# Simple VxLAN over MP-BGP

## Background

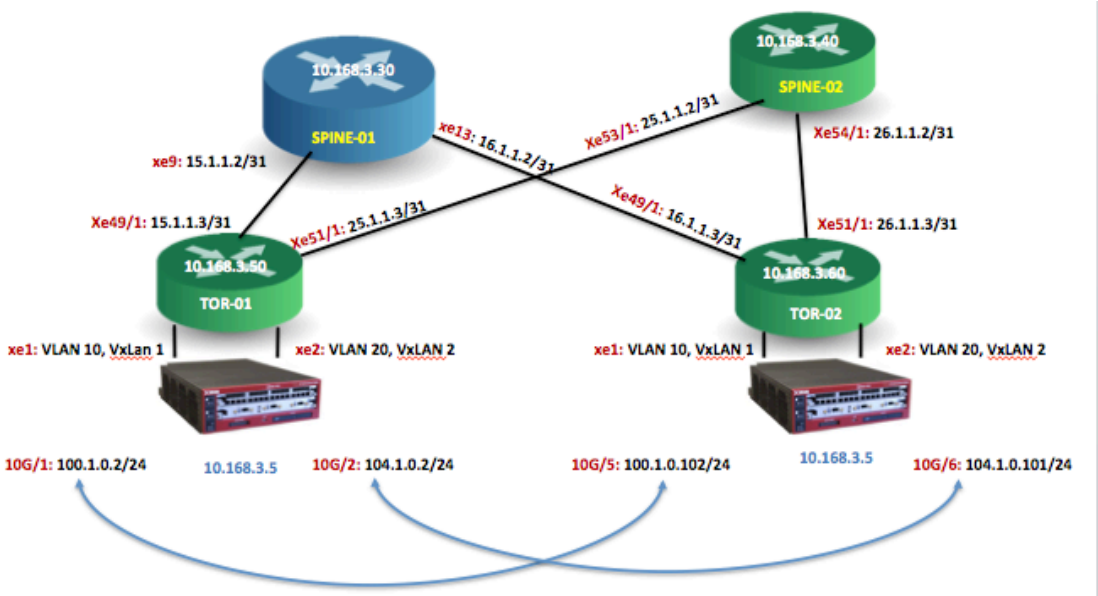
This document would show you how to configure VxLAN over MP-BGP in a simple POD containing two ToR and two Spine switches. We have also configured dual link, with BFD and ECMP for high availability.

For this example ipinfusion OcNOS was used. Also have IXIA generating simulated hosts across two VxLAN with traffic

## VxLAN key terminology

Virtual Extensible LAN (VxLAN)
VxLAN Network Identifier (VNI)
VxLAN Tunnel End Point (VTEP

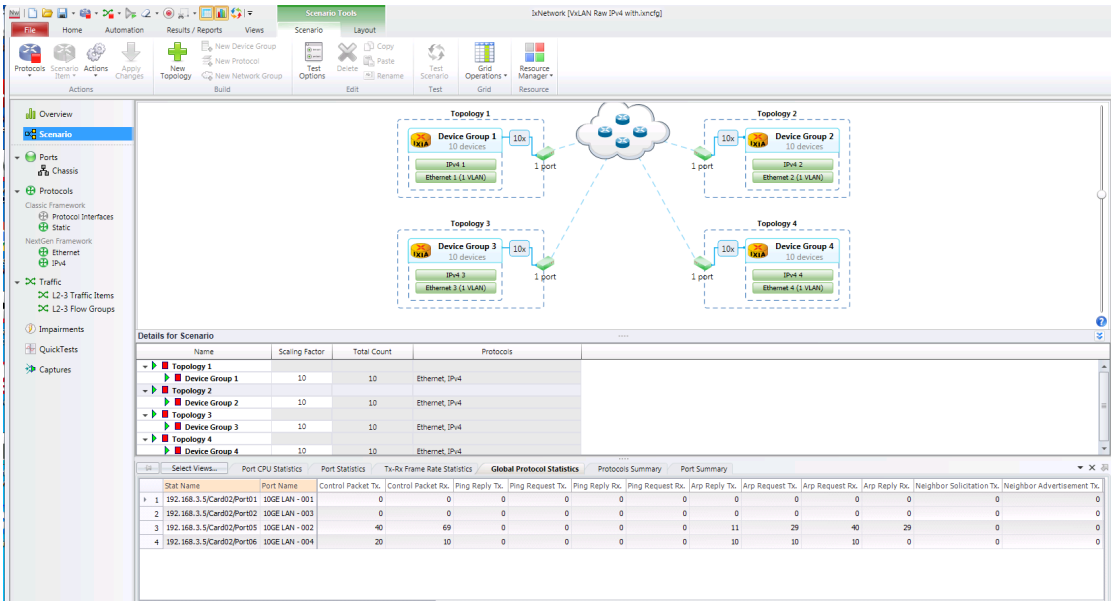
## Detail topology



## Validation

40 subscribers simulated via IXIA and 25% line rate sent bi-directional from hos to host via IXIA.

Screen capture of IX-Network for validated sessions




Traffic ran for one week without interrupt. Tested link redundancy by shutting the primary port and verifying traffic was not impacted for more than a few seconds

# Switch Configuration

## ToR1 configuration:

Here is key part of configuration on Top of the rack switch "TOR1" with comments to explain what each line of configuration does

```
! Configure management port
!
interface eth0
  ip address 10.168.3.50/24
  no shutdown
! Setup ISIS
!
router isis 127.0.0.1
  is-type level-2-only
  net 49.0001.3333.3333.3333.00
exit
! Add ISIS to loopback
!
interface lo
  ip address 3.3.3.3/32
  isis circuit-type level-2-only
  ip router isis 127.0.0.1
exit
! Configure interconnected ports with ISIS and BGP
!
interface xe49/1
  ip address 15.1.1.3/31
  isis circuit-type level-2-only
  ip router isis 127.0.0.1
exit
```

```
interface xe51/1
  ip address 25.1.1.3/31
  isis circuit-type level-2-only
  ip router isis 127.0.0.1
exit
! Configure BGP and BFD for ECMP
!
router bgp 1
  bgp router-id 3.3.3.3
  neighbor 1.1.1.1 remote-as 1
  neighbor 1.1.1.1 update-source 3.3.3.3
  neighbor 1.1.1.1 fall-over bfd
  neighbor 2.2.2.2 remote-as 1
  neighbor 2.2.2.2 update-source 3.3.3.3
  neighbor 2.2.2.2 fall-over bfd
exit
!Create a bridge port to carry MSTP
!
bridge 1 protocol mstp
! Create VLAN to isolate two sets of traffic
! Place them in bridge port
!
vlan database
  vlan 10 bridge 1 state enable
  vlan 20 bridge 1 state enable
exit
! Create a dummy VRF to carry L2 into L3
!
ip vrf vxlan-vrf
  rd 100:1
  route-target both 100:100
```

```
exit

! Create Tenant facing interfaces
! Note in my case IXIA port is 10G so I set speed accordingly
!
interface xe1
  speed 10g
  switchport
  bridge-group 1
  switchport mode hybrid
  switchport hybrid allowed vlan all
exit
!
interface xe2
  speed 10g
  switchport
  bridge-group 1
  switchport mode hybrid
  switchport hybrid allowed vlan all
exit
! Setup BGP to carry L2 address family
!
router bgp 1
  address-family l2vpn evpn
  neighbor 1.1.1.1 activate
  neighbor 2.2.2.2 activate
  exit-address-family
exit
! Setup to VxLAN each with isolated traffic into VLAN 10 and VLAN 20
!
nvo vxlan enable
nvo vxlan vtep-ip-global 3.3.3.3
```

```
nvo vxlan id 1 ingress-replication
 vxlan host-reachability-protocol evpn-bgp vxlan-vrf
 vxlan map-access port-vlan xe1 10
exit

nvo vxlan id 2 ingress-replication
 vxlan host-reachability-protocol evpn-bgp vxlan-vrf
 vxlan map-access port-vlan xe2 20
exit
```

## ToR2 configuration:

Here are detail configurations on ToR2 without comments.

```
interface eth0
 ip address 10.168.3.60/24
 no shutdown
exit

interface lo
 ip address 4.4.4.4/32
 isis circuit-type level-2-only
 ip router isis 127.0.0.1
exit

router isis 127.0.0.1
 is-type level-2-only
 net 49.0001.4444.4444.4444.00
exit

interface xe49/1
```

```
  ip address 16.1.1.3/31
  isis circuit-type level-2-only
  ip router isis 127.0.0.1
exit

interface xe51/1
  ip address 26.1.1.3/31
  isis circuit-type level-2-only
  ip router isis 127.0.0.1
exit

router bgp 1
  bgp router-id 4.4.4.4
  neighbor 1.1.1.1 remote-as 1
  neighbor 1.1.1.1 update-source 4.4.4.4
  neighbor 1.1.1.1 fall-over bfd
  neighbor 2.2.2.2 remote-as 1
  neighbor 2.2.2.2 update-source 4.4.4.4
  neighbor 2.2.2.2 fall-over bfd
exit

bridge 1 protocol mstp

vlan database
  vlan 10 bridge 1 state enable
  vlan 20 bridge 1 state enable
exit

ip vrf vxlan-vrf
  rd 100:1
  route-target both 100:100
exit
```

```
interface xe1
 speed 10g
 switchport
 bridge-group 1
 switchport mode hybrid
 switchport hybrid allowed vlan all
exit

interface xe2
 speed 10g
 switchport
 bridge-group 1
 switchport mode hybrid
 switchport hybrid allowed vlan all
exit

router bgp 1
 address-family l2vpn evpn
 neighbor 1.1.1.1 activate
 neighbor 2.2.2.2 activate
 exit-address-family
exit

nvo vxlan enable
nvo vxlan vtep-ip-global 4.4.4.4
nvo vxlan id 1 ingress-replication
 vxlan host-reachability-protocol evpn-bgp vxlan-vrf
 vxlan map-access port-vlan xe1 10
exit

nvo vxlan id 2 ingress-replication
```

```
 vxlan host-reachability-protocol evpn-bgp vxlan-vrf
 vxlan map-access port-vlan xe2 20
exit
```

## Spine1 configuration:

Spine configuration is a lot simpler than TOR configuration because it is mostly BGP and IGP configuration. These could be any switch that supports these protocols. In our case we are using Delta Products switches for the spine role as well

```
router isis 127.0.0.1
  is-type level-2-only
  net 49.0001.1111.1111.1111.00
exit

interface lo
  ip address 1.1.1.1/32
  isis circuit-type level-2-only
  ip router isis 127.0.0.1
exit

interface xe9/1
  ip address 15.1.1.2/31
  isis circuit-type level-2-only
  ip router isis 127.0.0.1
exit

interface xe13
  ip address 16.1.1.2/31
  isis circuit-type level-2-only
```

```
  ip router isis 127.0.0.1
exit

router bgp 1
  bgp router-id 1.1.1.1
  neighbor 4.4.4.4 remote-as 1
  neighbor 4.4.4.4 update-source 1.1.1.1
  neighbor 4.4.4.4 fall-over bfd
  neighbor 3.3.3.3 remote-as 1
  neighbor 3.3.3.3 update-source 1.1.1.1
  neighbor 3.3.3.3 fall-over bfd
  address-family l2vpn evpn
  neighbor 4.4.4.4 activate
  neighbor 4.4.4.4 route-reflector-client
  neighbor 3.3.3.3 activate
  neighbor 3.3.3.3 route-reflector-client
  exit-address-family
exit
```

## Spine2 configuration:

Spine1 is very similar to spine 1. Variation is only in the peer settings

```
router isis 127.0.0.1
  is-type level-2-only
  net 49.0001.2222.2222.2222.00
exit

interface lo
  ip address 2.2.2.2/32
  isis circuit-type level-2-only
```

```
  ip router isis 127.0.0.1
exit

interface xe53/1
  ip address 25.1.1.2/31
  isis circuit-type level-2-only
  ip router isis 127.0.0.1
exit

interface xe54/1
  ip address 26.1.1.2/31
  isis circuit-type level-2-only
  ip router isis 127.0.0.1
exit

router bgp 1
  neighbor 4.4.4.4 remote-as 1
  neighbor 4.4.4.4 update-source 2.2.2.2
  neighbor 4.4.4.4 fall-over bfd
  neighbor 3.3.3.3 remote-as 1
  neighbor 3.3.3.3 update-source 2.2.2.2
  neighbor 3.3.3.3 fall-over bfd
  address-family l2vpn evpn
  neighbor 4.4.4.4 activate
  neighbor 4.4.4.4 route-reflector-client
  neighbor 3.3.3.3 activate
  neighbor 3.3.3.3 route-reflector-client
  exit-address-family
exit
```