

Network Configuration Example

Campus Fabric EVPN Multihoming Workflow

Published 2023-06-28 Juniper Networks, Inc. 1133 Innovation Way Sunnyvale, California 94089 USA 408-745-2000 www.juniper.net

Juniper Networks, the Juniper Networks logo, Juniper, and Junos are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners.

Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

Network Configuration Example Campus Fabric EVPN Multihoming Workflow Copyright © 2023 Juniper Networks, Inc. All rights reserved.

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at https://support.juniper.net/support/eula/. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

Table of Contents

Chapter 1 Campus Fabric EVPN Multihoming Workflow	5
About this Configuration Example	5
Scope	5
Documentation Feedback	5
Technology Primer: EVPN Multihoming Use Case Overview	5
Benefits of Campus Fabric: EVPN Multihoming	6
Chapter 2 Juniper Mist Wired Assurance	8
Overview	8
Chapter 3 EVPN	9
EVPN Multihoming	9
Campus Fabric EVPN Multihoming Components	
Juniper Mist Wired Assurance	
Juniper Mist Wired Assurance Switches	11
Overview	11
Chapter 4 Campus Fabric EVPN Multihoming Build Workflow	13
Create the Campus Fabric	13
Campus Fabric Org Build	
Campus Fabric Site Build	
Choose the Campus Fabric Topology	
Select Campus Fabric Nodes	
Configure Networks	
Other IP Configuration	
Configure Campus Fabric Ports	
Core Switches	
Access Switches	
Campus Fabric Configuration Confirmation	
Chapter 5 Verification	33
Verification of the EVPN Multihoming Deployment	
Validation Steps	
BGP Underlay	
Verification of BGP peering	
EVPN VXLAN Verification Between Core Switches	
Verification of the EVPN Database on Both Core Switches	
Verification of VXLAN Tunnelling Between Core Switches	
External Campus Fabric Connectivity Through the GW QFX5110 Switches	
Chapter 6 EVPN Insights	44
Overview	
Summary	45
Chapter 7 Additional Information	46
EVPN Multihoming Configurations	46
Core1 Configuration	
Core2 Configuration	
Configuration of the EVPN VXLAN Overlay and Virtual Networks	47
Core1 Configuration	
Core2 Configuration	

50
51
53

Chapter 1 Campus Fabric EVPN Multihoming Workflow

About this Configuration Example

Scope

Use this Network Configuration Example (NCE) of Wired Assurance EVPN multihoming workflow for building an EVPN multihoming deployment.

Documentation Feedback

We encourage you to provide feedback so that we can improve our documentation. Send your comments to <u>design-center-comments@juniper.net</u>. Include the document or topic name, URL or page number, and software version (if applicable).

Technology Primer: EVPN Multihoming Use Case Overview

Most traditional campus architectures use single-vendor, chassis-based technologies that work well in small, static campuses with few endpoints. Campus architectures are too rigid to support the scalability and changing needs of modern large enterprises. Multichassis link aggregation group (MC-LAG) is a good example of a single-vendor technology that addresses the collapsed core deployment model. In this model, two chassis-based platforms are typically in the core of your network; deployed to handle all L2/L3 requirements while providing an active/backup resiliency environment. MC-LAG does not interoperate between vendors, creating lock-in, and is limited to two devices.

A Juniper Networks EVPN multihoming solution based on EVPN-VXLAN addresses the collapsed core architecture and is simple, programmable, and built on a standards-based architecture that is common across campuses and data centers. See <u>https://www.rfc-editor.org/rfc/rfc8365</u> for more information on this architecture.

EVPN multihoming uses a Layer 3 IP-based underlay network and an EVPN-VXLAN overlay network between the collapsed core Juniper switches. Broadcast, unknown unicast, and multicast (BUM) traffic, is handled natively by EVPN and eliminates the need for Spanning Tree Protocols (STP/RSTP). A flexible overlay network based on VXLAN tunnels combined with an EVPN control plane, efficiently provides Layer 3 or Layer 2 connectivity. This architecture decouples the virtual topology from the physical topology, which improves network flexibility and simplifies network management. Endpoints that require Layer 2 adjacency, such as IoT devices, can be placed anywhere in the network and remain connected to the same logical Layer 2 network.

With an EVPN multihoming deployment, up to four devices are supported and all of them use EVPN-VXLAN. This standard is vendor-agnostic, so you can use the existing access layer infrastructure such as LACP without the need to retrofit this layer of your network. Connectivity

with legacy switches is accomplished with standards-based ESI-LAG. ESI-LAG uses standardsbased Link Aggregation Control Protocol (LACP) to interconnect with legacy switches.

Benefits of Campus Fabric: EVPN Multihoming

The traditional Ethernet switching approach is inefficient because it leverages broadcast and multicast technologies to announce Media Access Control (MAC) addresses. It is also difficult to manage because you need to manually configure VLANs to extend them to new network ports. This problem increases multifold when considering the explosive growth of mobile and IoT devices.

EVPN multihoming's underlay topology is supported with a routing protocol that ensures loopback interface reachability between nodes. In the case of EVPN multihoming, Juniper through Mist Wired Assurance supports eBGP between the core switching platforms. These devices support the EVPN-VXLAN function as VXLAN Tunnel Endpoint (VTEPs) that encapsulate and decapsulate the VXLAN traffic. VTEP represents the construct within the switching platform that originates and terminates VXLAN tunnels. In addition to this, these devices route and bridge packets in and out of VXLAN tunnels as required. EVPN multihoming addresses the collapsed core model traditionally supported by technologies like MC-LAG and VRRP. In this case, you can retain the investment at the access layer while supporting the fiber or cabling plant that terminates connectivity up to four core devices.

L2 VXLAN GatewayL3 VXLAN Gateway



EVPN Multi-Homing

Figure 1: EVPN Multihoming

An EVPN-VXLAN network solves the problems of previous architectures and provides the following benefits:

 Reduced flooding and learning—Control plane-based Layer 2/Layer 3 learning reduces the flood and learn issues associated with data plane learning. Learning MAC addresses in the forwarding plane has an adverse impact on network performance as the number of endpoints grows. This is because more management traffic consumes the bandwidth which leaves less bandwidth available for production traffic. The EVPN control plane handles the exchange and learning of MAC addresses through eBGP routing, rather than a Layer 2 forwarding plane.

- Scalability—More efficient control-plane based Layer 2 and Layer 3 learning.
- Loop free built in—EVPN VXLAN mitigates the need for Spanning Tree between the
 access and core layers while supporting active-active load balancing between these
 layers.

Chapter 2 Juniper Mist Wired Assurance

Overview

Juniper Mist Wired Assurance is a cloud service that brings automated operations and service levels to the Campus Fabric for switches, IoT devices, access points, servers, and printers. It is about simplifying every step of the way, starting from Day 0 for seamless onboarding and autoprovisioning through Day 2 and beyond for operations and management. Juniper EX Series Switches provide rich Junos streaming telemetry that enable the insights for switch health metrics and anomaly detection, as well as Juniper Mist AI capabilities.

Mist's AI engine and virtual network assistant, Marvis, further simplifies troubleshooting while streamlining helpdesk operations by monitoring events and recommending actions. Marvis is one step towards the Self-Driving Network[™], turning insights into actions and fundamentally transforming Information Technology (IT) operations from reactive troubleshooting to proactive remediation.

Juniper Mist cloud services are 100% programmable using open Application Programming Interfaces (APIs) for full automation and/or integration with your Operational Support Systems such as: IT applications, Ticketing Systems, and IP Management Systems.

Mist delivers unique capabilities for the WAN Wide Area Network (WAN), Local Area Network (LAN) and Wireless networks.

- User Interface (UI) or API-driven configuration at scale.
- Service Level Expectations (SLE) for key performance metrics such as throughput, capacity, roaming, and uptime.
- Marvis—An integrated AI engine that provides rapid troubleshooting of Full Stack network issues, trending analysis, anomaly detection, and proactive problem remediation.
- Single management system.
- License management.
- Premium Analytics for long term trending and data storage.

For more information about Juniper Mist Wired Assurance, see the following datasheet: <u>https://www.juniper.net/content/dam/www/assets/datasheets/us/en/cloud-services/juniper-mist-wired-assurance-datasheet.pdf</u>

Chapter 3 EVPN

EVPN Multihoming

EVPN multihoming, with an EVPN-VXLAN architecture, decouples the overlay network from the underlay network. This approach addresses the needs of the modern enterprise network by allowing network administrators to create logical Layer 2 networks across one or more Layer 3 networks. In an EVPN multihoming deployment, the use of EVPN VXLAN supports native traffic isolation using routing-instances; commonly called Virtual Routing and Forwarding (VRFs) for macrosegmentation purposes.

The Mist UI workflow makes it easy to create campus fabrics.



Campus Fabric EVPN Multihoming Components

This configuration example uses the following devices:

- Two QFX5110 switches as distribution devices, software version: Junos OS Release 22.2R3.15 or later.
- Two access layer EX4100 switches, software version: Junos OS Release 22.3R1-S2.1 or later.
- One SRX345 WAN router, software version: 20.2R3-S2.5 or later.
- Juniper Access Points.
- Two Linux desktops that act as wired clients.



Figure 2: Topology

Juniper Mist Wired Assurance

Wired Assurance, through the Mist UI, can be used to centrally manage all Juniper switches. Juniper Mist Wired Assurance gives you full visibility on the devices that comprise your network's access layer. The Juniper Mist portal provides a user interface to access your architecture through the Al-driven cloud services with your Mist account. You can monitor, measure, and get alerts on key compliance metrics on the wired network including switch version and Power Over Ethernet (PoE) compliance, switch-AP affinity, and VLAN insights.

For information on Juniper Switch Onboarding to the Juniper Mist cloud, see:

https://www.juniper.net/documentation/us/en/software/nce/nce-214-midsize-branch-mist-pwp/topics/topic-map/nce-214-midsize-branch-mist-example part2.html

Wired Assurance, through the Mist UI, is used to build a Campus Fabric EVPN multihoming from ground up and includes the following:

- Assignment of p2p links between the core devices.
- Assignment of unique BGP AS numbers per device participating in the underlay and overlay.
- Creation of VRF instances allow you to logically segment traffic. This also includes the assignment of new or existing VLANs to each representative VRF.
- IP addressing of each L3 gateway Integrated Routing and Bridging (IRB) assigned to the core layer.
- IP addressing of each Io0.0 loopback.
- Configuration of routing policies for underlay and overlay connectivity.
- Optimized Maximum Transmission Unit (MTU) settings for p2p underlay, L3 IRB, and ESI-LAG bundles.
- Downloadable connection table (.csv format) that can be used by those involved in the physical buildout of the Campus Fabric.

Graphical interface depicting BGP peering between cores and physical link status.

For more information on Juniper Mist Wired Assurance, see: https://www.mist.com/documentation/category/wired-assurance/

Juniper Mist Wired Assurance Switches

You must validate that each device participating in the Campus Fabric has been adopted or claimed and assigned to a site. The switches were named for the respective layer in the fabric to facilitate building and operating the fabric.

🛄 DC80	TUE 11:36 AM 2 0 0										
5 Sw	itches	site Primary Site 💌	List Topology L	ocation				11:35:54 AM (updates every	/ 3 minutes)	Inventory Claim Switches	=
				5 Adopted Switches	0 Discovered Switches	10 Wired Clients	0 W				
			Switch-AP Affir	nity - PoE Compliance	- VLANS 80% V	ersion Compliance	Switch Uptime	Config Success			
Q Filter											
	Status	Name	☆ IP A	ddress	Model	Wired Clients	Version	Uptime	Managed	Serial Number	
	🖘 Connec	ted Acces	ss1 192	2.168.230.139	EX4100-24T	2	22.3R2.12	27d 12h 28m	\odot	FD0822AN0021	
	S Connec	ted Acces	ss2 192	2.168.230.127	EX4100-24T	2	22.3R1-S2.1	95d 15h 29m	\odot	FD0822AN0001	
	🖘 Connec	ted Core1	1 192	2.168.230.137	QFX5110-485	4	22.2R3.15	31d 19h 10m	\odot	WS3717450314	
	🔄 Connec	ted Corea	2 192	2.168.230.140	QFX5110-485	2	22.2R3.15	74d 43m	\odot	WS3718280099	

Overview

Templates

A key feature of switch management through the Juniper Mist cloud is the ability to use configuration templates and a hierarchical model to group the switches and make bulk updates. Templates provide uniformity and convenience, while the hierarchy (site and switch) provides both scale and granularity.

Templates and the hierarchical model mean that you can create a template configuration and then all the devices in each group inherit the template settings. When a conflict occurs, for example when there are settings at both the site and Organizational levels that apply to the same device, the narrower settings (in this case, site) override the broader settings defined at the Organization level.

Individual switches, at the bottom of the hierarchy, can inherit all or part of the configuration defined at the Organization level, and again at the site level. Individual switches can also have their own unique configurations.

You can include individual CLI commands at any level of the hierarchy, which are then appended to all the switches in that group on an "AND" basis– that is, individual CLI settings are appended to the existing configuration. The existing setting may replace or appended.

NOTE: You can include CLI commands for items not native to the Mist UI. This configuration data is applied last; overwriting existing configuration data within the same stanza. You can access the CLI command option from the Switch Template or individual switch configuration.

CLI CONFIGURATION

Additional CLI Commands 📵



Under Organization and Switch Templates, we use the following template:

Switch Templates		
1 Template		
TEMPLATE	SITES	
campus-fabric	1	4

Topology

Wired Assurance provides the template for LAN and Loopback IP addressing for each core device once the device's management IP address is reachable. Each device is provisioned with a /32 loopback address and /31 point-to-point interfaces that interconnect core switches. The devices such as the access layer of switches connect to the access layer using standard Link Aggregation Groups (LAG); while the distribution uses ESI-LAG in a multihoming, load balancing manner.

**

The WAN router can be provisioned via Mist UI but it is separate from the campus fabric workflow. The WAN router has a southbound lag configured to connect to the ESI-LAG on the core switches. The WAN router can be standalone or built as a High Availability cluster. In this document, a single SRX Series Firewall is used as the WAN router.

Chapter 4 Campus Fabric EVPN Multihoming Build Workflow

Create the Campus Fabric

From the Organization option on the left-hand section of the Mist UI, select Wired Campus Fabric.



Mist provides the option of deploying a Campus Fabric at the org or site-level noted on the upper left-hand Campus Fabric menu shown below. For example, if you are building a Campus wide architecture with multiple buildings, each building housing distribution and access switches, you can consider building an Org level Campus Fabric. This Campus Fabric ties each of the sites together forming a holistic Campus Fabric. Otherwise, the site build with a single set of core, distribution, and access switches is sufficient.

Campus Fabric Org Build

Campus Fabric org (Entire Org) •		0
Org Topologies Sites' Topologies		
	Campus Fabric is not configured at the Organization level	
	There may be Campus Fabric configurations for specific sites	
	Configure Campus Fabric	

Campus Fabric Site Build



Choose the Campus Fabric Topology

Select EVPN multihoming and complete the required fields below:

	ind configure related options		
TOPOLOGY TYPE			
EVPN Multihoming Collapsed core with ESI-Lag			
Campus Fabric Core-Distribution with ESI-Lag	ution		
Campus Fabric IP Clos			
Campus fabric with L3 at the edge			
Campus fabric with L3 at the edge	OVERLAY SETTINGS	UNDERLAY SETTINGS	
Campus fabric with L3 at the edge ONFIGURATION Opology Name	OVERLAY SETTINGS BGP Local AS	UNDERLAY SETTINGS AS Base	
Campus fabric with L3 at the edge CNFIGURATION EVPN Multihoming	OVERLAY SETTINGS BGP Local AS 65000	UNDERLAY SETTINGS AS Base 65001	
Compus fabric with L3 at the edge ONFIGURATION Depology Name EVPN Multihoming	OVERLAY SETTINGS BGP Local AS 65000 (2-byte or 4-byte)	AS Base 65001 (2-byte or 4-byte)	
Compus fabric with L3 at the edge ONFIGURATION Depology Name EVPN Multihoming	OVERLAY SETTINGS BGP Local AS 65000 (2-byte or 4-byte) Auto Router ID Subnet	AS Base (2-byte or 4-byte) Loopback prefix	
Campus fabric with L3 at the edge ONFIGURATION Dopology Name EVPN Multihoming	OVERLAY SETTINGS BGP Local AS 65000 (2-byte or 4-byte) Auto Router ID Subnet 172.16.254.0/23	UNDERLAY SETTINGS AS Base 65001 (2-byte or 4-byte) Loopback prefix /24	
Campus fabric with L3 at the edge ONFIGURATION Dopology Name EVPN Multihoming	OVERLAY SETTINGS BGP Local AS 65000 (2-byte or 4-byte) Auto Router ID Subnet 172.16.254.0/23 (xox.xox.xox.xox.xox/xox)	UNDERLAY SETTINGS AS Base 65001 (2-byte or 4-byte) Loopback prefix /24 Subnet	
Compus fabric with L3 at the edge CONFIGURATION Topology Name EVPN Multihoming	OVERLAY SETTINGS BGP Local AS 65000 (2-byte or 4-byte) Auto Router ID Subnet 172.16.254.0/23 (xox.xox.xox.xox/xox)	UNDERLAY SETTINGS AS Base 65001 (2-byte or 4-byte) Loopback prefix 724 Subnet 10.255.240.0/20	

Configuration

Topology Name consistent with the deployment type.

Overlay Settings

- BGP Local AS: represents iBGP AS number that are automatically allocated for every core device. You can use whatever private BGP AS number suits your deployment. The routing policy is provisioned by Mist to ensure that the AS numbers are never advertised outside of the fabric.
- Auto Router ID Subnet: This subnet is used to auto-configure the Router IDs on each device in the Fabric. Router IDs are loopback interfaces (lo0) on each device in the Fabric used for the overlay peering between the core devices.

Underlay Settings

- BGP Local AS: represents the starting point of private BGP AS numbers that are automatically allocated for every device. You can use the private BGP AS number range that suits your deployment. The routing policy is provisioned by Mist to ensure the AS numbers are never advertised outside of the fabric.
- Loopback prefix: represents the range of IP addresses associated with each device's loopback address. You can use the range that suits your deployment. VXLAN tunnelling using a VTEP is associated with this address allocated on all core devices.
- Subnet: represents the range of IP addresses used for point-to-point links between devices. You can use the range that suits your deployment. Mist breaks this subnet into /31 subnet addressing per link.

NOTE: We recommend default settings for all options unless it conflicts with the surrounding environment.

Select Campus Fabric Nodes

You can select devices to participate at each Layer of the EVPN multihoming deployment. We recommend that you validate each device's presence in the site switch inventory before the Campus Fabric is created.

The next step is to assign the switches to the layers. Since the switches were named relative to target layer functionality, they can be quickly assigned to their roles.

Select Campus Fabric Nodes

Select the switches that will be used in each layer of the topology and provide Router IDs as required

Collapsed Core Select Switches Q Filter Access Name MAC Address Serial Router ID Core1 WS3717450314 192.168.255.10 QFX5110-485 c0:42:d0:16:af:a0 Core2 b0:33:a6:11:49:00 WS3718280099 192.168.255.11 QFX5110-485 Access2 4c:73:4f:09:59:00 FD0822AN0001 192.168.255.21 EX4100-24T Access1 192.168.255.20 4c:73:4f:09:63:00 FD0822AN0021 EX4100-24T Select 2 Cancel × Campus Fabric Configuration ← Back Name MAC Addres Select Campus Fabric Nodes

Sciect campus rabite nodes	🖆 Core1 🗛	c0:42:d0:16:af:a0	WS3717450314	192.168.255.10	QFX5110-48S	
Select the switches that will be used in each layer of t	🔄 Core2 🛕	b0:33:a6:11:49:00	WS3718280099	192.168.255.11	QFX5110-485	
Colloped Core	Access2	4c:73:4f:09:59:00	FD0822AN0001	192.168.255.21	EX4100-24T	
Conapsed Core	Access1	4c:73:4f:09:63:00	FD0822AN0021	192.168.255.20	EX4100-24T	*required
					Select 2 Cancel	
Access						
			Select Switches			

Once all layers have selected the appropriate devices, Mist assigns each device a Router ID associated with a logical loopback address. This loopback is associated with a logical construct called a VTEP to source the VXLAN Tunnel. EVPN multihoming has VTEPs for VXLAN tunnelling on the core switches only.

2-4 collapsed core switches are required

(XXX.XXX.XXX.XXX/XX)

Mist provided Router-ID/loopback

NOTE: The loopback address and router-ID should be in the same subnet as provided by Mist.

Click the Continue button at the upper-right corner of the page and move to the Network Settings section of the EVPN multihoming deployment process.

Configure Networks

Enter Network information such as VLANs and VRF (routing instances for traffic isolation purposes) options. VLANs are mapped to Virtual Network Identifiers (VNIs) and can optionally be mapped to VRFs to provide customers a way to logically separate traffic patterns such as IoT devices from Corp IT. Port configuration for ESI-LAG between the Collapsed core and access switches are also defined in this section.

VRF

In a Campus Fabric deployment, the use of EVPN VXLAN supports native traffic isolation using routing-instances; commonly called VRFs for macrosegmentation purposes.

For more information on Routing Instance overview, see <u>https://www.juniper.net/documentation/us/en/software/junos/routing-overview/topics/concept/routing-instances-overview.html</u>

VLANs can be placed into a common VRF where all VLANs within each VRF have full connectivity to each other and other external networking resources. A common use case includes most enterprise domains isolating Guest Wi-Fi traffic and saves Internet connectivity. By default, the Campus Fabric provides complete isolation between VRFs forcing inter-VRF communications to traverse a Firewall or security compliance. This aligns with most Enterprise security use cases and compliance and is represented in this document.

Configure Networks

NETWORKS	VRF	CORE / ACCESS PORT CONFIGURATION
No networks defined	Configuration	Port configuration for ESI-Lag between Collapsed Core and Access switches
Create New Network Add Existing Network	Instances	Invalid name (use a-z, 0-9, $_,$ - and up to 32 characters, it should start with a letter)
OTHER IP CONFIGURATION	No VRF instances defined	Name
Network-specific IP configuration for each Collapsed Core switch	Add VRF Instance	
		Trunk Networks
No networks defined	DHCP RELAY	+
	Enabled O Disabled	Show Advanced 🔺

Networks

VLANs can be created or imported under this section including the IP subnet and Default Gateway per each VLANs.

The Shared Elements section of the campus-fabric template includes the Networks section mentioned above where VLANs are created.

NETWORKS	
Named VLAN IDs that can be u	sed by Port Profiles
vlan1033	1033 📏
vlan1088	1088 >
vlan1099	1099 📡
vlan1100	100 >

Back to the EVPN multihoming build, you can select the existing template that includes Layer 2 VLAN and IP information. All VLAN and IP information is inherited from the template.

Import from Temp Template	late	
campus-fabric:1	5 Networks	~
Name		VLAN ID
🖌 vlan1033		1033
🖌 vlan1088		1088
🖌 vlan1099		1099
NETWORKS		
Û	Edit Network	✓ ×
Name		
vlan1099		
VLAN ID		
1099		
(1 - 4094 or {{siteVa	r}})	
Subnet		0
10.99.99.0/24		
Virtual gateway		0
10.99.99.1		

Other IP Configuration

Juniper Mist Wired Assurance provides automatic IP addressing IRBs for each of the VLANs. Then, Port Profiles and Port Configuration associate the VLAN with specified ports. Once all VLANs are configured, each Collapsed core switch is automatically assigned IP addresses in each VLAN while sharing the Virtual Gateway address, typically used as a Default Gateway address for each VLAN. The following highlights one of the Collapsed Core's IP addressing for each VLAN:

OTHER IP CONFIGURATION			OTHER IP CONFIGURATION	
Network-specific IP co	onfiguration for each Colla	apsed Core switch	Network-specific IP configuration for each C	ollapsed Core switch
	Edit Core1	✓ ×	Edit Core2	✓ ×
vlan1033		10.33.33.2 义	vlan1033	10.33.33.3 🔉
vlan1088		10.88.88.2 📏	vlan1088	10.88.88.3 🔉
vlan1099		10.99.99.2 📏	vlan1099	10.99.99.3 📏

By default, all VLANs are placed in the default VRF. The VRF option allows you to group common VLANs into the same VRF or separate VRFs depending on traffic isolation requirements. This example includes three VRFs or routing instances: corp-it | developers | guest-wifi. Here, you build the first corp-it VRF and select the pre-defined vlan 1099.

VRF	VRF
Configuration	New VRF Instance 🗸 🗙
Coniguration	Name
Enabled Disabled	corp-it
	Networks
Instances	🗌 vlan1088 🗹 vlan1099 🗌 vlan1033
No VRF instances defined	Extra Routes
	NO EXtra routes denneu
Add VRF Instance	Add Extra Routes

By default, inter-VRF communications is not supported within the Campus Fabric. If inter-VRF communications is required, each VRF can include extra routes such as a Default Route that instructs the Campus Fabric to use an external router or firewall for further security inspection or routing capabilities. In this example, all traffic is trunked over the ESI-LAG and the SRX Series Firewall handles inter-VRF routing. See Figure 2.

SRX Series Firewall participates in the VLANs defined within the Campus Fabric and is the gateway of last resort for all traffic leaving the subnet. You can select the Add Extra Routes option to inform Mist to forward all traffic leaving 10.99.99.0/24 to use the next hop of the SRX Series Firewall: 10.99.99.254

You create two additional VRFs:

- developers using vlan 1088 with 0.0.0.0/0 using 10.88.88.254
- guest-wifi using vlan 1033 with 0.0.0.0/0 using 10.33.33.254

Configure Networks

Define networks, routing options, and port configurations

NETWORKS			VRF	
Û	Edit Network	✓ ×	Configuration Enabled Disabled 	
Name			Instances	
vlan1099				
VLAN ID			corp-it	1 network 义
1099			developers	1 network 📏
(1 - 4094 or {{site\	/ar}})			
Subnet		0	guest-wifi	1 network 📏
10.99.99.0/24				
Virtual gateway		0		Add VRF Instance
10.99.99.1			DHCP RELAY	
			 Enabled Disabled 	
OTHER IP CONF	FIGURATION			
Network-specific	IP configuration for each Colla	psed Core switch		
Core1		3 Static 📏		
Core2		3 Static 📏		

The final step in the Configure Networks section is the Core/Access Port Configuration:

CORE / ACCESS PORT CONFIGURATION	
Port configuration for ESI-Lag between Collapsed Core an switches	d Access
Name	
esi-lag	
Trunk Networks	
vlan1033(1033) × vlan1088(1088) × vlan1099(1099) ×
+	
Show Advanced	

In this section, you configure the active-active ESI-LAG trunks between core and access switches. Here, we name the port configuration and include VLANs associated with this configuration. The Advanced tab provides additional configuration options:

Enabled Oisabled		
Description		
Add Description		
/		
Mode		
Trunk O Access		
Port Network (Untagged/Nati	ve VLAN)	
None		
Speed		
Auto 🗸		
Duplex		
Auto		
Mac Limit		
0		
(0 - 16383, 0 => unlimited)		
PoE		
 Enabled Disabled 		
STP Edge		
🔿 Yes (No		
QoS		
🔾 Enabled 💿 Disabled		
🛃 Enable MTU		
9100		
(256 - 9216)		

Now that all VLANs are configured and assigned to each VRF, and the core/access ESI-LAGs are built, click the Continue button at the upper-right section of the Mist UI to move to the next step.

Configure Campus Fabric Ports

The final step is the selection of physical ports between core and access switches.

Switch	Model	Link to Core		Link to Access	
🛱 Core2	QFX5110-485	0/2 🝞		0	
	12 14 16 18 20 22 24 26 28 13 15 17 19 21 23 25 27 29	30 32 34 36 38 40 42 44 46	48 50 87450 49 51		
🗟 Core1	QFX5110-485	0/2 ?		0	
ess Switches					
4100-24T					Edit Ports for all EX4100-
Switch	Model	Link to Core	AE Index		
Access2	EX4100-24T	0/2 ?	0	0	
Access1	EX4100-24T	0/2	1	0	

NOTE: To ensure accuracy, we recommend that you run the CLI command "show lldp neighbors" on both core switches prior to this step in the deployment process.

Core Switches

We are now ready to select the ports that interconnect the Collapsed Core Switches.

Core1

You must select et-0/0/48 as a Collapsed Core link.

Ports

elect switch ports for Fa	bric and ESI-Lag connections	et-0/0/48		
ollapsed Core Switches		Port Type	Neighbor	
Switch	Model	Port Connection	Hostname Core2 MAC Address b0:33:a6:11:49:00	
S Core2	QFX5110-48S	Link to Collapsed-Core	IP Address 10.33.33.3	
Score1	QFX5110-485	Link to Access	Manufacturer Juniper Networks	
	10 12 14 16 18 20 22 24 26 28 30 32	34 36 38 40 42 44 46 84	 48 50 ∞ ∞ 	
1 3 5 7 9	11 13 15 17 19 21 23 25 27 29 31 33	35 37 39 41 43 45 47	49 51	

Ports Select switch ports for Fabric	and ESI-Lag connections	et-0/0/48		
Collapsed Core Switches Switch Core2 Core1	Model QFX5110-485 QFX5110-485	Port Type ge mge xe et Collapsed Core Switches Search	Neighbor Hostname Core2 MAC Address b0:33:a6:11:49:00 IP Address 10.33:33.3 Manufacturer Juniper Networks	
	12 14 16 18 20 22 24 26 28 30 32 13 15 17 19 21 23 25 27 29 31 33	Link 1 Link 2 35 37 39 41 43 45 47	₩ 49 51	

Choose Link1 – Core2.

You must select et-0/0/49 as a Collapsed Core link.

Ports

Select switch ports for Fabric and ESI-Lag connections

Collapsed Co	ore Sw	itche	s																et-0/0/49			
Switch									Mo QF	del X511	0-489	5							Port Type ge mge te	Neighbor Hostname	Core2	
S Core1			QFX5110-485									Port Connection Link to Collapsed-Core	MAC Address IP Address	b0:33:a6:11:49:00 10.33.33.3								
0	2	4	6	8	10	12	14	16	1	3 20	22	1	24	26	28	30	32		Link to Access	Manufacturer	Juniper Networks	
SFP+	<↔				↑ ↔															»		
1	З	5	7	9	11	13	13	5 17	1	21	23	2	25	27	29	31	33	35	5 37 39 41 43 45 47 4	9 51		

Ports

Select switch ports for Fabric and ESI-Lag connections

Collapsed	d Core Sv	vitche	S																et-0/0/49		
Switch									Mod	lel									Port Type	Neighbor	
S Co	re2								QF)	K511	10-48	S								Hostname	Core2
t⊊ Co	re1								QF)	(511	10-48	S							<	MAC Address	b0:33:a6:11:49:00
																			Collapsed Core Switches	IP Address	10.33.33.3
	0 2	4	6	8 10)	12	14	16	18	20	0 22		24	26	28	3	0	32	Q Search	Manufacturer	Juniper Networks
đ	<•>			1	 Image: A second s														Core2		
SFI				<.	>														Link 1		
	1 3	5	7	9 11		13	15	17	19	2	1 23		25	27	29	3	11	33	Link 2		

Note that only Link2 is the option left to interconnect with Core2.

Core2

You must select et-0/0/48 as a Collapsed Core link.

Ports		et-0/0/48		
elect switch ports for Fa	bric and ESI-Lag connections	Port Type ge mge xe et Port Connection	Neighbor Hostname Core1	
Switch	Model	Link to Collapsed-Core	IP Address 10.33.33.2	
🔄 Core2	QFX5110-485	Link to Access	Manufacturer Juniper Networks	
	10 12 14 16 18 20 22 24 26 28 30 32	34 36 38 40 42 44 46 84	48 50	
1 3 5 7 9	11 13 15 17 19 21 23 25 27 29 31 33	35 37 39 41 43 45 47	49 51	
与 Core1	QFX5110-48S	2/2	0	

Ports	et-0/0/48	
Select switch ports for Fabric and ESI-Lag connections Collapsed Core Switches	Port Type ge mge xe et	Neighbor Hostname Core1
Switch Model	Collapsed Core Switches	IP Address 10.33.33.2
S Core2 QFX5110-485	Q Search	Manufacturer Juniper Networks
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 3 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 3	Core1 2 3 Link 1 1 Link 2 3 3 35 37 39 41 43 45 47 49	51
S Core1 QFX5110-485	2/2	0

Choose Link1 – Core1.

You must then select et-0/0/49 as a Collapsed Core link.

Ports

Select switch ports for Fal	bric and ESI-Lag connections	et-0/0/49		
Collapsed Core Switches Switch	Model QFX5110-485	Port Type ge mge xe et Port Connection Link to Collapsed-Core	Neighbor Hostname Core1 MAC Address c0:42:d0:16:af:a0 IP Address 10.33.33.2	
0 2 4 6 8 + ds 1 3 5 7 9	10 12 14 16 18 20 22 24 26 28 30 32 ↑ ●	Link to Access	Manufacturer Juniper Networks	
Same Core1	QFX5110-48S	2/2	0	

Ports

Select switch ports for Fabric and ESI-Lag connections	et-0/0/49		
Collapsed Core Switches Model Switch Model Core2 QFX5110-485 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33	Port Type ge mge xe et Collapsed Core Switches Search Core1 Link 1 Link 2	Neighbor Hostname Core1 MAC Address c0:42:d0:16:af:a0 IP Address 10.33,33,2 Manufacturer Juniper Networks	
S Core1 QFX5110-48S	2/2	0	

Note that only Link2 is the option left to interconnect with Core1.

You can now select the ports that interconnect the core and access switches.

Core1

You can select xe-0/0/1 as a Link to Access1.

On Clients	Ports Select swite	ch ports for Fabric and ESI-La	g connections		
xe-0/0/1					
Port Type		Neighbor	Model	Link to Core	Link to Access
⊖ge ⊖mg	e 💿 xe 🔾 et	Hostname	QFX5110-485	2/2	0
Access Switche	MAC Address	MAC Address	QFX5110-485	1/2 😧	0
Q Search		Manufacturer	6 18 20 22 24 26 28 30 32 34 36 38	40 42 44 46 48 50	
Access2 Access1				dseptime and dse	
🗸 Location		3 5 7 9 11 13 15	7 19 21 23 25 27 29 31 33 35 37 39	41 43 45 47 49 51	

You can select xe-0/0/2 as a Link to Access2.

0)6	Ports					
Õ	xe-0/0/2			nections		
C	Port Type ge mge xe et	Neighbor				
5	<	Hostname MAC Address	Access2 4c:73:4f:09:59:00	1	Link to Core	Link to Access
(Ŧ	Access Switches	IP Address		5110-48S	2/2	0
	Q Search	Manufacturer	Juniper Networks	110-485	1/2 🕜	1
2	Access2 Access1			20 22	24 26 28 30 32 34 36 38 40 42 44 46 48 50	
R	Private 5G					
1	Location	5 7 9 11	13 15 17 19	21 23	25 27 29 31 33 35 37 39 41 43 45 47 49 51	

Core2

You can select xe-0/0/1 as a Link to Access2.

Clients xe-0/0/1	orts	g connections		
Port Type ge mge xe Access Switches	et Hostname MAC Address IP Address Masufacturer	Model QFX5110-485	Link to Core 2/2	Link to Access O
Access2 Access1	Manufacturer ~-	6 18 20 22 24 26 28 30 32 34 15 17 19 21 23 25 27 29 31 33 35 QFX5110-485	36 38 40 42 44 45 87 45 37 39 41 43 45 47 1/2 €	2

You can select xe-0/0/2 as a Link to Access1.

0)	xe-0/0/2									
Č	Port Type ○ ge ○ mge ● x ≮	e 🔾 et	Neighbor Hostname MAC Address	Access1	nections					
5	Access Switches		IP Address				A Link to Core		Link to Access	
ŧ	Q Search Access2		Manufacturer	Juniper Networks	5110-485		2/2		1	
2	Access1				20 22 24 26	28 30 32 34	36 38 40 42 44 46	48 50		
R	Private 5G	SFP.	5 7 9 11	13 15 17 19	21 23 25 27	29 31 33 35	37 39 41 43 45 47	Zadaso 49 ≥1		
⊲	Location	🗲 Core1		QFX	5110-485		1/2 🕐		2	

Access Switches

You can now select the ports that interconnect with the core switches.

You can select both uplinks and interface speed, while allowing Mist to define each AE index. In this case, uplinks xe-0/2/0, xe-0/2/3 are selected as Links to core on both access switches and AE Index 0/1 (system default numbering) on Access 2/1 respectively.

Access1

Access Switches	xe-0/2/0		
EX4100-24T	Port Type	Neighbor	Edit Ports for all EX4100-24T
Switch	⊖ge ⊖mge ⊖xe ⊖et	Hostname Core1 MAC Address c0:42:d0:16:af:a0 IP Address 10.33.33.2 Manufacturer Juniper Networks	AE Index
San Access2			0 0
Access1			1 0
0 2 4 6 8 10 12 14		0 2	
	17 19 21 23 1 3	1 3	

xe-0/2/3		
Port Type	Neighbor	dex
EX4 [·] Oge Omge Oxe Oet	Hastrona Care?	•
EX4	MAC Address b0:33:a6:11:49:00	Θ
16	IP Address 10.33.33.3 Manufacturer Juniper Networks	
SFP2		
	xe-0/2/3 Modi Port Type EX4 ge mge xe et EX4 16 6 6 6 6 6 6 6 6 6 6 6 6 6	xe-0/2/3 Modi Port Type Neighbor EX4 ge mge xe et Hostname Core2 MAC Address b0:33:a6:11:49:00 I6 IP Address 10.33.33.3 Manufacturer I6 Image: Second Se

NOTE: LLDP provides you with the core switch name. You can select only the required correct port speed.

