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Candela
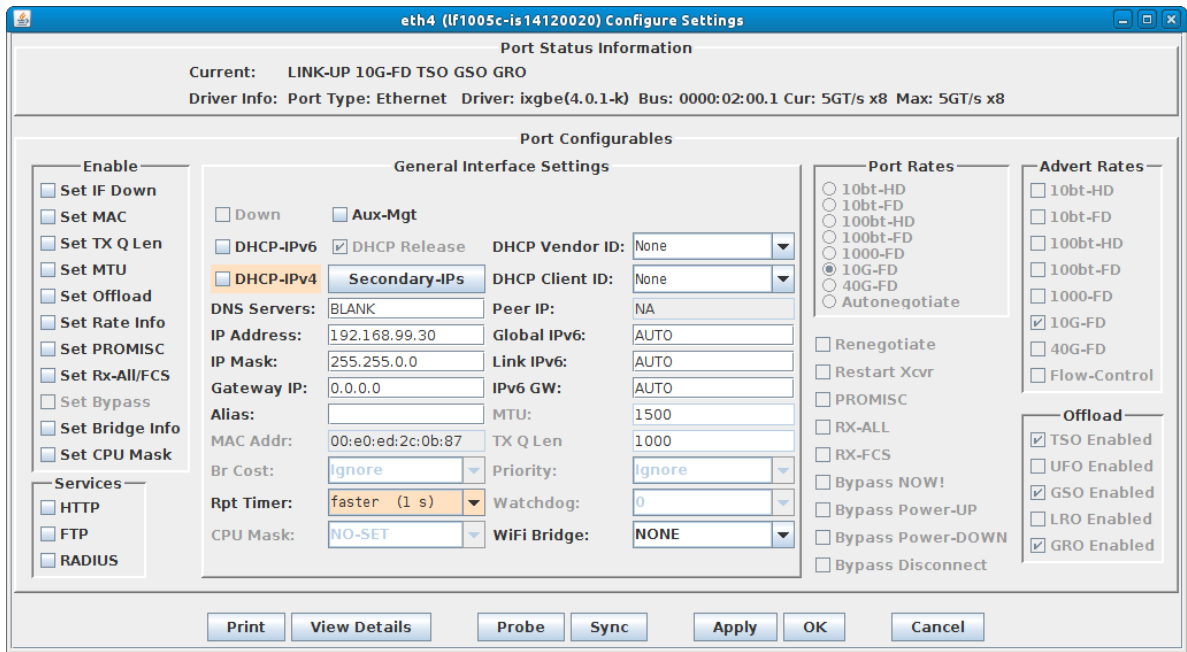**TECHNOLOGIES**
Network Testing and Emulation Solutions

5000 concurrent TCP streams and IP addresses

Goal: Quickly set up 5000 TCP connections from 5000 different IP addresses. Requires LANforge 5.2.10 or later. Use the new feature in 5.2.10 that lets 'multi-conn' Layer-3 TCP connections use a range of secondary IPs to quickly create 5000 stateful TCP/IP connections on different IP addresses. This example uses two 10G ports on a system similar to the LANforge CT503-MIX systems but the procedure should work on all properly licensed higher-end systems. A standard LANforge license only supports 1000 concurrent connections, contact your sales representative for additional licenses. This cookbook assumes basic familiarity with LANforge.
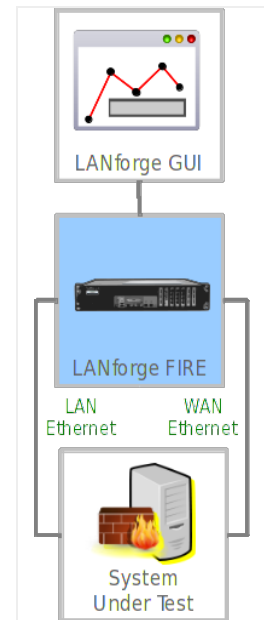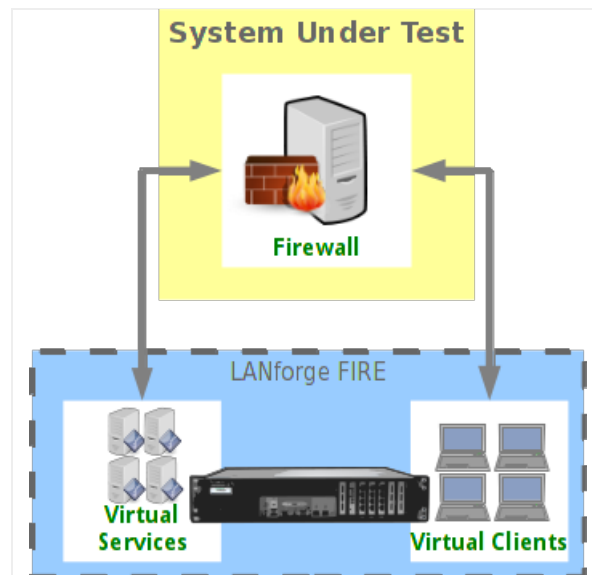
1. Create 5000 secondary IP addresses on an ethernet port. The IP address range should be on the same subnet as the primary IP address on this interface.

