

Juniper® Validated Design

JVD Test Report Brief: Collapsed Data Center Fabric with Juniper Apstra and Access Switches



Introduction

This test report brief contains qualification test report data for the Collapsed Fabric Data Center Design with Juniper Apstra Juniper Validated Design (JVD). This qualification includes validation of the blueprint deployment, incremental configuration push, checking telemetry and analytics, validating data, and traffic flow. If you have questions about this Juniper Validated Design, contact your Juniper Networks representative.

The objective of this test plan is to follow the Collapsed Fabric Data Center Design with Juniper Apstra JVD and run extended testing to harden the solution for customer deployment.

Testing will be on the following:

- Initial design and blueprint deploy through Apstra.
- Validation of fabric operation/monitoring through Apstra analytics/telemetry dashboard
- Validation of end-to-end traffic flow
- System health, ARP, ND, MAC, BGP (route, next hop), interface traffic counters, etc
- Anomalies and validation

Caveats:

- DCI feature is yet to be confirmed by the TME team if applicable and required for a collapsed fabric
- TP contains baseline number/qualified scaling numbers

Test Topology

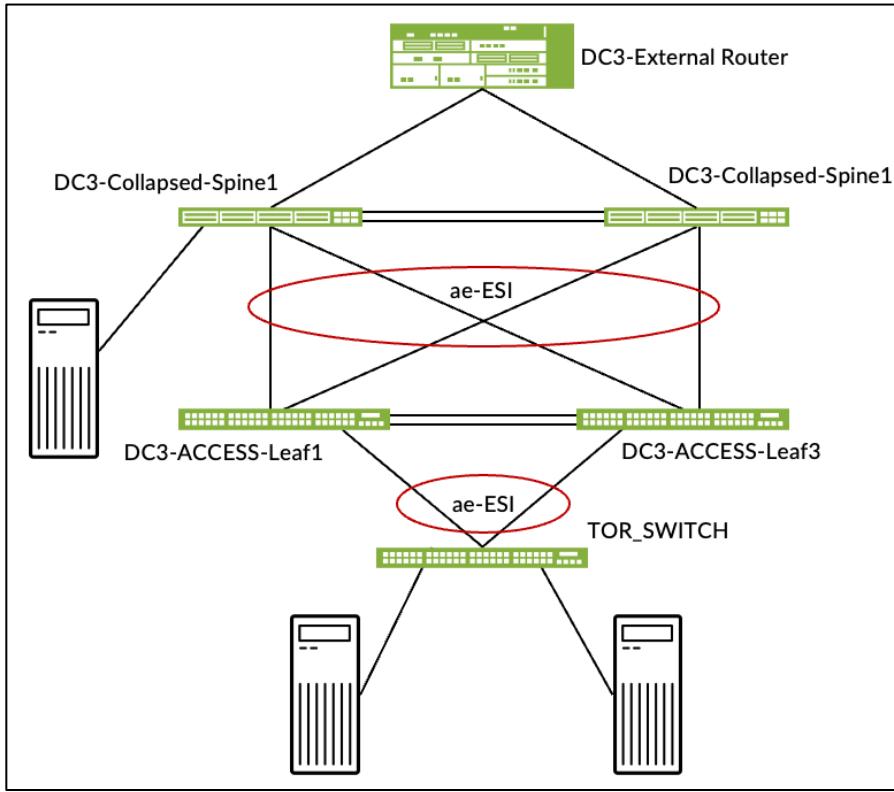


Figure 1: Reference Topology

Platforms Tested

The following table shows the platforms that were tested with this JVD.

Table 1: Tested Platforms

Role	Platform	OS
DC3-Collapsed-Spine1	QFX5120-48Y QFX5130-32CD QFX5700 ACX7100-48L PTX10001-36MR	Junos OS Release 22.2R3-S3
DC3-Collapsed-Spine2	QFX5120-48Y QFX5130-32CD QFX5700 ACX7100-48L PTX10001-36MR	Junos OS Release 22.2R3-S3
DC3-ACCESS-LEAF/TOR_SWITCH	EX4400	Junos OS Release 22.4R3
DC3-External Router	MX204	Junos OS Release 22.2R3-S3
AOS	AOS	4.2.1

Version Qualification History

This JVD has been qualified in Junos OS Release 22.2R3-S3 and Apstra AOS 4.2.1.