Access2

Access Switches EX4100-24T Switch Access2	xe-0/2/0 Port Type ge mge xe et	Neighbor Hostname Core2 MAC Address b0:33:a6:11:49:00 IP Address 10.33.33.3	Edit Ports for all EX4100-24T
0 2 4 6 8 10 12 14 9 0 2 4 6 8 10 12 14 1 3 5 7 9 11 13 15 Fin Access1	15 18 20 22 R 17 19 21 23 EX4100-24T	Manufacturer Juniper Networks	1 0

Access Switches	xe-0/2/3		Edit Ports for all EX4100-24T
Switch Mod	Port Type Oge Omge Oxe Oet	Neighbor Hostname Core1	dex
•• • •• • • <td>7 7 7 7 7 7 7 7 7 7</td> <td>MAC Address c0:42:d0:16:af:a0 IP Address 10.33.33.2 Manufacturer Juniper Networks</td> <td>0</td>	7 7 7 7 7 7 7 7 7 7	MAC Address c0:42:d0:16:af:a0 IP Address 10.33.33.2 Manufacturer Juniper Networks	0
Access1 EX4	100-24T 2/2	1	•

NOTE: LLDP provides you with the core switch name. You can select only the required correct port speed.

After you select all requisite port combinations, you can click the Continue button at the upperright corner of the Mist UI.

Campus Fabric Configuration Confirmation

On this page, you can confirm each device's configuration as shown below:

Campus Fabric Config	guration 1. Topology 2. Nodes 3. Network Settings 4. Ports <u>5. Confirm</u>		← Back	Apply Change
onfirm				
view the topology and click "Apply Chan	nges" to save the Fabric configuration to the Mist Cloud			
ollapsed Core		Core1		×
	E E		MAC Address c0:42:d0:16:a	af:a0
	Core2 Core1		Model QFX5110-48	s
	\square		Status connected	
255			Router ID 192.168.255.	.10
	(中)	VIANe		
	Access2 Access1	ID II	Address Name	
		1099 1	0.99.99.2 vlan1	099
		1088 1	0.88.88.2 vlan1	088
		Connections	to Collapsed Core	
		Switch	Port ID	
		Core2	et-0/0/48	
		Core2	et-0/0/49	
		Connections	to Access	
		Switch	Port ID	
		Access2	xe-0/0/2	
		Access1	xe-0/0/1	
		Remote	Shell Insights	Details

NOTE: The Remote Shell option, available at the lower-right corner, allows you to access each device if needed.

Apply Change

Once you complete the verification, you select the Apply Changes option at the upper-right corner of the Mist UI.

X Campus Fabric Configuration 1. Topology 2. Nodes 3. Network Settings 4. Ports 5. Confirm

Confirm again to create the fabric.

Mist presents you with the following banner including the estimated time for the Campus Fabric to be built. The process includes the following:

- Mist builds the point-to-point interfaces between Collapsed Core devices with IP addresses chosen from the range presented at the onset of the build.
- Each device is configured with a loopback address from the range presented at the onset of the build.
- eBGP is provisioned at each device with unique BGP autonomous system numbers. The primary goal of the underlay is to leverage ECMP for load balancing traffic on a per packet level for device loopback reachability. The primary goal of the eBGP overlay is support of customer traffic using EVPN-VXLAN.
- IP addressing of each L3 gateway IRB located on both Collapsed Core switches.
- IP addressing of each lo0.0 loopback.
- Configuration of routing policies for underlay and overlay connectivity.
- Optimized MTU settings for p2p underlay, L3 IRB, and ESI-LAG bundles.
- VXLAN to VLAN mapping using VNI addresses that are automatically assigned.
- VRF creation of corp-it, developers, and guest-wifi and VLAN associated with each VRF.

- VXLAN tunnelling creation between distribution devices and distribution-core devices (in support of the northbound SRX Series Firewall that is configured in the subsequent steps).
- Downloadable connection table (.csv format) that can be used by those involved in the physical buildout of the Campus Fabric.
- Graphical interface depicting all devices with BGP peering and physical link status.

Applying Changes		
	Campus Fabric configuration successfully saved to the Mist Cloud Configuration will be immediately pushed to switches or when they next come online and may nearine up to 10 minutes to complete.	
	Close Campus Fabric Configuration	

Once you click Close Campus Fabric Configuration, you can view a summary of the newly created Campus Fabric EVPN Multihoming.

Campus Fabric site Primary Site •									
Org Topologies									
Campus Fabric is not configured at the Organization level									
Site Topologies									
Name EVPN Multihoming	Тереlegy ID 736f89fa-e362-480b-8473-3c4a0942b8c3	site Primary Site	Type Multihoming	Routed At Collapsed-Core	Date Created Jun 20, 2023 1:23:39 PM				

With Juniper Mist Wired Assurance, you download a connection table (.csv format) representing the physical layout of the Campus Fabric. This can be used to validate all switch interconnects for those participating in the physical Campus Fabric build. Once the Campus Fabric is built or is in the process of being built, you can download the connection table.



Connection Table spreadsheet:

А	В	С	D	E	F	G	н	1	J	К	L	М	N	0	Р	Q	R	S
Role 1	Switch 1	Mac 1	Model 1	Serial 1	Site 1	Port Role 1	AE 1	Port 1	<>	Port 2	AE 2	Port Role 2	Site 2	Serial 2	Model 2	Mac 2	Switch 2	Role 2
collapsed-co	Core2	b033a6114900	QFX5110-48S	WS3718280099	Primary Site	uplink		et-0/0/48	< >	et-0/0/48		downlink	Primary Site	WS3717450314	QFX5110-48S	c042d016afa0	Core1	collapsed-core
collapsed-co	Core2	b033a6114900	QFX5110-48S	WS3718280099	Primary Site	downlink		et-0/0/49	< >	et-0/0/49		uplink	Primary Site	WS3717450314	QFX5110-48S	c042d016afa0	Core1	collapsed-core
collapsed-co	Core2	b033a6114900	QFX5110-48S	WS3718280099	Primary Site	esi-lag	() xe-0/0/1	< >		0	esi-lag	Primary Site	FD0822AN0001	EX4100-24T	4c734f095900	Access2	access
collapsed-co	Core2	b033a6114900	QFX5110-48S	WS3718280099	Primary Site	esi-lag	1	1 xe-0/0/2	< >		1	esi-lag	Primary Site	FD0822AN0021	EX4100-24T	4c734f096300	Access1	access
collapsed-co	Core1	c042d016afa0	QFX5110-48S	WS3717450314	Primary Site	esi-lag	() xe-0/0/2	< >		0	esi-lag	Primary Site	FD0822AN0001	EX4100-24T	4c734f095900	Access2	access
collapsed-co	Core1	c042d016afa0	QFX5110-48S	WS3717450314	Primary Site	esi-lag	1	1 xe-0/0/1	< >		1	esi-lag	Primary Site	FD0822AN0021	EX4100-24T	4c734f096300	Access1	access

Apply VLANs to Access Ports

As previously discussed, Mist provides the ability to templatize well known services such as Radius, Network Time Protocol (NTP), and Domain Name System (DNS) that can be used across all devices within a site. These templates can also include VLANs and port profiles that can be targeted at each device within a site. The last step before verification is to associate VLANs with the requisite ports on each access switch.

In this case, Desktop1 and Desktop 2 are associated with different ports on each access switch which requires the configuration to be applied to Access1 and Access2 respectively. See Figure 2.

Mist Access Points connect to the same port on Access1/Access2 allowing the Switch Template to be customized with this configuration. For example, the following found under the Switch Template option is customized to associate each switch with its role: core, distribution, and access. Further, all access switches (defined by Model EX4100 switch as an example) associated the AP port profile with ge-0/0/16 without needing to configure each independent switch.

Select Switches Configuration	I.				
border Role:border	Info Port Config	CLI Config	IP Config (OOB)	CLI Config	
core Role:core	Apply port profiles	to port ran	ges on matching	switches	AP >
access Role:access	Unassigned ports	5			Default
default all remaining switches				Add Po	гі капде

Using Access1 as an example, we apply vlan1099 to port ge-0/0/11 under the Port Configuration section on Access1. In this example, vlan1099 (corp-it), vlan1088 (developers), and vlan1033 (guest-wifi) are defined in the Switch Template. Here, vlan1099 is selected under the configuration profile:

 Port Profile Ass Site, Template 	s ignment e, or System Defined	1	
1	Edit Port F	Range	✓ ×
Port Aggrega	tion		
Port IDs			
ge-0/0/11			
(ge-0/0/1, ge-0/0 Interface L2 interface	/4, ge-0/1/1-23, etc)	🔿 L3 sub-interfa	ces
Configuration P	rofile		

The Switch Template definition for vlan1099 is shown below, representing attributes associated with VLANs such as dot1x authentication, Quality of Service (QoS), and Power over Ethernet. vlan1088 and vlan1033 need to be configured in a similar way.

E 🖸 E	dit Port Profile	~
Name		
vlan1099		
Port Enabled		
Enabled Disable	t	
Description		
Corp-IT		
Mode		
🔿 Trunk 💿 Access		
Port Network (Untagged	/Native VLAN)	
vlan1099		1099 🗸
VoIP Network		
None		~
Duplex Auto V Mac Limit 0 PoE Enabled O Disable) (0 - 16383, 0 => unlimited)	
Yes No		
C Enabled O Disable	ł	
Enable MTU	7	
Storm Control Enabled Disable	1	
Persistent (Sticky) MAC	Learning	

Chapter 5 Verification

Verification of the EVPN Multihoming Deployment

For verification of EVPN multihoming deployment, see Figure 2.

There are two desktops to validate the Campus Fabric. Let us take a quick look to see if Desktop1 can connect internally and externally.



Validation Steps

The validation includes the following steps:

- Confirmed local IP address, VLAN and default gateway were configured on Desktop1.
- Can ping default gateway that indicates that we can reach the access switch.
- Ping to WAN router failed (10.99.99.254) we need to troubleshoot.

Start by validating Campus Fabric in the Mist UI, by selecting the Campus Fabric option under the Organization tab on the left-hand side of the UI.



Remote shell access into each device within the Campus Fabric is supported here as well as visual representation of the following capabilities:

- BGP peering establishment.
- Transmit/Receive traffic on a link-by-link basis.
- Telemetry, such as Ildp, from each device that verifies the physical build.

BGP Underlay

Purpose

Verifying the state of eBGP between core switches is essential for EVPN VXLAN to operate as expected. This network of point-to-point links between each layer supports:

- Load balancing using ECMP for greater resiliency and bandwidth efficiencies.
- bfd, bi-directional forwarding, to decrease convergence times during failures.
- Loopback reachability to support VXLAN tunnelling.

Action

Verify that BGP sessions are established between the core devices to ensure loopback reachability, bfd session status, and load-balancing using ECMP.

NOTE: Operational data can be gathered through the Campus Fabric section of the Mist UI or using external applications such as SecureCRT or Putty.

Verification of BGP peering

Core1

Remote Shell can be accessed via the bottom-right of the Campus Fabric, from the switch view or via Secure Shell (SSH).

mist@Corel> show bar	s gummar						
Threading mode: BGP	T/0	1					
Default eBGP mode: a	dvertis	e - accept.	receive -	accept			
Groups: 2 Peers: 3 I		re. 0	1000100 - 1	accept			
Table Tot I	Dathe A	ct Dathe Si	Innressed	History	Damp State	Pendi	a de la companya de la
inet.0			ippressed	miscory	Danp Scace	renari	-9 -
	2	2	0	0	0		0
bgp.evpn.0							
	28	28	0	0	0		0
Peer	AS	InPkt	: OutPkt	OutQ	Flaps Last	Up/Dwn	State #Active/Received/Accepted/Damped.
••							
10.255.240.2 inet.0: 1/1/1/0	65001	. 38	3 37	0	0	15:53	Establ
10.255.240.5	65001	. 39	38	0	0	15:53	Establ
172.16.254.1 bgp.evpn.0: 28/28/ default-switch.evp default_evpne	65000 /28/0 on.0: 26 ovpn.0:	52 /26/26/0 2/2/2/0	2 49	0	0	15:45	Establ
<pre>{master:0} mist@Core1></pre>							

From the BGP summary we can see that the underlay (10.255.240.X) peer relationships are established. This means that the underlay links are attached to the correct devices and the links are up.

It also shows the overlay (172.16.254.x) relationship is established with Core2 and that it is peering at the correct loopback addresses. This demonstrates loopback reachability.

We can also see routes received; time established are roughly equal which looks good so far.

If BGP is not established, you can validate the underlay links and addressing, and that the loopback addresses are correct. Loopback addresses can be pinged from other loopback addresses.

