



Pica8 Deployment Guide

Pica8 EVPN-VXLAN Test and Evaluation Guide

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Executive Summary

Almost a decade ago Pica8 was first to market with an open, fully-capable Debian Linux-based Software-Defined Network Operating System (NOS) currently supporting a variety of 1, 10, 25, 40, 100, and 400GB white box networking hardware. Pica8's PicOS® Software Switches support all major L2/L3 switching and routing protocols while continuing to deliver SDN capabilities through Pica8's adoption of Open-vSwitch (OVS), as well as a groundbreaking blended SDN implementation that practically applies SDN-like control – without service interruption – directly into a traditional L2/L3 command-line operation mode. Pica8 is leading the way in combining Software Defined Networks (SDN), traditional Layer2/3 networking, and open network automation.

To further differentiate itself and disrupt the market, Pica8 has introduced its Amplified Network Control Platform (AmpCon) to automate, simplify, and optimize configuration and change management of the network INCLUDED with its software-switch bundles. Pica8 is taking an industry leading position in the open networking market by completely separating hardware from software such that Enterprises remain completely unencumbered without any licensing restrictions on speed, port-configuration, or capability so Enterprises can easily incorporate the latest multi-gig, PoE, or ToR 400GB hardware.

Pica8's industry leading software-switch license is the only transferable, perpetual license among all certified networking platforms. Pica8's simplified licensing model translates into immediate ROI and cost-savings with the ability to move licenses due to hardware upgrades, changes, or RMAs giving them the flexibility they require to deploy whatever hardware fits their needs now or in the future.

Open networking is a way of thinking– open networking with Pica8 is a means to deliver adaptable, open network architectures through policy driven control. Through disaggregation (or decoupling) of the data/forwarding plane from the management and control plane, Pica8 software switches provide multi-dimensional flexibility of identical OS with hardware agnostic platforms, as well as support of traditional L2/L3 switching capabilities and a next generation open architecture.

Pica8 is bringing all these capabilities to bare by providing a Proof-of-Concept (PoC) Test plan for its software-switches and Amplified Control Management Platform (AmpCon) that encompasses all of the previously detailed EVPN-VXLAN capabilities across its Debian-Linux-based Open Network Operating System (NOS) in-conjunction with Pica8's Amplified Control (AmpCon) network management and automation platform.

Testing Overview and Documentation

This document provides example EVPN and- VXLAN configurations using utilizing a centrallyized routing architecture.

Ethernet Virtual Private Network (EVPN-VXLAN) Testing

Ethernet Virtual Private Network or EVPN is a technology designed to carry Layer 2 traffic over wide area network protocols. EVPN is a multi-tenant BGP-based control plane for layer-2 (bridging) and layer-3 (routing) VPNs. It's the unifying L2+L3 equivalent of the traditional L3-only MPLS/VPN control plane. PicOS EVPN implementation leverages VXLAN technology as described in RFC7348. VXLAN has been the predominant technology used in the enterprise and data center domains to achieve Layer 2 level scalability over an IP overlay backbone. VXLAN has become the technology of choice for separating the virtual network from underlying physical network and has greatly enhanced the network virtualization, easier network management and orchestration. VXLANs provides network segmentation but also helps solve the scalability issue normally associated with VLANs.

The following list describes the list of features that PicOS BGP EVPN-VXLAN implementation supports:

- Exchange of VNI membership between VTEPs using EVPN type 3 routes.
- Exchange of host MAC and IP addresses using EVPN type 2 routes.
- Prefix-based routing using EVPN type-5 routes (EVPN IP prefix route).



- Exchange of MAC Mobility Extended Community to support host/VM mobility.
- Dual attached host via VXLAN active-active mode. MAC synchronization between switches is achieved via MLAG.
- Inter Subnet routing for IPv4. Distributed symmetric and asymmetric routing between different subnets and centralized routing.
- Multi-tenancy over layer 3.

To share routing information with its peers, BGP uses update packets. Routes with the same path attributes are placed in the Network Layer Reachability Information (NLRI) of the update packet and advertised. Since traditional BGP-4 only supports IPv4 unicast routing information, Multiprotocol Extensions for BGP (MP-BGP) was developed to provide additional support for network layer protocols such as multicast and IPv6. MP-BGP extensions are added to the NLRI after which description for different protocols like IPv6 unicast and VPN instance family are subsequently added.

EVPN defines the EVPN sub-address family in the L2VPN address family with the introduction of EVPN NLRI. Once the routes are advertised, VXLAN tunnels are automatically established to carry packets. EVPN NLRI has the following EVPN route types:

- Type-1, Ethernet Auto-Discovery routes: are used for network wide messaging. The Ethernet auto discovery routes are used when a customer edge (CE) device is multi-homed. In case when a CE device is single-homed, the Ethernet Subnet Identifier (ESI) is zero. Type-1 routes are advertised on per ESI and per EVI basis and used to achieve fast convergence.
- Type-2, MAC with IP advertisement routes: are used to advertise the MAC and IP addresses of hosts.
- Type-3, Inclusive Multicast routes: are used for the automatic discovery of VTEPs and dynamically establishing VXLAN tunnels.
- Type-4, Ethernet Segment Routes: are needed in multi-homing scenarios and used for Designated Forwarder Election. Designated Forwarder is responsible for sending broadcast, unknown unicast and multicast (BUM) traffic to the CE on an Ethernet Segment.
- Type-5, IP Prefix route: provides encoding for inter-subnet forwarding. These routes are used for advertising IP prefixes for connectivity between different subnets across the enterprise.

Pica8 currently supports Type-2, Type-3 and Type-5 routes at the moment. Upcoming releases this year will add support for EVPN Type-1 and Type-4, as well as EVPN-Multi-Homing.

Both eBGP and iBGP peerings can be used for the EVPN address family.

For more details specifically around BGP, please refer to Pica8's [BGP EVPN Configuration Guide](#).

EVPN and MLAG – True Stacking Alternatives

Pica8 eliminates the need for traditional stacking through a combination of Multi-Chassis Link Aggregation (MLAG), leaf-spine topologies, and AmpCon automation. By utilizing MLAG for peering and spine redundancy, a network designed with EVPN and MLAG increases bandwidth by making "All links active". This design eliminates:

- Port count restrictions
- The need for Spanning –Tree Protocols
- Loops
- Poorly built proprietary cables
- Single-point-of-failure

and generally, removes black holes found in traditional stacking strategies. Pica8's AmpCon provides template-driven, playbook automation that eliminates the need for single-IP-based element management addressing, which remains as the only possible benefit from traditional stacking, which if one element has an issue, the entire stack becomes unreachable.

Hyperconvergence, containerization/virtualization, combined with Network Function Virtualization (NFV) and various types of incoming traffic at the network edge, have driven the need for network fabric virtualization to the access layer. With MLAG or

EVPN-based leaf-spine topologies, it is possible to completely do away with STP, as MLAG makes all of the linked switches in an MLAG domain appear as “one gigantic switch” to the rest of the network. MLAG enables each access layer switch to maximize the use of all connections, providing both north and south redundancy for all network traffic. No longer is a stack limited to “stacking cables” or a limited number of ports. MLAG allows for all links to always remain active without sacrificing redundancy. MLAG peer switches synchronize forwarding states between them, so if a leaf or spine switch fails, traffic is automatically rerouted for continuous uptime.

Alternatively, EVPN-VXLAN combines a pure Layer-3 routed “underlay network”, with a virtually-tunneled and segmented L2/L3 overlay network. EVPN-VXLAN’s pure Layer-3 underlay network means that all links are again active at the underlay layer due to the lack of a required Layer-2 endpoint-based network. MLAG can then be optionally applied to the overlay network necessary, when attaching pure layer-2 switches at either end of a VXLAN Tunnel Endpoint (VTEP). If all switches are VTEPs, no MLAG is required to reap the benefits of equal-cost multi-path (ECMP) link redundancy and all links active for maximum performance and scalability that is absent with traditional stacking strategies.

The following sample designs are highly scalable alternative strategies for deploying a large number of ports in a closet or IDF, without the limitations of conventional stacking or the cost of a chassis. Utilizing a switch such as the Edge-Core AS4630-54PE for both spine and leaf positions, up to 102 switches (with a combined total of 480 access ports) can easily be deployed in the configurations shown below. Note that all the access ports, in the spine as well as leaf switches, are active and usable to connect endpoints.

Stacking Alternative Scenarios

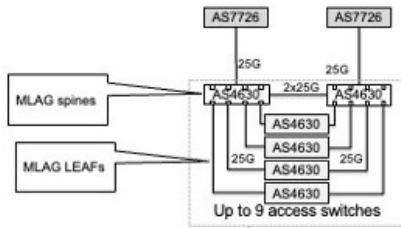
Example – General Topology / Cabling

Example Data Closet (each Floor, alternative to stacking)



Example 1: MLAG-ONLY (NO EVPN) Alternative

MLAG-ONLY access cluster 2x25G uplinks



- Only MLAG spines
- Up to 11 switches in a cluster
- Uplinks on MLAG spines are part of the underlay network
- Access switches uplinks are L2 VLAN trunks (overlay network)

2x MLAG spine switches each with

- 1x 25G primary uplink
- 2x 25G MLAG peer-link
- Up to 9x 25G MLAG links to access switches (including 2x 100G-to-4x25G breakout ports)
- 48x access ports

Up to 9x access switches, each with

- 2x 25G uplinks L2 LAG (VLAN trunks)
- 48x access ports

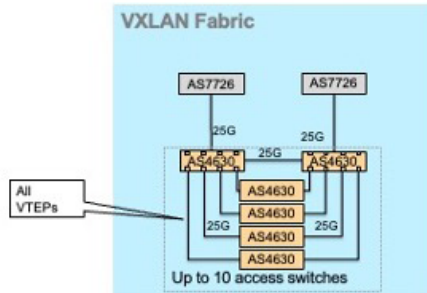
Example 1 – Explanation

This configuration option is appropriate when 25G uplinks are required from wiring closets. The cluster can have up to 11 switches. All switches are Edgecore AS4630s, but they serve different roles. Two of the switches serve as MLAG spine switches, and up to 9 switches serve as pure access switches. On the MLAG spine switches, the two 100G QSFP28 ports are each broken out to 4x25G ports. Each MLAG spine switch has a primary 25G uplink to the Core Spine switches, and a pair of backup 25G links to the peer MLAG spine switch. Each MLAG spine switch also has 9x 25G links to the downstream access switches. Only the MLAG spine switches are VTEPs, and only the uplinks from the MLAG spine switches are part of the underlay VXLAN network. The access switches have 2x 25G L2 LAG VLAN trunk uplinks to the MLAG spine switches. All switches have 48 access ports for overlay network access.

BENEFITS: This cluster configuration reduces the number of VTEPs in the EVPN network. The MLAG spine switch role is more important, since it serves as both MLAG spines and VTEP. The access switches are simple L2 switches with a VLAN trunk LAG uplink.

Example 2: EVPN-ONLY 2x25G Uplinks (NO MLAG) Alternative

EVPN Access Cluster with 2x25G uplinks – NO MLAG



- All switches are VTEPs
- Up to 12 switches in a cluster
- Uplinks on all switches (aggregation and access) are part of the underlay network

2x aggregation switches, each with

- 1x 25G primary uplink (VXLAN)
- 1x 25G backup uplink (VXLAN)
- Up to 10x 25G to access switches (including 2x 100G-to-4x25G breakout ports)
- 48x access ports

Up to 10x access switches, each with

- 2x 25G load-sharing L3 uplinks (VXLAN), one to each of the aggregation switches
- 48x access ports

Example 2 – Explanation

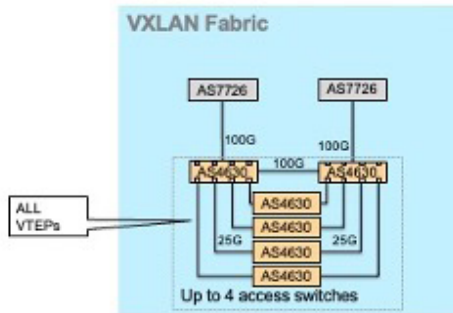
This configuration option is appropriate when 25G uplinks are required from wiring closets. The cluster can have up to 12 switches. All switches are Edgecore AS4630s, but they serve different roles. Two of the switches serve as aggregation & access switches, and up to 10 switches serve as pure access switches. On the aggregation switches, the two 100G QSFP28 ports are each broken out to 4x25G ports. Each aggregation switch has a primary 25G uplink to the Core Spine switches, and a backup 25G link to the peer aggregation switch.

Both aggregation switches also have 25G links to the downstream access switches. Similar to the previous cluster configuration, the access switches have two load-sharing 25G uplinks (ECMP) to the aggregation switches. All switches are VTEPs and have 48 access ports for overlay network access. The only differences between the switches are the uplink configuration. The uplinks are all part of the underlay VXLAN network.

BENEFITS: The configuration logically is also similar to a typical SDN-Access configuration, where all access switches are VTEPs.

Example 3: EVPN-ONLY 2x100G Uplinks (NO MLAG) Alternative

EVPN Access Cluster with 2x100G uplinks – NO MLAG



- All access switches are VTEPs
- Up to 6 switches in a cluster
- Uplinks on all switches (aggregation and access) are part of the underlay network

- 2x aggregation switches, each with**
- 1x 100G primary uplink (VXLAN)
 - 1x 100G backup uplink (VXLAN)
 - 4x 25G relay for downstream switches
 - 48x access ports

- 4x access switches, each with**
- 2x 25G load-sharing uplinks (VXLAN), one to each of the aggregation switches
 - 48x access ports

Example 3 – Explanation

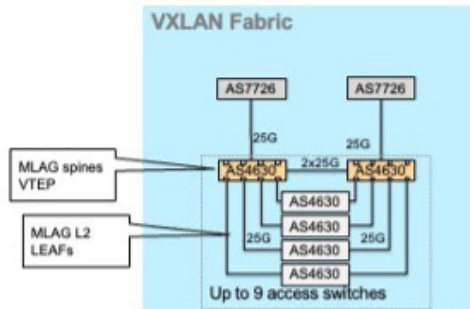
This configuration option is appropriate when high capacity 100G uplinks are required from wiring closets. All switches are Edgecore AS4630s, but they serve different roles. Two of the switches serve as aggregation & access switches, and 4 switches serve as pure access switches. Each aggregation switch has a primary 100G uplink to the Core Spine switches, and a backup 100G link to the peer aggregation switch. Both aggregation switches also have 25G links to the downstream access switches. The access switches have two load-sharing 25G uplinks (ECMP) to the aggregation switches. All switches are VTEPs and have 48 access ports for overlay network access. The only differences between the switches are the uplink configuration. The uplinks are all part of the underlay VXLAN network.

This cluster configuration can be expanded with additional aggregation and access switches. With each additional aggregation switch, 2 access switches can be added. For example, the cluster can be expanded to 3 aggregation + 6 access switches, or 4 aggregation + 8 access switches. Each cluster still has two 100G uplinks.

BENEFITS: The configuration logically is similar to a typical SDN-Access configuration, where all access switches are VTEPs.

Example 4: EVPN+MLAG 2x25G Uplinks (NO EVPN) Alternative

EVPN+MLAG access cluster 2x25G uplinks



- Only MLAG spines are VTEPs
- Up to 11 switches in a cluster
- Uplinks on MLAG spines are part of the underlay network
- Access switches uplinks are L2 VLAN trunks (overlay network)

2x MLAG spine switches (VTEPs) each with

- 1x 25G primary uplink (VXLAN)
- 2x 25G MLAG peer-link
- Up to 9x 25G MLAG links to access switches (including 2x 100G-to-4x25G breakout ports)
- 48x access ports

Up to 9x access switches, each with

- 2x 25G uplinks L2 LAG (VLAN trunks)
- 48x access ports

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Example 4 – Explanation

This configuration option is appropriate when 25G uplinks are required from wiring closets. The cluster can have up to 11 switches. All switches are EdgeCore AS4630S, but they serve different roles. Two of the switches serve as MLAG spine switches, and up to 9 switches serve as pure access switches. On the MLAG spine switches, the two 100G QSFP28 ports are each broken out to 4x25G ports. Each MLAG spine switch has a primary 25G uplink to the Core Spine switches, and a pair of backup 25G links to the peer MLAG spine switch. Each MLAG spine switch also has 9x 25G links to the downstream access switches. Only the MLAG spine switches are VTEPs, and only the uplinks from the MLAG spine switches are part of the underlay VXLAN network. The access switches have 2x 25G L2 LAG VLAN trunk uplinks to the MLAG spine switches. All switches have 48 access ports for overlay network access

BENEFITS: This cluster configuration reduces the number of VTEPs in the EVPN network. The MLAG spine switch role is more important in this scenario since it serves as both MLAG spines and VTEP. The access switches are simple L2 switches with a VLAN trunk LAG-based uplink.

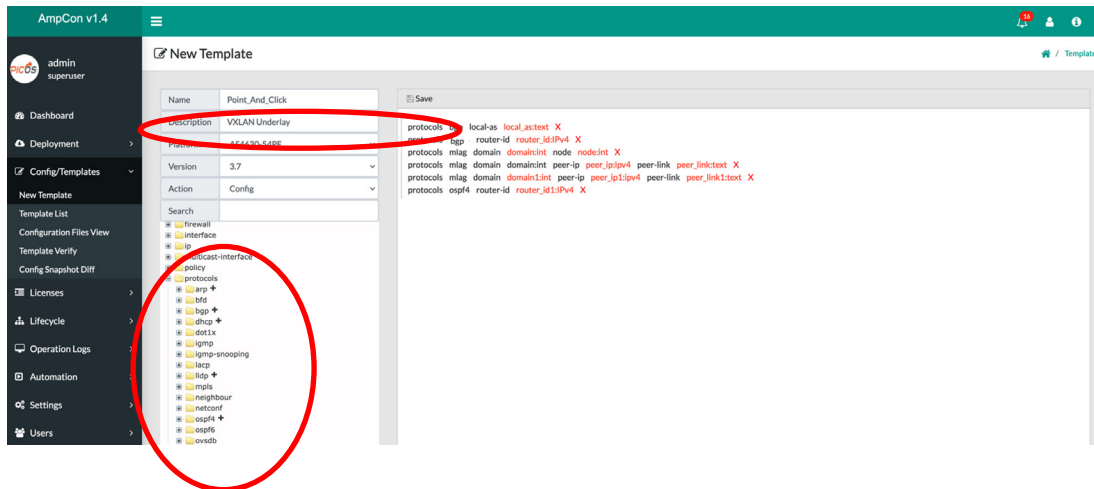
Automating EVPN-VXLAN Deployment via AmpCon + Jinja and Ansible

Ultimately, deploying an EVPN-VXLAN elastic network should not be complex nor tedious with having to painstakingly deploy intricate configurations across every corner of the network.

