 'Display' button. Any modifications take place immediately after you click 'Submit'.

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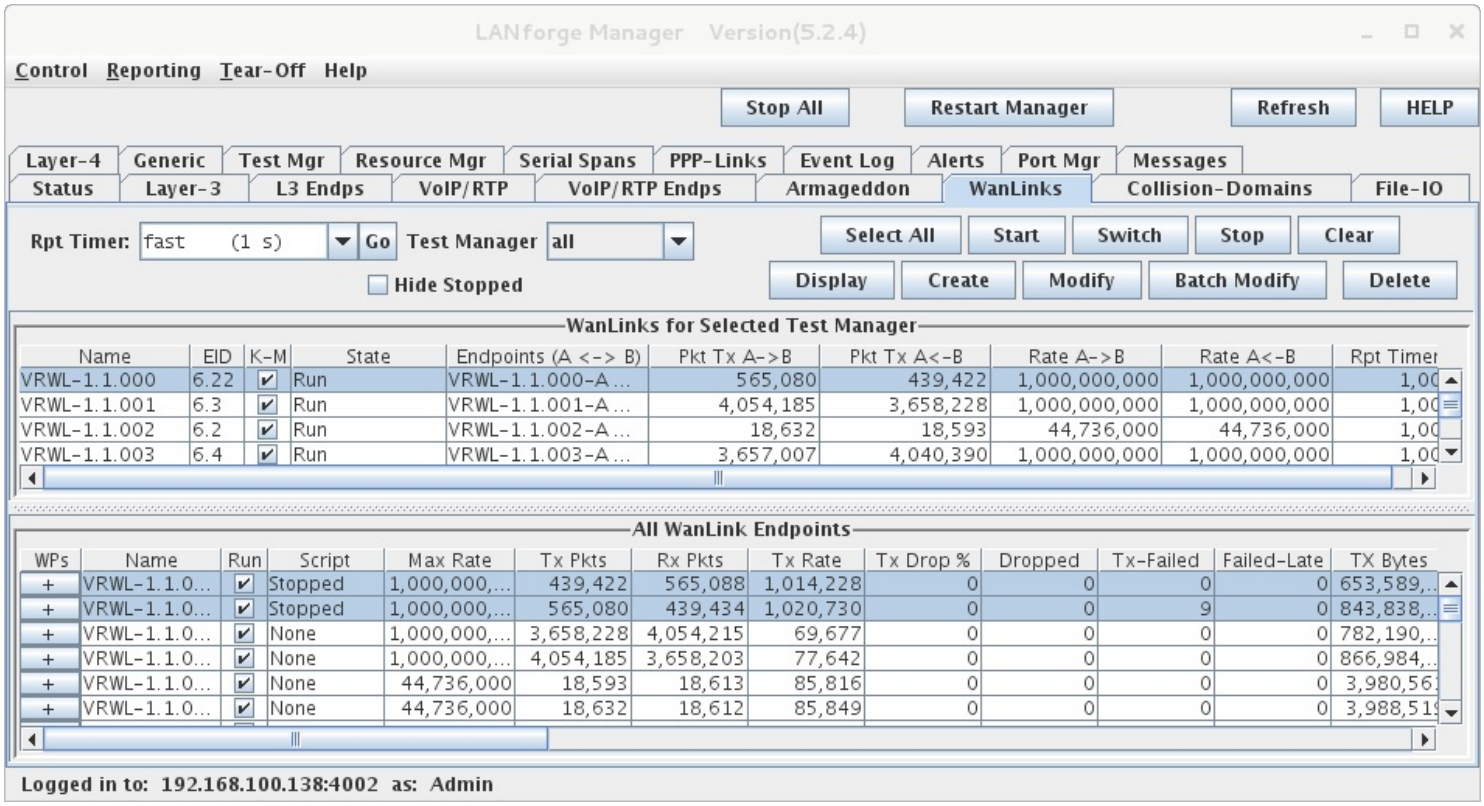
# LANforge-ICE Related Screen Shots

## WanLinks Tab



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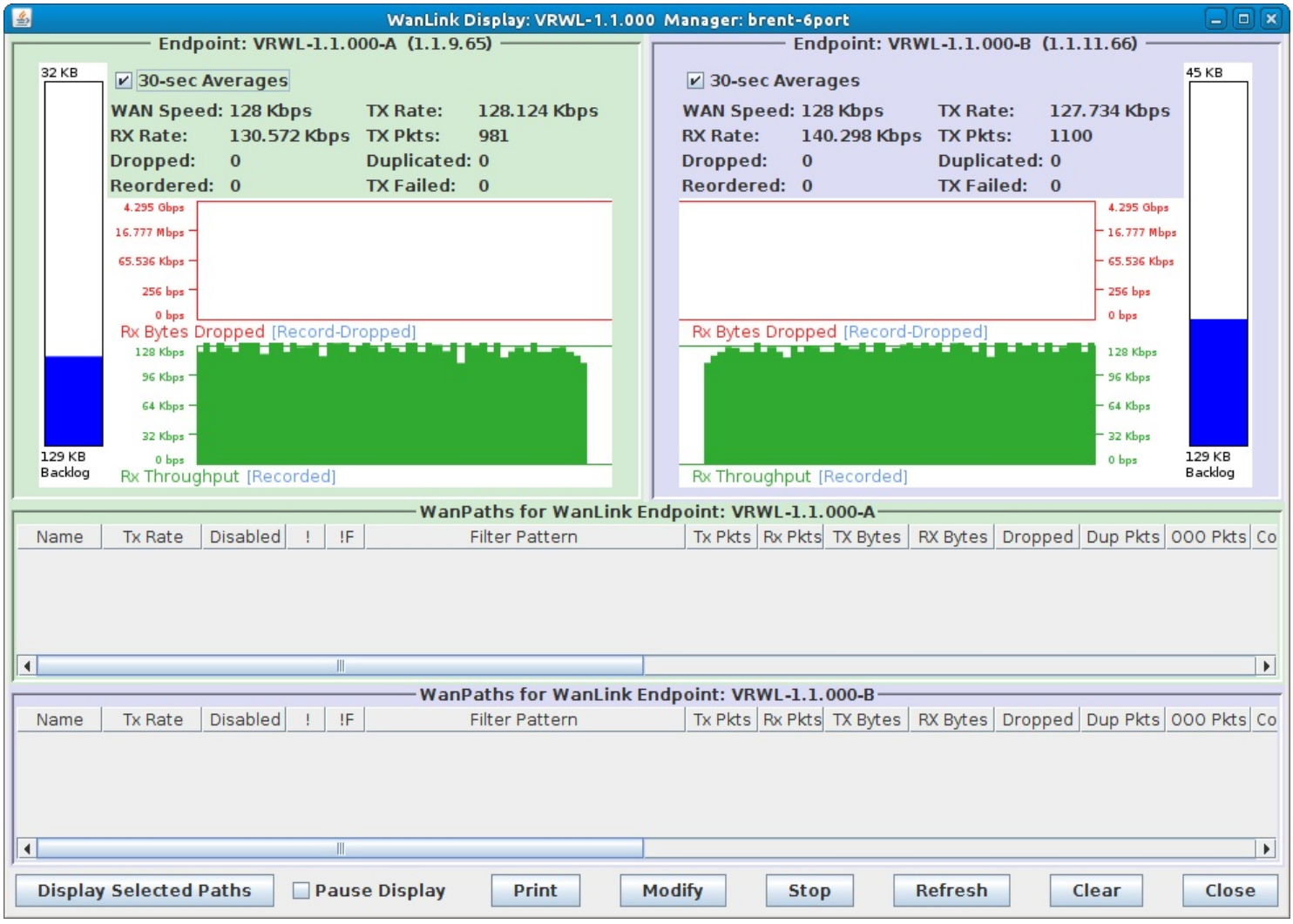
# WanLink Display



