Juniper® Validated Design

JVD Test Report Brief: Campus Fabric IP Clos Using Mist Wired Assurance

JVD-ENTWIRED-IPCLOS-03-01

Introduction

This test plan aims to validate the Phase 3 Campus Fabric IP Clos.

The Campus Fabric IP Clos extends the EVPN fabric to connect VLANs across multiple buildings or floors of a single building. This is done by stretching the Layer 2 VXLAN network with routing occurring on the access devices.

Test Topology

Figure 1: Phase 3 Campus Fabric IP Clos Topology 1

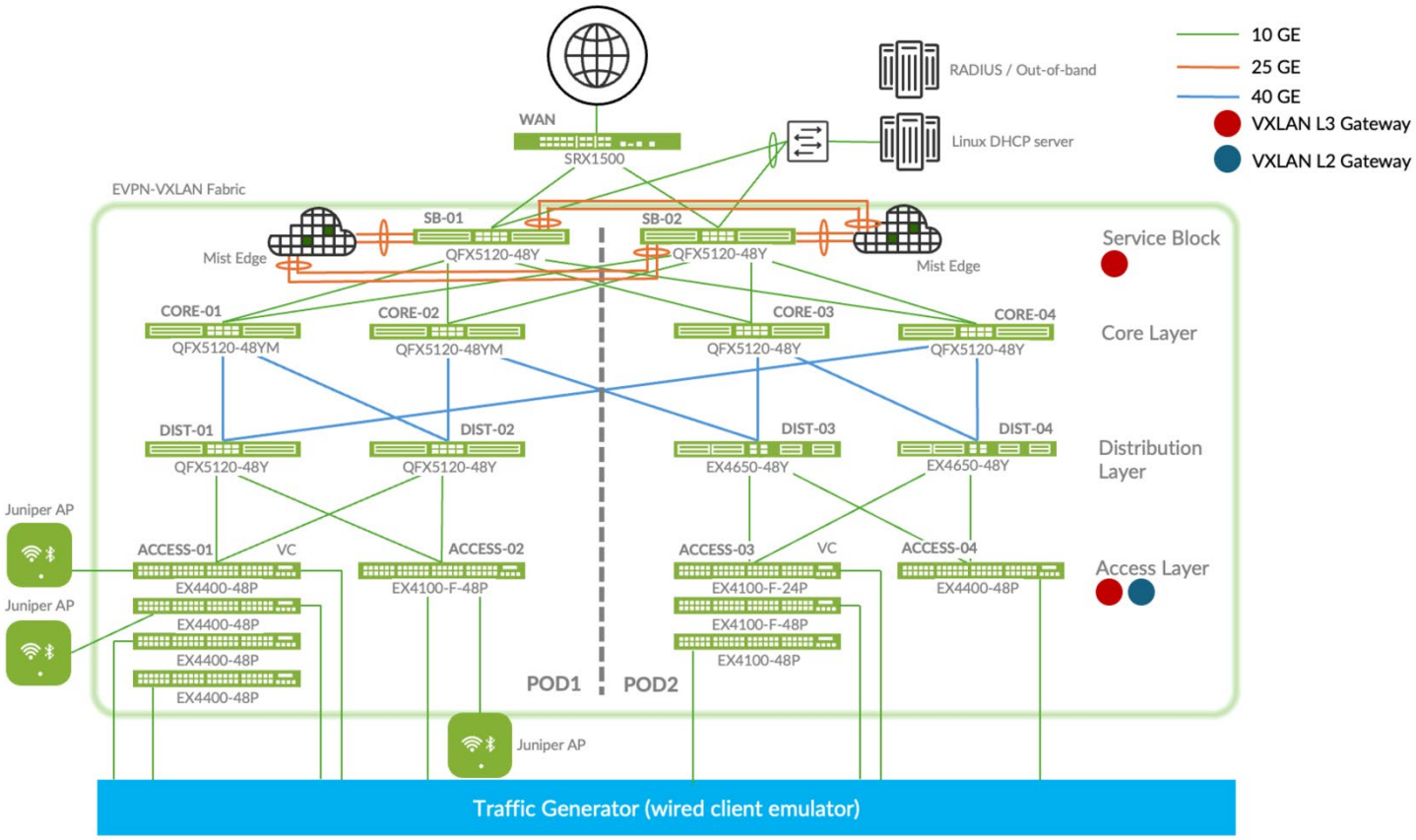
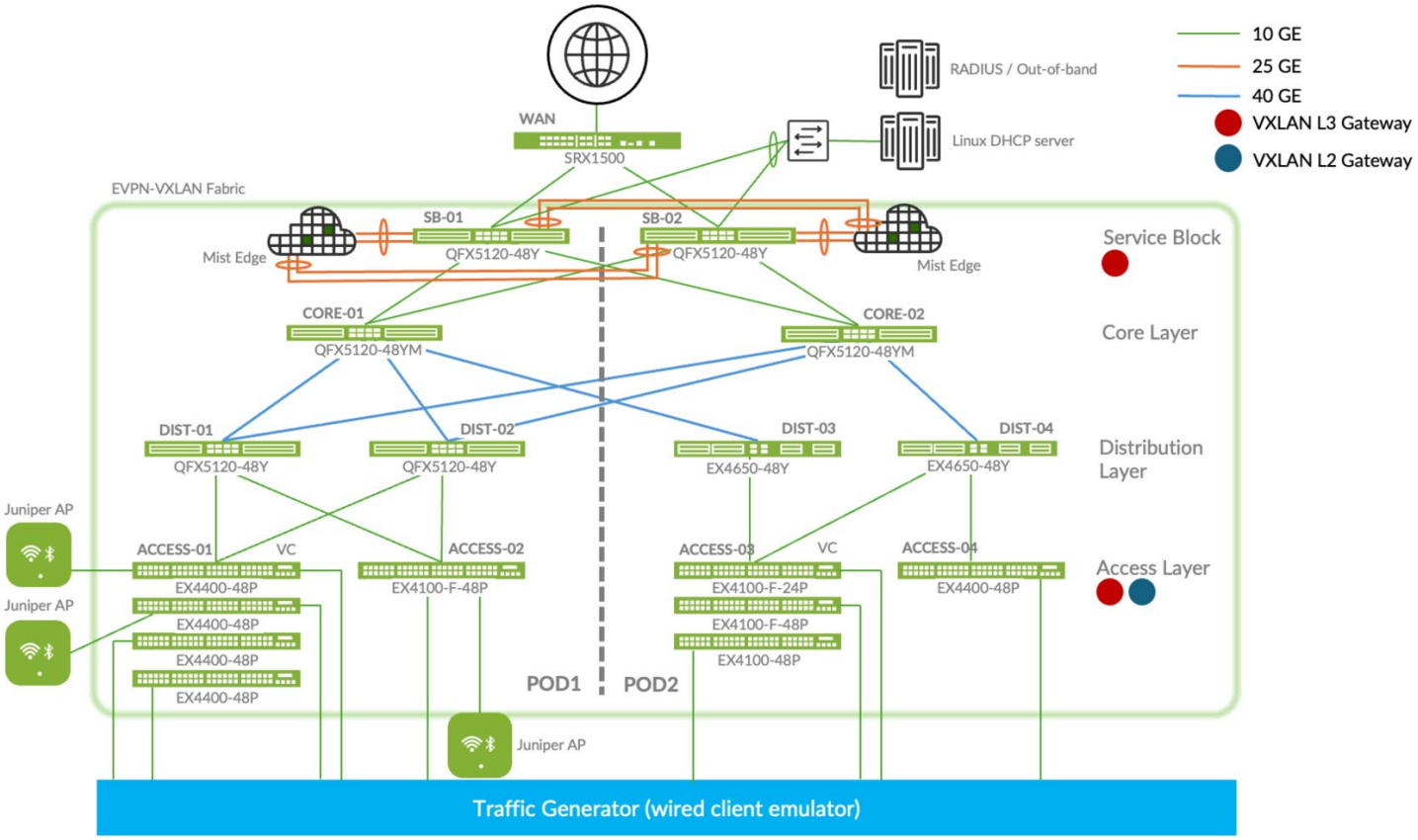


