Dell EMC OS10 BGP eVPN Configuration Cheat Sheet

A short BGP eVPN VXLAN OS 10 Configuration Sheet

Abstract

A short configuration document on how to enable and deploy BGP eVPN VXLAN on the Dell EMC switches running OS10.

February 2019

Revisions

Date	Description
January 2019	Initial release

Acknowledgements

This paper was produced by the following members of the Dell EMC storage engineering team.

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1 Introduction

Dell EMC OS 10.4.2 introduces dynamic VXLAN functionality that leverages the Border Gateway Protocol (BGP) scalable design. With BGP eVPN, the legacy scalability limitations of creating static VxLAN tunnels between VTEP end points is no longer the case.

1.1 Objective

This document provides a set of valid Dell EMC networking configurations that apply to a BGP eVPN typical deployment scenario.

1.2 Audience

The suggested audience for this document is a system administrator, network architect, system engineer, or data center architect.

2 Setup

Figure1 shows the reference deployment setup used in the lab to demonstrate the Dell EMC OS10 BGP eVPN functionality.

The setup consists of three Dell EMC switches running the 10.4.2.1.251 software release. Two dynamic tunnels are established using BGP eVPN between the end-points (Leaf switches).

The objective of this setup is to highlight how a typical Layer 2 domain between two separate physical data centers is stretched across an IP infrastructure while retaining and providing a flat Layer 2 connectivity.

Two VNIs are used to directly map two VLANs that are stretched (1000 and 2000). The result is two VMs that are each assigned to vlan 1000 and 2000. The VLANs can communicate with their respective counterpart across the Layer 3 cloud as if each VM was connected to a Layer 2 switch.

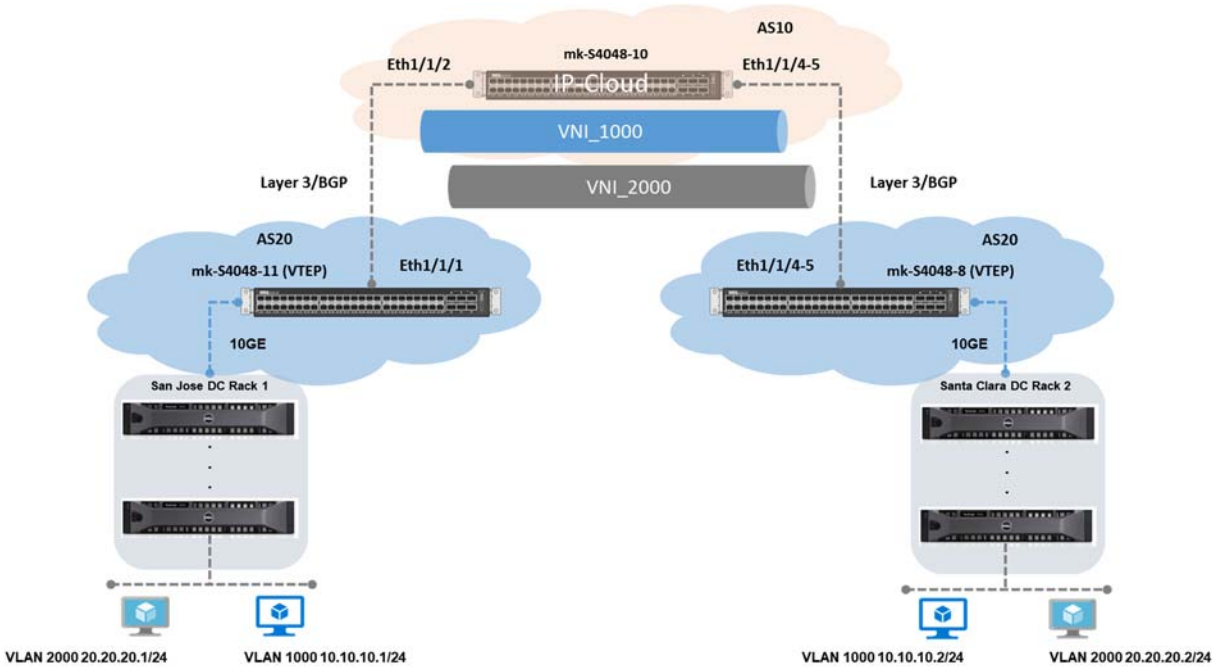

Figure 1 BGP eVPN VxLAN deployment diagram

2.1 Deployment components

The setup consists of three devices:

- Router – Layer 3 IP-Cloud
- Leaf 1 – VTEP (VXLAN/Virtual Tunnel End-Point)
- Leaf 2 – VTEP (VXLAN/Virtual Tunnel End-Point)

Two dynamic VxLAN tunnels are established between the Leaf switches simulating two data centers.

A Dell EMC Networking S4048 configuration details

A.1 Configuration of S4048-10 for Layer 3 IP-Cloud

1. Enter the following commands to configure the Layer 3 interfaces between the spine/core and leaf switches:

```
mk-S4048-10# conf t
mk-S4048-10(config)# interface ethernet1/1/2
mk-s4048-10(conf-if-eth1/1/2)# des link_2_S4048-11
mk-s4048-10(conf-if-eth1/1/2)# no switchport
mk-s4048-10(conf-if-eth1/1/2)# ip add 155.13.1.1/24
mk-s4048-10(conf-if-eth1/1/2)# exit
mk-s4048-10(config)# int range eth1/1/4-1/1/5
mk-s4048-10(conf-range-eth1/1/4-1/1/5)# des link_2_S4048-8
mk-s4048-10(conf-range-eth1/1/4-1/1/5)# no switchport
mk-s4048-10(conf-range-eth1/1/4-1/1/5)# exit
mk-s4048-10(config)# interface eth1/1/4
mk-s4048-10(conf-if-eth1/1/4)# ip add 155.14.1.1/24
mk-s4048-10(conf-if-eth1/1/4)# exit
mk-s4048-10(config)# interface eth1/1/5
mk-s4048-10(conf-if-eth1/1/5)# ip add 155.15.1.1/24
mk-s4048-10(conf-if-eth1/1/5)# end
mk-s4048-10#
```

2. Configure the local loopback to use as the update source interface:

```
mk-s4048-10# conf
mk-s4048-10(config)# interface loopback0
mk-s4048-10(conf-if-lo-0)# ip add 1.1.1.1/24
mk-s4048-10(conf-if-lo-0)# end
mk-s4048-10#
```

3. Configure the BGP and related eVPN configurations.

Note: There are different autonomous areas (AS) that are defined. The spine and leaf switches are configured in different AS numbers.

```
mk-s4048-10# conf
mk-s4048-10(config)# router bgp 10
mk-s4048-10(conf-router-bgp-10)# address-family ipv4 unicast
mk-s4048-10(conf-router-bgpv4-af)# redistribute connected
mk-s4048-10(conf-router-bgpv4-af)# exit
mk-s4048-10(config-router-bgp-10)# neighbor 155.13.1.3  <<< link to Leaf 1
mk-s4048-10(config-router-neighbor)# remote-as 20
mk-s4048-10(config-router-neighbor)# address-family ipv4 unicast
mk-s4048-10(config-router-bgp-neighbor-af)# no sender-side-loop-detection
mk-s4048-10(config-router-bgp-neighbor-af)# exit
mk-s4048-10(config-router-neighbor)# exit
mk-s4048-10(config-router-bgp-10)# neighbor 3.3.3.3  <<<< Leaf 2 loopback
```

```
mk-s4048-10(config-router-neighbor)# remote-as 20
mk-s4048-10(config-router-neighbor)# send-community extended
mk-s4048-10(config-router-neighbor)# update-source loopback 0
mk-s4048-10(config-router-neighbor)# address-family ipv4 unicast
mk-s4048-10(config-router-neighbor)# no activate
mk-s4048-10(config-router-bgp-neighbor-af)# exit
mk-s4048-10(config-router-neighbor)# address-family l2vpn evpn
mk-s4048-10(config-router-bgp-neighbor-af)#  activate
mk-s4048-10(config-router-bgp-neighbor-af)# no sender-side-loop-detection
mk-s4048-10(config-router-bgp-neighbor-af)# exit
mk-s4048-10(config-router-neighbor)# exit
*********************************************************************
mk-s4048-10(config-router-bgp-10)# neighbor 155.15.1.5  <<< link to Leaf 2
mk-s4048-10(config-router-neighbor)# remote-as 20
mk-s4048-10(config-router-neighbor)# address-family ipv4 unicast
mk-s4048-10(config-router-bgp-neighbor-af)# no sender-side-loop-detection
mk-s4048-10(config-router-bgp-neighbor-af)# exit
mk-s4048-10(config-router-neighbor)# exit
mk-s4048-10(config-router-bgp-10)# neighbor 155.15.1.4 <<< link to Leaf 2
mk-s4048-10(config-router-neighbor)# remote-as 20
mk-s4048-10(config-router-neighbor)# address-family ipv4 unicast
mk-s4048-10(config-router-bp-neighbor-af)#no sender-side-loop-detection
mk-s4048-10(config-router-bgp-neighbor-af)# exit
mk-s4048-10(config-router-neighbor)# exit
*********************************************************************
mk-s4048-10(config-router-bgp-10)# neighbor 2.2.2.2 <<< Leaf 1 loopback
mk-s4048-10(config-router-neighbor)# remote-as 20
mk-s4048-10(config-router-neighbor)# send-community extended
mk-s4048-10(config-router-neighbor)# update-source loopback 0
mk-s4048-10(config-router-neighbor)# address-family ipv4 unicast
mk-s4048-10(config-router-neighbor)# no activate
mk-s4048-10(config-router-bgp-neighbor-af)# exit
mk-s4048-10(config-router-neighbor)# address-family l2vpn evpn
mk-s4048-10(config-router-bgp-neighbor-af)# activate
mk-s4048-10(config-router-bgp-neighbor-af)# no sender-side-loop-detection
mk-s4048-10(config-router-bgp-neighbor-af)# end
mk-s4048-10#
```

A.2 Configuration of S4048-11 for Leaf 1

1. Enter the following commands to configure the eVPN globally:

```
mk-s4048-11# conf
mk-s4048-11(config)# evpn
mk-s4048-11(config-evpn)# auto-evi
```

Note: Auto derive route distinguishers, route-targets and other eVPN parameters. If auto-evi is not used, then all necessary parameters as stated before will need to be configured manually.

```
mk-s4048-11(config)# end
```

2. Configure the local loopback using the following commands:

```
mk-s4048-11# conf
mk-s4048-11(config)# int lo0
mk-s4048-11(conf-if-lo-0)# ip add 2.2.2.2/24
mk-s4048-11(conf-if-lo-0)# end
mk-s4048-11#
```

3. Enter the following commands to configure NVE source interface:

```
mk-s4048-11# conf
mk-s4048-11(config)# nve
mk-s4048-11(conf-nve)# source-interface loopback 0
mk-s4048-11(conf-nve)# end
mk-s4048-11#
```

4. Configure BGP using the following commands:

```
mk-s4048# conf
mk-s4048-11(config)# router bgp 20
mk-s4048-11(config-router-bgp-20)# address-family ipv4 unicast
mk-s4048-11(configure-router-bgpv4-af)# redistribute connected
mk-s4048-11(configure-router-bgpv4-af)# exit
mk-s4048-11(configure-router-bgp-20)# neighbor 155.13.1.1  <<< First link
to spine
mk-s4048-11(config-router-neighbor)# remote-as 10
mk-s4048-11(config-router-neighbor)# address-family ipv4 unicast
mk-s4048-11(config-router-bgp-neighbor-af)# allowas-in 1
mk-s4048-11(config-router-bgp-neighbor-af)# exit
mk-s4048-11(config-router-neighbor)# exit
**********************************************************************
mk-s4048-11(config-router-bgp-20)# neighbor 1.1.1.1
mk-s4048-11(config-router-neighbor)# remote-as 10
mk-s4048-11(config-router-neighbor)# send-community extended
mk-s4048-11(config-router-neighbor)# update-source loopback0
mk-s4048-11(config-router-neighbor)# address-family ipv4 unicast
mk-s4048-11(config-router-neighbor)# no activate
mk-s4048-11(config-router-bgp-neighbor-af)# exit
mk-s4048-11(config-router-neighbor)# address-family l2vpn evpn
mk-s4048-11(config-router-bgp-neighbor-af)# activate
mk-s4048-11(config-router-bgp-neighbor-af)# allowas-in 1
mk-s4048-11(config-router-bgp-neighbor-af)# end
mk-s4048-11#
```

5. Configure the virtual networks (VNIs) and map to VxLAN:

```
mk-s4048-11# conf
mk-s4048-11(config)# virtual-network 1000
mk-s4048-11(conf-vn-1000)# vxlan-vni 1000
mk-s4048-11(conf-vn-1000)# exit
mk-s4048-11(config)# virtual-network 2000
mk-s4048-11(conf-vn-2000)# vxlan-vni 2000
```

```
mk-s4048-11(conf-vn-2000)# end
mk-s4048-11#
```

6. Enter the following commands to configure the virtual network to VLAN:

```
mk-s4048-11# conf
mk-s4048-11(config)# interface vlan1000
mk-s4048-11(conf-if-vl-1000)# virtual-network 1000
mk-s4048-11(conf-if-vl-1000)# exit
mk-s4048-11(config)# interface vlan 2000
mk-s4048-11(conf-if-vl-2000)# virtual-network 2000
mk-s4048-11(conf-if-vl-2000)# end
mk-s4048-11#
```

7. Configure the Layer 3 interfaces to the spine switch:

```
mk-s4048-11# conf
mk-s4048-11(config)# int eth1/1/1
mk-s4048-11(conf-if-eth1/1/1)# des link_2_S4048-10
mk-s4048-11(conf-if-eth1/1/1)# no switchport
mk-s4048-11(conf-if-eth1/1/1)# ip add 155.13.1.3/24
mk-s4048-11(conf-if-eth1/1/1)# end
```

8. Configure user VLAN 1000 and VLAN 2000 to be stretched across the Layer 3 cloud:

```
mk-s4048-11# conf
mk-s4048-11(config)# int eth1/1/45
mk-s4048-11(conf-if-eth1/1/45)# des Link_2_TestLink
mk-s4048-11(conf-if-eth1/1/45)# switch mode trunk
mk-s4048-11(conf-if-eth1/1/45)# switch trunk allowed vlan 1000,2000
mk-s4048-11(conf-if-eth1/1/45)#
```

A.3 Configuration of S4048-08 for Leaf 2

1. Configure the eVPN globally:

```
mk-s4048-08# conf
mk-s4048-08(config)# evpn
mk-s4048-08(config-evpn)# auto-evi
```

Note: Auto derive route distinguishers, route-targets and other eVPN parameters. If auto-evi is not used, then all necessary parameters as stated before will need to be configured manually.

```
mk-s4048-08(config-evpn)# end
mk-s4048-08#
```

2. Configure the local loopback using the following commands:

```
mk-s4048-08# conf
mk-s4048-08(config)# int lo0
mk-s4048-08(conf-if-lo-0)# ip add 3.3.3.3/24
mk-s4048-08(conf-if-lo-0)# end
```

3. Enter the following commands to configure the NVE source interface:

```
mk-s4048-08# conf
mk-s4048-08(config)# nve
mk-s4048-08(conf-nve)# source-interface loopback 0
mk-s4048-08(conf-nve)# end
mk-s4048-08#
```

4. Configure the virtual networks (VNIs) and map to the VxLAN:

```
mk-s4048-08# conf
mk-s4048-08(config)# virtual-network 1000
mk-s4048-08(conf-vn-1000)# vxlan-vni 1000
mk-s4048-08(conf-vn-1000)# exit
mk-s4048-08(config)# virtual-network 2000
mk-s4048-08(conf-vn-2000)# vxlan-vni 2000
mk-s4048-08(conf-vn-2000)# end
mk-s4048-08#
```

5. Using the following commands, configure the BGP:

```
mk-s4048-08# conf
mk-s4048-08(config)# router bgp 20
mk-s4048-08(config-router-bgp-20)# address-family ipv4 unicast
mk-s4048-08(configure-router-bgpv4-af)# redistribute connected
mk-s4048-08(configure-router-bgpv4-af)# exit
mk-s4048-08(configure-router-bgp-20)# neighbor 155.14.1.1  <<< First link
to spine
mk-s4048-08(config-router-neighbor)# remote-as 10
mk-s4048-08(config-router-neighbor)# address-family ipv4 unicast
mk-s4048-08(config-router-bgp-neighbor-af)# allowas-in 1
mk-s4048-08(config-router-bgp-neighbor-af)# exit
mk-s4048-08(config-router-neighbor)# exit
**********************************************************************
mk-s4048-08(config-router-bgp-20)# neighbor 155.15.1.1  <<< Second link to
spine
mk-s4048-08(config-router-neighbor)# remote-as 10
mk-s4048-08(config-router-neighor)# address-family ipv4 unicast
mk-s4048-08(config-router-bgp-neighbor-af)# allowas-in 1
mk-s4048-08(config-router-bgp-neighbor-af)# exit
mk-s4048-08(config-router-neighbor)# exit
mk-s4048-08(config-router-bgp-20)#
**********************************************************************
mk-s4048-08(config-router-bgp-20)# neighbor 1.1.1.1
mk-s4048-08(config-router-neighbor)# remote-as 10
mk-s4048-08(config-router-neighbor)# send-community extended
mk-s4048-08(config-router-neighbor)# update-source loopback0
mk-s4048-08(config-router-neighbor)# address-family ipv4 uni
mk-s4048-08(config-router-neighbor)# no activate
mk-s4048-08(config-router-bgp-neighbor-af)# exit
mk-s4048-08(config-router-neighbor)# address-family l2vpn evpn
mk-s4048-08(config-router-bgp-neighbor-af)# activate
```

```
mk-s4048-08(config-router-bgp-neighbor-af)# allowas-in 1
mk-s4048-08(config-router-bgp-neighbor-af)# end
mk-s4048-08#
```

6. Configure the virtual networks (VNIs) and map to the VxLAN:

```
mk-s4048-08# conf
mk-s4048-08(config)# virtual-network 1000
mk-s4048-08(conf-vn-1000)# vxlan-vni 1000
mk-s4048-08(conf-vn-1000)# exit
mk-s4048-08(config)# virtual-network 2000
mk-s4048-08(conf-vn-2000)# vxlan-vni 2000
mk-s4048-08(conf-vn-2000)# end
mk-s4048-08#
```

7. Configure the virtual network to the VLAN:

```
mk-s4048-08# conf
mk-s4048-08(config)# interface vlan1000
mk-s4048-08(conf-if-vl-1000)# virtual-network 1000
mk-s4048-08(conf-if-vl-1000)# exit
mk-s4048-08(config)# interface vlan 2000
mk-s4048-08(conf-if-vl-2000)# virtual-network 2000
mk-s4048-08(conf-if-vl-2000)# end
mk-s4048-08#
```

8. Configure the Layer 3 interfaces to the spine switch:

```
mk-s4048-08# conf
mk-s4048-08(config)# int range eth1/1/4-1/1/5
mk-s4048-08(conf-range-eth1/1/4-1/1/5)# no switchport
mk-s4048-08(conf-range-eth1/1/4-1/1/5)# end
mk-s4048-08# conf
mk-s4048-08(config)# interface eth1/1/4
mk-s4048-08(conf-if-eth1/1/4)# des Link_2_Spine
mk-s4048-08(conf-if-eth1/1/4)# ip add 155.15.1.4/24
mk-s4048-08(conf-if-eth1/1/4)# exit
mk-s4048-08(config)# interface eth1/1/5
mk-s4048-08(conf-if-eth1/1/5)# des Link_2_Spine
mk-s4048-08(conf-if-eth1/1/5)# ip add 155.14.1.5
mk-s4048-08(conf-if-eth1/1/5)# end
mk-s4048-08#
```

9. Configure user VLAN 1000 and VLAN 2000 to be stretched across the Layer 3 cloud:

```
mk-s4048-08#conf
mk-s4048-08(config)# int eth1/1/45
mk-s4048-08(conf-if-eth1/1/45)# des Link_2_TestLink
mk-s4048-08(conf-if-eth1/1/45)# switchport mode trunk
mk-s4048-08(conf-if-eth1/1/45)# switchport trunk allowed vlan 1000, 2000
mk-s4048-08(conf-if-eth1/1/45)# end
mk-s4048-08#
```