A. Go to the Port Manager tab, select the client-side ethernet port and click Modify. Ensure subnet mask is 255.255.0.0 or similar so we have plenty of room to add the 5000 secondary IPs on the subnet. Apply if changes were made.
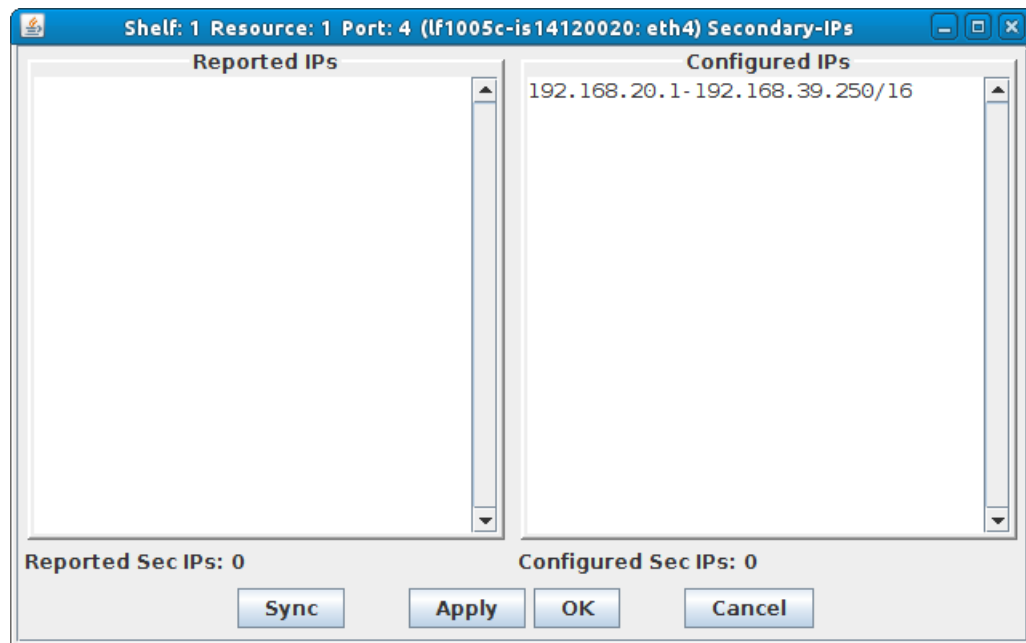
eth4 (lf1005c-is14120020) Configure Settings

Port Status Information

Current: LINK-UP 10G-FD TSO GSO GRO

Driver Info: Port Type: Ethernet   Driver: ixgbe(4.0.1-k) Bus: 0000:02:00.1 Cur: 5GT/s x8 Max: 5GT/s x8

Port Configurables

Enable
- ☐ Set IF Down
- ☐ Set MAC
- ☐ Set TX Q Len
- ☐ Set MTU
- ☐ Set Offload
- ☐ Set Rate Info
- ☐ Set PROMISC
- ☐ Set Rx-All/FCS
- ☐ Set Bypass
- ☐ Set Bridge Info
- ☐ Set CPU Mask

Services
- ☐ HTTP
- ☐ FTP
- ☐ RADIUS

General Interface Settings

☐ Down	☐ Aux-Mgt
☐ DHCP-IPv6	☑ DHCP Release DHCP Vendor ID: None
☐ DHCP-IPv4 Secondary-IPs	DHCP Client ID: None
DNS Servers: BLANK	Peer IP: NA
IP Address: 192.168.99.30	Global IPv6: AUTO
IP Mask: 255.255.0.0	Link IPv6: AUTO
Gateway IP: 0.0.0.0	IPv6 GW: AUTO
Alias:	MTU: 1500
MAC Addr: 00:e0:ed:2c:0b:87	TX Q Len 1000
Br Cost: Ignore	Priority: Ignore
Rpt Timer: faster (1 s)	Watchdog: 0
CPU Mask: NO-SET	WiFi Bridge: NONE

Port Rates
- ○ 10bt-HD
- ○ 10bt-FD
- ○ 100bt-HD
- ○ 100bt-FD
- ○ 1000-FD
- ◉ 10G-FD
- ○ 40G-FD
- ○ Autonegotiate

- ☐ Renegotiate
- ☐ Restart Xcvr
- ☐ PROMISC
- ☐ RX-ALL
- ☐ RX-FCS
- ☐ Bypass NOW!
- ☐ Bypass Power-UP
- ☐ Bypass Power-DOWN
- ☐ Bypass Disconnect

Advert Rates
- ☐ 10bt-HD
- ☐ 10bt-FD
- ☐ 100bt-HD
- ☐ 100bt-FD
- ☐ 1000-FD
- ☑ 10G-FD
- ☐ 40G-FD
- ☐ Flow-Control

Offload
- ☑ TSO Enabled
- ☐ UFO Enabled
- ☑ GSO Enabled
- ☐ LRO Enabled
- ☑ GRO Enabled

Print   View Details   Probe   Sync   Apply   OK   Cancel

B. Click the **Secondary-IPS** button to bring up the Secondary IP address management window. Enter the IP address range similar to the image below and click **Apply**:

Shelf: 1 Resource: 1 Port: 4 (lf1005c-is14120020: eth4) Secondary-IPs

Reported IPs

Configured IPs

192.168.20.1-192.168.39.250/16

Reported Sec IPs: 0

Configured Sec IPs: 0

Sync   Apply   OK   Cancel

C. Click 'Sync' after a few minutes to make sure all of the new IP addresses were properly created.

Shelf: 1 Resource: 1 Port: 4 (lf1005c-is14120020: eth4) Secondary-IPs

Reported IPs
192.168.20.1-192.168.39.137/16

Configured IPs
192.168.20.1-192.168.39.137/16

Reported Sec IPs: 5001   Configured Sec IPs: 5001

Sync   Apply   OK   Cancel

D. Make sure a second ethernet port on the LANforge is properly configured for the server-side of the network. In this case, we are using a network-emulator in bridge mode as device-under-test, so all IP addresses are on the same subnet.

eth5 (lf1005c-is14120020) Configure Settings

Port Status Information

Current: LINK-UP 10G-FD Flow-Control TSO GSO GRO

Driver Info: Port Type: Ethernet   Driver: ixgbe(4.0.1-k) Bus: 0000:02:00.0 Cur: 5GT/s x8 Max: 5GT/s x8

Port Configurables

Enable
- ☐ Set IF Down
- ☐ Set MAC
- ☐ Set TX Q Len
- ☐ Set MTU
- ☐ Set Offload
- ☐ Set Rate Info
- ☐ Set PROMISC
- ☐ Set Rx-All/FCS
- ☐ Set Bypass
- ☐ Set Bridge Info
- ☐ Set CPU Mask

Services
- ☐ HTTP
- ☐ FTP
- ☐ RADIUS

General Interface Settings

☐ Down   ☐ Aux-Mgt

☐ DHCP-IPv6   ☑ DHCP Release   DHCP Vendor ID: None
☐ DHCP-IPv4   Secondary-IPs   DHCP Client ID: None
DNS Servers: BLANK   Peer IP: NA
IP Address: 192.168.99.31   Global IPv6:   AUTO
IP Mask: 255.255.0.0   Link IPv6:   AUTO
Gateway IP: 0.0.0.0   IPv6 GW: AUTO
Alias: MTU: 1500
MAC Addr: 00:e0:ed:2c:0b:86 TX Q Len   1000
Br Cost: Ignore   Priority: Ignore
Rpt Timer: faster (1 s)   Watchdog: 0
CPU Mask: NO-SET   WiFi Bridge: NONE

Port Rates
- ○ 10bt-HD
- ○ 10bt-FD
- ○ 100bt-HD
- ○ 100bt-FD
- ○ 1000-FD
- ◉ 10G-FD
- ○ 40G-FD
- ○ Autonegotiate

- ☐ Renegotiate
- ☐ Restart Xcvr
- ☐ PROMISC
- ☐ RX-ALL
- ☐ RX-FCS
- ☐ Bypass NOW!
- ☐ Bypass Power-UP
- ☐ Bypass Power-DOWN
- ☐ Bypass Disconnect

Advert Rates
- ☐ 10bt-HD
- ☐ 10bt-FD
- ☐ 100bt-HD
- ☐ 100bt-FD
- ☐ 1000-FD
- ☑ 10G-FD
- ☐ 40G-FD
- ☐ Flow-Control

Offload
- ☑ TSO Enabled
- ☐ UFO Enabled
- ☑ GSO Enabled
- ☐ LRO Enabled
- ☑ GRO Enabled

Print   View Details   Probe   Sync   Apply   OK   Cancel

For more information see LANforge User's Guide: Ports (Interfaces)

2. Create a Layer-3 TCP connection to utilize these 5000 secondary IPs and start the traffic.

A. Go to the **Layer-3** tab and click Create. Configure the **CX Name**, **CX Type**, **Ports**, and **PDU Size** in section 1. The port in the green section should be the one with the secondary IP Addresses. In section 2, configure **Min IP Port** in the green section, and **Multi-Conn** in both. In section 3, select 'Linear' for the **IP Addr** selection box in the green section. In section 5, select the **Concurrent IP Addrs** checkbox in the green section.

B. Start the connection, and then go to the **Port Mgr** tab, select one of the ethernet ports, and sniff the traffic (or use third-party tools) to verify the IP address range is as expected: