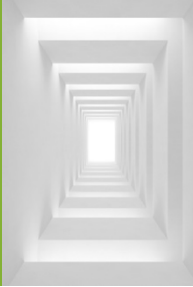


Juniper® Validated Design

JVD Test Report Brief: Campus Fabric WAN Router Integration



JVD-ENTWIRED-WANROUTER-02-01

Introduction

The objective of this JVD is to validate campus fabric integration with a WAN router. Any campus fabric deployment requires connectivity to a WAN router, and this document, along with the associated test cases, outlines the available options for enabling interaction and packet exchange. The examples are based on implementations using a Juniper Networks® MX Series Universal Router in an earlier phase, as well as end-to-end scenarios with Juniper Networks® SRX Series Firewalls and Juniper® Session Smart® Routers.

Scenarios Covered

- An IP Clos fabric with separate service blocks for WAN router integration with IPv4 underlay and IPv4 clients with an SRX cluster as a WAN Edge-managed router. Exterior BGP peering /29 through LAG between Fabric and WAN router used.
- An IP Clos fabric with separate service blocks for WAN router integration with IPv4 underlay and IPv4 clients with an SSR cluster as a WAN Edge-managed router. Exterior BGP peering /29 through LAG between Fabric and WAN router used.
- An IP Clos fabric with separate service blocks for WAN router integration with IPv6 underlay and IPv4 clients with an SRX cluster as a WAN Edge-managed router. Exterior BGP peering /29 through LAG between Fabric and WAN router used.
- An IP Clos fabric with separate service blocks for WAN router integration with IPv6 underlay and IPv4 clients with an SSR cluster as a WAN Edge-managed router. Exterior BGP peering /29 through LAG between Fabric and WAN router used.
- An IP Clos fabric with separate service blocks for WAN router integration and IPv6 underlay and dual-stack IPv4/IPv6 clients with an SRX cluster as a manually-managed WAN router. Exterior BGP peering /31 and /127 with point-to-point links between fabric and WAN router used.
- EVPN Multi-Homing with separate service blocks, for WAN router integration and Bridged Overlay and IPv4 clients with an SRX cluster as a WAN Edge-managed router. Without usage of any routing protocol as the WAN router implements default gateway for access VLAN.
- EVPN Multi-Homing with separate service blocks, for WAN router integration and Bridged Overlay and IPv4 clients with an SSR cluster as WAN Edge-managed router. Without usage of any routing protocol as the WAN router implements default gateway for access VLAN.

Test Topology

Figure 1: WAN Router Integration Phase 2 Lab (Without Bridged Overlay)

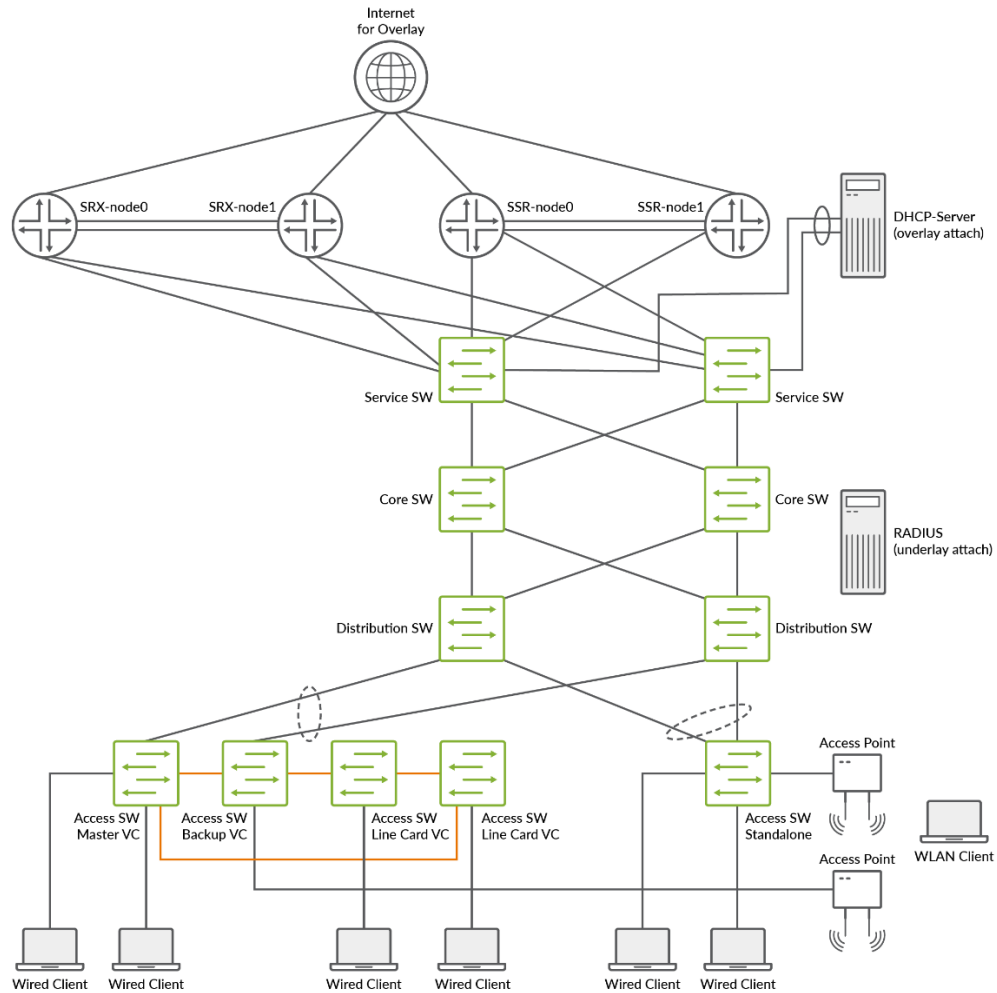
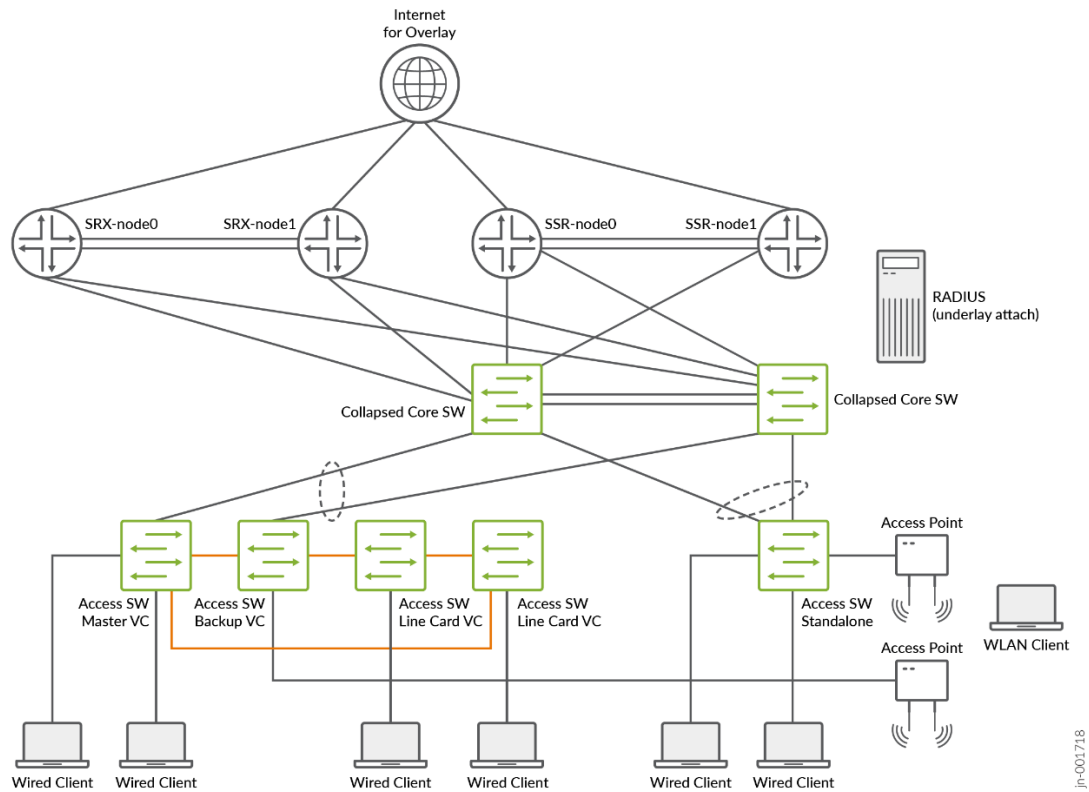


Figure 2: WAN Router Integration Phase 2 (With Bridged Overlay)



Platforms, Controllers, and Roles

Table 1 lists the platforms tested for this JVD during initial qualification. For more details on all supported platforms and OS versions, see the [Validated Platforms and Software](#) section in the JVD document.

Tag	Role	Model	OS	Linecard	RE	Fabric	VC	Helper/DUT	Additional Info
R0	ACCESS-Switch-1	EX4400-48P	Junos OS 24.4R2-S2	NA	NA	NA	YES	DUT	
R1	ACCESS-Switch-2	EX4100-F-48P	Junos OS 24.4R2-S2	NA	NA	NA	YES	DUT	
R2	DISTRIBUTION-Switch-1	QFX5120-48Y-8C	Junos OS 24.4R2-S2	NA	NA	NA	NO	DUT	
R3	DISTRIBUTION-Switch-2	QFX5120-48Y-8C	Junos OS 24.4R2-S2	NA	NA	NA	NO	DUT	
R4	CORE-Switch-1	QFX5120-48Y-8C	Junos OS 24.4R2-S2	NA	NA	NA	NO	DUT	

Tag	Role	Model	OS	Linecard	RE	Fabric	VC	Helper/DUT	Additional Info
R5	CORE-Switch-2	QFX5120-48Y-8C	Junos OS 24.4R2-S2	NA	NA	NA	NO	DUT	
R6	SERVICE BLOCK-Switch-1	QFX5120-48Y-8C	Junos OS 24.4R2-S2	NA	NA	NA	NO	DUT	
R7	SERVICE BLOCK-Switch-2	QFX5120-48Y-8C	Junos OS 24.4R2-S2	NA	NA	NA	NO	DUT	
R8	WAN-Router-1 (pair)	SRX1500	Junos OS 23.4R2-S6	NA	NA	NA	NO	DUT	External Gateway
R9	WAN-Router-2 (pair)	SSR1500	Firmware 7.1.0-50	NA	NA	NA	NO	DUT	External Gateway
R10	DHCP Server	EX4100-48P	Junos OS 24.4R2-S2	NA	NA	NA	NO	Helper	DHCP Server
R11	RADIUS Server	Linux	Ubuntu 16.04.3 LTS	NA	NA	NA	NO	Helper	Dot1X Server
AP	MIST AP	AP	Mist OS	NA	NA	NA	NO	Helper/DUT	WiFi Access Point
RT0	Traffic Generator	Spirent	SpirentOS	NA	NA	NA	NO	Helper	Access hosts / DHCP Client

Version Qualification History

This JVD was initially qualified on Junos OS Release 24.4R2-S2. For more details on all supported platforms and OS versions, see the Validated Platforms and Software section in the JVD document.

Scale and Performance Data

- VLAN count: 50
- VRF count: 10

High Level Features Tested

- WAN router integration for Layer 3 fabric exit with eBGP as the routing protocol
- WAN router attached to core switch (not tested in this phase)
- WAN router attached to dedicated service block switches

- Redundant WAN router design with two Juniper SSRs in cluster configuration
- Redundant WAN router design with two Juniper SRX Firewalls in cluster configuration
- The access layer switches have client VLANs distributed across EVPN Type-5 VRFs
- All the access layer switches act as Layer 2 and Layer 3 VXLAN gateways
- Each client VLAN has anycast gateway IRBs on each access switch
- Bidirectional Forwarding Detection is used to provide faster convergence to both the underlay as well as overlay eBGP adjacency
- Stateless DHCP relay helps the clients get IP addresses from the DHCP server across the IP fabric
- The DHCP server is multi-homed to service block function devices
- Wi-Fi access points attached to access switches

Traffic Profiles

Eight router tester ports have been used for the host emulations and end-to-end traffic

Device emulations:

- Host Mac Addresses
- IPv4 and IPv6 Hosts
- Dot1x Clients
- DHCP Clients

Traffic details:

- Intra-VNI traffic between users within the access switch
- Intra-VNI traffic between users across the access switches
- Inter-VNI (same VRF) traffic within the access switch
- Inter-VNI (same VRF) traffic across the access switches
- Inter-VNI (Inter VRF) traffic between users within the access switch
- Inter-VNI (Inter VRF) traffic between users across the access switches
- DHCP and Static IP-based traffic between users across and within the access switches
- Jumbo traffic between users across and within the access switches

Event and Triggers Test

Failover Events:

- Node reboot - service block and access switch.
- Interface flaps - Between service block and wan device.

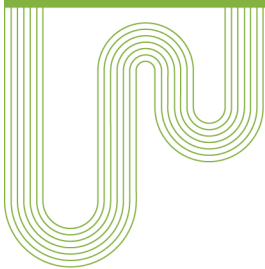
Traffic recovery validated post all failure scenarios

Known Limitations

Changing the MTU on LAN interfaces of a WAN Edge-managed SRX or SSR is only possible through API or template modifications as of April 2026. A fix for the GUI is already scheduled for a later date.

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