Figure 2: Phase 3 Campus Fabric IP Clos Topology 2



Platforms Tested

Tag	Role	Model	OS	Linecard	RE	Fabric	VC	Helper/DUT	Additional Info
R0	ACCESS-Switch-1	EX4400-48P	Junos OS 24.2R2-S2.5	NA	NA	IPCloS	YES	DUT	
R1	ACCESS-Switch-2	EX4100-F-48P	Junos OS 24.2R2-S2.5	NA	NA	IPCloS	NA	DUT	
R2	ACCESS-Switch-3	EX4100-F-24P	Junos OS 24.2R2-S2.5	NA	NA	IPCloS	YES	DUT	
R3	ACCESS-Switch-4	EX4400-48MP	Junos OS 24.2R2-S2.5	NA	NA	IPClos	NA	DUT	
R4	DISTRIBUTION-Switch-1	QFX5120-48Y	Junos OS 24.2R2-S2.5	NA	NA	IPCloS	NA	DUT	
R5	DISTRIBUTION-Switch-2	QFX5120-48Y	Junos OS 24.2R2-S2.5	NA	NA	IPCloS	NA	DUT	

Tag	Role	Model	OS	Linecard	RE	Fabric	VC	Helper/DUT	Additional Info
R6	DISTRIBUTION-Switch-3	EX4650-48Y	Junos OS 24.2R2-S2.5	NA	NA	IPCIoS	NA	DUT	
R7	DISTRIBUTION-Switch-4	EX4650-48Y	Junos OS 24.2R2-S2.5	NA	NA	IPCIoS	NA	DUT	
R8	CORE-Switch-1	QFX5120-48YM	Junos OS 24.2R2-S2.5	NA	NA	IPCIoS	NA	DUT	
R9	CORE-Switch-2	QFX5120-48YM	Junos OS 24.2R2-S2.5	NA	NA	IPCIoS	NA	DUT	
R10	CORE-Switch-3	QFX5120-48Y	Junos OS 24.2R2-S2.5	NA	NA	IPCIoS	NA	DUT	
R11	CORE-Switch-4	QFX5120-48Y	Junos OS 24.2R2-S2.5	NA	NA	IPCIoS	NA	DUT	
R12	Service Block-Switch-1	QFX5120-48Y	Junos OS 24.2R2-S2.5	NA	NA	IPCIoS	NA	DUT	
R13	Service Block-Switch-2	QFX5120-48Y	Junos OS 24.2R2-S2.5	NA	NA	IPCIoS	NA	DUT	
R14	WAN ROUTER	SRX1500	Junos OS 24.2R2-18	NA	NA	NA	NA	Helper	External gateway
R15	RADIUS Server VM	LINUX	Ubuntu 16.04.3 LTS	NA	NA	NA	NA	Helper	
R16	DHCP Server VM-1	Microsoft	Windows 2022	NA	NA	NA	NA	Helper	
AP	MIST Access Points	AP	MIST OS	NA	NA	NA	NA	Helper/DUT	WIFI Access Points
RT0	Tgen	Spirent	SpirentOS	NA	NA	NA	NA	Helper	Wired Clients/DHCP Client/Dot1x clients emulation
Mist-Edge	Mist Edge	ME-X6	Mist Edge tunterm v0.1.3395+deb11	NA	NA	NA	NA	Helper	

Version Qualification History

This JVD was initially qualified on Junos OS Release 24.2R2. For more details on all supported platforms and OS versions, see the Validated Platforms and Software section in the JVD document.

Scale

IP Clos fabric:

- Features: Scale number: Role
- Number of SERVICE BLOCK switches tested : 2 : SERVICE BLOCK
- Number of CORE switches tested: 4 : CORE
- Number of DISTRIBUTION switches tested : 4 : DISTRIBUTION
- Number of ACCESS switches tested: 6 : ACCESS
- Number of MIST EDGE tested : 4 : MIST EDGE
- Max BGP adjacency : 4 : ACCESS
- Local ARP entries : 15000 : ACCESS
- Local MAC addresses learnt: 15000 : ACCESS
- DHCP RELAY IRBs : 20 : ACCESS
- EVPN Type 2/5 VRFs : 15 : ACCESS AND SERVICE BLOCK
- Remote VTEPs : 7 : ACCESS AND SERVICE BLOCK
- VLANs : 500 : ACCESS
- IRBs : 500 : ACCESS

Tested scale when only Juniper Networks® EX4400 Switches were deployed as access switches of the IP Clos fabric

- When IPv4 clients only and L3-profile configured a global fabric scale of 84K Clients was tested.
- When IPv6 clients only and L3-profile configured a global fabric scale of 37K Clients was tested.
- When IPv4 / IPv6 Dual-Stack Clients and l3-profile configured a global fabric scale of 23K Clients was tested.

