



# VXLAN-MCLAG Active-Active High Availability Support

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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.

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

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](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>redundancy</b> <b>Example:</b> Device(config)# redundancy	Configures the redundancy group.
<b>Step 4</b>	<b>interchassis group</b> <i>group-id</i> <b>Example:</b> Device(config-red)# interchassis group 2	Configures interchassis group.
<b>Step 5</b>	<b>member ip</b> <i>peer ip address</i> <b>Example:</b> 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.
<b>Step 6</b>	<b>monitor peer</b> [bfd   track] <b>Example:</b> Device(config-r-ic)# monitor peer bfd	Specifies the the peer monitoring method.
<b>Step 7</b>	<b>mlacp node-id</b> <i>node id</i> <b>Example:</b> Device(config-r-ic)# mlacp node-id 2	Configures mLACP node ID.
<b>Step 8</b>	<b>backbone interface</b> <i>backbone if</i> <b>Example:</b> Device(config-r-ic)# backbone interface Gi0/0/2	Configures a backbone interface for the redundancy group.
<b>Step 9</b>	<b>end</b> <b>Example:</b> 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
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface Port-channel</b> <i>port channel number</i> <b>Example:</b> Device(config-if)# interface Port-channel 2	Configures the interface for port channel.
<b>Step 4</b>	<b>negotiation</b> <b>Example:</b> Device(config-if)# negotiation	Configures auto negotiation mode.
<b>Step 5</b>	<b>lACP fast-switchover</b> <b>Example:</b> Device(config-if)# lACP fast-switchover	Specifies LACP Port Channel interface.
<b>Step 6</b>	<b>mlACP interchassis group</b> <i>rg id</i> <b>Example:</b> Device(config-if)# mlACP interchassis group 2	Configures mLACP peer PoA RG ID.

	Command or Action	Purpose
Step 7	<b>mlacp mode active-active</b> <b>Example:</b> Device(config-if)# mlacp mode active-active	Enables mLACP active-active POA redundancy.
Step 8	<b>mlacp load-balance primary vlan <i>vlan-id</i></b> <b>Example:</b> 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.
Step 9	<b>mlacp load-balance secondary vlan <i>vlan-id</i></b> <b>Example:</b> 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	<b>service instance <i>id</i> ethernet</b> <b>Example:</b> Device(config-if-srv)# service instance 20 ethernet	Configures service instance identifier.
Step 11	<b>encapsulation dot1q</b> <b>Example:</b> Device(config-if-srv)# encapsulation dot1q 20	Configures ethernet frame match criteria.
Step 12	<b>end</b> <b>Example:</b> 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	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
Step 3	<b>bridge-domain <i>id</i></b> <b>Example:</b> Device(config)# bridge-domain 20	Configures the bridge domain ID.
Step 4	<b>member vni <i>number</i></b> <b>Example:</b> Device(config-bdomain)# member vni 7777	Configures member virtual network identifier (VNI).
Step 5	<b>member Port-channel <i>number</i> service-instance <i>id</i></b> <b>Example:</b> Device(config-bdomain)# member Port-channell service-instance 20	Configures port channel and service instance.
Step 6	<b>exit</b> <b>Example:</b> Device(config-bdomain)# exit	Exits bridge domain mode and returns to global configuration mode.
Step 7	<b>interface Loopback <i>number</i></b> <b>Example:</b> Device(config-if)# interface Loopback10	Specifies a loopback interface.
Step 8	<b>ip address</b> <b>Example:</b> Device(config-if)# ip address 77.1.1.1 255.255.255.255	Configures IP address.
Step 9	<b>exit</b> <b>Example:</b> Device(config-if)# exit	Exits interface configuration mode and returns to global configuration mode.

	Command or Action	Purpose
Step 10	<b>interface nve</b> <b>Example:</b> Device(config)# interface nve1	Configures network virtualization endpoint interface.
Step 11	<b>member vni number</b> <b>Example:</b> Device(config-if)# member vni 7777	Configures VNI information.
Step 12	<b>ingress-replication IPV4 address</b> <b>Example:</b> Device(config-if-nve-vni)# ingress-replication 99.1.1.1	Configures remote Peer IPV4 Address.
Step 13	<b>exit</b> <b>Example:</b> Device(config-if-nve-vni)# exit	Exits network virtualization endpoint interface configuration mode and returns to global configuration mode.
Step 14	<b>source-interface Loopback id</b> <b>Example:</b> Device(config-if)# source-interface Loopback10	Configures interface loopback.
Step 15	<b>no shutdown</b> <b>Example:</b> Device(config-if)# no shutdown	Restarts the interface.
Step 16	<b>end</b> <b>Example:</b> 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	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
Step 2	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
Step 3	<b>bridge-domain <i>id</i></b> <b>Example:</b> