Candela
TECHNOLOGIES
Network Testing and Emulation Solutions

sales@candelatech.com
support@candelatech.com
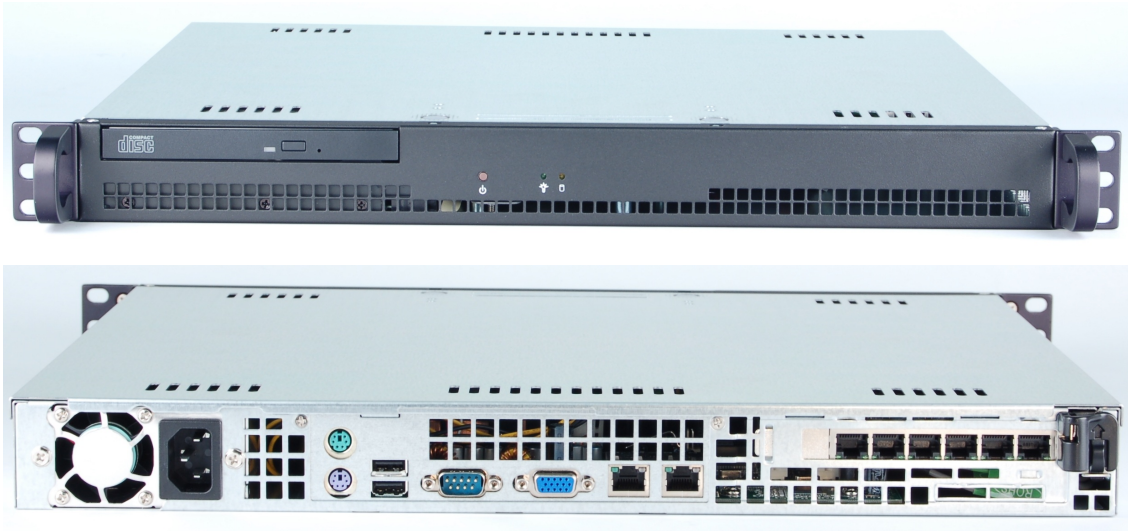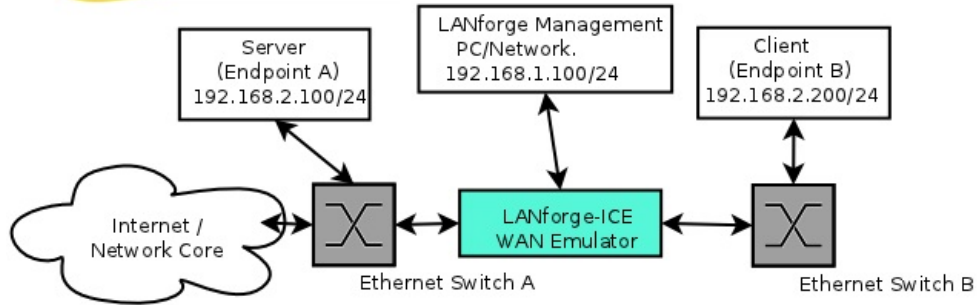+1 (360) 380-1618 [PST, GMT -8]

CT962 LANforge-ICE 155Mbps WAN Emulator

The CT962 is an excellent choice for a 1U rack-mount network emulator supporting speeds up to 155Mbps (bi-directional). The CT962 fits into a standard rack and is only 14 inches deep. It supports standard VGA, Keyboard, and Mouse interfaces for easy console/desktop access to the system. The CT962 is relatively noisy, so it is better for a data center deployment than a desktop environment. The CT962 hardware can support up to 3 concurrent WAN emulations at 155Mbps. 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

LANforge ICE Network Diagram

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Server
(Endpoint A)
192.168.2.100/24

LANforge Management
PC/Network.
192.168.1.100/24

Client
(Endpoint B)
192.168.2.200/24

Internet /
Network Core

LANforge-ICE
WAN Emulator

Ethernet Switch A

Ethernet Switch B

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. If connecting directly to a PC, an ethernet cross-over cable should be used. 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 CT962 should now boot. If DHCP is enabled on the Management network, the CT962 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 CT962 server if managing locally, and click the 'Discover' button. It should find the CT962 appliance and add the IP address to the drop-down box in the Connect widget. Press 'Connect' and you will be connected to the CT962.

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'.

LANforge-ICE Related Screen Shots

WanLinks Tab

Control   Reporting   Tear-Off   Help

Stop All   Restart Manager   Refresh   HELP

| Layer-4 | Generic | Test Mgr | Resource Mgr | Serial Spans | PPP-Links | Event Log | Alerts | Port Mgr | Messages |
| Status | Layer-3 | L3 Endps | VoIP/RTP | VoIP/RTP Endps | Armageddon | WanLinks | Collision-Domains | File-IO |

Rpt Timer: fast (1 s) Go   Test Manager all

Select All   Start   Switch   Stop   Clear
Display   Create   Modify   Batch Modify   Delete

☐ Hide Stopped

WanLinks for Selected Test Manager

Name	EID	K-M	State	Endpoints (A <-> B)	Pkt Tx A->B	Pkt Tx A<-B	Rate A->B	Rate A<-B	Rpt Timer
VRWL-1.1.000	6.22	✔	Run	VRWL-1.1.000-A ...	565,080	439,422	1,000,000,000	1,000,000,000	1,00
VRWL-1.1.001	6.3	✔	Run	VRWL-1.1.001-A ...	4,054,185	3,658,228	1,000,000,000	1,000,000,000	1,00
VRWL-1.1.002	6.2	✔	Run	VRWL-1.1.002-A ...	18,632	18,593	44,736,000	44,736,000	1,00
VRWL-1.1.003	6.4	✔	Run	VRWL-1.1.003-A ...	3,657,007	4,040,390	1,000,000,000	1,000,000,000	1,00

All WanLink Endpoints

WPs	Name	Run	Script	Max Rate	Tx Pkts	Rx Pkts	Tx Rate	Tx Drop %	Dropped	Tx-Failed	Failed-Late	TX Bytes
+	VRWL-1.1.0...	✔	Stopped	1,000,000,...	439,422	565,088	1,014,228	0	0	0	0	653,589,...
+	VRWL-1.1.0...	✔	Stopped	1,000,000,...	565,080	439,434	1,020,730	0	0	9	0	843,838,...
+	VRWL-1.1.0...	✔	None	1,000,000,...	3,658,228	4,054,215	69,677	0	0	0	0	782,190,...
+	VRWL-1.1.0...	✔	None	1,000,000,...	4,054,185	3,658,203	77,642	0	0	0	0	866,984,...
+	VRWL-1.1.0...	✔	None	44,736,000	18,593	18,613	85,816	0	0	0	0	3,980,56...
+	VRWL-1.1.0...	✔	None	44,736,000	18,632	18,612	85,849	0	0	0	0	3,988,51...

Logged in to: 192.168.100.138:4002 as: Admin

WanLink Display

WanLink Display: VRWL-1.1.000 Manager: brent-6port

Endpoint: VRWL-1.1.000-A (1.1.9.65)

☑ 30-sec Averages

WAN Speed: 128 Kbps   TX Rate: 128.124 Kbps
RX Rate: 130.572 Kbps   TX Pkts: 981
Dropped: 0   Duplicated: 0
Reordered: 0   TX Failed: 0

32 KB

4.295 Gbps
16.777 Mbps
65.536 Kbps
256 bps
0 bps
Rx Bytes Dropped [Record-Dropped]

128 Kbps
96 Kbps
64 Kbps
32 Kbps
0 bps
Rx Throughput [Recorded]

129 KB Backlog

Endpoint: VRWL-1.1.000-B (1.1.11.66)

☑ 30-sec Averages

WAN Speed: 128 Kbps   TX Rate: 127.734 Kbps
RX Rate: 140.298 Kbps   TX Pkts: 1100
Dropped: 0   Duplicated: 0
Reordered: 0   TX Failed: 0

45 KB

4.295 Gbps
16.777 Mbps
65.536 Kbps
256 bps
0 bps
Rx Bytes Dropped [Record-Dropped]

128 Kbps
96 Kbps
64 Kbps
32 Kbps
0 bps
Rx Throughput [Recorded]

129 KB Backlog

WanPaths for WanLink Endpoint: VRWL-1.1.000-A

Name	Tx Rate	Disabled	!	!F	Filter Pattern	Tx Pkts	Rx Pkts	TX Bytes	RX Bytes	Dropped	Dup Pkts	OOO Pkts	Co

WanPaths for WanLink Endpoint: VRWL-1.1.000-B

Name	Tx Rate	Disabled	!	!F	Filter Pattern	Tx Pkts	Rx Pkts	TX Bytes	RX Bytes	Dropped	Dup Pkts	OOO Pkts	Co

Display Selected Paths   ☐ Pause Display   Print   Modify   Stop   Refresh   Clear   Close

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 (dec2010-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

	Endpoint A	Endpoint B
	☐ ICEcap Replay	☐ ICEcap Replay
Replay File:		
	Dir	Dir
	☑ Loop Replay	☑ Loop Replay
	☑ Replay Latency	☑ Replay Latency
	☑ Replay Loss	☑ Replay Loss
	☑ Replay Dup	☑ Replay Dup
	☑ Replay Bandwidth	☑ Replay Bandwidth

WanLink Information

Test Manager: default_tm

	Endpoint A	Endpoint B
	☐ Dump Packets	☐ Dump Packets
Dump File:		
	☐ Force Packet Gap	☐ Force Packet Gap
	☐ Drop-Xth	☐ Drop-Xth
	☐ Reorder-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	☐ Chain-to-Next
	☐ Checksum	☐ 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	☐ Chain-to-Next
	☐ Checksum	☐ Checksum

Software Features

1. General purpose WAN and Network impairment emulator.

2. Able to simulate DS1, DS3, OC3, DSL, CableModem, Satellite links and other rate-limited networks, from 10bps up to 155Mbps (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 programmatic 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. Mid-Range 1U rackmount server.

2. Operating System: Fedora Linux with customized Linux kernel.

3. Up to 6 PCIe Intel Pro/1000 10/100/1000 Ethernet ports. Additional 10/100/1000 Ethernet interface for management.

4. High-availability Ethernet hardware bypass option available.

5. 2.8 GHz or higher Pentium processor.

6. One PCIe slot.

7. 1 GB or more RAM.

8. 40 GB or larger Hard Drive.

9. Solid State Drive option available.

10. Standard US or European power supply (automatically detects EU v/s US power).

11. Weight: 18 lbs or 8.2 kg.

12. Dimensions: 17 x 14 x 1.75 inches (14-inch deep 1U rackmount server)   Metric: 432 x 356 x 44 mm.

13. ROHS compliant.

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.

- VoIP-Mobile Audio Quality Testing using POLQA/PESQ.

- Mobile-Mobile Audio Quality Testing using POLQA/PESQ.

- Armageddon: Each pair of ports requires a license if not already included.

- RF Chambers for WiFi testing.

- External battery pack: 12+ hours for CT520, CT523, CT92X and other platforms.

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