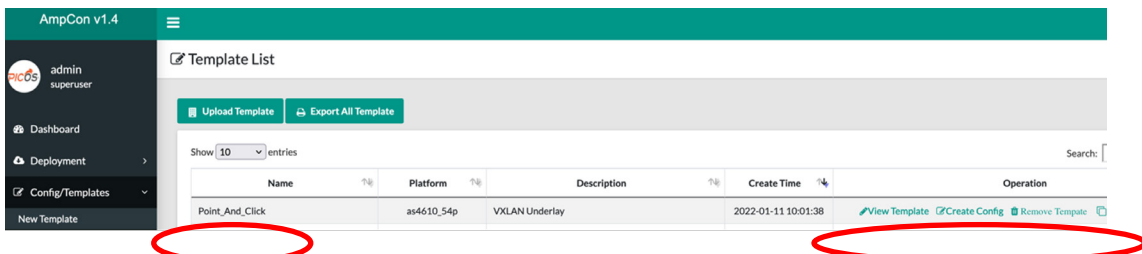
To that end, Pica8 is endeavoring to shift the paradigm in network automation to enable Enterprises of all sizes to deploy EVPN-VXLAN enabled open-networks through automation that can address a wide-arrange of users from NetOps who may be fearful of automation and are not familiar with development tools and languages to DevOps engineers who want “Everything-As-Code”. Meet AmpCon - Pica8’s Amplified Control Automation and Network Management platform. AmpCon is designed with “point-and-

click” in mind, while integrating industry-standard network automation tools like Jinja and Ansible playbooks, with a full suite of REST APIs for DevOps “Everything-As-Code” engineers.

First, let’s create some Jinja templates simply by adding commands from a “Point-And-Click” driven tree:



Next, save the template to automagically turn that code into customizable templates:



Templates that we can share and edit:

Edit Template

Model: Name: Description: Template Files:

```

set protocols bgp local-as {{ local_as }}
set protocols bgp router-id {{ router_id }}
set protocols bgp peer-group RR remote-as {{ bgp_remoteas_label1 }}
set protocols bgp peer-group RR update-source {{ bgp_updatesrc_label1 }}
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor {{ bgp_neighbor_ip1 }} peer-group "RR"
set protocols bgp neighbor {{ bgp_neighbor_ip2 }} peer-group "RR"
set protocols mlag domain {{ domain }} node {{ node }}
set protocols mlag domain {{ domain1 }} peer-ip {{ peer_ip }} peer-link {{ peer_link }}
set protocols mlag domain {{ domain2 }} peer-ip {{ peer_ip1 }} peer-link {{ peer_link1 }}
set protocols ospf router-id {{ router_id0 }}
set protocols ospf auto-cost reference-bandwidth {{ ospf_ref_bwidth }}
set protocols ospf network {{ ospf_network0 }} area {{ ospf_area0 }}
set protocols ospf vrf {{ ospf_vrf0_name }} router-id {{ ospf_vrf0_router_id0 }}
set protocols ospf vrf {{ ospf_vrf0_name }} auto-cost reference-bandwidth {{ ospf_ref_bwidth }}
set protocols ospf vrf {{ ospf_vrf0_name }} {{ ospf_vrf0_network0 }} area {{ ospf_area0 }}

{#::::For VLANs 1 through X Map VNIs Y through Z :::#}
{% for i in range(10,30) %}
set vxlans vni 100{{i}} decapsulation mode "service-vlan-per-port"
set vxlans vni 100{{i}} vlan {{i}}
{% endfor %}

```

and even customize the automagically created variables in that automagically created template:

Edit Template

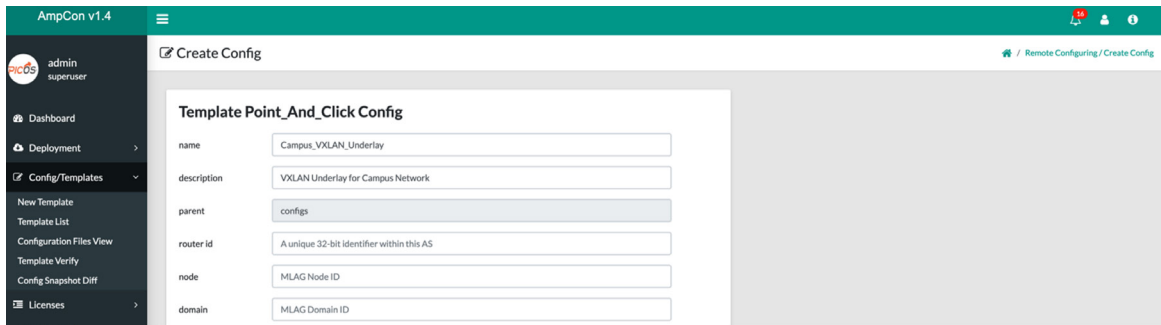
Model: Name: Description: Template Files:

```

{
  "router_id":{
    "param_default": "",
    "type": "IPv4",
    "description": "A unique 32-bit identifier within this AS",
    "param_check": ""
  },
  "node":{
    "param_default": "",
    "type": "int",
    "description": "MLAG Node ID",
    "param_check": "[0..1]"
  },
  "domain":{
    "param_default": "",
    "type": "int",
    "description": "MLAG Domain ID",
    "param_check": "[1..255]"
  },
  "peer_ip1":{
    "param_default": "",
    "type": "ipv4",
    "description": "The IP address of peer",
    "param_check": ""
  },
  "local_as":{
    "param_default": "",
    "type": "text",

```

That newly created template, AmpCon automagically turns into Wizard-Driven Forms:



You can even import your own Jinja-based templates:

```

name: My_ZTNA_Access_Template
description: Access Switch Template - Zero-Trust
platform: as4630-54pe
content_start:

{#:::: For input Variable::::#}
set system hostname {{ Hostname }}
set l3-interface vlan-interface Vlan10 address {{VLAN10_Address}} prefix-length {{VLAN10_Prefix_Length}}
set protocols sflow agent-id {{VLAN10_Address}}
set protocols sflow source-address {{VLAN10_Address}}
set protocols dot1x aaa radius nas-ip {{VLAN10_Address}}

{#:::: Basic Management config::::#}
set protocols static route 0.0.0.0/0 next-hop {{ Default_gateway }}
{#:::: set protocols dot1x aaa radius nas-ip {{Management_IP_Address_Mask.split('/')[0]}} :::#}
set system management-ethernet eth0 ip-address IPv4 {{Management_IP_Address_Mask.split('/')[0]}}/{{Management_IP_Ad
set system management-ethernet eth0 ip-gateway IPv4 {{ Default_MGMT_gateway }}

{#::::For ports 1/1/2 through 1/1/48:data vlan 10 :::#}
{% for i in range(2,49) %}
set interface gigabit-ethernet ge-1/1/{{ i }} description ""
set interface gigabit-ethernet ge-1/1/{{ i }} mtu 1514
set interface gigabit-ethernet ge-1/1/{{ i }} disable false
set interface gigabit-ethernet ge-1/1/{{ i }} power-preemphasis-level 0
set interface gigabit-ethernet ge-1/1/{{ i }} snmp-trap true
set interface gigabit-ethernet ge-1/1/{{ i }} loopback false
set interface gigabit-ethernet ge-1/1/{{ i }} mac-learning true
set interface gigabit-ethernet ge-1/1/{{ i }} family ethernet-switching port-mode "trunk"

set protocols dot1x interface ge-1/1/{{ i }} host-mode "multiple"
set protocols dot1x interface ge-1/1/{{ i }} recovery-timeout 3600
set protocols dot1x interface ge-1/1/{{ i }} session-timeout 3600
set protocols dot1x interface ge-1/1/{{ i }} auth-mode 802.1x
set protocols dot1x interface ge-1/1/{{ i }} auth-mode mac-radius
set protocols dot1x traceoptions interface ge-1/1/{{ i }} flag all
{% endfor %}

```

Simply upload them into AmpCon:

AmpCon v1.6.1

admin SuperAdmin

Dashboard

Deployment

Config/Templates

New Template

Template List

Configuration Files View

Template Verify

Config Snapshot Diff

Template List

Upload Template **Export All Template**

Showing 1 to 6 of 6 entries Show 10 entries

Template Name	Platform
EVPN-VXLAN_Routed_Edge	N2248PX-ON
T3_customVlans	N3208PX-ON

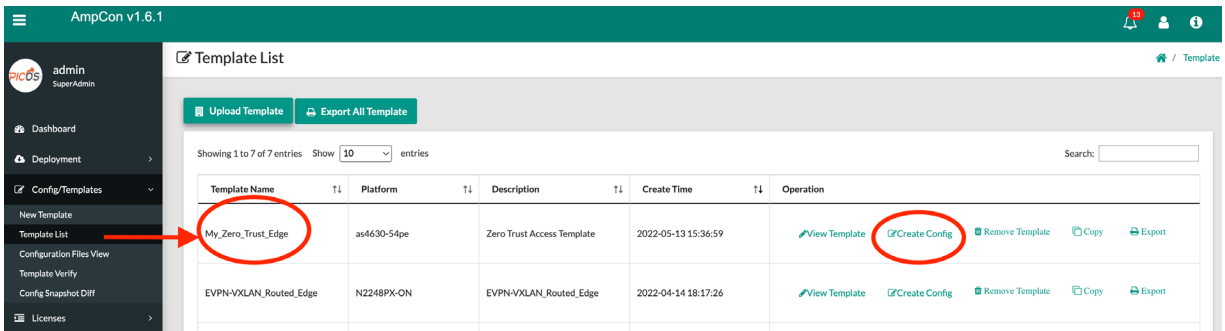
Upload Template

Name: *

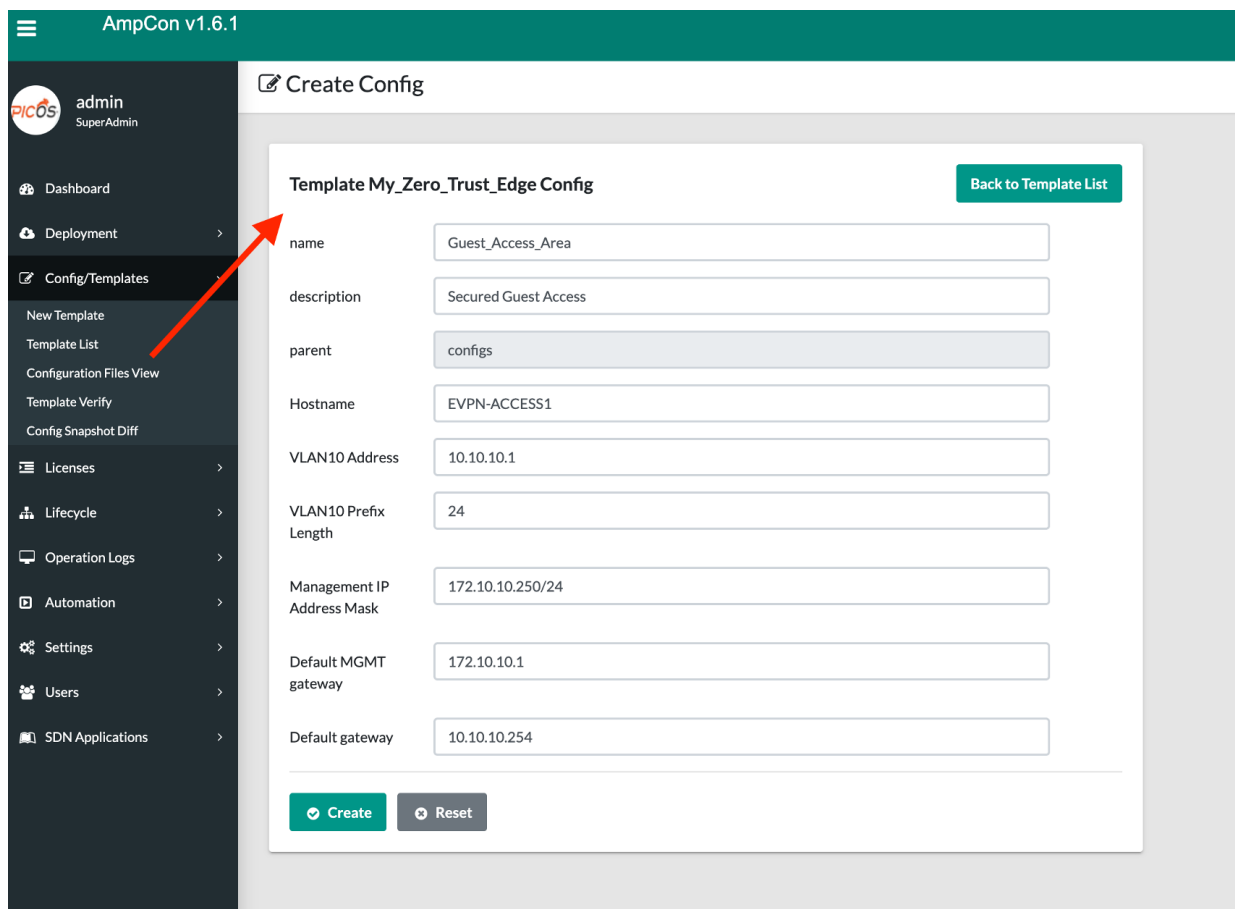
Description:

Template File: *

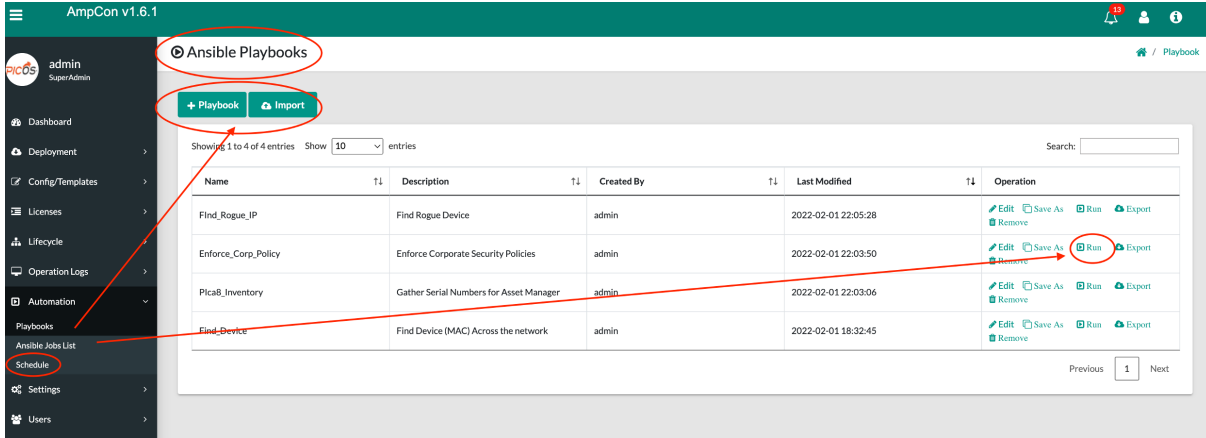
Upload



And instantly turn that template into a Wizard-Driven form that anyone of any experience level can fill-in to automate deployment:



And design your own Ansible Playbooks to perform tasks like compliance checking and security policy enforcement:



Ansible Playbook

Name: Description:

-
-
-
- Enforce_Corp_Policy
 - ComplianceEnforcement.yml

```

1 ---
2 - name: Check the Security Compliance (NAC) and enforce policy if needed
3   hosts: all
4   tasks:
5     - name: Show whether Dot1x is enabled on all interfaces
6       picos_config: mode='cli_show' cmd='show dot1x interface'
7       register: exec_result
8     - name: Compliance check on the NAC
9       debug: var=exec_result.stdout_lines
10    - name: Show interfaces in which Dot1X (NAC) is disabled
11      set_fact:
12        i_list: "{{ exec_result.stdout | regex_findall('\n(\\S)+ +disabled', ignorecase=True) }}"
13    - name: Loop through the interfaces that failed the Compliance Test and enable Dot1x
14      picos_config: mode='cli_config' cmd='set protocols dot1x interface {{ item }} auth-m
15      loop: "{{ i_list }}"
16    - name: Verify whether Dot1x is now enabled on all interfaces
17      picos_config: mode='cli_show' cmd='show dot1x interface'
18      register: exec_results
19    - name: NAC status on all ports after enforcing the NAC policy
20      debug: var=exec_results.stdout_lines
          
```

AmpCon v1.6.1

admin SuperAdmin

Ansible Jobs List

Job View Switch View

Showing 1 to 1 of 1 entries Show 10 entries Search:

Job Name	Playbook Name	Schedule Type	Job Creation Time	Created By (user)	Status	Operation
2022-05-13 16:04:56::Enforce_Corp_Policy	Enforce_Corp_Policy	Run Now	2022-05-13 16:05:05	admin	EXECUTED	Task Results Remove

Previous 1 Next

Task Results

Result Table Result Output

Hostname/SN Job Name Task Name Filter Clear

Showing 1 to 5 of 5 entries Show 10 entries Search:

Task Name	SN	Modified Time	Duration	State	Operation
Verify whether Dot1x is now enabled on all interfaces	463054PE2138020	2022-05-13 16:05:05	0:00:00.000000	Success	Show Result
NAC status on all ports after enforcing the NAC policy	463054PE2138020	2022-05-13 16:05:05	0:00:00.000000	Success	Show Result
Show interfaces in which Dot1X (NAC) is disabled	463054PE2138020	2022-05-13 16:05:04	0:00:00.000000	Success	Show Result
Show whether Dot1x is enabled on all interfaces	463054PE2138020	2022-05-13 16:05:03	0:00:00.000000	Success	Show Result
Compliance check on the NAC	463054PE2138020	2022-05-13 16:05:03	0:00:00.000000	Success	Show Result

Previous 1 Next

This is just a taste of the power of automation in AmpCon built for NetOps and DevOps alike.

Feel free to consult our videos here: <https://www.youtube.com/user/Pica8YT> for more Pica8 guided tutorials and checkout our GitHub Repo for sample configurations, templates, and playbooks:

<https://github.com/pica8>

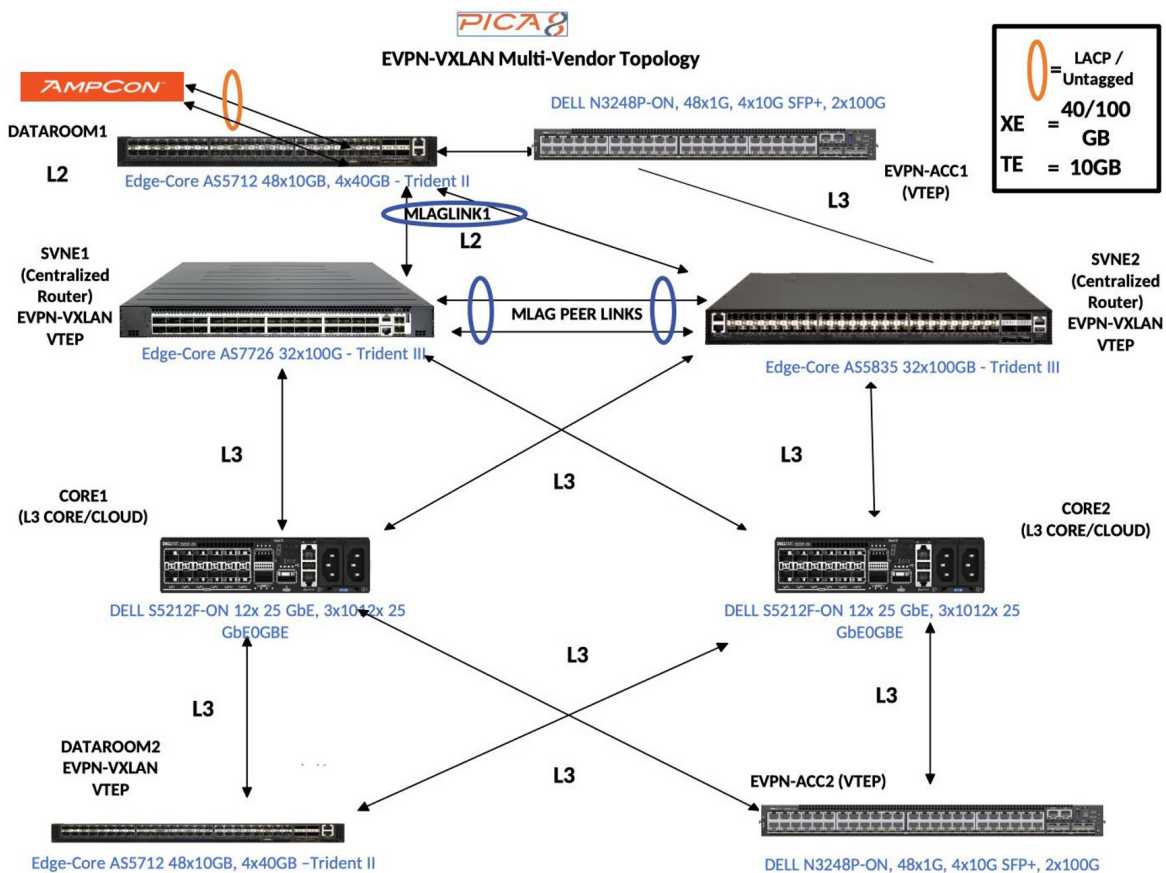
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Reference Topology and Test Configuration Examples

The following topology is representative of an Enterprise network utilizing EVPN-VXLAN Overlay and mixed BGP/OSPF Underlay network. In this case EVPN-VXLAN is used to deliver services and Zero-Trust to the edge while providing a robust Enterprise Layer-3, “all-links active” network utilizing MLAG, BGP, and OSPF, respectively.

The topology consists of a typical SPINE-LEAF, EVPN-VXLAN overlay with Service Virtual Network Endpoints (SVNE) “Spines” (SVNE1 and SVNE2), EVPN-VXLAN enabled Virtual Tunnel Endpoints (VTEPs) at the Data Services Edge (DATA ROOM 1) and Access Layer (EVPN-ACC1 and EVPN-ACC2), with a Layer-3 routed-core (CORE1 and CORE2) which could also be representative of the public Internet.



This topology is an example of Pica8’s ability to run on a mixed-vendor all whitebox (FS, DELL and Edgecore, in this case) network and provide secure, highly-available, and elastic EVPN-VXLAN enabled network fabric.



Example Pica8 Configurations

MLAG Configuration

MLAG is set up between SVNE1 and SVNE2

MLAG Configuration for SVNE1

```
set interface aggregate-ethernet ae1 description "Connection to VNE2"
set interface aggregate-ethernet ae1 aggregated-ether-options lACP enable true
set interface aggregate-ethernet ae1 family ethernet-switching native-vlan-id 4094
set interface aggregate-ethernet ae1 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 10
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 20
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 30
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 40
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 11
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 300
set interface aggregate-ethernet ae11 description "to S4128T-1"
set interface aggregate-ethernet ae11 aggregated-ether-options lACP enable true
set interface aggregate-ethernet ae11 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae11 family ethernet-switching vlan members 10,20,30,40
set interface aggregate-ethernet ae11 family ethernet-switching vlan members 300
set interface aggregate-ethernet ae12 description "to PC4-NAS"
set interface aggregate-ethernet ae12 family ethernet-switching native-vlan-id 40
set interface aggregate-ethernet ae12 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 40 untagged
set interface aggregate-ethernet ae20 description "Connection to EXT-ROUTER"
set interface aggregate-ethernet ae20 aggregated-ether-options lACP enable true
set interface gigabit-ethernet te-1/1/1 ether-options 802.3ad "ae11"
set interface gigabit-ethernet te-1/1/1 speed "10000"
set interface gigabit-ethernet te-1/1/2 ether-options 802.3ad "ae12"
set interface gigabit-ethernet te-1/1/2 speed "1000"
set interface gigabit-ethernet te-1/1/3 mtu 2000
set interface gigabit-ethernet te-1/1/3 ether-options 802.3ad "ae20"
set interface gigabit-ethernet te-1/1/3 speed "10000"
set interface gigabit-ethernet te-1/1/4 mtu 2000
set interface gigabit-ethernet te-1/1/4 speed "10000"
set interface gigabit-ethernet te-1/1/5 mtu 2000
set interface gigabit-ethernet te-1/1/6 mtu 2000
set interface gigabit-ethernet te-1/1/25 speed "1000"
set interface gigabit-ethernet te-1/1/26 speed "1000"
set interface gigabit-ethernet te-1/1/27 speed "1000"
set interface gigabit-ethernet te-1/1/28 speed "1000"
set interface gigabit-ethernet xe-1/1/1 description " TO CORE1 "
set interface gigabit-ethernet xe-1/1/1 mtu 2000
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/4 description " TO CORE2 "
set interface gigabit-ethernet xe-1/1/4 mtu 2000
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/5 ether-options 802.3ad "ae1"
```



```
set interface gigabit-ethernet xe-1/1/6 ether-options 802.3ad "ae1"
set ip routing enable true
set l3-interface vlan-interface vlan4094 address 10.0.0.1 prefix-length 30
set protocols lldp enable true
set protocols mlag domain 1 node 0
set protocols mlag domain 1 peer-ip 10.0.0.1 peer-link "ae1"
set protocols mlag domain 1 peer-ip 10.0.0.1 peer-vlan 4094
set protocols mlag domain 1 interface ae11 link 1
set protocols mlag domain 1 interface ae12 link 2
set protocols spanning-tree enable false
set protocols spanning-tree mstp interface te-1/1/28 manual-forwarding true
set system hostname "SVNE1"
set vlans vlan-id 10 l3-interface "vlan10"
set vlans vlan-id 11 l3-interface "vlan11"
set vlans vlan-id 20 l3-interface "vlan20"
set vlans vlan-id 30 l3-interface "vlan30"
set vlans vlan-id 40 l3-interface "vlan40"
set vlans vlan-id 300 l3-interface "vlan300"
set vlans vlan-id 3000 l3-interface "vlan3000"
set vlans vlan-id 3101 l3-interface "vlan3101"
set vlans vlan-id 3102 l3-interface "vlan3102"
set vlans vlan-id 4094 l3-interface "vlan4094"
set vlans vlan-id 111
set vlans vlan-id 888
```

MLAG Configuration for SVNE2

```
set interface aggregate-ethernet ae1 description "Connection to VNE1"
set interface aggregate-ethernet ae1 aggregated-ether-options lacp enable true
set interface aggregate-ethernet ae1 family ethernet-switching native-vlan-id 4094
set interface aggregate-ethernet ae1 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 10
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 20
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 30
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 40
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 11
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 300
set interface aggregate-ethernet ae11 description "to S4128T-1"
set interface aggregate-ethernet ae11 aggregated-ether-options lacp enable true
set interface aggregate-ethernet ae11 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae11 family ethernet-switching vlan members 10,20,30,40
set interface aggregate-ethernet ae11 family ethernet-switching vlan members 300
set interface aggregate-ethernet ae12 description "to PC4-NAS"
set interface aggregate-ethernet ae12 family ethernet-switching native-vlan-id 40
set interface aggregate-ethernet ae12 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 40 untagged
set interface aggregate-ethernet ae20 description "Connection to EXT-ROUTER"
set interface aggregate-ethernet ae20 aggregated-ether-options lacp enable true
set interface gigabit-ethernet te-1/1/1 ether-options 802.3ad "ae11"
set interface gigabit-ethernet te-1/1/1 speed "10000"
set interface gigabit-ethernet te-1/1/2 ether-options 802.3ad "ae12"
set interface gigabit-ethernet te-1/1/2 speed "1000"
set interface gigabit-ethernet te-1/1/3 mtu 2000
set interface gigabit-ethernet te-1/1/3 ether-options 802.3ad "ae20"
```

```

set interface gigabit-ethernet te-1/1/3 speed "10000"
set interface gigabit-ethernet te-1/1/4 mtu 2000
set interface gigabit-ethernet te-1/1/4 speed "10000"
set interface gigabit-ethernet te-1/1/5 mtu 2000
set interface gigabit-ethernet te-1/1/6 mtu 2000
set interface gigabit-ethernet xe-1/1/1 description " TO CORE2 "
set interface gigabit-ethernet xe-1/1/1 mtu 2000
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/4 description " TO CORE1 "
set interface gigabit-ethernet xe-1/1/4 mtu 2000
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/5 ether-options 802.3ad "ae1"
set interface gigabit-ethernet xe-1/1/6 ether-options 802.3ad "ae1"
set ip routing enable true
set l3-interface loopback lo address 10.1.1.202 prefix-length 32
set l3-interface loopback lo address 10.1.1.254 prefix-length 32
set l3-interface vlan-interface vlan4094 address 10.0.0.2 prefix-length 30
set protocols lldp enable true
set protocols mlag domain 1 node 1
set protocols mlag domain 1 peer-ip 10.0.0.2 peer-link "ae1"
set protocols mlag domain 1 peer-ip 10.0.0.2 peer-vlan 4094
set protocols mlag domain 1 interface ae11 link 1
set protocols mlag domain 1 interface ae12 link 2
set protocols spanning-tree enable false
set system hostname "SVNE2"
set vlans vlan-id 10 l3-interface "vlan10"
set vlans vlan-id 11 l3-interface "vlan11"
set vlans vlan-id 20 l3-interface "vlan20"
set vlans vlan-id 30 l3-interface "vlan30"
set vlans vlan-id 40 l3-interface "vlan40"
set vlans vlan-id 300 l3-interface "vlan300"
set vlans vlan-id 3000 l3-interface "vlan3000"
set vlans vlan-id 3101 l3-interface "vlan3101"
set vlans vlan-id 3102 l3-interface "vlan3102"
set vlans vlan-id 4094 l3-interface "vlan4094"
set vlans vlan-id 111
set vlans vlan-id 888

```

admin@SVNE2#

MLAG Configuration for DATAROOM1 Switch [+Localized L2]

admin@DATAROOM-SW1#

```

set alias s as "show/display set/no-more"
set interface aggregate-ethernet ae12 description "lACP link to Esxi Server"
set interface aggregate-ethernet ae12 aggregated-ether-options lacp enable true
set interface aggregate-ethernet ae12 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 10
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 20

```



```
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 111
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 888
set interface aggregate-ethernet ae12 family ethernet-switching native-vlan-id 111
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 111 untagged
set interface aggregate-ethernet ae1 aggregated-ether-options lacp enable true
set interface aggregate-ethernet ae1 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 111
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 888
set interface gigabit-ethernet xe-1/1/1 ether-options 802.3ad "ae12"
set interface gigabit-ethernet xe-1/1/2 ether-options 802.3ad "ae12"
set interface gigabit-ethernet te-1/1/1 ether-options 802.3ad "ae1"
set interface gigabit-ethernet te-1/1/2 ether-options 802.3ad "ae1"
set ip routing enable true
set protocols lldp enable true
set system hostname "DATAROOM-SW1"
set l3-interface vlan-interface vlan4094 address 10.0.0.3 prefix-length 30
set protocols lldp enable true
set protocols mlag domain 1 node 2
set protocols mlag domain 1 peer-ip 10.0.0.1 peer-link "ae12"
set protocols mlag domain 1 peer-ip 10.0.0.1 peer-vlan 4094
set protocols mlag domain 1 peer-ip 10.0.0.2 peer-link "ae12"
set protocols mlag domain 1 peer-ip 10.0.0.2 peer-vlan 4094
set protocols mlag domain 1 interface ae12 link 1
set protocols mlag domain 1 interface ae12 link 2
set protocols spanning-tree enable true
set vlans vlan-id 10
set vlans vlan-id 20
set vlans vlan-id 111
set vlans vlan-id 888
set vlans vlan-id 4094 l3-interface "vlan4094"
```

MLAG Verification

```
admin@SVNE1# run show mlag domain summary
Domain ID: 1      Domain MAC: 48:6E:73:FF:00:01      Node ID: 0
```

```
-----
Peer Link  Peer IP          Peer Vlan  Neighbor Status  Config Matched  MAC Synced  # of Links
-----
ae1        10.0.0.2           4094      ESTABLISHED      Yes             Yes         2
```

```
admin@SVNE1#
admin@SVNE1#
admin@SVNE1#
admin@SVNE1# runs h
Not a XORP configure mode command!
admin@SVNE1# run show mlag consistency-parameter summary
Overall : PASS
-----
Global   : PASS
Link 1   : PASS
Link 2   : PASS
```

MLAG Configurations:



```

-----
Property                Local Value      Peer Value      Result
-----
Domain ID                1                1                PASS
Node ID                  0                1                PASS
Peer VLAN                4094            4094            PASS
Link Count               2                2                PASS
Link IDs                 1 2             1 2             PASS

```

Spanning-Tree Configurations:

```

-----
Property                Local Value      Peer Value      Result
-----
Enable                  No                No                PASS

```

DHCP Snooping Configurations:

```

-----
Property                Local Value      Peer Value      Result
-----
VLAN Count              0                0                PASS
VLAN IDs                PASS

```

IGMP Snooping Configurations:

```

-----
Property                Local Value      Peer Value      Result
-----
Enable                  No                No                PASS

```

VXLAN Configurations:

```

-----
Property                Local Value      Peer Value      Result
-----
VXLAN UDP Port          0                0                PASS
VXLAN Mac Learning      TRUE             TRUE             PASS
VXLAN Enable            FALSE            FALSE            PASS
VXLAN Source VTEP       0.0.0.0         0.0.0.0         PASS
VXLAN VNI Count         0                0                PASS
VXLAN VNIs              PASS

```

admin@SVNE1# run show mlag domain s

Possible completions:

- <domain> Show MLAG domain information
- summary Show MLAG domain summary information

admin@SVNE1# run show mlag domain summary

Domain ID: 1 Domain MAC: 48:6E:73:FF:00:01 Node ID: 0

```

-----
Peer Link Peer IP      Peer Vlan Neighbor Status Config Matched MAC Synced # of Links
-----
ael        10.0.0.2    4094     ESTABLISHED   Yes          Yes          2

```

admin@SVNE1#

admin@SVNE1# run show mlag link ?

Possible completions:

- <link> Show MLAG link information
- summary Show MLAG link summary information

admin@SVNE1# run show mlag link su

Possible completions:



```

<link> Show MLAG link information
summary Show MLAG link summary information

```

```

admin@SVNE1# run show mlag link summary
Total Links: 2

```

Link	Local LAG	Link Status	Local Status	Peer Status	Config Matched	Flood
1	ae11	FULL	UP	UP	Yes	No
2	ae12	FULL	UP	UP	Yes	No

```

admin@SVNE1#

```

```

admin@SVNE1# run show mlag link 1 ?

```

```

Possible completions:

```

```

<[Enter]> Execute this command
| Pipe through a command

```

```

admin@SVNE1# run show mlag link 1

```

Link	Local LAG	Link Status	Local Status	Peer Status	Config Matched	Flood
1	ae11	FULL	UP	UP	Yes	No

```

admin@SVNE1# run show mlag consistency-parameter link 1

```

```

Port Configurations:

```

Property	Local Value	Peer Value	Result
MTU	1514	1514	PASS
Mac Learning	Yes	Yes	PASS
Lag Mode	LACP	LACP	PASS
Native Vlan	1	1	PASS
Port Vlan Mode	Trunk	Trunk	PASS
Trunk Vlan Count	4	4	PASS
Trunk VLAN IDs			PASS

```

Spanning-Tree Configurations:

```

Property	Local Value	Peer Value	Result

```

VXLAN Configurations:

```

Property	Local Value	Peer Value	Result
Link 1 VXLAN	N/A	N/A	PASS

```

admin@SVNE1# set protocols spanning-tree enable true

```

```

admin@SVNE1# commit

```

```

Commit OK.

```

```

Save done.

```

```

admin@SVNE1#

```

```

admin@SVNE1#

```

```

admin@SVNE1# run show mlag domain su

```

```

Possible completions:

```

```

<domain> Show MLAG domain information
summary Show MLAG domain summary information

```

```

admin@SVNE1# run show mlag domain summary

```

```

Domain ID: 1 Domain MAC: 48:6E:73:FF:00:01 Node ID: 0

```

```

-----
Peer Link Peer IP Peer Vlan Neighbor Status Config Matched MAC Synced # of Links

```



```
-----  
ael          10.0.0.2          4094          ESTABLISHED          Yes          Yes          2
```

```
admin@SVNE1# run show mlag consistency-parameter summary
```

```
Overall : PASS
```

```
-----  
Global : PASS
```

```
Link 1 : PASS
```

```
Link 2 : PASS
```

MLAG Configurations:

```
-----  
Property          Local Value          Peer Value          Result  
-----  
Domain ID         1                    1                    PASS  
Node ID           0                    1                    PASS  
Peer VLAN         4094                 4094                 PASS  
Link Count        2                    2                    PASS  
Link IDs          1 2                  1 2                  PASS
```

Spanning-Tree Configurations:

```
-----  
Property          Local Value          Peer Value          Result  
-----  
Enable            Yes                  Yes                  PASS  
Mode              MSTP(in CIST)       MSTP(in CIST)       PASS  
CIST  
-- Bridge Priority 32768                32768                PASS  
-- Hello Time     2                    2                    PASS  
-- Forward Delay  15                   15                   PASS  
-- Max Age        20                   20                   PASS  
-- Max Hops       20                   20                   PASS  
-- Configuration Name Pica8                Pica8                PASS  
-- Revision Level  0                    0                    PASS  
MST Instance Count 0                    0                    PASS
```

DHCP Snooping Configurations:

```
-----  
Property          Local Value          Peer Value          Result  
-----  
VLAN Count        0                    0                    PASS  
VLAN IDs          PASS
```

IGMP Snooping Configurations:

```
-----  
Property          Local Value          Peer Value          Result  
-----  
Enable            No                   No                   PASS
```

VXLAN Configurations:

```
-----  
Property          Local Value          Peer Value          Result  
-----  
VXLAN UDP Port    0                    0                    PASS  
VXLAN Mac Learning TRUE                 TRUE                 PASS  
VXLAN Enable      FALSE                FALSE                PASS  
VXLAN Source VTEP  0.0.0.0              0.0.0.0              PASS
```




```
VXLAN VNI Count          0          0          PASS
VXLAN VNIs              PASS
admin@SVNE1#
```

Underlay

Underlay Configuration

The Underlay configuration includes MP-BGP, OSPF, and the use of individualized VRFs to further segment and control routing.

Following are underlay configuration for SVNE1.

```
set interface gigabit-ethernet xe-1/1/3 mtu 2000
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/3 speed "40000"
set interface gigabit-ethernet xe-1/1/4 mtu 2000
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/4 speed "40000"

set protocols ospf router-id 10.1.1.201
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3101 network "point-to-point"
set protocols ospf interface vlan3102 network "point-to-point"

set ip vrf blue
set l3-interface loopback lo address 10.1.1.201 prefix-length 32
set l3-interface loopback lo address 10.1.1.254 prefix-length 32
set l3-interface vlan-interface vlan4094 address 1.1.1.1 prefix-length 30
set l3-interface vlan-interface vlan3101 description "Connection to Core1"
set l3-interface vlan-interface vlan3101 address 10.1.1.0 prefix-length 31
set l3-interface vlan-interface vlan3102 description "Connection to Core2"
set l3-interface vlan-interface vlan3102 address 10.1.1.4 prefix-length 31
set l3-interface vlan-interface vlan10 vrf "blue"
set l3-interface vlan-interface vlan10 address 192.168.10.1 prefix-length 24
set l3-interface vlan-interface vlan10 address 2001:10::10:61 prefix-length 64
set l3-interface vlan-interface vlan20 vrf "blue"
set l3-interface vlan-interface vlan20 address 192.168.20.1 prefix-length 24
set l3-interface vlan-interface vlan20 address 2001:20::20:61 prefix-length 64
set l3-interface vlan-interface vlan30 vrf "blue"
set l3-interface vlan-interface vlan30 address 192.168.30.1 prefix-length 24
set l3-interface vlan-interface vlan30 address 2001:30::30:61 prefix-length 64
set l3-interface vlan-interface vlan40 vrf "blue"
set l3-interface vlan-interface vlan40 address 192.168.40.1 prefix-length 24
set l3-interface vlan-interface vlan40 address 2001:40::40:61 prefix-length 64
set l3-interface vlan-interface vlan11 vrf "blue"
set l3-interface vlan-interface vlan11 address 192.168.11.1 prefix-length 24
set l3-interface vlan-interface vlan300 address 192.168.42.117 prefix-length 24
set protocols vrrp interface vlan10 vrid 1 version 3
```



```
set protocols vrrp interface vlan10 vrid 1 ip 192.168.10.254
set protocols vrrp interface vlan10 vrid 1 load-balance disable false
set protocols vrrp interface vlan10 vrid 6 version 3
set protocols vrrp interface vlan10 vrid 6 ip fe80::10
set protocols vrrp interface vlan10 vrid 6 ip 2001:10::10:254
set protocols vrrp interface vlan10 vrid 6 load-balance disable false
set protocols vrrp interface vlan20 vrid 2 version 3
set protocols vrrp interface vlan20 vrid 2 ip 192.168.20.254
set protocols vrrp interface vlan20 vrid 2 load-balance disable false
set protocols vrrp interface vlan20 vrid 7 version 3
set protocols vrrp interface vlan20 vrid 7 ip fe80::20
set protocols vrrp interface vlan20 vrid 7 ip 2001:20::20:254
set protocols vrrp interface vlan20 vrid 7 load-balance disable false
set protocols vrrp interface vlan30 vrid 3 version 3
set protocols vrrp interface vlan30 vrid 3 ip 192.168.30.254
set protocols vrrp interface vlan30 vrid 3 load-balance disable false
set protocols vrrp interface vlan30 vrid 8 version 3
set protocols vrrp interface vlan30 vrid 8 ip fe80::30
set protocols vrrp interface vlan30 vrid 8 ip 2001:30::30:254
set protocols vrrp interface vlan30 vrid 8 load-balance disable false
set protocols vrrp interface vlan40 vrid 4 version 3
set protocols vrrp interface vlan40 vrid 4 ip 192.168.40.254
set protocols vrrp interface vlan40 vrid 4 load-balance disable false
set protocols vrrp interface vlan40 vrid 9 version 3
set protocols vrrp interface vlan40 vrid 9 ip fe80::40
set protocols vrrp interface vlan40 vrid 9 ip 2001:40::40:254
set protocols vrrp interface vlan40 vrid 9 load-balance disable false
set protocols vrrp interface vlan11 vrid 5 version 3
set protocols vrrp interface vlan11 vrid 5 ip 192.168.11.254
set protocols vrrp interface vlan11 vrid 5 load-balance disable false
set protocols vrrp interface vlan300 vrid 30 version 3
set protocols vrrp interface vlan300 vrid 30 ip 192.168.42.119
set protocols vrrp interface vlan300 vrid 30 load-balance disable false

set protocols bgp local-as 65001
set protocols bgp router-id 10.1.1.201
set protocols bgp peer-group RR remote-as "internal"
set protocols bgp peer-group RR update-source "10.1.1.201"
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor 10.1.1.203 peer-group "RR"
set protocols bgp neighbor 10.1.1.204 peer-group "RR"
set protocols bgp ipv4-unicast redistribute connected
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw
```

Following are underlay configuration for SVNE2.

```
set interface gigabit-ethernet xe-1/1/3 mtu 2000
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/3 speed "40000"
set interface gigabit-ethernet xe-1/1/4 mtu 2000
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching port-mode "trunk"
```



```
set interface gigabit-ethernet xe-1/1/4 speed "40000"

set l3-interface loopback lo address 10.1.1.202 prefix-length 32
set l3-interface loopback lo address 10.1.1.254 prefix-length 32
set l3-interface vlan-interface vlan3101 description "Connection to Core2"
set l3-interface vlan-interface vlan3101 address 10.1.1.17 prefix-length 30
set l3-interface vlan-interface vlan3102 description "Connection to Core1"
set l3-interface vlan-interface vlan3102 address 10.1.1.13 prefix-length 30
set protocols ospf router-id 10.1.1.202
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3101 network "point-to-point"
set protocols ospf interface vlan3102 network "point-to-point"

set ip vrf blue
set l3-interface loopback lo address 10.1.1.202 prefix-length 32
set l3-interface loopback lo address 10.1.1.254 prefix-length 32
set l3-interface vlan-interface vlan4094 address 1.1.1.2 prefix-length 30
set l3-interface vlan-interface vlan3101 description "Connection to Core2"
set l3-interface vlan-interface vlan3101 address 10.1.1.16 prefix-length 31
set l3-interface vlan-interface vlan3102 description "Connection to Core1"
set l3-interface vlan-interface vlan3102 address 10.1.1.12 prefix-length 31
set l3-interface vlan-interface vlan10 vrf "blue"
set l3-interface vlan-interface vlan10 address 192.168.10.2 prefix-length 24
set l3-interface vlan-interface vlan10 address 2001:10::10:62 prefix-length 64
set l3-interface vlan-interface vlan40 vrf "blue"
set l3-interface vlan-interface vlan40 address 192.168.40.2 prefix-length 24
set l3-interface vlan-interface vlan40 address 2001:40::40:62 prefix-length 64
set l3-interface vlan-interface vlan20 vrf "blue"
set l3-interface vlan-interface vlan20 address 192.168.20.2 prefix-length 24
set l3-interface vlan-interface vlan20 address 2001:20::20:62 prefix-length 64
set l3-interface vlan-interface vlan30 vrf "blue"
set l3-interface vlan-interface vlan30 address 192.168.30.2 prefix-length 24
set l3-interface vlan-interface vlan30 address 2001:30::30:62 prefix-length 64
set l3-interface vlan-interface vlan11 vrf "blue"
set l3-interface vlan-interface vlan11 address 192.168.11.1 prefix-length 24
set l3-interface vlan-interface vlan300 address 192.168.42.118 prefix-length 24

set protocols bgp local-as 65001
set protocols bgp router-id 10.1.1.202
set protocols bgp peer-group RR remote-as "internal"
set protocols bgp peer-group RR update-source "10.1.1.202"
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor 10.1.1.203 peer-group "RR"
set protocols bgp neighbor 10.1.1.204 peer-group "RR"
set protocols bgp ipv4-unicast redistribute connected
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw

set protocols ospf router-id 10.1.1.202
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3101 network "point-to-point"
set protocols ospf interface vlan3102 network "point-to-point"
```

```
set protocols vrrp interface vlan10 vrid 1 version 3
set protocols vrrp interface vlan10 vrid 1 ip 192.168.10.254
set protocols vrrp interface vlan10 vrid 1 load-balance disable false
set protocols vrrp interface vlan10 vrid 6 version 3
set protocols vrrp interface vlan10 vrid 6 ip fe80::10
set protocols vrrp interface vlan10 vrid 6 ip 2001:10::10:254
set protocols vrrp interface vlan10 vrid 6 load-balance disable false
set protocols vrrp interface vlan20 vrid 2 version 3
set protocols vrrp interface vlan20 vrid 2 ip 192.168.20.254
set protocols vrrp interface vlan20 vrid 2 load-balance disable false
set protocols vrrp interface vlan20 vrid 7 version 3
set protocols vrrp interface vlan20 vrid 7 ip fe80::20
set protocols vrrp interface vlan20 vrid 7 ip 2001:20::20:254
set protocols vrrp interface vlan20 vrid 7 load-balance disable false
set protocols vrrp interface vlan30 vrid 3 version 3
set protocols vrrp interface vlan30 vrid 3 ip 192.168.30.254
set protocols vrrp interface vlan30 vrid 3 load-balance disable false
set protocols vrrp interface vlan30 vrid 8 version 3
set protocols vrrp interface vlan30 vrid 8 ip fe80::30
set protocols vrrp interface vlan30 vrid 8 ip 2001:30::30:254
set protocols vrrp interface vlan30 vrid 8 load-balance disable false
set protocols vrrp interface vlan40 vrid 4 version 3
set protocols vrrp interface vlan40 vrid 4 ip 192.168.40.254
set protocols vrrp interface vlan40 vrid 4 load-balance disable false
set protocols vrrp interface vlan40 vrid 9 version 3
set protocols vrrp interface vlan40 vrid 9 ip fe80::40
set protocols vrrp interface vlan40 vrid 9 ip 2001:40::40:254
set protocols vrrp interface vlan40 vrid 9 load-balance disable false
set protocols vrrp interface vlan11 vrid 5 version 3
set protocols vrrp interface vlan11 vrid 5 ip 192.168.11.254
set protocols vrrp interface vlan11 vrid 5 load-balance disable false
set protocols vrrp interface vlan300 vrid 30 version 3
set protocols vrrp interface vlan300 vrid 30 ip 192.168.42.119
set protocols vrrp interface vlan300 vrid 30 load-balance disable false
```

Following are underlay configuration for CORE1.

```
set interface gigabit-ethernet te-1/1/1 mtu 2000
set interface gigabit-ethernet te-1/1/1 family ethernet-switching native-vlan-id 3201
set interface gigabit-ethernet te-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/1 speed "10000"
set interface gigabit-ethernet te-1/1/2 mtu 2000
set interface gigabit-ethernet te-1/1/2 family ethernet-switching native-vlan-id 3202
set interface gigabit-ethernet te-1/1/2 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/2 speed "10000"
set interface gigabit-ethernet te-1/1/3 mtu 2000
set interface gigabit-ethernet te-1/1/3 family ethernet-switching native-vlan-id 3203
set interface gigabit-ethernet te-1/1/3 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/3 speed "10000"
set interface gigabit-ethernet te-1/1/4 speed "10000"
set interface gigabit-ethernet xe-1/1/1 mtu 2000
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/2 mtu 2000
```

```

set interface gigabit-ethernet xe-1/1/2 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/2 family ethernet-switching port-mode "trunk"
set ip routing enable true
set l3-interface loopback lo address 10.1.1.203 prefix-length 32
set l3-interface vlan-interface vlan3100 description "Connection to Core2"
set l3-interface vlan-interface vlan3100 address 10.1.1.21 prefix-length 31
set l3-interface vlan-interface vlan3101 description " Connection to VNE1"
set l3-interface vlan-interface vlan3101 address 10.1.1.1 prefix-length 31
set l3-interface vlan-interface vlan3102 description " Connection to VNE2"
set l3-interface vlan-interface vlan3102 address 10.1.1.13 prefix-length 31
set l3-interface vlan-interface vlan3201 description " Connection to ACC1"
set l3-interface vlan-interface vlan3201 address 10.1.1.24 prefix-length 31
set l3-interface vlan-interface vlan3202 description " Connection to ACC2"
set l3-interface vlan-interface vlan3202 address 10.1.1.32 prefix-length 31
set l3-interface vlan-interface vlan3203 description "Connection to ACC3"
set l3-interface vlan-interface vlan3203 address 10.1.1.38 prefix-length 31
set protocols bgp local-as 65001
set protocols bgp cluster-id 10.1.1.203
set protocols bgp router-id 10.1.1.203
set protocols bgp peer-group RRclient remote-as "internal"
set protocols bgp peer-group RRclient update-source "10.1.1.203"
set protocols bgp peer-group RRclient evpn activate true
set protocols bgp peer-group RRclient evpn route-reflector-client
set protocols bgp neighbor 10.1.1.201 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.202 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.207 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.208 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.209 peer-group "RRclient"
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw
set protocols lldp enable true
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.203
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3100 network "point-to-point"
set protocols ospf interface vlan3101 network "point-to-point"
set protocols ospf interface vlan3102 network "point-to-point"
set protocols ospf interface vlan3201 network "point-to-point"
set protocols ospf interface vlan3202 network "point-to-point"
set protocols ospf interface vlan3203 network "point-to-point"

```

Following are underlay configuration for CORE2.

```

set interface gigabit-ethernet te-1/1/1 mtu 2000
set interface gigabit-ethernet te-1/1/1 family ethernet-switching native-vlan-id 3201
set interface gigabit-ethernet te-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/1 speed "10000"
set interface gigabit-ethernet te-1/1/2 mtu 2000
set interface gigabit-ethernet te-1/1/2 family ethernet-switching native-vlan-id 3202
set interface gigabit-ethernet te-1/1/2 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/2 speed "10000"
set interface gigabit-ethernet te-1/1/3 speed "10000"

```



```
set interface gigabit-ethernet te-1/1/4 mtu 2000
set interface gigabit-ethernet te-1/1/4 family ethernet-switching native-vlan-id 3204
set interface gigabit-ethernet te-1/1/4 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/4 speed "10000"
set interface gigabit-ethernet xe-1/1/1 mtu 2000
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/2 mtu 2000
set interface gigabit-ethernet xe-1/1/2 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/2 family ethernet-switching port-mode "trunk"
set ip routing enable true
set l3-interface loopback lo address 10.1.1.204 prefix-length 32
set l3-interface vlan-interface vlan3100 description "Connection to Core1"
set l3-interface vlan-interface vlan3100 address 10.1.1.21 prefix-length 31
set l3-interface vlan-interface vlan3101 description " Connection to VNE2"
set l3-interface vlan-interface vlan3101 address 10.1.1.17 prefix-length 31
set l3-interface vlan-interface vlan3102 description " Connection to VNE1"
set l3-interface vlan-interface vlan3102 address 10.1.1.5 prefix-length 31
set l3-interface vlan-interface vlan3201 description " Connection to ACC2"
set l3-interface vlan-interface vlan3201 address 10.1.1.36 prefix-length 31
set l3-interface vlan-interface vlan3202 description " Connection to ACC1"
set l3-interface vlan-interface vlan3202 address 10.1.1.28 prefix-length 31
set l3-interface vlan-interface vlan3204 description "Connection to ACC3"
set l3-interface vlan-interface vlan3204 address 10.1.1.40 prefix-length 31
set protocols bgp local-as 65001
set protocols bgp cluster-id 10.1.1.203
set protocols bgp router-id 10.1.1.204
set protocols bgp peer-group RRclient remote-as "internal"
set protocols bgp peer-group RRclient update-source "10.1.1.204"
set protocols bgp peer-group RRclient evpn activate true
set protocols bgp peer-group RRclient evpn route-reflector-client
set protocols bgp neighbor 10.1.1.201 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.202 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.207 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.208 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.209 peer-group "RRclient"
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw
set protocols lldp enable true
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.204
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3100 network "point-to-point"
set protocols ospf interface vlan3101 network "point-to-point"
set protocols ospf interface vlan3102 network "point-to-point"
set protocols ospf interface vlan3201 network "point-to-point"
set protocols ospf interface vlan3202 network "point-to-point"
set protocols ospf interface vlan3204 network "point-to-point"
```



Following are underlay configuration for DATAROOM2.

```
set protocols lldp enable true
set ip routing enable true
set interface gigabit-ethernet xe-1/1/5 description "To CORE 2"
set interface gigabit-ethernet xe-1/1/5 mtu 2000
set interface gigabit-ethernet xe-1/1/5 family ethernet-switching native-vlan-id 3202
set interface gigabit-ethernet xe-1/1/5 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/6 description "To CORE 1"
set interface gigabit-ethernet xe-1/1/6 mtu 2000
set interface gigabit-ethernet xe-1/1/6 family ethernet-switching native-vlan-id 3201
set interface gigabit-ethernet xe-1/1/6 family ethernet-switching port-mode "trunk"
set l3-interface loopback lo address 10.1.1.207 prefix-length 32
set l3-interface vlan-interface vlan3201 description "Connection to CORE1"
set l3-interface vlan-interface vlan3201 address 10.1.1.38 prefix-length 30
set l3-interface vlan-interface vlan3202 description "Connection to CORE2"
set l3-interface vlan-interface vlan3202 address 10.1.1.46 prefix-length 30
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.207
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3201 network "point-to-point"
set protocols ospf interface vlan3202 network "point-to-point"

set vlans vlan-id 3201 l3-interface "vlan3201"
set vlans vlan-id 3202 l3-interface "vlan3202"
```

Underlay Verification

Following commands are used for verifying underlay configuration.

```
admin@EVPN-ACC1# run show ospf neighbor
Neighbor ID      Pri State           Dead Time Address           Interface
  RXmtL RqstL DBsmL
10.1.1.205       1 Full/DROther    37.294s 10.1.1.37          vlan3211:10.1.1.38
  0      0      0
10.1.1.206       1 Full/DROther    31.566s 10.1.1.45          vlan3212:10.1.1.46
  0      0      0

admin@EVPN-ACC1# run show ospf neighbor
Neighbor ID      Pri State           Dead Time Address           Interface
  RXmtL RqstL DBsmL
10.1.1.205       1 Full/DROther    31.756s 10.1.1.37          vlan3211:10.1.1.38
  0      0      0
10.1.1.206       1 Full/DROther    35.791s 10.1.1.45          vlan3212:10.1.1.46
  0      0      0

admin@EVPN-ACC1# run show ospf route
===== OSPF network routing table =====
N   10.1.1.0/30          [60] area: 0.0.0.0
                                   via 10.1.1.37, vlan3211
N   10.1.1.4/30         [60] area: 0.0.0.0
```

```

N 10.1.1.12/30 via 10.1.1.45, vlan3212
[60] area: 0.0.0.0
via 10.1.1.37, vlan3211
N 10.1.1.16/30 [60] area: 0.0.0.0
via 10.1.1.45, vlan3212
N 10.1.1.20/30 [60] area: 0.0.0.0
via 10.1.1.45, vlan3212
via 10.1.1.37, vlan3211
N 10.1.1.24/30 [40] area: 0.0.0.0
via 10.1.1.37, vlan3211
N 10.1.1.28/30 [40] area: 0.0.0.0
via 10.1.1.45, vlan3212
N 10.1.1.32/30 [40] area: 0.0.0.0
via 10.1.1.45, vlan3212
via 10.1.1.37, vlan3211
N 10.1.1.36/30 [20] area: 0.0.0.0
directly attached to vlan3211
N 10.1.1.40/30 [40] area: 0.0.0.0
via 10.1.1.37, vlan3211
N 10.1.1.44/30 [20] area: 0.0.0.0
directly attached to vlan3212
N 10.1.1.48/30 [40] area: 0.0.0.0
via 10.1.1.45, vlan3212
N 10.1.1.201/32 [60] area: 0.0.0.0
via 10.1.1.37, vlan3211
via 10.1.1.45, vlan3212
N 10.1.1.202/32 [60] area: 0.0.0.0
via 10.1.1.37, vlan3211
via 10.1.1.45, vlan3212
N 10.1.1.203/32 [40] area: 0.0.0.0
via 10.1.1.37, vlan3211
N 10.1.1.204/32 [40] area: 0.0.0.0
via 10.1.1.45, vlan3212
N 10.1.1.205/32 [20] area: 0.0.0.0
via 10.1.1.37, vlan3211
N 10.1.1.206/32 [20] area: 0.0.0.0
via 10.1.1.45, vlan3212
N 10.1.1.207/32 [0] area: 0.0.0.0
directly attached to lo
N 10.1.1.208/32 [40] area: 0.0.0.0
via 10.1.1.37, vlan3211
via 10.1.1.45, vlan3212
N 10.1.1.254/32 [60] area: 0.0.0.0
via 10.1.1.37, vlan3211
via 10.1.1.45, vlan3212

```

===== OSPF router routing table =====

```

R 10.1.1.201 [60] area: 0.0.0.0, ASBR
via 10.1.1.37, vlan3211
via 10.1.1.45, vlan3212
R 10.1.1.202 [60] area: 0.0.0.0, ASBR
via 10.1.1.37, vlan3211
via 10.1.1.45, vlan3212
R 10.1.1.203 [40] area: 0.0.0.0, ASBR
via 10.1.1.37, vlan3211

```



```
R 10.1.1.204 [40] area: 0.0.0.0, ASBR
via 10.1.1.45, vlan3212
R 10.1.1.205 [20] area: 0.0.0.0, ASBR
via 10.1.1.37, vlan3211
R 10.1.1.206 [20] area: 0.0.0.0, ASBR
via 10.1.1.45, vlan3212
R 10.1.1.208 [40] area: 0.0.0.0, ASBR
via 10.1.1.37, vlan3211
via 10.1.1.45, vlan3212
```

```
===== OSPF external routing table =====
N E2 1.1.1.0/30 [60/20] tag: 0
via 10.1.1.37, vlan3211
via 10.1.1.45, vlan3212
N E2 172.16.0.0/24 [40/20] tag: 0
via 10.1.1.37, vlan3211
via 10.1.1.45, vlan3212
```

```
admin@EVPN-ACC1# run ping 10.1.1.201
PING 10.1.1.201 (10.1.1.201) 56(84) bytes of data.
64 bytes from 10.1.1.201: icmp_seq=1 ttl=62 time=1.52 ms
64 bytes from 10.1.1.201: icmp_seq=2 ttl=62 time=1.27 ms
64 bytes from 10.1.1.201: icmp_seq=3 ttl=62 time=64.0 ms
64 bytes from 10.1.1.201: icmp_seq=4 ttl=62 time=1.52 ms
64 bytes from 10.1.1.201: icmp_seq=5 ttl=62 time=1.70 ms

--- 10.1.1.201 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 10ms
rtt min/avg/max/mdev = 1.271/13.998/63.982/24.992 ms
admin@EVPN-ACC1#
```

Overlay

Overlay Configuration

Following are overlay configuration for SVNE1.

```
set vlans vlan-id 10 l3-interface "vlan10"
set vlans vlan-id 11 l3-interface "vlan11"
set vlans vlan-id 20 l3-interface "vlan20"
set vlans vlan-id 30 l3-interface "vlan30"
set vlans vlan-id 40 l3-interface "vlan40"
set vlans vlan-id 300 l3-interface "vlan300"
set vlans vlan-id 3000 l3-interface "vlan3000"
set vlans vlan-id 3101 l3-interface "vlan3101"
set vlans vlan-id 3102 l3-interface "vlan3102"
set vlans vlan-id 4094 l3-interface "vlan4094"

set vxlans source-interface lo address 10.1.1.254
set vxlans vni 10010 decapsulation mode "service-vlan-per-port"
set vxlans vni 10010 vlan 10
```



```
set vxlans vni 10030 decapsulation mode "service-vlan-per-port"  
set vxlans vni 10030 vlan 30  
set vxlans vni 10020 decapsulation mode "service-vlan-per-port"  
set vxlans vni 10020 vlan 20  
set vxlans vni 10040 decapsulation mode "service-vlan-per-port"  
set vxlans vni 10040 vlan 40  
set vxlans vni 10011 decapsulation mode "service-vlan-per-port"  
set vxlans vni 10011 vlan 11
```

Following are overlay configuration for SVNE2.

```
set vlans vlan-id 10 l3-interface "vlan10"  
set vlans vlan-id 11 l3-interface "vlan11"  
set vlans vlan-id 20 l3-interface "vlan20"  
set vlans vlan-id 30 l3-interface "vlan30"  
set vlans vlan-id 40 l3-interface "vlan40"  
set vlans vlan-id 300 l3-interface "vlan300"  
set vlans vlan-id 3000 l3-interface "vlan3000"  
set vlans vlan-id 3101 l3-interface "vlan3101"  
set vlans vlan-id 3102 l3-interface "vlan3102"  
set vlans vlan-id 4094 l3-interface "vlan4094"  
  
set vxlans source-interface lo address 10.1.1.254  
set vxlans vni 10010 decapsulation mode "service-vlan-per-port"  
set vxlans vni 10010 vlan 10  
set vxlans vni 10040 decapsulation mode "service-vlan-per-port"  
set vxlans vni 10040 vlan 40  
set vxlans vni 10020 decapsulation mode "service-vlan-per-port"  
set vxlans vni 10020 vlan 20  
set vxlans vni 10030 decapsulation mode "service-vlan-per-port"  
set vxlans vni 10030 vlan 30  
set vxlans vni 10011 decapsulation mode "service-vlan-per-port"  
set vxlans vni 10011 vlan 11
```

Following are overlay configuration for CORE1.

```
set protocols bgp local-as 65001  
set protocols bgp cluster-id 10.1.1.203  
set protocols bgp router-id 10.1.1.203  
set protocols bgp peer-group RRclient remote-as "internal"  
set protocols bgp peer-group RRclient update-source "10.1.1.203"  
set protocols bgp peer-group RRclient evpn activate true  
set protocols bgp peer-group RRclient evpn route-reflector-client  
set protocols bgp neighbor 10.1.1.201 peer-group "RRclient"  
set protocols bgp neighbor 10.1.1.202 peer-group "RRclient"  
set protocols bgp neighbor 10.1.1.207 peer-group "RRclient"  
set protocols bgp neighbor 10.1.1.208 peer-group "RRclient"  
set protocols bgp neighbor 10.1.1.209 peer-group "RRclient"  
set protocols bgp evpn advertise-all-vni  
set protocols bgp evpn advertise-default-gw
```



Following are overlay configuration for CORE2.

```
set protocols bgp local-as 65001
set protocols bgp cluster-id 10.1.1.203
set protocols bgp router-id 10.1.1.204
set protocols bgp peer-group RRclient remote-as "internal"
set protocols bgp peer-group RRclient update-source "10.1.1.204"
set protocols bgp peer-group RRclient evpn activate true
set protocols bgp peer-group RRclient evpn route-reflector-client
set protocols bgp neighbor 10.1.1.201 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.202 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.207 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.208 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.209 peer-group "RRclient"
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw
```

Following are overlay configuration for DATAROOM2.

(SNMP target is the SNMP collector address)

(SFLOW Collector address is address of SFLOW/Inmon monitoring server)

```
set vlans vlan-id 10
set vlans vlan-id 20
set vlans vlan-id 111
set vlans vlan-id 888
set interface gigabit-ethernet te-1/1/1 ether-options 802.3ad "ae12"
set interface gigabit-ethernet te-1/1/2 ether-options 802.3ad "ae12"
set interface aggregate-ethernet ae12 aggregated-ether-options lacp enable true
set interface aggregate-ethernet ae12 description "to Windows Server"
set interface aggregate-ethernet ae12 family ethernet-switching native-vlan-id 888
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 888 untagged
set 13-interface loopback lo address 10.1.1.207 prefix-length 32
set protocols snmp community public authorization "read-only"
set protocols snmp contact "support@pica8.com"
set protocols snmp location "Palo-Alto"
set protocols snmp trap-group targets 10.10.10.228 security-name public
set protocols snmp trap-group version "v2"
set protocols snmp trap-group source-interface "Vlan10"
set protocols sflow disable false
set protocols sflow sampling-rate ingress 1000
set protocols sflow sampling-rate egress 1000
set protocols sflow polling-interval 10
set protocols sflow header-len 128
set protocols sflow collector 10.10.10.228
```

```
set protocols bgp local-as 65001
set protocols bgp router-id 10.1.1.207
set protocols bgp peer-group RR remote-as "internal"
set protocols bgp peer-group RR update-source "10.1.1.207"
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor 10.1.1.203 peer-group "RR"
set protocols bgp neighbor 10.1.1.204 peer-group "RR"
```



```
set protocols bgp ipv4-unicast network 10.1.1.207/32
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw

set vxlans source-interface lo address 10.1.1.207
set vxlans vni 10010 decapsulation mode "service-vlan-per-port"
set vxlans vni 10010 vlan 10
set vxlans vni 10020 decapsulation mode "service-vlan-per-port"
set vxlans vni 10020 vlan 20
set vxlans vni 10030 decapsulation mode "service-vlan-per-port"
set vxlans vni 10030 vlan 111
set vxlans vni 10040 decapsulation mode "service-vlan-per-port"
set vxlans vni 10040 vlan 888
```

Following are overlay configuration for ACCESS SWITCH1.

ACC2:

```
admin@EVPN-ACC1# s
set alias s as "show/display set/no-more"
set firewall filter block-20-101 sequence 20 from destination-address-ipv4 192.168.20.101/32
set firewall filter block-20-101 sequence 20 from source-address-ipv4 192.168.10.0/24
set firewall filter block-20-101 sequence 20 then action "discard"
set interface gigabit-ethernet ge-1/1/3 disable true
set interface gigabit-ethernet ge-1/1/5 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching native-vlan-id 999
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching vlan members 10
set interface gigabit-ethernet ge-1/1/12 family ethernet-switching native-vlan-id 20
set interface gigabit-ethernet ge-1/1/13 family ethernet-switching native-vlan-id 30
set interface gigabit-ethernet ge-1/1/14 family ethernet-switching native-vlan-id 40
set interface gigabit-ethernet ge-1/1/19 family ethernet-switching native-vlan-id 10
set interface gigabit-ethernet ge-1/1/19 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/19 voice-vlan vlan-id 11
set interface gigabit-ethernet ge-1/1/19 voice-vlan tagged mode "tag"
set interface gigabit-ethernet ge-1/1/20 family ethernet-switching native-vlan-id 10
set interface gigabit-ethernet te-1/1/1 mtu 2000
set interface gigabit-ethernet te-1/1/1 family ethernet-switching native-vlan-id 3201
set interface gigabit-ethernet te-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/2 mtu 2000
set interface gigabit-ethernet te-1/1/2 family ethernet-switching native-vlan-id 3202
set interface gigabit-ethernet te-1/1/2 family ethernet-switching port-mode "trunk"
set interface ethernet-switching-options
set ip routing enable true
set l3-interface loopback lo address 10.1.1.208 prefix-length 32
set l3-interface vlan-interface vlan3201 description "Connection to CORE2"
set l3-interface vlan-interface vlan3201 address 10.1.1.37 prefix-length 31
set l3-interface vlan-interface vlan3202 description "Connection to CORE1"
set l3-interface vlan-interface vlan3202 address 10.1.1.33 prefix-length 31
set poe interface all
set protocols bgp local-as 65001
set protocols bgp router-id 10.1.1.208
set protocols bgp peer-group RR remote-as "internal"
set protocols bgp peer-group RR update-source "10.1.1.208"
```



```
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor 10.1.1.203 peer-group "RR"
set protocols bgp neighbor 10.1.1.204 peer-group "RR"
set protocols bgp ipv4-unicast redistribute connected
set protocols bgp evpn advertise-all-vni
set protocols dot1x interface ge-1/1/5 host-mode "multiple"
set protocols dot1x interface ge-1/1/5 auth-mode 802.1x
set protocols dot1x interface ge-1/1/5 auth-mode mac-radius
set protocols dot1x aaa radius authentication server-ip 192.168.42.105 shared-key
    "cGljYThwaWNhOA=="
set protocols dot1x aaa radius dynamic-author client 192.168.42.105 shared-key "cGljYThwaWNhOA=="
set protocols dot1x aaa radius nas-ip 10.1.1.208
set protocols dot1x filter mac_auth_policy_2 description "dot1x-dynamic-filter"
set protocols dot1x filter mac_auth_policy_2 sequence 10 then
set protocols lldp enable true
set protocols lldp interface ge-1/1/19 compliance cdp true
set protocols lldp compliance cdp true
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.208
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3201 network "point-to-point"
set protocols ospf interface vlan3202 network "point-to-point"
set system hostname "EVPN-ACC1"
set system inband loopback 10.1.1.208
set vlans vlan-id 10
set vlans vlan-id 11
set vlans vlan-id 20
set vlans vlan-id 30
set vlans vlan-id 40
set vlans vlan-id 999
set vlans vlan-id 3201 l3-interface "vlan3201"
set vlans vlan-id 3202 l3-interface "vlan3202"
set vlans voice-vlan aging 600
set vxlans source-interface lo address 10.1.1.208
set vxlans vni 10010 decapsulation mode "service-vlan-per-port"
set vxlans vni 10010 vlan 10
set vxlans vni 10020 decapsulation mode "service-vlan-per-port"
set vxlans vni 10020 vlan 20
set vxlans vni 10030 decapsulation mode "service-vlan-per-port"
set vxlans vni 10030 vlan 30
set vxlans vni 10040 decapsulation mode "service-vlan-per-port"
set vxlans vni 10040 vlan 40
set vxlans vni 10011 decapsulation mode "service-vlan-per-port"
set vxlans vni 10011 vlan 11

admin@EVPN-ACC1#
```