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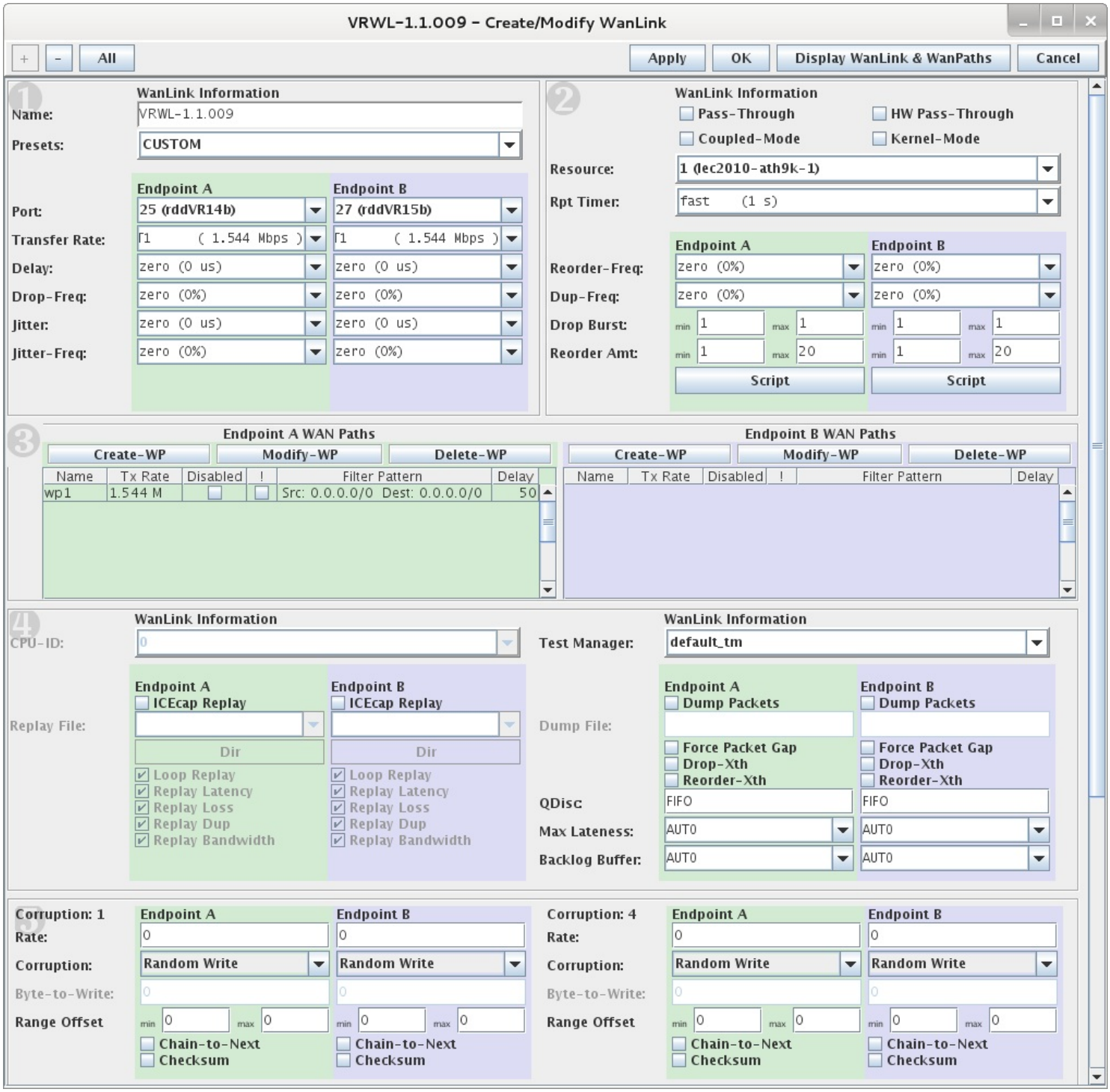
# Create/Modify WanLink Window


VRWL-1.1.009 - Create/Modify WanLink
+
-
All
Apply
OK
Display WanLink & WanPaths
Cancel
1
WanLink Information
Name:
VRWL-1.1.009
Presets:
CUSTOM
Endpoint A
Endpoint B
Port:
25 (rddVR14b)
27 (rddVR15b)
Transfer Rate:
T1 ( 1.544 Mbps )
T1 ( 1.544 Mbps )
Delay:
zero (0 us)
zero (0 us)
Drop-Freq:
zero (0%)
zero (0%)
Jitter:
zero (0 us)
zero (0 us)
Jitter-Freq:
zero (0%)
zero (0%)
2
WanLink Information
Pass-Through
HW Pass-Through
Coupled-Mode
Kernel-Mode
Resource:
1 (lec2010-ath9k-1)
Rpt Timer:
fast (1 s)
Endpoint A
Endpoint B
Reorder-Freq:
zero (0%)
zero (0%)
Dup-Freq:
zero (0%)
zero (0%)
Drop Burst:
min 1 max 1
min 1 max 1
Reorder Amt:
min 1 max 20
min 1 max 20
Script
Script
3
Endpoint A WAN Paths
Create-WP
Modify-WP
Delete-WP
Name
Tx Rate
Disabled
!
Filter Pattern
Delay
wp1
1.544 M
Src: 0.0.0.0/0 Dest: 0.0.0.0/0
50
Endpoint B WAN Paths
Create-WP
Modify-WP
Delete-WP
Name
Tx Rate
Disabled
!
Filter Pattern
Delay
4
WanLink Information
CPU-ID:
0
WanLink Information
Test Manager:
default_tm
Endpoint A
ICEcap Replay
Endpoint B
ICEcap Replay
Replay File:
Dir
Dir
Loop Replay
Replay Latency
Replay Loss
Replay Dup
Replay Bandwidth
Loop Replay
Replay Latency
Replay Loss
Replay Dup
Replay Bandwidth
Endpoint A
Dump Packets
Endpoint B
Dump Packets
Dump File:
Force Packet Gap
Drop-Xth
Reorder-Xth
Force Packet Gap
Drop-Xth
Reorder-Xth
QDisc
FIFO
FIFO
Max Lateness:
AUTO
AUTO
Backlog Buffer:
AUTO
AUTO
5
Corruption: 1
Endpoint A
Endpoint B
Rate:
0
0
Corruption:
Random Write
Random Write
Byte-to-Write:
0
0
Range Offset
min 0 max 0
min 0 max 0
Chain-to-Next
Checksum
Chain-to-Next
Checksum
Corruption: 4
Endpoint A
Endpoint B
Rate:
0
0
Corruption:
Random Write
Random Write
Byte-to-Write:
0
0
Range Offset
min 0 max 0
min 0 max 0
Chain-to-Next
Checksum
Chain-to-Next
Checksum