The primary goal of eBGP in the underlay is to provide loopback reachability between core switches in an EVPN multihoming deployment. This loopback is used to terminate VXLAN tunnels between devices. The following shows loopback reachability from Core1 to Core2 in the Fabric:

PING 172.16.254.1 (172.16.254.1): 56 data bytes								
5								
ns								
5								
round-trip min/avg/max/stddev = 9.518/9.885/10.470/0.418 ms								

NOTE: eBGP sessions are established between core switches in the Campus Fabric. Loopback reachability is verified between the core devices.

Let us verify that the routes are established between core devices using multiple paths. For example, Dist1 should leverage both paths through Core1/2 to reach Dist2 and vice versa.

Core1: ECMP loopback reachability with Core2

mist@Core1> show re	oute forwa	rding-table destinat	ion 1	72.16.254	.1			
Routing table: default.inet								
Internet:								
Destination	Type RtRe	f Next hop	Туре	Index	NhRef	Netif		
172.16.254.1/32	user	1	ulst	131070	4			
		10.255.240.5	ucst	1740	4	et-0/0/48.0		
		10.255.240.2	ucst	1741	4	et-0/0/49.0		

Core2: ECMP loopback reachability with Core1

<pre>mist@Core2> show re Routing table: defa Internet:</pre>	oute forwar ault.inet	ding-table destinat	ion 1'	72.16.254	.2	
Destination 172.16.254.2/32	Type RtRef user 1	Next hop	Type ulst	Index 131070	NhRef 4	Netif
		10.255.240.4 10.255.240.3	ucst ucst	1737 1738	4 4	et-0/0/48.0 et-0/0/49.0

Finally, we validate BFD for fast converge in the case of a link or device failure between cores:

mist@Core2> show bfd session								
			Detect	Transmit				
Address	State	Interface	Time	Interval	Multiplier			
10.255.240.3	Up	et-0/0/49.0	1.050	0.350	3			
10.255.240.4	Up	et-0/0/48.0	1.050	0.350	3			
172.16.254.2	Up		3.000	1.000	3			
3 sessions, 3 clients								
Cumulative transmit rate	6.7 pps, 0	cumulative rece	ive rate (5.7 pps				
{master:0}								
mist@Core2> 🗌								

NOTE: At this point, BGP Underlay and Overlay is operational through the verification of BGP between the core devices of the Campus Fabric and that loopback routes are also established between core devices.

EVPN VXLAN Verification Between Core Switches

Since the desktop can ping its default gateway, we can assume the Ethernet-switching tables are correctly populated, VLAN, and interface-mode are correct. If pinging the default gateway fails, then troubleshoot underlay connectivity.

Verification of the EVPN Database on Both Core Switches

Core1

VLAN	DomainId	MAC address	Active source	Timestamp	IP address
	10001	b0:33:a6:11:49:00	172.16.254.1	Jun 20 17:24:07	
	10001	c0:42:d0:16:af:a0	irb.0	Jun 20 17:23:45	
	11033	00:00:5e:00:01:01	05:00:00:fd:e8:00:00:2b:19:00	Jun 20 17:24:07	10.33.33.1
	11033	b0:33:a6:11:49:00	172.16.254.1	Jun 20 17:24:07	10.33.33.3
	11033	c0:42:d0:16:af:a0	irb.1033	Jun 20 17:23:55	10.33.33.2
	11088	00:00:5e:00:01:01	05:00:00:fd:e8:00:00:2b:50:00	Jun 20 17:24:07	10.88.88.1
	11088	52:54:00:91:ed:5c	00:11:00:00:00:01:00:01:02:00	Jun 20 17:49:04	10.88.88.88
	11088	b0:33:a6:11:49:00	172.16.254.1	Jun 20 17:24:07	10.88.88.3
	11088	c0:42:d0:16:af:a0	irb.1088	Jun 20 17:23:55	10.88.88.2
	11099	00:00:5e:00:01:01	05:00:00:fd:e8:00:00:2b:5b:00	Jun 20 17:24:07	10.99.99.1
	11099	52:54:00:a4:c5:73	00:11:00:00:00:01:00:01:02:01	Jun 20 17:49:14	10.99.99.99
	11099	b0:33:a6:11:49:00	172.16.254.1	Jun 20 17:24:07	10.99.99.3
	11099	c0:42:d0:16:af:a0	irb.1099	Jun 20 17:23:55	10.99.99.2

Core2

mist(mist@Core2> show evpn database Instance: default-switch										
VT.AN	DomainId	MAC address	Active source	Timestamp	TP address						
V LIFILY	10001	b0:33:a6:11:49:00	irb.0	$J_{110} = 20 = 17 \cdot 23 \cdot 45$	ii uuuicoo						
	10001	c0.42.d0.16.af.a0	172,16,254,2	$J_{\rm un} = 20 + 17 \cdot 23 \cdot 43$							
	11033	00.00.50.00.01.01	05.00.00.fd.e8.00.00.2b.19.00	Jun 20 17.24.07	10.33.33.1						
	11033	b0:33:a6:11:49:00	irb. 1033	Jun 20 17:23:55	10.33.33.3						
	11033	c0.42.d0.16.af.a0	172 16 254 2	$J_{\rm un} = 20 + 17 \cdot 23 \cdot 03$	10 33 33 2						
	11088	00.00.50.00.01.01	05.00.00.fd.e8.00.00.25.50.00	Jun 20 17.24.07	10.88.88.1						
	11088	52.54.00.91.ed.5c	00.11.00.00.01.00.01.00.01.02.00	Tup 20 17.24.07	10.88.88.88						
	11000	b0.33.a6.11.40.00	irb 1099	Jun 20 17:49:04	10.00.00.00						
	11000	d0.42.d0.16.af.a0	172 16 254 2	Tup 20 17.24.07	10.00.00.3						
	11000	00.00.Ec.00.01.01	1/2.10.234.2 05.00.00.fd.c0.00.00.25.55.00	Jun 20 17:24:07	10.00.00.2						
	11099	52.54.00.54.55.72	00:11:00:00:01:00:01:00:01:00:01	Jun 20 17:24:07	10.99.99.1						
	11033	52:54:00:a4:C5:/3	00:11:00:00:00:01:00:01:02:01	Jun 20 17:49:13	10.99.99.99						
	11099	b0:33:a6:11:49:00	1rb.1099	Jun 20 17:23:55	10.99.99.3						
	11099	c0:42:d0:16:af:a0	172.16.254.2	Jun 20 17:24:07	10.99.99.2						
{mast	ter:0}										
mist	Core2>										

Both core switches have identical EVPN databases, which is expected. Note that the entries for desktop1 (10.99.99.99) and desktop2 (10.88.88.88) are present in each core switch. These entries are learned through the Campus Fabric from the ESI LAGs to each access switch. For example, Desktop1/10.99.99.99 is associated with shared ESI 10-digit segment between Core1/2 facing Access1 and is associated with a VNI of 11099. The fact that we see both Desktop ARP and associated ESI 10-digit **segment** entries leans towards an issue between the core and the SRX Series Firewall. Remember, the SRX Series Firewall is responsible for routing traffic between routing-instances, in this case between corp-it, developers, and guest-wifi.

Verification of VXLAN Tunnelling Between Core Switches



	Core1:	Ethernet	Switching	and	ARP	Tables
--	--------	----------	-----------	-----	-----	--------

mist@Corel> show	ethernet-switching	ng table							
	atic NAC D dw	ania NAC	T lo		ned D Deve	atont ato	+ i a		
MAC IIAGS (S = St SE = s	tatistics enable	d. NM – n	on confidence \mathcal{L}	oured MAC	. R - remote Pl	E MAC. O -	ovsdb	MAC)	
		-,		,	,	, .		,	
Ethernet switchir	ng table : 11 ent	ries, 11	learned						
Routing instance	: default-switch								
Vlan	MAC		MAC	Logical		SVLBNH/	Ac	tive	
name	address		flags	interfa	ce	VENH Ind	ex so	urce	
default	00:cc:34:f	2:ec:80	D	ge-0/0/	11.0				
default	00:cc:34:f	2:ec:84	D	ge-0/0/	11.0				
default	b0:33:a6:1	1:49:00	DRP	vtep.32	769		17	2.16.254.1	
vlan1033	00:00:5e:0	0:01:01	DR	esi.185	0	1760	05	:00:00:fd:e8:00:0	0:25:19:00
vlan1033	b0:33:a6:1	1:49:00	DRP	vtep.32	769		17	2.16.254.1	
vlan1088	00:00:5e:0	0:01:01	DRP	esi.184	8	1760	05	:00:00:fd:e8:00:0	0:25:50:00
vlan1088	52:54:00:9	l:ed:5c	DLR	ae0.0					
vlan1088	b0:33:a6:1	1:49:00	DRP	vtep.32	769		17	2.16.254.1	
vlan1099	00:00:5e:0	0:01:01	DRP	esi.184	9	1760	05	:00:00:fd:e8:00:0	0:25:55:00
vlan1099	52:54:00:a	4:c5:73	DLR	ael.0					
vlan1099	b0:33:a6:1	1:49:00	DRP	vtep.32	769		17	2.16.254.1	
{master:0}									
mist@Core1> show	arp								
MAC Address	Address	Name			Interface		Flags		
b0:33:a6:11:49:00	10.33.33.3	10.33.33	.3		irb.1033 [vte	327691	perman	ent remote	
b0:33:a6:11:49:00	10.88.88.3	10.88.88	.3		irb.1088 [vte	327691	perman	ent remote	
52:54:00:91:ed:5c	10.88.88.88	10.88.88	.88		irb.1088 [ae0]	.01	perman	ent remote	
b0:33:a6:11:49:00	10.99.99.3	10.99.99	.3		irb.1099 [vter	5.327691	perman	ent remote	
52:54:00:a4:c5:73	10.99.99.99	10.99.99	.99		irb.1099 [ae1	.01	perman	ent remote	
b0:33:a6:11:49:36	10.255.240.2	10.255.2	40.2		et-0/0/49.0		none		
b0:33:a6:11:49:35	10.255.240.5	10.255.2	40.5		et-0/0/48.0		none		
fe:00:00:00:00:80	128.0.0.16	fpc0			bme0.0		perman	ent	
c0:42:d0:16:af:a3	3 192.168.1.1	192.168.	1.1		em2.32768		none		
72:92:c6:eb:1e:6c	192.168.1.16	192.168.	1.16		em2.32768		none		
cc:e1:94:ba:39:e0	192.168.230.1	192.168.	230.1		vme.0		none		
Total entries: 11									
(master:0)									
mistRCorel>									
TO SCOLCIN									

Core2: Ethernet Switching and ARP Ta	ables
--------------------------------------	-------

mist@Core2> show e	thernet-switchi	ng table						
MAC flags (S - sta	tic MAC, D - dy	namic MAC	, L - loc	ally lea	rned, P - Persi	stent stat	ic	
SE - st	atistics enable	d, NM – n	on config	ured MAC	, R - remote PE	MAC, 0 - 0	ovsdb M	IAC)
Ethernet switching	table : 9 entr.	ies, 9 le	arned					
Routing instance :	derault-switch		MAG	T 1			3-4	
	MAC		MAC	Logical		SVLBNH/	ACT	ive
dofault	address	6 6 0	DDD	Theria	760	VENH INGE.	K 500 172	
derault wlap1022	CU:42:dU:1	0:a1:a0	DRP	vtep.32	201 2	1740	1/2	
vianioss vianioss	-0.42.d0.1	6.56.50	DRP	es1.1/3	J 760	1/40	172	16 254 2
vianioss vianioss	00:00:50:0	0.01.01	סאר	vcep.32	703 2	1749	05.	00.00.fd.e8.00.00.25.50.00
vlan1099	52.54.00.0	1.ed.5c	DRP	200 0	4	1/40	05.	00.00.10.28.00.00.25.50.00
vlan1088	c0.42.d0.1	f.af.a0	אונע	vten 32	769		172	16.254.2
vlap1099	00.00.50.0	0.01.01	DRP	eci 175	1	1748	05.	00.00.fd.e8.00.00.2b.5b.00
vlan1099	52:54:00:a	4:05:73	DLR	ae1.0	*	1/10		00100114100100100120130100
vlan1099	c0:42:d0:1	6:af:a0	DRP	vten. 32	769		172	. 16. 254. 2
v Luit Copp	0011210012	orarrao	bitt	1000101			- / -	
{master:0}								
mist@Core2> show a	rp							
MAC Address	Address	Name			Interface	1	Flags	
c0:42:d0:16:af:a0	10.33.33.2	10.33.33	.2		irb.1033 [vtep	.32769]	permane	ent remote
c0:42:d0:16:af:a0	10.88.88.2	10.88.88	.2		irb.1088 [vtep	.32769]	permane	ent remote
52:54:00:91:ed:5c	10.88.88.88	10.88.88	.88		irb.1088 [ae0.	0] j	permane	ent remote
c0:42:d0:16:af:a0	10.99.99.2	10.99.99	.2		irb.1099 [vtep	.32769]	permane	ent remote
52:54:00:a4:c5:73	10.99.99.99	10.99.99	.99		irb.1099 [ael.	0] j	permane	ent remote
c0:42:d0:16:af:d6	10.255.240.3	10.255.2	40.3		et-0/0/49.0	1	none	
c0:42:d0:16:af:d5	10.255.240.4	10.255.2	40.4		et-0/0/48.0	1	none	
fe:00:00:00:00:80	128.0.0.16	fpc0			bme0.0	1	permane	ent
b0:33:a6:11:49:03	192.168.1.1	192.168.	1.1		em2.32768	1	none	
be:be:16:a8:6d:dd	192.168.1.16	192.168.	1.16		em2.32768	1	none	
cc:e1:94:ba:39:e0	192.168.230.1	192.168.	230.1		vme.0	1	none	
Total entries: 11								
{master:0}								
mist@Core2>								

Connectivity between the core and distribution switches looks correct since MAC and ARPs are being learned across the Fabric on both cores. Let us look at the connection between core and WAN router.

External Campus Fabric Connectivity Through the GW QFX5110 Switches



Mist enables the QFX5110 Switch to translate between VXLAN traffic within the Campus Fabric and standard Ethernet switching for external connectivity. In this case, it is a SRX Series Firewall. Let us verify the ESI status on the core switches.



We must configure the ESI-LAG for L2 connectivity between the Collapsed Core switches and WAN Router as Mist does not configure this automatically. You can have a pre-defined Port Profile build and associated with the requisite ports on each core switch.

Add a Port profile on core switches interfaces facing the WAN router.

The following represents an existing Port Profile applied to each SRX Series Firewall facing QFX5110 Switch port.

PORT CONFIGURATION	
Port Profile Assignment * Site, Template, or System Defined	
New Port Range	 ✓
 Port Aggregation Disable LACP AE Index 2 (0 - 127) ESI-LAG Allow switch port operator to modify port profile Yes Yes No Port IDs ge-0/0/10 (ge-0/0/1, ge-0/0/4, ge-0/1/1-23, etc) Interface L2 interface L3 interface L3 sub-interf 	aces
Configuration Profile	
esi-lag	trunk 🗸
Enable Dynamic Configuration Enable "Up/Down Port" Alert Type Manage Alert Types in Alerts Page Description Add Description	

Save the configuration and then verify the changes on the core switch.

mist@Corel> sh	ow lacp statistics	interfaces ae2			
Aggregated int	erface: ae2				
LACP Stati	stics: LACP R	tx LACP Tx Unkno	wn Rx Illegal	L Rx	
ge-0/0/1	.0 35	8 358	0	0	
{master:0}					
mist@Corel> sh	ow evpn database				
Instance: defa	ult-switch				
VLAN DomainId	MAC address	Active source	Tim	nestamp	IP address
10001	b0:33:a6:11:49:00	172.16.254.1	Jun	n 20 17:24:07	
10001	c0:42:d0:16:af:a0	irb.0	Jun	n 20 17:23:45	
11033	00:00:5e:00:01:01	05:00:00:fd:e8:00:0	0:2b:19:00 Jun	n 20 17:55:42	10.33.33.1
11033	b0:33:a6:11:49:00	172.16.254.1	Jun	n 20 17:55:42	10.33.33.3
11033	c0:42:d0:16:af:a0	irb.1033	Jun	n 20 17:55:42	10.33.33.2
11033	ee:38:73:9a:b6:a6	00:11:00:00:00:01:0	0:01:02:02 Jun	n 20 18:15:50	10.33.33.254
11088	00:00:5e:00:01:01	05:00:00:fd:e8:00:0	0:2b:50:00 Jun	n 20 17:55:42	10.88.88.1
11088	52:54:00:91:ed:5c	: 00:11:00:00:00:01:0	0:01:02:00 Jun	n 20 18:14:06	10.88.88.88
11088	b0:33:a6:11:49:00	172.16.254.1	Jun	n 20 17:55:42	10.88.88.3
11088	c0:42:d0:16:af:a0	irb.1088	Jun	n 20 17:55:42	10.88.88.2
11088	ee:38:73:9a:b6:a6	00:11:00:00:00:01:0	0:01:02:02 Jun	n 20 18:15:50	10.88.88.254
11099	00:00:5e:00:01:01	05:00:00:fd:e8:00:0	0:2b:5b:00 Jun	n 20 17:55:42	10.99.99.1
11099	52:54:00:a4:c5:73	00:11:00:00:00:01:0	0:01:02:01 Jun	n 20 18:19:23	10.99.99.99
11099	b0:33:a6:11:49:00	172.16.254.1	Jun	n 20 17:55:42	10.99.99.3
11099	c0:42:d0:16:af:a0	irb.1099	Jun	n 20 17:55:42	10.99.99.2
11099	ee:38:73:9a:b6:a6	00:11:00:00:00:01:0	0:01:02:02 Jun	n 20 18:15:50	10.99.99.254
{master:0}					
mist@Core1> sh	ow arp				
MAC Address	Address	Name	Interface	•	Flags
b0:33:a6:11:49	:00 10.33.33.3	10.33.33.3	irb.1033	[vtep.32769]	permanent remote
ee:38:73:9a:b6	a6 10.33.33.254	10.33.33.254	irb.1033	[ae2.0]	permanent remote
b0:33:a6:11:49	:00 10.88.88.3	10.88.88.3	irb.1088	[vtep.32769]	permanent remote
52:54:00:91:ed	:5c 10.88.88.88	10.88.88.88	irb.1088	[ae0.0]	permanent remote
ee:38:73:9a:b6	a6 10.88.88.254	10.88.88.254	irb.1088	[ae2.0]	permanent remote
b0:33:a6:11:49	:00 10.99.99.3	10.99.99.3	irb.1099	[vtep.32769]	permanent remote
52:54:00:a4:c5	:73 10.99.99.99	10.99.99.99	irb.1099	[ae1.0]	permanent remote
ee:38:73:9a:b6	:a6 10.99.99.254	10.99.99.254	irb.1099	[ae2.0]	permanent remote
b0:33:a6:11:49	:36 10.255.240.2	10.255.240.2	et-0/0/49	9.0	none
b0:33:a6:11:49	:35 10.255.240.5	10.255.240.5	et-0/0/48	3.0	none
fe:00:00:00:00	:80 128.0.0.16	fpc0	bme0.0		permanent
c0:42:d0:16:af	:a3 192.168.1.1	192.168.1.1	em2.32768	3	none
72:92:c6:eb:1e	:6c 192.168.1.16	192.168.1.16	em2.32768	3	none
cc:el:94:ba:39 Total entries:	:e0 192.168.230.1 14	192.168.230.1	vme.0		none
<pre>{master:0} mist@Core1></pre>					

Core1: LACP active status to the WAN router produces new entries in the switch/ARP tables:

Core	e2: LACP active	e status to the	WAN router pro	duces new entr	ies in the swit	ch/ARP tables:
mist@Core2> show lacp	statistics inte	erfaces ae2				
Aggregated interface:	ae2					
LACP Statistics:	LACP Rx	LACP TX U	nknown Rx Il	legal Rx		
ge-0/0/10	601	600	0	0		
{master:0}						
mist@Core2> show ether	net-switching (table				
MAC flags (S - static	MAC, D - dynam:	ic MAC, L - lo	cally learned,	P - Persistent	static	
SE - statis	tics enabled, 1	NM - non confi	gured MAC, R -	remote PE MAC,	0 - ovsdb MA	C)
	1 12+	. 12 1				
Ethernet switching tab	ault_ewitch	s, 13 learned				
Vlan	MAC	MAC	Logical	сит в	NH/ Acti	V 0
	addroce	flage	interface	VENU	Today cour	
dofault	auaress	Fial DDD	utop 32760	VENI	172	16 254 2
vlap1022	00.00.50.00.0		oci 1753	1740	1/2.	0.00.fd.o8.00.00.2b.19.00
viani033	c0.42.d0.16.a		uton 32760	1/40	172	16 254 2
vlan1033	ee.38.73.9a.b		ao2 0		1/2.	10.234.2
vlan1088	00.00.50.00.0	1.01 DDR	aci 1752	1748	05.0	0.00.fd.e8.00.00.2b.50.00
vlan1088	52:54:00:91:00	disc DLR	ae0.0	1/10	03.0	0.00.110.00.00.20.30.00
vlan1088	c0:42:d0:16:a	fia0 DRP	vten. 32769		172.	16.254.2
vlan1088	ee:38:73:9a:b	5:a6 DLR	ae2.0		1/21	10125412
vlan1099	00:00:5e:00:0	1:01 DRP	esi.1751	1748	05:0	0:00:fd:e8:00:00:2b:5b:00
vlan1099	52:54:00:a4:c	5:73 DLR	ael.0			
vlan1099	a0:36:9f:bd:0	e:a0 DL	ae1.0			
vlan1099	c0:42:d0:16:a:	f:a0 DRP	vtep.32769		172.	16.254.2
vlan1099	ee:38:73:9a:b	5:a6 DLR	ae2.0			
{master:0}						
mist@Core2> show arp						
MAC Address Addr	ess Na	ne	Inte	rface	Flags	
c0:42:d0:16:af:a0 10.3	3.33.2 10	.33.33.2	irb.	1033 [vtep.3276	9] permanen	t remote
ee:38:73:9a:b6:a6 10.3	3.33.254 10	.33.33.254	irb.	1033 [ae2.0]	permanen	t remote
c0:42:d0:16:af:a0 10.8	8.88.2 10	.88.88.2	irb.	1088 [vtep.3276	9] permanen	tremote
52:54:00:91:ed:5c 10.8	8.88.88 10	.88.88.88	irb.	1088 [ae0.0]	permanen	tremote
ee:38:/3:9a:D6:a6 10.8	8.88.254 10	.88.88.254	irb.	1088 [ae2.0]	permanen	t remote
CU:42:dU:16:af:aU 10.9	9.99.2 10	.99.99.2	irb.	1099 [Vtep.32/6	9] permanen	t remote
52:54:00:84:65:73 10.9	9.99.99 10	.99.99.99	1rD.	1099 [ae1.0]	permanen	t remote
ee:38:/3:9a:D6:a6 10.9	9.99.254 10	· 99.99.204	irp.	1099 [ae2.0]	permanen	tremote
C0:42:00:16:a1:06 10.2	55.240.5 10	255.240.3	et-0	/0/49.0	none	
fo.00.00.00.00.00 129	0 0 16 fm	.255.240.4	ec=0	0/40.0	normanon	•
b0.33.a6.11.49.03 192	169 1 1 1 1 1	2 168 1 1	om?	32768	permanen	C.
be:be:16:a8:6d:dd 192.	168.1.16 19	2.168.1.16	em2.	32768	none	
c:=1:94:ba:39:e0 192.	168.230.1 19	2.168.230.1	vme.	0	none	
Total entries: 14			VIIIC .			
{master:0}						
mist@Core2>						

NOTE: .254 entries represent the WAN router's Default Gateway IP addresses now found in Core1 and Core2.

We go back to Desktop1 to see if it can cross the fabric.



The last step is to verify that Desktop1 can ping Desktop2.

root@desktop1:~# ping 10.88.88.88 -c 2
PING 10.88.88.88 (10.88.88.88) 56(84) bytes of data.
64 bytes from 10.88.88.88: icmp_seq=1 ttl=62 time=0.945 ms
64 bytes from 10.88.88.88: icmp_seq=2 ttl=62 time=0.844 ms
10.88.88.88 ping statistics
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 0.844/0.894/0.945/0.050 ms
root@desktop1:~#

NOTE: Connectivity within and outside of the Campus fabric is verified. Desktops communicate with each through the Fabric, each in an isolated VRF, then forwarded to the SRX Series Firewall through the ESI-LAG on both core devices when accessing services outside of the Campus Fabric. The Campus Fabric performs total isolation between VRF by default while using the SRX Series Firewall to accept or discard inter-VRF communications.

Chapter 6 EVPN Insights

Overview

Juniper Mist Wired Assurance provides you with real-time status related to the health of the EVPN multihoming deployment using telemetry such as BGP neighbor status and TX/RX port statistics. The following screenshots are from the EVPN multihoming build by accessing the Campus Fabric option under the Organization/Wired of the Mist Portal:

< Campus F	abrics : EVF	PN Multih	noming										Edit Conf	iguration		Delete 🛃	Connection Ta
Collapsed Core													Core1				>
					Core2	Core1								м	AC Addres: Mode Statu:	s c0:42:d0:16: l QFX5110-48 s connected	af:a0 5
Access															Site Router IE	Primary Site172.16.254.2	
					Access2	Access1							VLAN ID	S IP /	Address	Nam	e 1022
													1088	10	.88.88.2	vlar	1033
													1099	10	.99.99.2	vlan	1099
													Conne V	ections to switch Core2 Core2	RX Bytes 454.9 ME 664.2 ME	ed Core TX Bytes 3 390.3 MB 3 729.2 MB	Link Status Up Up
BGP Sumr	mary nformation								2:28 P	M (Updates Even	y 3 Minutes) 🗘	٩	Conn	ections to Switch Access2	D Access RX Bytes 618.9 M	TX Bytes B 893.6 MB	Link Status Up
Status	State	Neighbor	Neighbor AS	Local AS	Uptime	RX Routes	TX Routes	RX Packets	TX Packets	VRF Name	Neighbor Type		~	Access1	689.1 M	B 944.3 MB	Up
Connected	Established	10.255.240.5	65001	65002	1h	1	1	138	137	default	Underlay		~	-	999 MB	401.5 MB	Up
• Connected	Established	10.255.240.2	65001	65002	1h	1	1	138	137	default	Underlay						
		170 11 05 11				50	20	107	100	1.5.1	O malani			- manager	- C. 20	and the second	Contraction of

< Campus F	abrics : EVF	PN Multih	noming									Edit Confi	iguration		Delete	Connection Tab
Collapsed Core												Core2				×
Access					Core2	Core1							M	AC Addres Mode Statu Siti Router II	s b0:33:a6:1 d QFX5110-4 s connected e Primary Sit D 172.16.254	1:49:00 85 e .1
					Access2	Access1						VLAN: 10 1033	s 10. 10.	ddress 33.33.3	Na Via	me in1033
												1099	10	99.99.3	vla	in1099
												Conne	switch	Collaps RX Bytes	ed Core TX Bytes	Link Status
												~	Core1	1.9 GB	1.5 GB	Up
BGP Sumr	mary											Conne	ections to	Access		
Neighbor II	nformation								2:28 P1	VI (Updates Every	3 Minutes) 🕈 🔍	~	Switch Access2	RX Bytes	TX Bytes	Link Status Up
Status Connected	State Established	Neighbor 10.255.240.3	Neighbor AS 65002	Local AS 65001	Uptime 1h 4m	RX Routes	TX Routes	RX Packets	TX Packets	VRF Name default	Neighbor Type Underlay	*	Access1	1.2 GB	1.5 GB	Up
Connected	Established	10.255.240.4	65002	65001	1h 4m	1	1	145	144	default	Underlay					
Connected	Established	172.16.254.2	65000	65000	1h 4m	39	58	184	205	default	Overlay	1	Remote S	nell	Insights	Details

From this view, Mist also provides remote accessibility into each device's console through the Remote Shell option as well as rich telemetry through the Switch Insights option. Remote Shell is demonstrated throughout this document when displaying real-time operational status of each device during the verification stage.

Switch Insights of Core1 displays historical telemetry including BGP peering status critical to the health of the Campus Fabric:

Monitor Wireless	Wired WAN Location	n Insights SWI	tch Core1 🔻	Today 💌				
	Core	:1						
12:00 AM Jun 20 - 2:29 PM Jun 12:00 am	n 20		6:00	(drag an area of intere	st to Zoom in)		12:00 pm	Switch Events
Total Bytes 30 MB		1			0.025230			Port Errors
20 MB		h		~~~				
				8:30 /	AM - 8:40 AM Jun 20: 6.7 MB, 0 Port	: Errors		
[
Switch Events	46 Total 33 Good 5	Neutral 8 Bad	All event Types	~	All switch ports			
Config Changed by User		1:55:34.818 PM J	un 20, 2023	Text	EVPN_BGP_PEER_STA established)	TUS_CHANGE: iBGP peer sta	atus changed to established	(1 currently
BGP Neighbor Up		1:24:07.685 PM J	un 20, 2023	Model	QFX5110-485			
Overlay BGP Peer State Change		1:24:07.685 PM J	un 20, 2023	Version	22.2R3.15			
BGP Neighbor Up		1:23:59.685 PM J	un 20, 2023					
BGP Neighbor Up		1:23:59.685 PM J	un 20, 2023					

Summary

Mist Campus Fabric provides an easy method to build an EVPN multihoming deployment to enable EVPN-VXLAN overlay networks. This can be done solely in Mist UI. Steps are added in this document to help you understand the troubleshooting steps if deployment is not working correctly.

Chapter 7 Additional Information

EVPN Multihoming Configurations

This section displays the configuration output from the Juniper Mist cloud for the IP Fabric underlay on the core and distribution switches using eBGP.

Mist provides you with the following options (default in parenthesis):

- BGP Local AS (65001).
- Loopback Prefix (/24).
- Subnet (10.255.240.0/20) point to point interfaces between core devices.

Mist enables per-packet (Junos OS defines this as per-flow) load-balancing using ECMP and fast convergence of BGP in the event of a link or node failure using BFD.

Core1 Configuration

1. Interconnects with Core2.

```
set interfaces et-0/0/48 description evpn_downlink-to-b033a6114900
set interfaces et-0/0/48 unit 0 family inet address 10.255.240.4/31
set interfaces et-0/0/49 description evpn_uplink-to-b033a6114900
set interfaces et-0/0/49 unit 0 family inet address 10.255.240.3/31
```

2. Loopback interface and router ID.

set groups top interfaces lo0 unit 0 family inet address 172.16.254.2/32 set groups top routing-options router-id 172.16.254.2

3. Per-packet load-balancing.

```
set groups top policy-options policy-statement ecmp_policy then load-
balance per-packet
set groups top policy-options policy-statement ecmp_policy then accept
set groups top routing-options forwarding-table export ecmp policy
```

4. BGP underlay network with Core2.

```
set protocols bgp group evpn_underlay type external
set protocols bgp group evpn_underlay log-updown
set protocols bgp group evpn_underlay import evpn_underlay_import
set protocols bgp group evpn_underlay family inet unicast
set protocols bgp group evpn_underlay authentication-key "xyz"
set protocols bgp group evpn_underlay export evpn_underlay_export
set protocols bgp group evpn_underlay local-as 65002
set protocols bgp group evpn_underlay multipath multiple-as
set protocols bgp group evpn_underlay bfd-liveness-detection minimum-
interval 350
set protocols bgp group evpn_underlay bfd-liveness-detection multiplier 3
set protocols bgp group evpn_underlay neighbor 10.255.240.2 peer-as 65001
set protocols bgp group evpn_underlay neighbor 10.255.240.5 peer-as 65001
```

Core2 Configuration

1. Interconnects with Core1.

```
set interfaces et-0/0/48 description evpn_uplink-to-c042d016afa0
set interfaces et-0/0/48 unit 0 family inet address 10.255.240.5/31
set interfaces et-0/0/49 description evpn_downlink-to-c042d016afa0
set interfaces et-0/0/49 unit 0 family inet address 10.255.240.2/31
```

2. Loopback interface and router ID.

```
set groups top interfaces lo0 unit 0 family inet address 172.16.254.2/32 set groups top routing-options router-id 172.16.254.2
```

3. Per-packet load-balancing.

```
set groups top policy-options policy-statement ecmp_policy then load-
balance per-packet
set groups top policy-options policy-statement ecmp_policy then accept
set groups top routing-options forwarding-table export ecmp_policy
```

4. BGP underlay network with Core1.

```
set protocols bgp group evpn_underlay type external
set protocols bgp group evpn_underlay log-updown
set protocols bgp group evpn_underlay import evpn_underlay_import
set protocols bgp group evpn_underlay family inet unicast
set protocols bgp group evpn_underlay authentication-key "xyz"
set protocols bgp group evpn_underlay export evpn_underlay_export
set protocols bgp group evpn_underlay local-as 65001
set protocols bgp group evpn_underlay multipath multiple-as
set protocols bgp group evpn_underlay bfd-liveness-detection minimum-
interval 350
set protocols bgp group evpn_underlay bfd-liveness-detection multiplier 3
set protocols bgp group evpn_underlay neighbor 10.255.240.4 peer-as 65002
set protocols bgp group evpn_underlay neighbor 10.255.240.3 peer-as 65002
```

Configuration of the EVPN VXLAN Overlay and Virtual Networks

This section displays the configuration output from the Juniper Mist cloud for the EVPN VXLAN Overlay on the core and distribution switches using eBGP.

Mist enables load balancing across the Overlay network and fast convergence of BGP in the event of a link or node failure using BFD between the core and distribution layers.

Mist provisions L3 IRB interfaces on the distribution layer

Mist enables VXLAN tunnelling, VLAN to VXLAN mapping, and MP BGP configuration snippets such as vrf-targets on core switches.

Core1 Configuration

1. BGP Overlay peering between the two distribution switches.

```
set protocols bgp group evpn_overlay type internal
set protocols bgp group evpn_overlay local-address 172.16.254.2
set protocols bgp group evpn_overlay log-updown
set protocols bgp group evpn_overlay family evpn signaling
set protocols bgp group evpn_overlay authentication-key "xyz"
set protocols bgp group evpn_overlay cluster 1.0.0.1
set protocols bgp group evpn_overlay local-as 65000
set protocols bgp group evpn_overlay multipath
set protocols bgp group evpn_overlay bfd-liveness-detection minimum-
interval 1000
set protocols bgp group evpn_overlay bfd-liveness-detection multiplier 3
set protocols bgp group evpn_overlay bfd-liveness-detection session-mode
automatic
set protocols bgp group evpn overlay neighbor 172.16.254.1
```

2. Switch options that define vrf-targets and the source loopback interface used for VXLAN.

```
set groups top switch-options vtep-source-interface lo0.0
set groups top switch-options route-distinguisher 172.16.254.2:1
set groups top switch-options vrf-target target:65000:1
set groups top switch-options vrf-target auto
```

3. VXLAN encapsulation.

```
set groups top protocols evpn no-core-isolation
set groups top protocols evpn encapsulation vxlan
set groups top protocols evpn default-gateway no-gateway-community
set groups top protocols evpn extended-vni-list all
```

4. VRFs used for traffic isolation.

```
set groups top routing-instances guest-wifi instance-type vrf
set groups top routing-instances guest-wifi routing-options static route
0.0.0.0/0 next-hop 10.33.33.254
set groups top routing-instances guest-wifi routing-options auto-export
set groups top routing-instances guest-wifi interface irb.1033
set groups top routing-instances guest-wifi route-distinguisher
172.16.254.2:103
set groups top routing-instances guest-wifi vrf-target target:65000:103
set groups top routing-instances guest-wifi vrf-table-label
set groups top routing-instances developers instance-type vrf
set groups top routing-instances developers routing-options static route
0.0.0/0 next-hop 10.88.88.254
set groups top routing-instances developers routing-options auto-export
set groups top routing-instances developers interface irb.1088
set groups top routing-instances developers route-distinguisher
172.16.254.2:102
set groups top routing-instances developers vrf-target target:65000:102
set groups top routing-instances developers vrf-table-label
set groups top routing-instances corp-it instance-type vrf
set groups top routing-instances corp-it routing-options static route
0.0.0/0 next-hop 10.99.99.254
set groups top routing-instances corp-it routing-options auto-export
set groups top routing-instances corp-it interface irb.1099
set groups top routing-instances corp-it route-distinguisher
172.16.254.2:101
set groups top routing-instances corp-it vrf-target target:65000:101
set groups top routing-instances corp-it vrf-table-label
```

5. VLAN to VXLAN mapping.

```
set vlans vlan1033 vlan-id 1033
set vlans vlan1033 l3-interface irb.1033
set vlans vlan1033 vxlan vni 11033
set vlans vlan1088 vlan-id 1088
set vlans vlan1088 l3-interface irb.1088
set vlans vlan1088 vxlan vni 11088
set vlans vlan1099 vlan-id 1099
set vlans vlan1099 l3-interface irb.1099
set vlans vlan1099 vxlan vni 11099
```

6. L3 IRB interface enablement with virtual gateway addressing.

```
set interfaces irb unit 1033 virtual-gateway-accept-data
set interfaces irb unit 1033 description vlan1033
set interfaces irb unit 1033 family inet address 10.33.33.2/24 virtual-
gateway-address 10.33.33.1
set interfaces irb unit 1088 virtual-gateway-accept-data
set interfaces irb unit 1088 description vlan1088
set interfaces irb unit 1088 family inet address 10.88.88.2/24 virtual-
gateway-address 10.88.88.1
set interfaces irb unit 1099 virtual-gateway-accept-data
set interfaces irb unit 1099 description vlan1099
set interfaces irb unit 1099 family inet address 10.99.99.2/24 virtual-
gateway-address 10.99.99.1
```

Core2 Configuration

1. BGP Overlay peering between the two distribution switches.

```
set protocols bgp group evpn_overlay type internal
set protocols bgp group evpn_overlay local-address 172.16.254.1
set protocols bgp group evpn_overlay log-updown
set protocols bgp group evpn_overlay family evpn signaling
set protocols bgp group evpn_overlay authentication-key "xyz"
set protocols bgp group evpn_overlay cluster 1.0.0.1
set protocols bgp group evpn_overlay local-as 65000
set protocols bgp group evpn_overlay multipath
set protocols bgp group evpn_overlay bfd-liveness-detection minimum-
interval 1000
set protocols bgp group evpn_overlay bfd-liveness-detection multiplier 3
set protocols bgp group evpn_overlay bfd-liveness-detection session-mode
automatic
set protocols bgp group evpn overlay neighbor 172.16.254.2
```

2. Switch options that define vrf-targets and the source loopback interface used for VXLAN.

```
set groups top switch-options vtep-source-interface lo0.0
set groups top switch-options route-distinguisher 172.16.254.1:1
set groups top switch-options vrf-target target:65000:1
set groups top switch-options vrf-target auto
```

```
3. VXLAN encapsulation.
```

```
set groups top protocols evpn no-core-isolation
set groups top protocols evpn encapsulation vxlan
set groups top protocols evpn default-gateway no-gateway-community
set groups top protocols evpn extended-vni-list all
```

4. VRFs used for traffic isolation.

set groups top routing-instances guest-wifi instance-type vrf set groups top routing-instances guest-wifi routing-options static route 0.0.0/0 next-hop 10.33.33.254 set groups top routing-instances guest-wifi routing-options auto-export set groups top routing-instances guest-wifi interface irb.1033 set groups top routing-instances guest-wifi route-distinguisher 172.16.254.1:103 set groups top routing-instances quest-wifi vrf-target target:65000:103 set groups top routing-instances guest-wifi vrf-table-label set groups top routing-instances developers instance-type vrf set groups top routing-instances developers routing-options static route 0.0.0/0 next-hop 10.88.88.254 set groups top routing-instances developers routing-options auto-export set groups top routing-instances developers interface irb.1088 set groups top routing-instances developers route-distinguisher 172.16.254.1:102 set groups top routing-instances developers vrf-target target:65000:102 set groups top routing-instances developers vrf-table-label set groups top routing-instances corp-it instance-type vrf set groups top routing-instances corp-it routing-options static route 0.0.0/0 next-hop 10.99.99.254 set groups top routing-instances corp-it routing-options auto-export set groups top routing-instances corp-it interface irb.1099 set groups top routing-instances corp-it route-distinguisher 172.16.254.1:101 set groups top routing-instances corp-it vrf-target target:65000:101 set groups top routing-instances corp-it vrf-table-label

5. VLAN to VXLAN mapping.

```
set vlans vlan1033 vlan-id 1033
set vlans vlan1033 l3-interface irb.1033
set vlans vlan1033 vxlan vni 11033
set vlans vlan1088 vlan-id 1088
set vlans vlan1088 l3-interface irb.1088
set vlans vlan1088 vxlan vni 11088
set vlans vlan1099 vlan-id 1099
set vlans vlan1099 l3-interface irb.1099
set vlans vlan1099 vxlan vni 11099
```

6. L3 IRB interface enablement with virtual gateway addressing.

```
set interfaces irb unit 1033 virtual-gateway-accept-data
set interfaces irb unit 1033 description vlan1033
set interfaces irb unit 1033 family inet address 10.33.33.3/24 virtual-
gateway-address 10.33.33.1
set interfaces irb unit 1088 virtual-gateway-accept-data
set interfaces irb unit 1088 description vlan1088
set interfaces irb unit 1088 family inet address 10.88.88.3/24 virtual-
gateway-address 10.88.88.1
set interfaces irb unit 1099 virtual-gateway-accept-data
set interfaces irb unit 1099 description vlan1099
set interfaces irb unit 1099 family inet address 10.99.99.3/24 virtual-
gateway-address 10.99.99.1
```

Configuration of the Layer 2 ESI-LAG Between the Core Switches and the Access Switches

This section displays the configuration output from the Juniper Mist cloud for the enablement of the Layer 2 ESI LAG between the distribution switches and access switches. This Mist profile enables all VLANs on the Ethernet bundle with requisite ESI and LACP configuration options. From the perspective of the access switches, the Ethernet bundle that is configured on the

access layer views the ESI-LAG as a single MAC address with the same LACP system-ID. This enables load hashing between distribution and access layers without requiring L2 loop free detection protocols such as Rapid Spanning Tree Protocol (RSTP).



Core1 Configuration

 Interface association with the newly created Ethernet bundle that includes ESI and LACP configuration.

```
set interfaces ae0 apply-groups esi-lag
set interfaces ae0 esi 00:11:00:00:00:01:00:01:02:00
set interfaces ae0 esi all-active
set interfaces ae0 aggregated-ether-options lacp active
set interfaces ae0 aggregated-ether-options lacp periodic fast
set interfaces ae0 aggregated-ether-options lacp system-id
00:00:00:31:57:00
set interfaces ae0 aggregated-ether-options lacp admin-key 0
set interfaces ael apply-groups esi-lag
set interfaces ael esi 00:11:00:00:00:01:00:01:02:01
set interfaces ael esi all-active
set interfaces ael aggregated-ether-options lacp active
set interfaces ael aggregated-ether-options lacp periodic fast
set interfaces ael aggregated-ether-options lacp system-id
00:00:00:31:57:01
set interfaces ael aggregated-ether-options lacp admin-key 1
set groups esi-lag interfaces <*> unit 0 family ethernet-switching
interface-mode trunk
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1033
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1088
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1099
set interfaces xe-0/0/1 description esilag-to-4c734f095900
set interfaces xe-0/0/1 hold-time up 120000
set interfaces xe-0/0/1 hold-time down 1
set interfaces xe-0/0/1 ether-options 802.3ad ae1
set interfaces xe-0/0/1 unit 0 family ethernet-switching storm-control
default
deactivate interfaces xe-0/0/1 unit 0
set interfaces xe-0/0/2 description esilag-to-4c734f095900
set interfaces xe-0/0/2 hold-time up 120000
set interfaces xe-0/0/2 hold-time down 1
set interfaces xe-0/0/2 ether-options 802.3ad ae0
```

```
set interfaces xe-0/0/2 unit 0 family ethernet-switching storm-control default deactivate interfaces xe-0/0/2 unit 0
```

Core2 Configuration

 Interface association with the newly created Ethernet bundle that includes ESI and LACP configuration.

```
set interfaces ae0 apply-groups esi-lag
set interfaces ae0 esi 00:11:00:00:01:00:01:02:00
set interfaces ae0 esi all-active
set interfaces ae0 aggregated-ether-options lacp active
set interfaces ae0 aggregated-ether-options lacp periodic fast
set interfaces ae0 aggregated-ether-options lacp system-id
00:00:00:31:57:00
set interfaces ae0 aggregated-ether-options lacp admin-key 0
set interfaces ael apply-groups esi-lag
set interfaces ael esi 00:11:00:00:01:00:01:02:01
set interfaces ael esi all-active
set interfaces ael aggregated-ether-options lacp active
set interfaces ael aggregated-ether-options lacp periodic fast
set interfaces ael aggregated-ether-options lacp system-id
00:00:00:31:57:01
set interfaces ael aggregated-ether-options lacp admin-key 1
set groups esi-lag interfaces <*> unit 0 family ethernet-switching
interface-mode trunk
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1033
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1088
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1099
set interfaces xe-0/0/1 description esilag-to-4c734f095900
set interfaces xe-0/0/1 hold-time up 120000
set interfaces xe-0/0/1 hold-time down 1
set interfaces xe-0/0/1 ether-options 802.3ad ae1
set interfaces xe-0/0/1 unit 0 family ethernet-switching storm-control
default.
deactivate interfaces xe-0/0/1 unit 0
set interfaces xe-0/0/2 description esilag-to-4c734f095900
set interfaces xe-0/0/2 hold-time up 120000
set interfaces xe-0/0/2 hold-time down 1
set interfaces xe-0/0/2 ether-options 802.3ad ae0
set interfaces xe-0/0/2 unit 0 family ethernet-switching storm-control
default
deactivate interfaces xe-0/0/2 unit 0
```

Access1 Configuration

1. VLANs associated with the new LACP Ethernet bundle.

```
set groups esi-lag interfaces <*> mtu 9200
set groups esi-lag interfaces <*> unit 0 family ethernet-switching
interface-mode trunk
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1033
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1088
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1099
set interfaces ael apply-groups esi-lag
set interfaces ael aggregated-ether-options lacp active
set interfaces xe-0/2/0 ether-options 802.3ad ae1
set interfaces xe-0/2/0 unit 0 family ethernet-switching storm-control
default
deactivate interfaces xe-0/2/0 unit 0
set interfaces xe-0/2/3 ether-options 802.3ad ae1
set interfaces xe-0/2/3 unit 0 family ethernet-switching storm-control
default
deactivate interfaces xe-0/2/3 unit 0
```

Access2 Configuration

1. VLANs associated with the new LACP Ethernet bundle.

```
set groups esi-lag interfaces <*> mtu 9200
set groups esi-lag interfaces <*> unit 0 family ethernet-switching
interface-mode trunk
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1033
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1088
set groups esi-lag interfaces <*> unit 0 family ethernet-switching vlan
members vlan1099
set interfaces aeO apply-groups esi-lag
set interfaces ae0 aggregated-ether-options lacp active
set interfaces xe-0/2/0 ether-options 802.3ad ae0
set interfaces xe-0/2/0 unit 0 family ethernet-switching storm-control
default
deactivate interfaces xe-0/2/0 unit 0
set interfaces xe-0/2/3 ether-options 802.3ad ae0
set interfaces xe-0/2/3 unit 0 family ethernet-switching storm-control
default.
deactivate interfaces xe-0/2/3 unit 0
```

Configuration of the Layer 2 ESI-LAG Between the Core Switches and Juniper SRX Series Firewall

This section displays the configuration output from the Juniper Mist cloud for the enablement of the Layer 2 ESI LAG between the core switches and SRX Series Firewall. This Mist profile enables all VLANs on the Ethernet bundle with requisite ESI and LACP configuration options. From the perspective of the SRX Series Firewall, the Ethernet bundle that is configured on the SRX Series Firewall views the ESI-LAG as a single MAC address with the same LACP system-ID. This enables load hashing between the core and SRX Series Firewall without requiring L2 loop free detection protocols such as RSTP.



Core 1 Configuration

 Interface association with the newly created Ethernet bundle that includes ESI and LACP configuration.

```
set interfaces ge-0/0/10 description esilag-to-4c734f095900
set interfaces ge-0/0/10 hold-time up 120000
set interfaces ge-0/0/10 hold-time down 1
set interfaces ge-0/0/10 ether-options 802.3ad ae2
set interfaces ge-0/0/10 unit 0 family ethernet-switching storm-control
default
deactivate interfaces ge-0/0/10 unit 0
set interfaces ae2 apply-groups esi-lag
set interfaces ae2 esi 00:11:00:00:01:00:01:02:02
set interfaces ae2 aggregated-ether-options lacp active
set interfaces ae2 aggregated-ether-options lacp system-id
00:00:00:31:57:02
set interfaces ae2 aggregated-ether-options lacp admin-key 2
```

Core 2 Configuration

 Interface association with the newly created Ethernet bundle that includes ESI and LACP configuration.

```
set interfaces ge-0/0/10 description esilag-to-4c734f095900
set interfaces ge-0/0/10 hold-time up 120000
set interfaces ge-0/0/10 hold-time down 1
set interfaces ge-0/0/10 ether-options 802.3ad ae2
set interfaces ge-0/0/10 unit 0 family ethernet-switching storm-control
default
deactivate interfaces ge-0/0/10 unit 0
set interfaces ae2 apply-groups esi-lag
set interfaces ae2 esi 00:11:00:00:01:00:01:02:02
set interfaces ae2 esi all-active
set interfaces ae2 aggregated-ether-options lacp active
set interfaces ae2 aggregated-ether-options lacp periodic fast
set interfaces ae2 aggregated-ether-options lacp system-id
00:00:00:31:57:02
set interfaces ae2 aggregated-ether-options lacp admin-key 2
```

SRX Series Firewall Configuration

1	Interface	association	with new	lv created	Ethernet	bundle a	nd LACP	configuration.
				,				

set	: interfaces	ae0	flexible-vlan-tagging			
set	: interfaces	ae0	aggregated-ether-options lacp active			
set	: interfaces	ae0	unit	1033	vlan-id 1033	
set	: interfaces	ae0	unit	1033	family inet address	10.33.33.254/24
set	: interfaces	ae0	unit	1088	vlan-id 1088	
set	: interfaces	ae0	unit	1088	family inet address	10.88.88.254/24
set	: interfaces	ae0	unit	1099	vlan-id 1099	
set	: interfaces	ae0	unit	1099	family inet address	10.99.99.254/24