Following are overlay configuration for ACCESS SWITCH2.

```
admin@EVPN-ACC2# s
set alias s as "show/display set/no-more"
set interface gigabit-ethernet ge-1/1/5 family ethernet-switching port-mode "trunk"
```

```

set interface gigabit-ethernet ge-1/1/6 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching native-vlan-id 999
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching vlan members 10
set interface gigabit-ethernet ge-1/1/12 family ethernet-switching native-vlan-id 20
set interface gigabit-ethernet ge-1/1/13 family ethernet-switching native-vlan-id 30
set interface gigabit-ethernet ge-1/1/14 family ethernet-switching native-vlan-id 40
set interface gigabit-ethernet ge-1/1/20 family ethernet-switching native-vlan-id 10
set interface gigabit-ethernet te-1/1/3 mtu 2000
set interface gigabit-ethernet te-1/1/3 family ethernet-switching native-vlan-id 3203
set interface gigabit-ethernet te-1/1/3 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/3 speed "10000"
set interface gigabit-ethernet te-1/1/4 mtu 2000
set interface gigabit-ethernet te-1/1/4 family ethernet-switching native-vlan-id 3204
set interface gigabit-ethernet te-1/1/4 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/4 speed "10000"
set ip routing enable true
set l3-interface loopback lo address 10.1.1.209 prefix-length 32
set l3-interface vlan-interface vlan3203 description "Connection to CORE1"
set l3-interface vlan-interface vlan3203 address 10.1.1.39 prefix-length 31
set l3-interface vlan-interface vlan3204 description "Connection to CORE2"
set l3-interface vlan-interface vlan3204 address 10.1.1.41 prefix-length 31
set poe interface all
set protocols bgp local-as 65001
set protocols bgp router-id 10.1.1.209
set protocols bgp peer-group RR remote-as "internal"
set protocols bgp peer-group RR update-source "10.1.1.209"
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor 10.1.1.203 peer-group "RR"
set protocols bgp neighbor 10.1.1.204 peer-group "RR"
set protocols bgp ipv4-unicast redistribute connected
set protocols bgp evpn advertise-all-vni
set protocols dot1x interface ge-1/1/5 host-mode "multiple"
set protocols dot1x interface ge-1/1/5 auth-mode 802.1x
set protocols dot1x interface ge-1/1/5 auth-mode mac-radius
set protocols dot1x interface ge-1/1/6 host-mode "multiple"
set protocols dot1x interface ge-1/1/6 auth-mode 802.1x
set protocols dot1x interface ge-1/1/6 auth-mode mac-radius
set protocols dot1x aaa radius authentication server-ip 192.168.42.105 shared-key
    "cGljYThwaWNhOA=="
set protocols dot1x aaa radius dynamic-author client 192.168.42.105 shared-key "cGljYThwaWNhOA=="
set protocols dot1x aaa radius nas-ip 10.1.1.209
set protocols dot1x filter mac_auth_policy_2 description "dot1x-dynamic-filter"
set protocols dot1x filter mac_auth_policy_2 sequence 10 then
set protocols lldp enable true
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.209
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3203 network "point-to-point"
set protocols ospf interface vlan3204 network "point-to-point"
set system hostname "EVPN-ACC2"
set system inband loopback 10.1.1.209
set vlans vlan-id 10

```



```
set vlans vlan-id 11
set vlans vlan-id 20
set vlans vlan-id 30
set vlans vlan-id 40
set vlans vlan-id 999
set vlans vlan-id 3203 l3-interface "vlan3203"
set vlans vlan-id 3204 l3-interface "vlan3204"
set vxlans source-interface lo address 10.1.1.209
set vxlans vni 10010 decapsulation mode "service-vlan-per-port"
set vxlans vni 10010 vlan 10
set vxlans vni 10020 decapsulation mode "service-vlan-per-port"
set vxlans vni 10020 vlan 20
set vxlans vni 10030 decapsulation mode "service-vlan-per-port"
set vxlans vni 10030 vlan 30
set vxlans vni 10040 decapsulation mode "service-vlan-per-port"
set vxlans vni 10040 vlan 40
set vxlans vni 10011 decapsulation mode "service-vlan-per-port"
set vxlans vni 10011 vlan 11
```

```
admin@EVPN-ACC2#
```

Overlay Verification

Following commands are used for verifying underlay configuration.

```
admin@SVNE1> show bgp evpn route vni 10010
BGP table version is 4304, local router ID is 10.1.1.201
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
EVPN type-1 prefix: [1]:[ESI]:[EthTag]:[IPlen]:[VTEP-IP]
EVPN type-2 prefix: [2]:[EthTag]:[MAClen]:[MAC]:[IPlen]:[IP]
EVPN type-3 prefix: [3]:[EthTag]:[IPlen]:[OrigIP]
EVPN type-4 prefix: [4]:[ESI]:[IPlen]:[OrigIP]
EVPN type-5 prefix: [5]:[EthTag]:[IPlen]:[IP]
```

```
Network          Next Hop          Metric LocPrf Weight Path
*> [2]:[0]:[48]:[00:00:5e:00:01:01]:[32]:[192.168.10.254]
10.1.1.254              32768 i
ET:8 RT:65001:10010 Default Gateway
*> [2]:[0]:[48]:[00:00:5e:00:02:01]:[32]:[192.168.10.254]
10.1.1.254              32768 i
ET:8 RT:65001:10010 Default Gateway
* i[2]:[0]:[48]:[2c:60:0c:d5:1d:0e]
10.1.1.208              0    100    0 i
RT:65001:10010 ET:8
*>i[2]:[0]:[48]:[2c:60:0c:d5:1d:0e]
10.1.1.208              0    100    0 i
RT:65001:10010 ET:8
* i[2]:[0]:[48]:[2c:60:0c:d5:1e:cc]
10.1.1.207              0    100    0 i
RT:65001:10010 ET:8
*>i[2]:[0]:[48]:[2c:60:0c:d5:1e:cc]
10.1.1.207              0    100    0 i
RT:65001:10010 ET:8
```



```
*> [2]:[0]:[48]:[3c:2c:30:80:bd:83]:[32]:[192.168.10.1]
10.1.1.254          32768 i
ET:8 RT:65001:10010 Default Gateway
*> [2]:[0]:[48]:[3c:2c:30:80:bd:83]:[128]:[fe80::3e2c:3020:180:bd83]
10.1.1.254          32768 i
ET:8 RT:65001:10010 Default Gateway ND:Router Flag
* i[2]:[0]:[48]:[c4:54:44:4d:b5:f1]
10.1.1.208          0    100    0 i
RT:65001:10010 ET:8
*>i[2]:[0]:[48]:[c4:54:44:4d:b5:f1]
10.1.1.208          0    100    0 i
RT:65001:10010 ET:8
*>i[3]:[0]:[32]:[10.1.1.207]
10.1.1.207          0    100    0 i
RT:65001:10010 ET:8

* i[3]:[0]:[32]:[10.1.1.207]
10.1.1.207          0    100    0 i
RT:65001:10010 ET:8
*>i[3]:[0]:[32]:[10.1.1.208]
10.1.1.208          0    100    0 i
RT:65001:10010 ET:8
* i[3]:[0]:[32]:[10.1.1.208]
10.1.1.208          0    100    0 i
RT:65001:10010 ET:8
*> [3]:[0]:[32]:[10.1.1.254]
10.1.1.254          32768 i
ET:8 RT:65001:10010
Displayed 10 prefixes (15 paths)
```

#

```
admin@EVPN-SVNE1# run show l3-interface vlan-interface vlan30
```

```
vlan30      Hwaddr 3C:2C:30:80:BD:83, Vlan:30, MTU: 1500, State:UP

Inet addr: 192.168.30.1/24

          192.168.30.254/24

          2001:30::30:61/64

          fe80::3e2c:3020:480:bd83/64
```

Traffic statistics:

```
5 sec input rate IPv4 0 packets/sec, IPv6 0 packets/sec
5 sec forwarding rate IPv4 0 packets/sec, IPv6 0 packets/sec
IPv4 Input Packets.....1303155
IPv4 Forwarding Packets.....438412
IPv6 Input Packets.....1118897
IPv6 Forwarding Packets.....0
```




```
admin@PC5:~$ ping 192.168.20.101
PING 192.168.20.101 (192.168.20.101) 56(84) bytes of data.
64 bytes from 192.168.20.101: icmp_seq=1 ttl=63 time=0.467 ms
64 bytes from 192.168.20.101: icmp_seq=2 ttl=63 time=0.525 ms
64 bytes from 192.168.20.101: icmp_seq=3 ttl=63 time=0.546 ms
64 bytes from 192.168.20.101: icmp_seq=4 ttl=63 time=0.468 ms
^C
admin@PC4:~$ ping 192.168.10.101
PING 192.168.10.101 (192.168.10.101) 56(84) bytes of data.
64 bytes from 192.168.10.101: icmp_seq=1 ttl=63 time=2.28 ms
From 192.168.40.1 icmp_seq=2 Redirect Host(New nexthop: 101.10.168.192)
64 bytes from 192.168.10.101: icmp_seq=2 ttl=63 time=1.13 ms
From 192.168.40.1 icmp_seq=3 Redirect Host(New nexthop: 101.10.168.192)
64 bytes from 192.168.10.101: icmp_seq=3 ttl=63 time=28.6 ms
^C
--- 192.168.10.101 ping statistics ---
3 packets transmitted, 3 received, +2 errors, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 1.133/10.675/28.610/12.690 ms
admin@PC4:~$
```

Additional Verification

Following additional verification commands are executed to verify VXLAN and EVPN functionality.

```
admin@SVNE1> show mlag domain summary
Domain ID: 1      Domain MAC: 48:6E:73:FF:00:01      Node ID: 0
-----
Peer Link  Peer IP          Peer Vlan  Neighbor Status  Config Matched  MAC Synced  # of Links
-----
ae1         10.0.0.2           4094      ESTABLISHED      Yes              Yes          2
```

```
admin@SVNE1> show mlag link summary
Total Links: 2
-----
Link  Local LAG  Link Status  Local Status  Peer Status  Config Matched  Flood
-----
1     ae11       FULL        UP            UP           Yes             No
2     ae12       FULL        UP            UP           Yes             No
```

```
admin@SVNE1> show mlag consistency-parameter summary
Overall : PASS
-----
Global  : PASS
Link 1  : PASS
Link 2  : PASS
```

```
MLAG Configurations:
-----
Property          Local Value  Peer Value  Result
-----
Domain ID         1            1           PASS
Node ID           0            1           PASS
```



```
Peer VLAN          4094          4094          PASS
Link Count         2              2              PASS
Link IDs           1  2          1  2          PASS
```

Spanning-Tree Configurations:

```
-----
Property           Local Value    Peer Value    Result
-----
Enable             No             No             PASS
```

DHCP Snooping Configurations:

```
-----
Property           Local Value    Peer Value    Result
-----
VLAN Count         0              0              PASS
VLAN IDs           0              0              PASS
```

IGMP Snooping Configurations:

```
-----
Property           Local Value    Peer Value    Result
-----
Enable             No             No             PASS
```

VXLAN Configurations:

```
-----
Property           Local Value    Peer Value    Result
-----
VXLAN UDP Port     4789          4789          PASS
VXLAN Mac Learning TRUE           TRUE           PASS
VXLAN Enable       TRUE           TRUE           PASS
VXLAN Source VTEP  10.1.1.254    10.1.1.254    PASS
VXLAN VNI Count    4              4              PASS
VXLAN VNIs         4              4              PASS
```

```
admin@SVNE1> show vxlan tunnel
Total number of tunnels: 8
```

```
VNI 10010, Encap:service-vlan-delete, Decap:service-vlan-per-port
src addr:10.1.1.254, dst addr:10.1.1.207, state:UP
traffic type:all
Vtep type:EVPN
nexthops:10.1.1.2 10.1.1.6
output ports:xe-1/1/4 xe-1/1/3
```

```
src addr:10.1.1.254, dst addr:10.1.1.208, state:UP
traffic type:all
Vtep type:EVPN
nexthops:10.1.1.2 10.1.1.6
output ports:xe-1/1/4 xe-1/1/3
```

```
VNI 10020, Encap:service-vlan-delete, Decap:service-vlan-per-port
src addr:10.1.1.254, dst addr:10.1.1.207, state:UP
traffic type:BUM
Vtep type:EVPN
nexthops:10.1.1.2 10.1.1.6
output ports:xe-1/1/4
```



```
src addr:10.1.1.254, dst addr:10.1.1.208, state:UP
traffic type:BUM
Vtep type:EVPN
nexthops:10.1.1.2 10.1.1.6
output ports:xe-1/1/4
```

```
VNI 10030, Encap:service-vlan-delete, Decap:service-vlan-per-port
src addr:10.1.1.254, dst addr:10.1.1.207, state:UP
traffic type:BUM
Vtep type:EVPN
nexthops:10.1.1.2 10.1.1.6
output ports:xe-1/1/4
```

```
src addr:10.1.1.254, dst addr:10.1.1.208, state:UP
traffic type:BUM
Vtep type:EVPN
nexthops:10.1.1.2 10.1.1.6
output ports:xe-1/1/4
```

```
VNI 10040, Encap:service-vlan-delete, Decap:service-vlan-per-port
src addr:10.1.1.254, dst addr:10.1.1.207, state:UP
traffic type:BUM
Vtep type:EVPN
nexthops:10.1.1.2 10.1.1.6
output ports:xe-1/1/4
```

```
src addr:10.1.1.254, dst addr:10.1.1.208, state:UP
traffic type:BUM
Vtep type:EVPN
nexthops:10.1.1.2 10.1.1.6
output ports:xe-1/1/4
```

```
admin@SVNE1> show evpn vni
```

VNI	Type	VxLAN IF	# MACs	# ARPs	# Remote VTEPs	Tenant	VRF
10030	L2	vxlan10030	4	5	2	blue	
10010	L2	vxlan10010	7	10	2	blue	
10040	L2	vxlan10040	5	7	2	blue	
10020	L2	vxlan10020	4	5	2	blue	

```
admin@SVNE1> show bgp evpn summary
```

```
BGP router identifier 10.1.1.201, local AS number 65001 vrf-id 0
```

```
BGP table version 0
```

```
RIB entries 31, using 5952 bytes of memory
```

```
Peers 2, using 43 KiB of memory
```

```
Peer groups 1, using 64 bytes of memory
```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.1.1.203	4	65001	9864	5540	0	0	0	2d23h56m	12
10.1.1.204	4	65001	9861	5537	0	0	0	2d23h56m	12

```
Total number of neighbors 2
```

```
admin@SVNE1> show evpn arp-cache vni all
```

```
VNI 10040 #ARP (IPv4 and IPv6, local and remote) 5
```



Flags: I=local-inactive, P=peer-active, X=peer-proxy

Neighbor Seq #'s	Type	Flags	State	MAC	Remote ES/VTEP
2001:40::40:61 0/0	local		active	3c:2c:30:80:bd:83	
fe80::40 0/0	local		inactive	00:00:5e:00:02:09	
fe80::3e2c:3020:580:bd83 0/0	local		active	3c:2c:30:80:bd:83	
192.168.40.1 0/0	local		active	3c:2c:30:80:bd:83	
192.168.40.254 0/0	local		active	00:00:5e:00:01:04	

VNI 10010 #ARP (IPv4 and IPv6, local and remote) 7

Flags: I=local-inactive, P=peer-active, X=peer-proxy

Neighbor Seq #'s	Type	Flags	State	MAC	Remote ES/VTEP
fe80::10 0/0	local		inactive	00:00:5e:00:02:06	
192.168.10.2 0/0	local		inactive	1c:72:1d:cc:f5:c2	
2001:10::10:61 0/0	local		active	3c:2c:30:80:bd:83	
192.168.10.254 0/0	local		active	00:00:5e:00:01:01	
192.168.10.1 0/0	local		active	3c:2c:30:80:bd:83	
fe80::3e2c:3020:180:bd83 0/0	local		active	3c:2c:30:80:bd:83	
fe80::1e72:1d20:1cc:f5c2 0/0	local		inactive	1c:72:1d:cc:f5:c2	

VNI 10011 #ARP (IPv4 and IPv6, local and remote) 3

Flags: I=local-inactive, P=peer-active, X=peer-proxy

Neighbor Seq #'s	Type	Flags	State	MAC	Remote ES/VTEP
fe80::3e2c:3020:280:bd83 0/0	local		active	3c:2c:30:80:bd:83	
192.168.11.1 0/0	local		active	3c:2c:30:80:bd:83	
192.168.11.254 0/0	local		active	00:00:5e:00:01:05	

VNI 10030 #ARP (IPv4 and IPv6, local and remote) 7

Flags: I=local-inactive, P=peer-active, X=peer-proxy

Neighbor Seq #'s	Type	Flags	State	MAC	Remote ES/VTEP
fe80::30 0/0	local		inactive	00:00:5e:00:02:08	
fe80::3e2c:3020:480:bd83 0/0	local		active	3c:2c:30:80:bd:83	



```
fe80::c654:44ff:fe4d:b5f1 local inactive c4:54:44:4d:b5:f1
0/0
fe80::1e72:1d20:4cc:f5c2 local inactive 1c:72:1d:cc:f5:c2
0/0
192.168.30.1 local active 3c:2c:30:80:bd:83
0/0
192.168.30.254 local active 00:00:5e:00:01:03
0/0
2001:30::30:61 local active 3c:2c:30:80:bd:83
0/0
```

VNI 10020 #ARP (IPv4 and IPv6, local and remote) 7

Flags: I=local-inactive, P=peer-active, X=peer-proxy

Neighbor Seq #'s	Type	Flags	State	MAC	Remote ES/VTEP
fe80::20 0/0	local		inactive	00:00:5e:00:02:07	
192.168.20.254 0/0	local		active	00:00:5e:00:01:02	
fe80::3e2c:3020:380:bd83 0/0	local		active	3c:2c:30:80:bd:83	
fe80::56ab:3aff:fede:6993 0/0	local		inactive	54:ab:3a:de:69:93	
fe80::1e72:1d20:3cc:f5c2 0/0	local		inactive	1c:72:1d:cc:f5:c2	
192.168.20.1 0/0	local		active	3c:2c:30:80:bd:83	
2001:20::20:61 0/0	local		active	3c:2c:30:80:bd:83	

admin@SVNE1> show route vrf blue

show ip route vrf blue

=====

Codes: K - kernel route, C - connected, S - static, R - RIP,
O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
T - Table, v - VNC, V - VNC-Direct, A - Babel, F - PBR,
f - OpenFabric,
> - selected route, * - FIB route, q - queued, r - rejected, b - backup
t - trapped, o - offload failure