Scale and Performance Data

This document may contain key performance indexes (KPIs) used in solution validation. Validated KPIs are multi-dimensional and reflect our observations in customer networks or reasonably represent solution capabilities. These numbers do not indicate the maximum scale and performance of individual tested devices. For uni-dimensional data on individual SKUs, kindly contact your Juniper Networks representatives.

The Juniper JVD team continuously strives to enhance solution capabilities. Consequently, solution KPIs may change without prior notice. Always refer to the latest JVD test report for up-to-date solution KPIs. For the latest comprehensive test report, please reach out to your Juniper Networks representative.

Table 2: Scaling Numbers

Feature	Tested Scale
DC3LEAF1_VN_Count	2000
DC3LEAF1_VLAN_Count	2000
DC3LEAF1_IRB Count	2000
DC3LEAF1_local_mac_ip_host_entries	5000
DC3ESILEAF1_VN Count	2000
DC3ESILEAF1_VLAN Count	2000
DC3ESILEAF1_IRB Count	2000
DC3ESI1LEAF1_local_mac_ip_host_entries	5000
DC3 total MAC IP count	10000
VNI per leaf node	2000
VTEP per leaf node	1

NOTE: These scale numbers are NOT device maximums and only reference the scale when these multidimensional test cases are performed.

Table 3: Performance Numbers

Event	Performance
Multihomed Access Link Failure - Access switch	Traffic recovery time < 50msec
Multihomed Access Link Failure - Collapsed spine	Traffic recovery time < 50msec
Access switch to collapsed spine Link Failure	Traffic recovery time < 50msec
Dual homed Access switch node reboot	Traffic recovery time < 500msec
Dual homed collapsed spine node reboot	Traffic recovery time < 500msec
BGP protocol flap collapsed spine	Traffic recovery time < 500msec
Global Mac initialization time for 20k entries	< 10 secs

High Level Features Tested

The following table shows the features that were tested with this JVD.

Table 4: Features

Feature	Node	Description
Single Homed Access link	Leaf1	Up to 2,000 VLANs per access interface, distributed between Red and Blue VRF. Access hosts uses up to 10 MAC/IP entries per VLAN.
Multi homed Access link	All Leaf devices	AE bundle with ESI and LACP shared between Access switches and Collapsed spines. Up to 2,000 VLANs per access AE bundle and collapsed spine AE bundle distributed between Blue and Red VRF. Access hosts uses up to 10 MAC/IP entries per VLAN.
Collapsed spine Leaf pair	All Leaf devices	Apstra collapsed spine Rack type with links to Generic system. BGP peering from each VRF to the Generic system to provide connectivity between the VRFs and external hosts.
Collapsed spine Leaf pair	All Access devices	Apstra collapsed spine Rack type with links to Generic system. BGP peering from each VRF to the Generic system to provide connectivity between the VRFs and external hosts.
EBGP underlay and overlay	All devices	Default routing profile for Apstra Blueprint.
IP ECMP with fast re-route	All devices	Equal traffic distribution at all multipoints.
BFD	All devices	Underlay and overlay BFD with BGP at timers of both 500ms and 1000 ms, validated in steady state and Event testing.
MAC-VRF	All Leaf devices	Apstra default routing instance for Layer2. Single instance per leaf with 1 VXLAN VNI per VLAN and VLAN aware service type.
Layer3 IRB interface	All Leaf devices	1 L3 IRB address per VLAN/VNI. Same address/MAC used in other leaf pair, 9000 Bytes MTU.
EP-style Access interface	All Leaf devices	Apstra default VLAN configuration style.
Type 2 routing	All Leaf devices	Apstra default L2 route announcement type.
Type 5 routing	All Leaf devices	Default Apstra ip-prefix-routes announcement type.
LLDP	All Leafs and TOR switches	Apstra default link discovery mechanism.
Duplicate Mac Detection	All Leaf devices	Apstra default MAC-VRF settings.
BGP Graceful restart	All Leaf devices	All BGP peers.