# Software Features

1. General purpose WAN and Network impairment emulator.
2. Able to simulate DS1, DS3, OC3, OC12, DSL, CableModem, Satellite links and other rate-limited networks, from 10bps up to 1Gbps (full duplex).
3. Can modify various network attributes including: network-speed, latency, jitter, packet-loss, packet-reordering, and packet-duplication.
4. Supports Packet corruptions, including bit-flips, bit-transposes and byte-overwrites.
5. Supports WanPath feature to allow configuration of specific behavior between different IP subnets, MAC addresses or other packet filters using a single pair of physical interfaces. WanPath support may require purchase of additional WanPath licenses, please ask your sales contact for more information.
6. Supports routed and bridged mode for more flexibility in how you configure your network and LANforge-ICE.
7. Supports WAN emulation across virtual 802.1Q VLAN interfaces more efficient use of limited physical network interfaces.
8. Supports 'WAN-Playback' allowing one to capture the characteristics of a live WAN and later have LANforge-ICE emulate those captured characteristics. The playback file is in XML format, and can be easily created by hand or with scripts. The free LANforge-ICEcap tool can be used to probe networks and automatically create the XML playback file.
9. Allows packet sniffing and network protocol decoding with the integrated Wireshark protocol sniffer.
10. Includes comprehensive management information detailing all aspects of the LANforge system including processor statistics, test cases, and Ethernet port statistics.
11. GUI runs as Java application on Linux, MAC and Microsoft Operating Systems (among others).
12. GUI can run remotely, even over low-bandwidth links to accommodate the needs of the users.
13. Central management application can manage multiple units, tests, and testers simultaneously.
14. Includes easy built-in scripting to automatically iterate through bandwidth, latency and other settings. Advanced programatic scripting over a TCP socket also supported and example perl libraries and scripts are included.
15. Automatic discovery of LANforge resources simplifies maintenance and configuration of LANforge test equipment.

# Hardware Specification

1. High-End Intel Multi-Core 1U rackmount server.
2. Operating System: Fedora 64-bit Linux with customized Linux kernel.
3. 4 built-in 10/100/1000 Ethernet interfaces, one of which should be used for management.
4. 1 IPMI port.
5. High-availability Ethernet hardware bypass option available.

6. One Quad-Core Intel E3 v2 processor, 3.6+Ghz
7. 1 PCIe x16 slot (2-6 port 10/100/1000, 1-2 port 10G fibre, etc)
8. 8 GB or more RAM.
9. 40 GB or larger Hard Drive.
10. Solid State Drive option available.
11. Standard US or European power supply (automatically detects EU v/s US power).
12. Weight: 18 lbs or 8.2 kg.
13. Dimensions: 17 x 14 x 1.75 inches (14-inch deep 1U rackmount server)  Metric: 432 x 356 x 44 mm.
14. Power Supply: Fixed 350W AC
15. Estimated Power Usage: 1.4 Amps @ 120 VAC under load, 0.7 Amps idle.
16. ROHS compliant.

List Price: $9,290  List Price with 1 Year support (17%): $10,869

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## Additional Feature Upgrades

Unless otherwise noted in the product description, these features usually cost extra:

- WanPaths (LANforge-ICE feature set)
- Virtual Interfaces: MAC-VLANs, 802.1Q VLANs, WiFi stations, etc
- LANforge FIRE traffic generation.
- VOIP: Each concurrent call over the included package requires a license.
- Armageddon: Each pair of ports requires a license if not already included.
- External battery pack: 12+ hours for CT520, CT523, CT92X and other platforms.

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