VRF blue:

```
K>* 0.0.0.0/0 [255/8192] unreachable (blackhole), 02w5d03h
B>* 10.1.1.202/32 [20/20] via 10.1.1.3, vlan3100 (vrf default), weight 1, 02w5d03h
B>* 10.1.1.203/32 [20/20] via 10.1.1.1, vlan3101 (vrf default), weight 1, 02w5d03h
B>* 10.1.1.204/32 [20/20] via 10.1.1.5, vlan3102 (vrf default), weight 1, 02w5d03h
B>* 10.1.1.207/32 [20/40] via 10.1.1.1, vlan3101 (vrf default), weight 1, 01w0d03h
B>* 10.1.1.208/32 [20/40] via 10.1.1.1, vlan3101 (vrf default), weight 1, 02w0d01h
O 10.2.0.0/31 [110/20] is directly connected, vlan3103, weight 1, 02w5d03h
C>* 10.2.0.0/31 is directly connected, vlan3103, 02w5d03h
O>* 10.2.0.2/31 [110/40] via 10.2.0.1, vlan3103, weight 1, 02w5d03h
* via 10.2.0.5, vlan3104, weight 1, 02w5d03h
O 10.2.0.4/31 [110/20] is directly connected, vlan3104, weight 1, 02w5d03h
C>* 10.2.0.4/31 is directly connected, vlan3104, 02w5d03h
C>* 10.2.100.1/32 is directly connected, blue, 02w5d03h
```



```
B>* 10.2.100.2/32 [200/0] via 10.2.0.5, vlan3104, weight 1, 02w5d03h
O>* 10.2.100.3/32 [110/20] via 10.2.0.1, vlan3103, weight 1, 02w5d03h
O 192.168.10.0/24 [110/20] is directly connected, v4_vlan10_1, weight 1, 02w5d03h
C * 192.168.10.0/24 [0/10000] is directly connected, v6_vlan10_1, 02w5d03h
C * 192.168.10.0/24 [0/10000] is directly connected, v4_vlan10_1, 02w5d03h
C>* 192.168.10.0/24 is directly connected, vlan10, 02w5d03h
O 192.168.11.0/24 [110/20] is directly connected, v4_vlan11_5, weight 1, 02w5d03h
C * 192.168.11.0/24 [0/10000] is directly connected, v6_vlan11_5, 02w5d03h
C * 192.168.11.0/24 [0/10000] is directly connected, v4_vlan11_5, 02w5d03h
C>* 192.168.11.0/24 is directly connected, vlan11, 02w5d03h
O 192.168.20.0/24 [110/20] is directly connected, v4_vlan20_2, weight 1, 02w5d03h
C * 192.168.20.0/24 [0/10000] is directly connected, v6_vlan20_2, 02w5d03h
C * 192.168.20.0/24 [0/10000] is directly connected, v4_vlan20_2, 02w5d03h
C>* 192.168.20.0/24 is directly connected, vlan20, 02w5d03h
O 192.168.30.0/24 [110/20] is directly connected, v4_vlan30_3, weight 1, 02w5d03h
C * 192.168.30.0/24 [0/10000] is directly connected, v6_vlan30_3, 02w5d03h
C * 192.168.30.0/24 [0/10000] is directly connected, v4_vlan30_3, 02w5d03h
C>* 192.168.30.0/24 is directly connected, vlan30, 02w5d03h
O 192.168.40.0/24 [110/20] is directly connected, v4_vlan40_4, weight 1, 02w5d03h
C * 192.168.40.0/24 [0/10000] is directly connected, v6_vlan40_4, 02w5d03h
C * 192.168.40.0/24 [0/10000] is directly connected, v4_vlan40_4, 02w5d03h
C>* 192.168.40.0/24 is directly connected, vlan40, 02w5d03h
```

```
show ipv6 route vrf blue
```

```
=====
Codes: K - kernel route, C - connected, S - static, R - RIPng,
       O - OSPFv3, I - IS-IS, B - BGP, N - NHRP, T - Table,
       v - VNC, V - VNC-Direct, A - Babel, F - PBR,
       f - OpenFabric,
       > - selected route, * - FIB route, q - queued, r - rejected, b - backup
       t - trapped, o - offload failure
```

```
VRF blue:
```

```
K>* ::/0 [255/8192] unreachable (blackhole), 02w5d03h
C * 2001:10::/64 [0/10000] is directly connected, v6_vlan10_6, 02w5d03h
C * 2001:10::/64 [0/10000] is directly connected, v4_vlan10_6, 02w5d03h
C>* 2001:10::/64 is directly connected, vlan10, 02w5d03h
C * 2001:20::/64 [0/10000] is directly connected, v6_vlan20_7, 02w5d03h
C * 2001:20::/64 [0/10000] is directly connected, v4_vlan20_7, 02w5d03h
C>* 2001:20::/64 is directly connected, vlan20, 02w5d03h
C * 2001:30::/64 [0/10000] is directly connected, v6_vlan30_8, 02w5d03h
C * 2001:30::/64 [0/10000] is directly connected, v4_vlan30_8, 02w5d03h
C>* 2001:30::/64 is directly connected, vlan30, 02w5d03h
C * 2001:40::/64 [0/10000] is directly connected, v6_vlan40_9, 02w5d03h
C * 2001:40::/64 [0/10000] is directly connected, v4_vlan40_9, 02w5d03h
C>* 2001:40::/64 is directly connected, vlan40, 02w5d03h
C * fe80::/64 is directly connected, vlan3103, 02w5d03h
C * fe80::/64 is directly connected, vlan3104, 02w5d03h
C * fe80::/64 [0/10000] is directly connected, v6_vlan40_9, 02w5d03h
C * fe80::/64 [0/10000] is directly connected, v4_vlan40_9, 02w5d03h
C * fe80::/64 [0/10000] is directly connected, v6_vlan30_8, 02w5d03h
C * fe80::/64 [0/10000] is directly connected, v4_vlan30_8, 02w5d03h
C * fe80::/64 [0/10000] is directly connected, v6_vlan20_7, 02w5d03h
```



```
C * fe80::/64 [0/10000] is directly connected, v4_vlan20_7, 02w5d03h
C * fe80::/64 [0/10000] is directly connected, v6_vlan10_6, 02w5d03h
C * fe80::/64 [0/10000] is directly connected, v4_vlan10_6, 02w5d03h
C * fe80::/64 is directly connected, vlan40, 02w5d03h
C * fe80::/64 is directly connected, vlan30, 02w5d03h
C * fe80::/64 is directly connected, vlan20, 02w5d03h
C * fe80::/64 is directly connected, vlan11, 02w5d03h
C>* fe80::/64 is directly connected, vlan10, 02w5d03h
```

```
admin@SVNE1> show bgp evpn route vni 10010
BGP table version is 4304, local router ID is 10.1.1.201
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
EVPN type-1 prefix: [1]:[ESI]:[EthTag]:[IPlen]:[VTEP-IP]
EVPN type-2 prefix: [2]:[EthTag]:[MAClen]:[MAC]:[IPlen]:[IP]
EVPN type-3 prefix: [3]:[EthTag]:[IPlen]:[OrigIP]
EVPN type-4 prefix: [4]:[ESI]:[IPlen]:[OrigIP]
EVPN type-5 prefix: [5]:[EthTag]:[IPlen]:[IP]
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> [2]:[0]:[48]:[00:00:5e:00:01:01]:[32]:[192.168.10.254]	10.1.1.254			32768	i
	ET:8 RT:65001:10010				Default Gateway
*> [2]:[0]:[48]:[00:00:5e:00:02:01]:[32]:[192.168.10.254]	10.1.1.254			32768	i
	ET:8 RT:65001:10010				Default Gateway
* i[2]:[0]:[48]:[2c:60:0c:d5:1d:0e]	10.1.1.208	0	100	0	i
	RT:65001:10010				ET:8
*>i[2]:[0]:[48]:[2c:60:0c:d5:1d:0e]	10.1.1.208	0	100	0	i
	RT:65001:10010				ET:8
* i[2]:[0]:[48]:[2c:60:0c:d5:1e:cc]	10.1.1.207	0	100	0	i
	RT:65001:10010				ET:8
*>i[2]:[0]:[48]:[2c:60:0c:d5:1e:cc]	10.1.1.207	0	100	0	i
	RT:65001:10010				ET:8
*> [2]:[0]:[48]:[3c:2c:30:80:bd:83]:[32]:[192.168.10.1]	10.1.1.254			32768	i
	ET:8 RT:65001:10010				Default Gateway
*> [2]:[0]:[48]:[3c:2c:30:80:bd:83]:[128]:[fe80::3e2c:3020:180:bd83]	10.1.1.254			32768	i
	ET:8 RT:65001:10010				Default Gateway ND:Router Flag
* i[2]:[0]:[48]:[c4:54:44:4d:b5:f1]	10.1.1.208	0	100	0	i
	RT:65001:10010				ET:8
*>i[2]:[0]:[48]:[c4:54:44:4d:b5:f1]	10.1.1.208	0	100	0	i
	RT:65001:10010				ET:8
*>i[3]:[0]:[32]:[10.1.1.207]	10.1.1.207	0	100	0	i
	RT:65001:10010				ET:8
* i[3]:[0]:[32]:[10.1.1.207]	10.1.1.207	0	100	0	i

```

RT:65001:10010 ET:8
*>i[3]:[0]:[32]:[10.1.1.208]
10.1.1.208          0    100    0 i
RT:65001:10010 ET:8
* i[3]:[0]:[32]:[10.1.1.208]
10.1.1.208          0    100    0 i
RT:65001:10010 ET:8
*> [3]:[0]:[32]:[10.1.1.254]
10.1.1.254          32768 i
ET:8 RT:65001:10010

```

Displayed 10 prefixes (15 paths)

Reference Configuration for all Switches

Configuration for DATAROOM1 Switch (MLAG + L2)

```

admin@DATAROOM-SW1#
set alias s as "show/display set/no-more"
set interface aggregate-ethernet ae12 description "lACP link to Esxi Server"
set interface aggregate-ethernet ae12 aggregated-ether-options lACP enable true
set interface aggregate-ethernet ae12 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 10
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 20
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 111
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 888
set interface aggregate-ethernet ae12 family ethernet-switching native-vlan-id 111
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 111 untagged
set interface aggregate-ethernet ae1 aggregated-ether-options lACP enable true
set interface aggregate-ethernet ae1 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 111
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 888
set interface gigabit-ethernet xe-1/1/1 ether-options 802.3ad "ae12"
set interface gigabit-ethernet xe-1/1/2 ether-options 802.3ad "ae12"
set interface gigabit-ethernet te-1/1/1 ether-options 802.3ad "ae1"
set interface gigabit-ethernet te-1/1/2 ether-options 802.3ad "ae1"
set ip routing enable true
set protocols lldp enable true
set system hostname "DATAROOM-SW1"
set l3-interface vlan-interface vlan4094 address 10.0.0.3 prefix-length 30
set protocols lldp enable true
set protocols mlag domain 1 node 2
set protocols mlag domain 1 peer-ip 10.0.0.1 peer-link "ae12"
set protocols mlag domain 1 peer-ip 10.0.0.1 peer-vlan 4094
set protocols mlag domain 1 peer-ip 10.0.0.2 peer-link "ae12"
set protocols mlag domain 1 peer-ip 10.0.0.2 peer-vlan 4094
set protocols mlag domain 1 interface ae12 link 1
set protocols mlag domain 1 interface ae12 link 2
set protocols spanning-tree enable true
set vlans vlan-id 10
set vlans vlan-id 20

```




```
set vlans vlan-id 111
set vlans vlan-id 888
set vlans vlan-id 4094 l3-interface "vlan4094"
```

Configuration for SVNE Switch 1

```
admin@SVNE1# show/display set/no-more
set alias s as "show/display set/no-more"
set interface aggregate-ethernet ae1 description "Connection to VNE2"
set interface aggregate-ethernet ae1 aggregated-ether-options lACP enable true
set interface aggregate-ethernet ae1 family ethernet-switching native-vlan-id 4094
set interface aggregate-ethernet ae1 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 10
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 20
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 111
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 888
set interface aggregate-ethernet ae11 description "to S4128T-1"
set interface aggregate-ethernet ae11 aggregated-ether-options lACP enable true
set interface aggregate-ethernet ae11 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae11 family ethernet-switching vlan members 10,20,111,888
set interface aggregate-ethernet ae12 description "to PC4-NAS"
set interface aggregate-ethernet ae12 family ethernet-switching native-vlan-id 888
set interface aggregate-ethernet ae12 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 888 untagged
set interface gigabit-ethernet xe-1/1/1 ether-options 802.3ad "ae11"
set interface gigabit-ethernet xe-1/1/1 speed "10000"
set interface gigabit-ethernet xe-1/1/2 ether-options 802.3ad "ae12"
set interface gigabit-ethernet xe-1/1/2 speed "1000"
set interface gigabit-ethernet xe-1/1/3 mtu 2000
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/3 speed "10000"
set interface gigabit-ethernet xe-1/1/4 mtu 2000
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/4 speed "10000"
set interface gigabit-ethernet xe-1/1/5 mtu 2000
set interface gigabit-ethernet xe-1/1/6 mtu 2000
set interface gigabit-ethernet xe-1/1/5 ether-options 802.3ad "ae1"
set interface gigabit-ethernet xe-1/1/6 ether-options 802.3ad "ae1"
set ip routing enable true
set ip vrf blue
set l3-interface loopback lo address 10.1.1.201 prefix-length 32
set l3-interface loopback lo address 10.1.1.254 prefix-length 32
set l3-interface vlan-interface vlan3101 description "Connection to Core1"
set l3-interface vlan-interface vlan3101 address 10.1.1.1 prefix-length 30
set l3-interface vlan-interface vlan3102 description "Connection to Core2"
set l3-interface vlan-interface vlan3102 address 10.1.1.5 prefix-length 30
set l3-interface vlan-interface vlan10 vrf "blue"
set l3-interface vlan-interface vlan10 address 192.168.10.1 prefix-length 24
set l3-interface vlan-interface vlan111 vrf "blue"
set l3-interface vlan-interface vlan111 address 192.168.30.1 prefix-length 24
```



```
set l3-interface vlan-interface vlan20 vrf "blue"
set l3-interface vlan-interface vlan20 address 192.168.20.1 prefix-length 24
set l3-interface vlan-interface vlan888 vrf "blue"
set l3-interface vlan-interface vlan888 address 192.168.40.1 prefix-length 24
set l3-interface vlan-interface vlan4094 address 10.0.0.1 prefix-length 30
set protocols bgp local-as 65001
set protocols bgp router-id 10.1.1.201
set protocols bgp peer-group RR remote-as "internal"
set protocols bgp peer-group RR update-source "10.1.1.201"
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor 10.1.1.203 peer-group "RR"
set protocols bgp neighbor 10.1.1.204 peer-group "RR"
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw
set protocols lldp enable true
set protocols mlag domain 1 node 0
set protocols mlag domain 1 peer-ip 10.0.0.2 peer-link "ae1"
set protocols mlag domain 1 peer-ip 10.0.0.2 peer-vlan 4094
set protocols mlag domain 1 interface ae11 link 1
set protocols mlag domain 1 interface ae12 link 2
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.201
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3101 network "point-to-point"
set protocols ospf interface vlan3102 network "point-to-point"
set protocols vrrp interface vlan10 vrid 1 ip 192.168.10.254
set protocols vrrp interface vlan10 vrid 1 load-balance disable false
set protocols vrrp interface vlan20 vrid 2 ip 192.168.20.254
set protocols vrrp interface vlan20 vrid 2 load-balance disable false
set protocols vrrp interface vlan111 vrid 3 ip 192.168.30.254
set protocols vrrp interface vlan111 vrid 3 load-balance disable false
set protocols vrrp interface vlan888 vrid 4 ip 192.168.40.254
set protocols vrrp interface vlan888 vrid 4 load-balance disable false
set routing prefix-list
set system hostname "SVNE1"
set system inband loopback 10.1.1.201
set system log-level "trace"
set vlans vlan-id 10 l3-interface "vlan10"
set vlans vlan-id 20 l3-interface "vlan20"
set vlans vlan-id 111 l3-interface "vlan111"
set vlans vlan-id 888 l3-interface "vlan888"
set vlans vlan-id 11100 l3-interface "vlan3000"
set vlans vlan-id 3101 l3-interface "vlan3101"
set vlans vlan-id 3102 l3-interface "vlan3102"
set vlans vlan-id 4094 l3-interface "vlan4094"
set vxlans source-interface lo address 10.1.1.254
set vxlans vni 10010 decapsulation mode "service-vlan-per-port"
set vxlans vni 10010 vlan 10
set vxlans vni 10030 decapsulation mode "service-vlan-per-port"
set vxlans vni 10030 vlan 111
set vxlans vni 10020 decapsulation mode "service-vlan-per-port"
set vxlans vni 10020 vlan 20
set vxlans vni 10040 decapsulation mode "service-vlan-per-port"
```



```
set vxlans vni 10040 vlan 888
set vxlans traceoptions flag all disable false
```

Configuration for SVNE Switch 2

```
admin@EVPN-SVNE-2# s
set alias s as "show/display set/no-more"
set interface aggregate-ethernet ae1 description "Connection to VNE1"
set interface aggregate-ethernet ae1 aggregated-ether-options lacp enable true
set interface aggregate-ethernet ae1 family ethernet-switching native-vlan-id 4094
set interface aggregate-ethernet ae1 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 10
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 20
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 111
set interface aggregate-ethernet ae1 family ethernet-switching vlan members 888
set interface aggregate-ethernet ae11 description "to S4128T-1"
set interface aggregate-ethernet ae11 aggregated-ether-options lacp enable true
set interface aggregate-ethernet ae11 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae11 family ethernet-switching vlan members 10,20,111,888
set interface aggregate-ethernet ae12 description "to PC4-NAS"
set interface aggregate-ethernet ae12 family ethernet-switching native-vlan-id 888
set interface aggregate-ethernet ae12 family ethernet-switching port-mode "trunk"
set interface aggregate-ethernet ae12 family ethernet-switching vlan members 888 untagged
set interface gigabit-ethernet xe-1/1/1 ether-options 802.3ad "ae11"
set interface gigabit-ethernet xe-1/1/1 speed "10000"
set interface gigabit-ethernet xe-1/1/2 ether-options 802.3ad "ae12"
set interface gigabit-ethernet xe-1/1/2 speed "1000"
set interface gigabit-ethernet xe-1/1/3 mtu 2000
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/3 speed "10000"
set interface gigabit-ethernet xe-1/1/4 mtu 2000
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/4 speed "10000"
set interface gigabit-ethernet xe-1/1/5 mtu 2000
set interface gigabit-ethernet xe-1/1/6 mtu 2000
set interface gigabit-ethernet xe-1/1/13 speed "1000"
set interface gigabit-ethernet xe-1/1/14 speed "1000"
set interface gigabit-ethernet xe-1/1/15 speed "1000"
set interface gigabit-ethernet xe-1/1/16 family ethernet-switching native-vlan-id 10
set interface gigabit-ethernet xe-1/1/16 speed "1000"
set interface gigabit-ethernet xe-1/1/37 speed "1000"
set interface gigabit-ethernet xe-1/1/38 speed "1000"
set interface gigabit-ethernet xe-1/1/39 speed "1000"
set interface gigabit-ethernet xe-1/1/40 family ethernet-switching native-vlan-id 10
set interface gigabit-ethernet xe-1/1/40 speed "1000"
set interface gigabit-ethernet xe-1/1/45 speed "1000"
set interface gigabit-ethernet xe-1/1/46 speed "1000"
set interface gigabit-ethernet xe-1/1/47 family ethernet-switching native-vlan-id 10
set interface gigabit-ethernet xe-1/1/47 speed "1000"
set interface gigabit-ethernet xe-1/1/48 family ethernet-switching native-vlan-id 10
```

```

set interface gigabit-ethernet xe-1/1/48 speed "1000"
set interface gigabit-ethernet xe-1/1/5 ether-options 802.3ad "ae1"
set interface gigabit-ethernet xe-1/1/6 ether-options 802.3ad "ae1"
set ip routing enable true
set ip vrf blue
set l3-interface loopback lo address 10.1.1.202 prefix-length 32
set l3-interface loopback lo address 10.1.1.254 prefix-length 32
set l3-interface vlan-interface vlan3101 description "Connection to Core2"
set l3-interface vlan-interface vlan3101 address 10.1.1.17 prefix-length 30
set l3-interface vlan-interface vlan3102 description "Connection to Core1"
set l3-interface vlan-interface vlan3102 address 10.1.1.13 prefix-length 30
set l3-interface vlan-interface vlan10 vrf "blue"
set l3-interface vlan-interface vlan10 address 192.168.10.2 prefix-length 24
set l3-interface vlan-interface vlan888 vrf "blue"
set l3-interface vlan-interface vlan888 address 192.168.40.2 prefix-length 24
set l3-interface vlan-interface vlan20 vrf "blue"
set l3-interface vlan-interface vlan20 address 192.168.20.2 prefix-length 24
set l3-interface vlan-interface vlan111 vrf "blue"
set l3-interface vlan-interface vlan111 address 192.168.30.2 prefix-length 24
set l3-interface vlan-interface vlan4094 address 10.0.0.2 prefix-length 30
set protocols bgp local-as 65001
set protocols bgp router-id 10.1.1.202
set protocols bgp peer-group RR remote-as "internal"
set protocols bgp peer-group RR update-source "10.1.1.202"
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor 10.1.1.203 peer-group "RR"
set protocols bgp neighbor 10.1.1.204 peer-group "RR"
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw
set protocols lldp enable true
set protocols mlag domain 1 node 1
set protocols mlag domain 1 peer-ip 10.0.0.1 peer-link "ae1"
set protocols mlag domain 1 peer-ip 10.0.0.1 peer-vlan 4094
set protocols mlag domain 1 interface ae11 link 1
set protocols mlag domain 1 interface ae12 link 2
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.202
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3101 network "point-to-point"
set protocols ospf interface vlan3102 network "point-to-point"
set protocols vrrp interface vlan10 vrid 1 ip 192.168.10.254
set protocols vrrp interface vlan10 vrid 1 load-balance disable false
set protocols vrrp interface vlan20 vrid 2 ip 192.168.20.254
set protocols vrrp interface vlan20 vrid 2 load-balance disable false
set protocols vrrp interface vlan111 vrid 3 ip 192.168.30.254
set protocols vrrp interface vlan111 vrid 3 load-balance disable false
set protocols vrrp interface vlan888 vrid 4 ip 192.168.40.254
set protocols vrrp interface vlan888 vrid 4 load-balance disable false
set routing prefix-list
set system hostname "EVPN-SVNE-2"
set system inband loopback 10.1.1.202
set system log-level "trace"
set vlans vlan-id 10 l3-interface "vlan10"

```

```

set vlans vlan-id 20 l3-interface "vlan20"
set vlans vlan-id 111 l3-interface "vlan111"
set vlans vlan-id 888 l3-interface "vlan888"
set vlans vlan-id 3101 l3-interface "vlan3101"
set vlans vlan-id 3102 l3-interface "vlan3102"
set vlans vlan-id 4094 l3-interface "vlan4094"
set vxlans source-interface lo address 10.1.1.254
set vxlans vni 10010 decapsulation mode "service-vlan-per-port"
set vxlans vni 10010 vlan 10
set vxlans vni 10040 decapsulation mode "service-vlan-per-port"
set vxlans vni 10040 vlan 888
set vxlans vni 10020 decapsulation mode "service-vlan-per-port"
set vxlans vni 10020 vlan 20
set vxlans vni 10030 decapsulation mode "service-vlan-per-port"
set vxlans vni 10030 vlan 111
set vxlans traceoptions flag all disable false

```

Configuration for Core Switch 1

```

set alias s as "show|display set|no-more"
set interface gigabit-ethernet xe-1/1/1 mtu 2000
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching native-vlan-id 3100
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/1 speed "10000"
set interface gigabit-ethernet xe-1/1/2 mtu 2000
set interface gigabit-ethernet xe-1/1/2 family ethernet-switching native-vlan-id 3201
set interface gigabit-ethernet xe-1/1/2 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/2 speed "10000"
set interface gigabit-ethernet xe-1/1/3 mtu 2000
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/3 speed "10000"
set interface gigabit-ethernet xe-1/1/4 mtu 2000
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/4 speed "10000"
set ip routing enable true
set l3-interface loopback lo address 10.1.1.203 prefix-length 32
set l3-interface vlan-interface vlan3100 description "Connection to Core2"
set l3-interface vlan-interface vlan3100 address 10.1.1.21 prefix-length 30
set l3-interface vlan-interface vlan3101 description "Connection to VNE1"

set l3-interface vlan-interface vlan3101 address 10.1.1.2 prefix-length 30
set l3-interface vlan-interface vlan3102 description "Connection to VNE2"

set l3-interface vlan-interface vlan3102 address 10.1.1.14 prefix-length 30
set l3-interface vlan-interface vlan3201 description "Connection to DIST1"
set l3-interface vlan-interface vlan3201 address 10.1.1.25 prefix-length 30
set protocols bgp local-as 65001
set protocols bgp cluster-id 10.1.1.203
set protocols bgp router-id 10.1.1.203
set protocols bgp peer-group RRclient remote-as "internal"

```

```
set protocols bgp peer-group RRclient update-source "10.1.1.203"
set protocols bgp peer-group RRclient evpn activate true
set protocols bgp peer-group RRclient evpn route-reflector-client
set protocols bgp neighbor 10.1.1.204 remote-as "internal"
set protocols bgp neighbor 10.1.1.204 update-source "10.1.1.203"
set protocols bgp neighbor 10.1.1.204 evpn activate true
set protocols bgp neighbor 10.1.1.201 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.202 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.207 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.208 peer-group "RRclient"
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw
set protocols lldp enable true
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.203
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3100 network "point-to-point"
set protocols ospf interface vlan3101 network "point-to-point"
set protocols ospf interface vlan3102 network "point-to-point"
set protocols ospf interface vlan3201 network "point-to-point"
set routing log-level debugging
set routing zebra debug
set system hostname "EVPN-CORE1"
set system ntp source-interface "lo"
set system inband loopback 10.1.1.203
set system log-level "trace"
set vlans vlan-id 3100 l3-interface "vlan3100"
set vlans vlan-id 3101 l3-interface "vlan3101"
set vlans vlan-id 3102 l3-interface "vlan3102"
set vlans vlan-id 3201 l3-interface "vlan3201"
```

Configuration for Core Switch 2

```
set alias s as "show|display set|no-more"
set interface gigabit-ethernet xe-1/1/1 mtu 2000
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching native-vlan-id 3100
set interface gigabit-ethernet xe-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/2 mtu 2000
set interface gigabit-ethernet xe-1/1/2 family ethernet-switching native-vlan-id 3201
set interface gigabit-ethernet xe-1/1/2 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/3 mtu 2000
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching native-vlan-id 3101
set interface gigabit-ethernet xe-1/1/3 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet xe-1/1/4 mtu 2000
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching native-vlan-id 3102
set interface gigabit-ethernet xe-1/1/4 family ethernet-switching port-mode "trunk"
set ip routing enable true
set l3-interface loopback lo address 10.1.1.204 prefix-length 32
set l3-interface vlan-interface vlan3100 description "Connection to Core1"
set l3-interface vlan-interface vlan3100 address 10.1.1.22 prefix-length 30
```



```
set l3-interface vlan-interface vlan3101 description "Connection to VNE2"

set l3-interface vlan-interface vlan3101 address 10.1.1.18 prefix-length 30
set l3-interface vlan-interface vlan3102 description "Connection to VNE1"

set l3-interface vlan-interface vlan3102 address 10.1.1.6 prefix-length 30
set l3-interface vlan-interface vlan3201 description "Connection to DIST2"
set l3-interface vlan-interface vlan3201 address 10.1.1.29 prefix-length 30
set protocols bgp local-as 65001
set protocols bgp cluster-id 10.1.1.203
set protocols bgp router-id 10.1.1.204
set protocols bgp peer-group RRclient remote-as "internal"
set protocols bgp peer-group RRclient update-source "10.1.1.204"
set protocols bgp peer-group RRclient evpn activate true
set protocols bgp peer-group RRclient evpn route-reflector-client
set protocols bgp neighbor 10.1.1.203 remote-as "internal"
set protocols bgp neighbor 10.1.1.203 update-source "10.1.1.204"
set protocols bgp neighbor 10.1.1.203 evpn activate true
set protocols bgp neighbor 10.1.1.201 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.202 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.207 peer-group "RRclient"
set protocols bgp neighbor 10.1.1.208 peer-group "RRclient"
set protocols bgp evpn advertise-all-vni
set protocols bgp evpn advertise-default-gw
set protocols lldp enable true
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.204
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3100 network "point-to-point"
set protocols ospf interface vlan3101 network "point-to-point"
set protocols ospf interface vlan3102 network "point-to-point"
set protocols ospf interface vlan3201 network "point-to-point"
set system hostname "EVPN-CORE2"
set system inband loopback 10.1.1.204
set vlans vlan-id 3100 l3-interface "vlan3100"
set vlans vlan-id 3101 l3-interface "vlan3101"
set vlans vlan-id 3102 l3-interface "vlan3102"
set vlans vlan-id 3201 l3-interface "vlan3201"
```

Configuration for Access Switch 1

ACC2:

```
admin@EVPN-ACC1# s
set alias s as "show/display set/no-more"
set firewall filter block-20-101 sequence 20 from destination-address-ipv4 192.168.20.101/32
set firewall filter block-20-101 sequence 20 from source-address-ipv4 192.168.10.0/24
set firewall filter block-20-101 sequence 20 then action "discard"
set interface gigabit-ethernet ge-1/1/3 disable true
set interface gigabit-ethernet ge-1/1/5 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching native-vlan-id 999
```

```

set interface gigabit-ethernet ge-1/1/11 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching vlan members 10
set interface gigabit-ethernet ge-1/1/12 family ethernet-switching native-vlan-id 20
set interface gigabit-ethernet ge-1/1/13 family ethernet-switching native-vlan-id 30
set interface gigabit-ethernet ge-1/1/14 family ethernet-switching native-vlan-id 40
set interface gigabit-ethernet ge-1/1/19 family ethernet-switching native-vlan-id 10
set interface gigabit-ethernet ge-1/1/19 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/19 voice-vlan vlan-id 11
set interface gigabit-ethernet ge-1/1/19 voice-vlan tagged mode "tag"
set interface gigabit-ethernet ge-1/1/20 family ethernet-switching native-vlan-id 10
set interface gigabit-ethernet te-1/1/1 mtu 2000
set interface gigabit-ethernet te-1/1/1 family ethernet-switching native-vlan-id 3201
set interface gigabit-ethernet te-1/1/1 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/2 mtu 2000
set interface gigabit-ethernet te-1/1/2 family ethernet-switching native-vlan-id 3202
set interface gigabit-ethernet te-1/1/2 family ethernet-switching port-mode "trunk"
set interface ethernet-switching-options
set ip routing enable true
set l3-interface loopback lo address 10.1.1.208 prefix-length 32
set l3-interface vlan-interface vlan3201 description "Connection to CORE2"
set l3-interface vlan-interface vlan3201 address 10.1.1.37 prefix-length 31
set l3-interface vlan-interface vlan3202 description "Connection to CORE1"
set l3-interface vlan-interface vlan3202 address 10.1.1.33 prefix-length 31
set poe interface all
set protocols bgp local-as 65001
set protocols bgp router-id 10.1.1.208
set protocols bgp peer-group RR remote-as "internal"
set protocols bgp peer-group RR update-source "10.1.1.208"
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor 10.1.1.203 peer-group "RR"
set protocols bgp neighbor 10.1.1.204 peer-group "RR"
set protocols bgp ipv4-unicast redistribute connected
set protocols bgp evpn advertise-all-vni
set protocols dot1x interface ge-1/1/5 host-mode "multiple"
set protocols dot1x interface ge-1/1/5 auth-mode 802.1x
set protocols dot1x interface ge-1/1/5 auth-mode mac-radius
set protocols dot1x aaa radius authentication server-ip 192.168.42.105 shared-key
    "cGljYThwaWNhOA=="
set protocols dot1x aaa radius dynamic-author client 192.168.42.105 shared-key "cGljYThwaWNhOA=="
set protocols dot1x aaa radius nas-ip 10.1.1.208
set protocols dot1x filter mac_auth_policy_2 description "dot1x-dynamic-filter"
set protocols dot1x filter mac_auth_policy_2 sequence 10 then
set protocols lldp enable true
set protocols lldp interface ge-1/1/19 compliance cdp true
set protocols lldp compliance cdp true
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.208
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3201 network "point-to-point"
set protocols ospf interface vlan3202 network "point-to-point"
set system hostname "EVPN-ACC1"
set system inband loopback 10.1.1.208
set vlans vlan-id 10

```




```
set vlans vlan-id 11
set vlans vlan-id 20
set vlans vlan-id 30
set vlans vlan-id 40
set vlans vlan-id 999
set vlans vlan-id 3201 l3-interface "vlan3201"
set vlans vlan-id 3202 l3-interface "vlan3202"
set vlans voice-vlan aging 600
set vxlans source-interface lo address 10.1.1.208
set vxlans vni 10010 decapsulation mode "service-vlan-per-port"
set vxlans vni 10010 vlan 10
set vxlans vni 10020 decapsulation mode "service-vlan-per-port"
set vxlans vni 10020 vlan 20
set vxlans vni 10030 decapsulation mode "service-vlan-per-port"
set vxlans vni 10030 vlan 30
set vxlans vni 10040 decapsulation mode "service-vlan-per-port"
set vxlans vni 10040 vlan 40
set vxlans vni 10011 decapsulation mode "service-vlan-per-port"
set vxlans vni 10011 vlan 11

admin@EVPN-ACC1#
```

Configuration for Access Switch 2

```
admin@EVPN-ACC2# s
set alias s as "show/display set/no-more"
set interface gigabit-ethernet ge-1/1/5 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/6 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching native-vlan-id 999
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet ge-1/1/11 family ethernet-switching vlan members 10
set interface gigabit-ethernet ge-1/1/12 family ethernet-switching native-vlan-id 20
set interface gigabit-ethernet ge-1/1/13 family ethernet-switching native-vlan-id 30
set interface gigabit-ethernet ge-1/1/14 family ethernet-switching native-vlan-id 40
set interface gigabit-ethernet ge-1/1/20 family ethernet-switching native-vlan-id 10
set interface gigabit-ethernet te-1/1/3 mtu 2000
set interface gigabit-ethernet te-1/1/3 family ethernet-switching native-vlan-id 3203
set interface gigabit-ethernet te-1/1/3 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/3 speed "10000"
set interface gigabit-ethernet te-1/1/4 mtu 2000
set interface gigabit-ethernet te-1/1/4 family ethernet-switching native-vlan-id 3204
set interface gigabit-ethernet te-1/1/4 family ethernet-switching port-mode "trunk"
set interface gigabit-ethernet te-1/1/4 speed "10000"
set ip routing enable true
set l3-interface loopback lo address 10.1.1.209 prefix-length 32
set l3-interface vlan-interface vlan3203 description "Connection to CORE1"
set l3-interface vlan-interface vlan3203 address 10.1.1.39 prefix-length 31
set l3-interface vlan-interface vlan3204 description "Connection to CORE2"
set l3-interface vlan-interface vlan3204 address 10.1.1.41 prefix-length 31
set poe interface all
set protocols bgp local-as 65001
set protocols bgp router-id 10.1.1.209
```

```

set protocols bgp peer-group RR remote-as "internal"
set protocols bgp peer-group RR update-source "10.1.1.209"
set protocols bgp peer-group RR evpn activate true
set protocols bgp neighbor 10.1.1.203 peer-group "RR"
set protocols bgp neighbor 10.1.1.204 peer-group "RR"
set protocols bgp ipv4-unicast redistribute connected
set protocols bgp evpn advertise-all-vni
set protocols dot1x interface ge-1/1/5 host-mode "multiple"
set protocols dot1x interface ge-1/1/5 auth-mode 802.1x
set protocols dot1x interface ge-1/1/5 auth-mode mac-radius
set protocols dot1x interface ge-1/1/6 host-mode "multiple"
set protocols dot1x interface ge-1/1/6 auth-mode 802.1x
set protocols dot1x interface ge-1/1/6 auth-mode mac-radius
set protocols dot1x aaa radius authentication server-ip 192.168.42.105 shared-key
    "cGljYThwaWNhOA=="
set protocols dot1x aaa radius dynamic-author client 192.168.42.105 shared-key "cGljYThwaWNhOA=="
set protocols dot1x aaa radius nas-ip 10.1.1.209
set protocols dot1x filter mac_auth_policy_2 description "dot1x-dynamic-filter"
set protocols dot1x filter mac_auth_policy_2 sequence 10 then
set protocols lldp enable true
set protocols spanning-tree enable false
set protocols ospf router-id 10.1.1.209
set protocols ospf auto-cost reference-bandwidth 200000
set protocols ospf network 10.1.1.0/24 area "0"
set protocols ospf redistribute connected
set protocols ospf interface vlan3203 network "point-to-point"
set protocols ospf interface vlan3204 network "point-to-point"
set system hostname "EVPN-ACC2"
set system inband loopback 10.1.1.209
set vlans vlan-id 10
set vlans vlan-id 11
set vlans vlan-id 20
set vlans vlan-id 30
set vlans vlan-id 40
set vlans vlan-id 999
set vlans vlan-id 3203 l3-interface "vlan3203"
set vlans vlan-id 3204 l3-interface "vlan3204"
set vxlans source-interface lo address 10.1.1.209
set vxlans vni 10010 decapsulation mode "service-vlan-per-port"
set vxlans vni 10010 vlan 10
set vxlans vni 10020 decapsulation mode "service-vlan-per-port"
set vxlans vni 10020 vlan 20
set vxlans vni 10030 decapsulation mode "service-vlan-per-port"
set vxlans vni 10030 vlan 30
set vxlans vni 10040 decapsulation mode "service-vlan-per-port"
set vxlans vni 10040 vlan 40
set vxlans vni 10011 decapsulation mode "service-vlan-per-port"
set vxlans vni 10011 vlan 11

admin@EVPN-ACC2#
    
```