Note: The L3-profile is currently not configured by Juniper Mist cloud automatically. Customers needing this profile need to configure it manually using additional CLI commands. This limitation is expected to be resolved in the next MIST update (currently scheduled January 2026) for all newly deployed fabrics created in Juniper Mist cloud.

When IPv4 clients only using VXLAN group-based-policies for micro-segmentation and vxlan-gbp-l3-profile configured a global fabric scale of 30K clients was tested.

Note: The vxlan-gbp-l3-profile is currently not configured by Juniper Mist cloud automatically. Customers needing this profile need to configure it manually using additional CLI commands. This limitation is expected to be resolved in the next MIST update (currently scheduled January 2026) for all newly deployed fabrics created in Juniper Mist cloud.

Tested scale when only Juniper Networks® EX4100 Switches were deployed as access switches of the IP Clos fabric

To be published later.

Performance Data

Traffic rate: 5k FPS per stream block.

High Level Features Tested

- IPv6 underlay
- IPv6 overlay
- Mist Edge Integration
- DHCP Relay
- DHCP Snooping
- Protect RE Filter
- Storm Control
- MAC Address limit with aging

Traffic Profile

- Traffic test between all clients of the same VLAN/VNI on the same switch.
- Traffic test between all clients of the same VLAN/VNI across PoDs.
- Traffic test between all clients of the same VLAN/VNI on different switches in the same PoD.
- Traffic test between all clients in different VLANs/VNIs, same VRF on the same switch.
- Traffic test between all clients in different VLANs on different switches in the same PoD.
- Inter-VRF (Inter-VNI) traffic between users attached to access switches in the same PoD and across PoDs.

Events and Trigger Testing

- Reboot
- Interface flaps
- RE switchover

Known Limitations

1. When using DHCPv6, the L3 VRF overlay loopback IPv6 address must currently be configured manually as the relay-source for DHCPv6 clients. This limitation is expected to be resolved in the next MIST update (currently scheduled January 2026) for all newly deployed fabrics created in Juniper Mist cloud.

Access Switch:

```
set groups top routing-instances VRF1_6 forwarding-options dhcp-relay dhcpv6 group vlan104_inet6
overrides relay-source lo0.x
set groups top routing-instances VRF1_6 forwarding-options dhcp-relay dhcpv6 group vlan104_inet6
forward-only
```

2. If you have IPv6 overlay wired or wireless clients, the following CLI configuration is recommended for now. This workaround will also be addressed by November 2025 for all new fabrics configured via MIST. This allows clients to obtain subnets of the local IPv6 address and also ensures that windows and mac-os clients required attributes through router advertisements to ask for a dhcp lease. This

limitation is expected to be resolved in next MIST update (currently scheduled Jan 2026) for all newly deployed fabrics created in MIST Cloud.

Access Switch:

```
set protocols router-advertisement interface irb.1099 prefix fd00:1234:5678:1099::/64 no-autonomous
set protocols router-advertisement interface irb.1099 managed-configuration
set protocols router-advertisement interface irb.1099 other-stateful-configuration
```

3. As a best practice, configure BFD with an interval of 3500 ms and a multiplier of 3 for both underlay and overlay BGP sessions between EX4100 Access and Distribution Switches. This best practice will be automatically implemented for all Fabrics created after November 12, 2025.

EX4100 Switch:

```
set protocols bgp group evpn_underlay bfd-liveness-detection minimum-interval 3500
set protocols bgp group evpn_underlay bfd-liveness-detection multiplier 3

set protocols bgp group evpn_overlay bfd-liveness-detection minimum-interval 3500
set protocols bgp group evpn_overlay bfd-liveness-detection multiplier 3
```

Intellectual Property Rights

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