VXLAN-MCLAG Active-Active High Availability Support

The VXLAN-MCLAG Active-Active High Availability Support feature implements dual-home device with pseudo Multichassis Link Aggregation Control Protocol (pMLACP) redundancy mode and layer 2 VxLAN on the Cisco ASR1000 Series Aggregation Services Routers.

Restrictions for VXLAN-MCLAG Active-Active High Availability Support

- The loopback interface configured for this feature cannot be used for another feature.
- The loopback interface of NVE interface must be shut down before configuring pmLACP, VxLAN and routing protocol.
- Bridge domain supports one VXLAN Network Identifier (VNI) Ethernet flow point (EFP) member only.
- Shutting the bridge domain affects status of the NVE interface, not the pseudo mLACP status.

Information About VXLAN-MCLAG Active-Active High Availability Support

Virtual Extensible LAN

Virtual Extensible LAN (VXLAN) is a network virtualization overlay technology that provides Layer 2 connectivity for workloads residing at noncontiguous points in the data center network. VXLAN enables

flexibility by allowing workloads to be placed anywhere, along with the traffic separation required in a multitenant environment. VXLAN is an industry-standard protocol and uses underlay IP networks. It extends Layer 2 segments over a Layer 3 infrastructure to build Layer 2 overlay logical networks. It encapsulates Ethernet frames into IP User Data Protocol (UDP) headers and transports the encapsulated packets through the underlay network to the remote VXLAN tunnel endpoints (VTEPs) using the normal IP routing and forwarding mechanism.

Multichassis Link Aggregation Group

Multichassis Link Aggregation Group (MC-LAG) and Inter-chassis Communication Protocol (ICCP) enable a switch/router to use standard Ethernet Link Aggregation for device dual-homing, with active/standby redundancy. MC-LAG provides a mean to dual home a device (the dual homed device (DHD)) to two different peer devices (the Point of Attachment), allowing to have the benefits of node redundancy. Point of Attachment (PoA) nodes run Inter-chassis Communication Protocol (ICCP) to synchronize state & form a Redundancy Group (RG).

In VXLAN - MCLAG Active-Active High Availability support, both the PoA ports are placed in active/active mode with manual VLAN load balancing. It provides higher bandwidth utilization than Multichassis Link Aggregation Control Protocol (mLACP). It also allows maximum flexibility for the Provider Edge-Customer Edge (PE-CE) inter-operability for dual-homing redundancy and failover recovery. Active and standby PoA nodes are configured on the identical interfaces, that is, the same loopback IP address and interface as VTEP source interface, VLAN and VNI mapping, and so on.

How to Configure VXLAN-MCLAG Active-Active High Availability Support

Configuring Interchassis Redundancy Groups on PoA

To configure interchassis redundancy groups on PoA, perform the steps below.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **redundancy**
4. **interchassis group** *group-id*
5. **member ip** *peer ip address*
6. **monitor peer [bfd | track]**
7. **mlacp node-id** *node id*
8. **backbone interface** *backbone if*
9. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable**	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: `Device> enable`	• Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**redundancy** **Example:** `Device(config)# redundancy`	Configures the redundancy group.
Step 4	**interchassis group** *group-id* **Example:** `Device(config-red)# interchassis group 2`	Configures interchassis group.
Step 5	**member ip** *peer ip address* **Example:** `Device(config-r-ic)# member ip 172.168.40.24`	Specifies IP address to be assigned to a remote peer dialing in to the interface.
Step 6	**monitor peer [bfd | track]** **Example:** `Device(config-r-ic)# monitor peer bfd`	Specifies the the peer monitoring method.
Step 7	**mlacp node-id** *node id* **Example:** `Device(config-r-ic)# mlacp node-id 2`	Configures mLACP node ID.
Step 8	**backbone interface** *backbone if* **Example:** `Device(config-r-ic)# backbone interface Gi0/0/2`	Configures a backbone interface for the redundancy group.
Step 9	**end** **Example:** `Device(config-if)# end`	Exits interface configuration mode and returns to privileged EXEC mode.

Configuring Port Channel on PoA

To configure port channel on PoA, perform the steps below.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface Port-channel** *port channel number*
4. **negotiation**

5. **lacp fast-switchover**
6. **mlacp interchassis group** *rg id*
7. **mlacp mode active-active**
8. **mlacp load-balance primary vlan** *vlan-id*
9. **mlacp load-balance secondary vlan** *vlan-id*
10. **service instance** *id* **ethernet**
11. **encapsulation dot1q**
12. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**interface Port-channel** *port channel number* **Example:** `Device(config-if)# interface Port-channel 2`	Configures the interface for port channel.
Step 4	**negotiation** **Example:** `Device(config-if)# negotiation`	Configures auto negotiation mode.
Step 5	**lacp fast-switchover** **Example:** `Device(config-if)# lacp fast-switchover`	Specifies LACP Port Channel interface.
Step 6	**mlacp interchassis group** *rg id* **Example:** `Device(config-if)# mlacp interchassis group 2`	Configures mLACP peer PoA RG ID.
Step 7	**mlacp mode active-active** **Example:** `Device(config-if)# mlacp mode active-active`	Enables mLACP active-active POA redundancy.
Step 8	**mlacp load-balance primary vlan** *vlan-id* **Example:** `Device(config-if)# mlacp load-balance primary vlan 40`	Configures the list of primary VLANs that will be active and inactive on the given PoA.

	Command or Action	Purpose
Step 9	**mlacp load-balance secondary vlan** *vlan-id* **Example:** `Device(config-if)# mlacp load-balance secondary vlan 20`	Configures the list of secondary VLANs that will be active and inactive on the given PoA.
Step 10	**service instance** *id* **ethernet** **Example:** `Device(config-if-srv)# service instance 20 ethernet`	Configures service instance identifier.
Step 11	**encapsulation dot1q** **Example:** `Device(config-if-srv)# encapsulation dot1q 20`	Configures ethernet frame match criteria.
Step 12	**end** **Example:** `Device(config-if)# end`	Exits interface configuration mode and returns to privileged EXEC mode.

Configuring Vxlan Unicast Core Configuration on POA

To configure Vxlan Unicast Core Configuration on POA, perform the steps below.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **bridge-domain** *id*
4. **member vni** *number*
5. **member Port-channel** *number* **service-instance** *id*
6. **exit**
7. **interface Loopback** *number*
8. **ip address**
9. **exit**
10. **interface nve**
11. **member vni** *number*
12. **ingress-replication** *IPV4 address*
13. **exit**
14. **source-interface Loopback** *id*
15. **no shutdown**
16. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**bridge-domain** *id* **Example:** `Device(config)# bridge-domain 20`	Configures the bridge domain ID.
Step 4	**member vni** *number* **Example:** `Device(config-bdomain)# member vni 7777`	Configures member virtual network identifier (VNI).
Step 5	**member Port-channel** *number* **service-instance** *id* **Example:** `Device(config-bdomain)# member Port-channel1 service-instance 20`	Configures port channel and service instance.
Step 6	**exit** **Example:** `Device(config-bdomain)# exit`	Exits bridge domain mode and returns to global configuration mode.
Step 7	**interface Loopback** *number* **Example:** `Device(config-if)# interface Loopback10`	Specifies a loopback interface.
Step 8	**ip address** **Example:** `Device(config-if)# ip address 77.1.1.1 255.255.255.255`	Configures IP address.
Step 9	**exit** **Example:** `Device(config-if)# exit`	Exits interface configuration mode and returns to global configuration mode.
Step 10	**interface nve** **Example:** `Device(config)# interface nve1`	Configures network virtualization endpoint interface.
Step 11	**member vni** *number* **Example:**	Configures VNI information.

	Command or Action	Purpose
	`Device(config-if)# member vni 7777`	
Step 12	**ingress-replication** *IPV4 address* **Example:** `Device(config-if-nve-vni)# ingress-replication 99.1.1.1`	Configures remote Peer IPV4 Address.
Step 13	**exit** **Example:** `Device(config-if-nve-vni)# exit`	Exits network virtualization endpoint interface configuration mode and returns to global configuration mode.
Step 14	**source-interface Loopback** *id* **Example:** `Device(config-if)# source-interface Loopback10`	Configures interface loopback.
Step 15	**no shutdown** **Example:** `Device(config-if)# no shutdown`	Restarts the interface.
Step 16	**end** **Example:** `Device(config-if)# end`	Exits interface configuration mode and returns to privileged EXEC mode.

Configuring Vxlan Multicast Core Configuration on POA

To configure Vxlan Multicast Core Configuration on POA, perform the steps below.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **bridge-domain** *id*
4. **member vni** *number*
5. **member Port-channel** *number* **service-instance** *id*
6. **exit**
7. **interface Loopback** *number*
8. **ip address**
9. **ip pim sparse-dense-mode**
10. **exit**
11. **interface nve**
12. **member vni** *number* **mcast-group** *address*
13. **source-interface Loopback**
14. **no shutdown**
15. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**bridge-domain** *id* **Example:** `Device(config)# bridge-domain 20`	Configures the bridge domain ID.
Step 4	**member vni** *number* **Example:** `Device(config-bdomain)# member vni 7777`	Configures member virtual network identifier (VNI).
Step 5	**member Port-channel** *number* **service-instance** *id* **Example:** `Device(config-bdomain)# member Port-channel1 service-instance 20`	Configures port channel and service instance.
Step 6	**exit** **Example:** `Device(config-bdomain)# exit`	Exits bridge domain mode and returns to global configuration mode.
Step 7	**interface Loopback** *number* **Example:** `Device(config-if)# interface Loopback10`	Specifies a loopback interface.
Step 8	**ip address** **Example:** `Device(config-if)# ip address 77.1.1.1 255.255.255.255`	Configures IP address.
Step 9	**ip pim sparse-dense-mode** **Example:** `Device(config-if)# ip pim sparse-dense-mode`	Enables PIM to operate in sparse or dense mode.
Step 10	**exit** **Example:** `Device(config-if)# exit`	Exits interface configuration mode and returns to global configuration mode.
Step 11	**interface nve** **Example:**	Configures network virtualization endpoint interface.

	Command or Action	Purpose
	`Device(config)# interface nve1`	
Step 12	**member vni** *number* **mcast-group** *address* **Example:** `Device(config-if)# member vni 7777 mcast-group 232.1.1.1`	Configures VNI information.
Step 13	**source-interface Loopback** **Example:** `Device(config-if)# source-interface Loopback10`	Configures interface loopback.
Step 14	**no shutdown** **Example:** `Device(config-if)# no shutdown`	Restarts the interface.
Step 15	**end** **Example:** `Device(config-if)# end`	Exits interface configuration mode and returns to privileged EXEC mode.

Configuring Dual-homed Device

To configure dual-homed device, perform the steps below:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface Port-channel** *number*
4. **switchport** *group-id*
5. **switchport trunk encapsulation dot1q**
6. **switchport trunk allowed vlan 20-50**
7. **switchport mode trunk**
8. **exit**
9. **interface GigabitEthernet3/1**
10. **switchport**
11. **switchport trunk encapsulation dot1q**
12. **switchport trunk allowed vlan 20-50**
13. **switchport mode trunk**
14. **channel-group** *number mode*
15. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable**	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: `Device> enable`	• Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**interface Port-channel** *number* **Example:** `Device(config)# interface Port-channel1`	Configures ethernet channel of interfaces.
Step 4	**switchport** *group-id* **Example:** `Device(config-if)# switchport`	Sets the interface as an Ethernet interface.
Step 5	**switchport trunk encapsulation dot1q** **Example:** `Device(config-r-ic)# switchport trunk encapsulation dot1q`	Defines the encapsulation format as IEEE 802.1Q (dot1q) for the specified interface.
Step 6	**switchport trunk allowed vlan 20-50** **Example:** `Device(config-r-ic)# switchport trunk allowed vlan 20-50`	Specifies that only certain VLANs are allowed on the specified trunk.
Step 7	**switchport mode trunk** **Example:** `Device(config-r-ic)# switchport mode trunk`	Sets the interface as an Ethernet trunk port.
Step 8	**exit** **Example:** `Device(config-r-ic)# exit`	Exits interface mode and returns to global configuration mode
Step 9	**interface GigabitEthernet3/1** **Example:** `Device(config-if)# interface GigabitEthernet3/1`	Enters the interface configuration mode on the Gigabit Ethernet interface.
Step 10	**switchport** **Example:** `Device(config-if)# switchport`	Configures the interface port.
Step 11	**switchport trunk encapsulation dot1q** **Example:** `Device(config-if)# switchport trunk encapsulation dot1q`	Defines the encapsulation format as IEEE 802.1Q (dot1q) for the specified interface.

	Command or Action	Purpose
Step 12	**switchport trunk allowed vlan 20-50** **Example:** `Device(config-if)# switchport trunk allowed vlan 20-50`	Specifies that only certain VLANs are allowed on the specified trunk.
Step 13	**switchport mode trunk** **Example:** `Device(config-if)# switchport mode trunk`	Sets the interface as an Ethernet trunk port.
Step 14	**channel-group** *number mode* **Example:** `Device(config-if)# channel-group 1 mode active`	Configures the port in a channel group and sets the mode.
Step 15	**end** **Example:** `Device(config-if)# end`	Exits interface configuration mode and returns to privileged EXEC mode.

Verifying VXLAN-MCLAG Active-Active High Availability Support

To verify, perform the steps below.

SUMMARY STEPS

1. **show lacp internal**
2. **show nve interface nve1**
3. **show nve peers**
4. **show platform software ethernet fp ac bridge-domain binding**
5. **show bridge-domain 20**
6. **show lacp multi-chassis load-balance port-channel**
7. **show nve vni 11111 detail**
8. **show lacp multi load group**

DETAILED STEPS

Step 1 **show lacp internal**

Example:

```
Flags:  S - Device is requesting Slow LACPDUs
        F - Device is requesting Fast LACPDUs
        A - Device is in Active mode       P - Device is in Passive mode

Channel group 1
                            LACP port     Admin     Oper    Port        Port
Port      Flags   State     Priority      Key       Key     Number      State
Gi0/0/0   SA      bndl      32768         0x1       0x1     0x1         0x3D

Channel group 2
```

```
                              LACP port     Admin     Oper    Port        Port
Port      Flags   State      Priority      Key       Key     Number      State
Gi0/0/1   SA      susp       32768         0x2       0x2     0x2         0x7D
```

Step 2 **show nve interface nve1**

Example:

```
Interface: nve1, State: Admin Up, Oper Up Encapsulation: Vxlan
source-interface: Loopback10 (primary:77.1.1.1 vrf:0)
```

Step 3 **show nve peers**

Example:

```
Interface  Peer-IP          VNI        Peer state
   nve1    99.1.1.1         7777
```

Step 4 **show platform software ethernet fp ac bridge-domain binding**

Example:

```
Forwarding Manager Bridge Domain Bindings

BD    Interface                      EFP DPIDB  SHG   STP  AOM id
-------------------------------------------------------------------------------
20    Port-channel1.EFP20            16908305   None FRWD 182, (created)
20    nve1.VNI7777                   16908307   None FRWD 268, (created)
40    Port-channel1.EFP40            16908306   None BLCK 258, (created)
40    nve2.VNI8888                   16908308   None FRWD 285, (created)
```

Step 5 **show bridge-domain 20**

Example:

```
FBridge-domain 20 (2 ports in all)
State: UP                    Mac learning: Enabled
Aging-Timer: 300 second(s)
    Port-channel1 service instance 20
    vni 7777
   AED MAC address    Policy  Tag       Age  Pseudoport
   0   0000.6177.0003 forward dynamic   300  nve1.VNI7777, VxLAN
                                            src: 77.1.1.1 dst: 99.1.1.1
   0   0000.6177.0009 forward dynamic   300  nve1.VNI7777, VxLAN
                                            src: 77.1.1.1 dst: 99.1.1.1
   0   0000.6177.0000 forward dynamic   300  nve1.VNI7777, VxLAN
                                            src: 77.1.1.1 dst: 99.1.1.1
   0   0000.1577.0009 forward dynamic   300  Port-channel1.EFP20
```

Step 6 **show lacp multi-chassis load-balance port-channel**

Example:

```
Interface Port-Channel 1
        Local Configuration:
                P-mLACP Enabled:      Yes
                Redundancy Group:     1
                Revertive Mode:       Revertive
                Primary VLANs:        20
                Secondary VLANs:      40
        Local Interface State:
                Interface ID: 1
                Port State:           Up
                Primary VLAN State:   Active
                Secondary VLAN State: Standby
        Peer Interface State:
```

```
                Interface ID: 1
                Primary VLAN State:   Active
                Secondary VLAN State: Standby
```

Step 7 **show nve vni 11111 detail**

Example:

```
IInterface  VNI        Multicast-group  VNI state
nve1       11111      N/A              Up
VNI Detailed statistics:
   Pkts In   Bytes In   Pkts Out  Bytes Out
1682112875 107655224000 1681321674 107604587136
```

Step 8 **show lacp multi load group**

Example:

```
Interchassis Redundancy Group 1

                RG State:       Synchronized
                ICCP Version:   0
        Backbone Uplink Status: Connected
        Local Configuration:
                Node-id:        0

        Peer Information:
                State:          Up
                Node-id:        1
                ICCP Version:   0

States:      Active     - ACT           Standby    - SBY
             Down       - DN            AdminDown  - ADN
             Unknown    - UN            Reverting  - REV

P-mLACP Interfaces
Interface    Port State     Local VLAN State      Peer VLAN State
   ID          Local       Primary/Secondary     Primary/Secondary
   1             UP             ACT/SBY               ACT/SBY
```

Configuration Examples for VXLAN-MCLAG Active-Active High Availability Support

Example: Configuring VXLAN HA on Multicast Mode

The following example shows how to configure the VXLAN-MCLAG Active-Active High Availability Support feature on a multicast mode with two points of attachments (POA) connected to branch devices. The following is the configuration on the first POA—POA1.

```
ip multicast-routing distributed
ip pim bidir-enable
ip pim rp-address 4.4.4.4 bidir

redundancy
 mode sso
```

```
 interchassis group 1
  monitor peer bfd
  member ip 9.9.9.9
  backbone interface GigabitEthernet0/1/0
  mlacp system-priority 200
  mlacp node-id 0

bridge-domain 20
 member vni 7777
 member Port-channel1 service-instance 20
!

bridge-domain 40
 member vni 8888
 member Port-channel1 service-instance 40
!
interface Loopback10
 ip address 77.1.1.1 255.255.255.255
 ip pim sparse-dense-mode
!
interface Loopback11
 ip address 88.1.1.1 255.255.255.255
 ip pim sparse-dense-mode
!
interface Port-channel1
 no ip address
 negotiation auto
 lacp fast-switchover
 mlacp interchassis group 1
 mlacp mode active-active
 mlacp load-balance primary vlan 40
 mlacp load-balance secondary vlan 20
 service instance 20 ethernet
  encapsulation dot1q 20
 !
 service instance 40 ethernet
  encapsulation dot1q 40
 !
!
interface nve1
 no ip address
 member vni 7777 mcast-group 225.1.1.1
 source-interface Loopback10
!
interface nve2
 no ip address
 member vni 8888 mcast-group 226.1.1.1
 source-interface Loopback11
!

interface GigabitEthernet0/1/0
 ip address 192.168.20.1 255.255.255.0
 ip pim sparse-dense-mode
 negotiation auto
!

router ospf 10
 router-id 3.3.3.3
 network 0.0.0.0 255.255.255.255 area 10
!
```

The following is the configuration on the second POA—POA2.

```
ip multicast-routing distributed
ip pim bidir-enable
```

```
ip pim rp-address 4.4.4.4 bidir

redundancy
 mode sso
 interchassis group 1
  monitor peer bfd
  member ip 3.3.3.3
  backbone interface GigabitEthernet0/0/1
  mlacp system-priority 200
  mlacp node-id 1

bridge-domain 20
 member vni 7777
 member Port-channel1 service-instance 20
!

bridge-domain 40
 member vni 8888
 member Port-channel1 service-instance 40
!

interface Loopback10
 ip address 77.1.1.1 255.255.255.255
 ip pim sparse-dense-mode
!
interface Loopback11
 ip address 88.1.1.1 255.255.255.255
 ip pim sparse-dense-mode
!
interface Port-channel1
 no ip address
 negotiation auto
 no keepalive
 lacp fast-switchover
 mlacp interchassis group 1
 mlacp mode active-active
 mlacp load-balance primary vlan 20
 mlacp load-balance secondary vlan 40
 service instance 20 ethernet
  encapsulation dot1q 20
 !
 service instance 40 ethernet
  encapsulation dot1q 40
 !
!
interface nve1
 no ip address
 member vni 7777 mcast-group 225.1.1.1
 source-interface Loopback10
!
interface nve2
 no ip address
 member vni 8888 mcast-group 226.1.1.1
 source-interface Loopback11
!

interface GigabitEthernet0/1/0
 ip address 192.168.20.1 255.255.255.0
 ip pim sparse-dense-mode
 negotiation auto
!

interface GigabitEthernet0/0/1
 ip address 192.168.4.1 255.255.255.0
```

```
 ip pim sparse-dense-mode
 negotiation auto
end

router ospf 10
 router-id 9.9.9.9
 network 0.0.0.0 255.255.255.255 area 10
!
```

The following is the configuration on the first branch—Branch1.

```
ip multicast-routing distributed
ip pim bidir-enable
ip pim rp-address 4.4.4.4 bidir
!
bridge-domain 20
 member vni 7777
 member GigabitEthernet0/0/0 service-instance 20
!
interface Loopback10
 ip address 99.1.1.1 255.255.255.255
 ip pim sparse-dense-mode
!
interface nve1
 no ip address
 member vni 7777 mcast-group 225.1.1.1
 source-interface Loopback10
!
interface GigabitEthernet0/0/0
no ip address
negotiation auto
 service instance 20 ethernet
  encapsulation dot1q 20
 !
!
interface GigabitEthernet0/0/0
 ip address 192.168.3.1 255.255.255.0
 ip pim sparse-dense-mode
!
router ospf 10
 network 0.0.0.0 255.255.255.255 area 10
!
```

The following is the configuration on the second branch—Branch2.

```
ip multicast-routing distributed
ip pim bidir-enable
ip pim rp-address 4.4.4.4 bidir
!
bridge-domain 40
 member vni 8888
 member GigabitEthernet0/0/0 service-instance 40
!
interface Loopback11
 ip address 100.1.1.1 255.255.255.255
 ip pim sparse-dense-mode
!
interface nve1
 no ip address
 member vni 8888 mcast-group 226.1.1.1
 source-interface Loopback11
!
interface GigabitEthernet0/0/0
no ip address
 negotiation auto
```

```
 service instance 40 ethernet
  encapsulation dot1q 40
 !
!
interface GigabitEthernet0/0/1
 ip address 192.168.21.1 255.255.255.0
 ip pim sparse-dense-mode
negotiation auto
!
router ospf 10
network 0.0.0.0 255.255.255.255 area 10
!
```

Example: Configuring VXLAN HA on Unicast Mode

The following example shows how to configure the VXLAN-MCLAG Active-Active High Availability Support feature on an unicast mode with two points of attachments (POA) connected to branch devices. The following is the configuration on the first POA—POA1.

```
redundancy
 mode sso
 interchassis group 1
  monitor peer bfd
  member ip 9.9.9.9
  backbone interface GigabitEthernet0/1/0
  mlacp system-priority 200
  mlacp node-id 0

bridge-domain 20
 member vni 7777
 member Port-channel1 service-instance 20
!

bridge-domain 40
 member vni 8888
 member Port-channel1 service-instance 40
!
interface Loopback10
 ip address 77.1.1.1 255.255.255.255
!
interface Loopback11
 ip address 88.1.1.1 255.255.255.255
!
interface Port-channel1
 no ip address
 negotiation auto
 lacp fast-switchover
 mlacp interchassis group 1
 mlacp mode active-active
 mlacp load-balance primary vlan 40
 mlacp load-balance secondary vlan 20
 service instance 20 ethernet
  encapsulation dot1q 20
 !
 service instance 40 ethernet
  encapsulation dot1q 40
 !
!
interface nve1
 no ip address
 member vni 7777
```

```
  ingress-replication 99.1.1.1
 !
 source-interface Loopback10
!
interface nve2
 no ip address
 member vni 8888
  ingress-replication 100.1.1.1
 !
 source-interface Loopback11
!

router ospf 10
 router-id 3.3.3.3
 network 0.0.0.0 255.255.255.255 area 10
!
```

The following is the configuration on the second POA—POA2.

```
redundancy
 mode sso
 interchassis group 1
  monitor peer bfd
  member ip 3.3.3.3
  backbone interface GigabitEthernet0/0/1
  mlacp system-priority 200
  mlacp node-id 1

bridge-domain 20
 member vni 7777
 member Port-channel1 service-instance 20
!

bridge-domain 40
 member vni 8888
 member Port-channel1 service-instance 40
!

interface Loopback10
 ip address 77.1.1.1 255.255.255.255
!
interface Loopback11
 ip address 88.1.1.1 255.255.255.255
!
interface Port-channel1
 no ip address
 negotiation auto
 no keepalive
 lacp fast-switchover
 mlacp interchassis group 1
 mlacp mode active-active
 mlacp load-balance primary vlan 20
 mlacp load-balance secondary vlan 40
 service instance 20 ethernet
  encapsulation dot1q 20
 !
 service instance 40 ethernet
  encapsulation dot1q 40
 !
!
interface nve1
 no ip address
 member vni 7777
  ingress-replication 99.1.1.1
 !
```

```
 source-interface Loopback10
!
interface nve2
 no ip address
 member vni 8888
  ingress-replication 100.1.1.1
 !
 source-interface Loopback11
!

router ospf 10
 router-id 9.9.9.9
 network 0.0.0.0 255.255.255.255 area 10
!
```

The following is the configuration on the first branch—Branch1.

```
bridge-domain 20
 member vni 7777
 member GigabitEthernet0/0/0 service-instance 20
!
interface Loopback10
 ip address 99.1.1.1 255.255.255.255
!
interface nve1
 no ip address
 member vni 7777
     ingress-replication 77.1.1.1
 source-interface Loopback10
!
interface GigabitEthernet0/0/0
no ip address
negotiation auto
 service instance 20 ethernet
  encapsulation dot1q 20
 !
!
router ospf 10
 network 0.0.0.0 255.255.255.255 area 10
!
```

The following is the configuration on the second branch—Branch2.

```
bridge-domain 40
 member vni 8888
 member GigabitEthernet0/0/0 service-instance 40
!
interface Loopback11
 ip address 100.1.1.1 255.255.255.255
!
interface nve1
 no ip address
 member vni 8888
     ingress-replication 88.1.1.1
 source-interface Loopback11
!
interface GigabitEthernet0/0/0
no ip address
negotiation auto
 service instance 40 ethernet
  encapsulation dot1q 40
 !
!
router ospf 10
```

```
 network 0.0.0.0 255.255.255.255 area 10
!
```

Additional References for VXLAN-MCLAG Active-Active High Availability Support

Related Documents

Related Topic	Document Title
Carrier Ethernet commands	Cisco IOS Carrier Ethernet Command Reference

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for VXLAN-MCLAG Active-Active High Availability Support

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for VXLAN-MCLAG Active-Active High Availability Support

Feature Name	Releases	Feature Information
VXLAN-MCLAG Active-Active High Availability Support	Cisco IOS XE 3.16S	The VXLAN-MCLAG Active-Active High Availability Support feature implements dual-home device with pseudo Multichassis Link Aggregation Control Protocol (pMLACP) redundancy mode and layer 2 VXLAN on the Cisco ASR 1000 Series Aggregation Services Routers. The following commands were introduced by this feature: **show lacp internal, show nve interface nve1, show nve peersshow platform software ethernet fp ac bridge-domain binding, show bridge-domain 20, show lacp multi-chassis load-balance port-channel, show nve vni 11111 detail, show lacp multi load group**