Event Testing

The following table shows the events that were tested with this JVD.

Table 5: Tested Events

Test	Details
Create Agent profiles for managed devices	Apstra Deployment Step as documented in JVD.
Create Pristine Configurations and acknowledge managed devices	Apstra Deployment Step as documented in JVD.
Create a Logical Device, interface Map, and device profile for collapsed spines	Apstra Deployment Step as documented in JVD.
Create a Logical Device, interface Map, device profile for Access devices	Apstra Deployment Step as documented in JVD.
Create a Logical Device, Interface Map, Device profile for external router and emulated servers	Apstra Deployment Step as documented in JVD.
Create a rack type for Collapsed spines	Apstra Deployment Step as documented in JVD.
Create a rack type for Access switches/TOR	Apstra Deployment Step as documented in JVD.
Create rack templates for collapsed spines	Apstra Deployment Step as documented in JVD.
Create a blueprint with the template	Apstra Deployment Step as documented in JVD.
Assign all resource pools for the blueprint	Apstra Deployment Step as documented in JVD.
Assign Interface Maps to managed devices	Apstra Deployment Step as documented in JVD.
Check Cabling Map	Apstra Deployment Step as documented in JVD.
Commit the blueprint	Apstra Deployment Step as documented in JVD.
Configure Overlay Network routing zones	Apstra Deployment Step as documented in JVD.
Assign EVPN loopbacks	Apstra Deployment Step as documented in JVD.
Create Virtual Networks	Apstra Deployment Step as documented in JVD.
Commit Overlay Updates	Apstra Deployment Step as documented in JVD. Verify successful establishment of the control plane and verify no anomalies reported.
Verify Overlay Connectivity	Validate forwarding plane establishment with emulated host test traffic.
Apstra Device State Changes	Undeploy / drain / set pristine configuration of leaf and spine nodes. Validate redeployment success and re-establishment of control and forwarding planes.
Remove and Add Tenants	Modify virtual networks and connectivity templates for selected VLANs and check for removal/addition with test traffic. Expected traffic loss when tenant is removed, and restoration of traffic once tenants are re-added.
Reboot Devices	Ensure minimal traffic loss when a redundant node is rebooted, and that control and forwarding plane are restored with ECMP when the node reboot is completed.
Server Link Failure	Interface down/up, laser on/off at access layer for single-homed link. Only traffic to/from the connected hosts will be impacted.
Multihomed link failure	Interface down/up, laser on/off at access layer with minimal traffic loss for links which are redundant. AE member links and complete AE bundles are flapped. Only traffic to/from the connected hosts will be impacted.

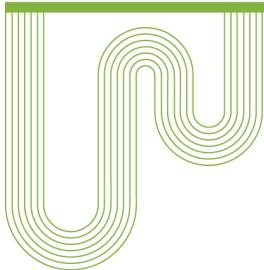
Test	Details
Process Restart	Ensure minimal traffic loss and full recovery when various JUNOS processes are killed/restarted.
MAC Move	MAC/IP host move within VLAN to adjacent TOR/servers.
Deactivate BGP on DUTs	Ensure minimal traffic loss when various BGP sessions are deactivated. Full traffic restoration when sessions are restored.
Longevity Tests	Extended traffic run for 8 hours.
Extended Negative Testing	Continual loop of process restarts, protocol, and interface flaps to ensure stability and resilience of control and data plane.
Collapsed spine and Access devices Upgrade from Apstra	JUNOS Image changes performed via Apstra on all managed devices. Verify control and forward planes are functional after system upgrade.

Traffic Profiles

The following table shows the traffic profiles that were tested with this JVD.

Table 6: Tested Traffic Profiles

Traffic Path	Type	Load	Packet Size
dc3_host1_blue_to_allblue	Intra_VRF	1000pps	random 256-1024 bytes
dc3_host1_red_to_allred	Intra_VRF	1000pps	random 256-1024 bytes
dc3_host1_host1_red_to_allblue	Inter_VRF	1000pps	random 256-1024 bytes
External_routes_to_all_blue	External	1000pps	random 256-1024 bytes
External_routes_to_all_red	External	1000pps	random 256-1024 bytes



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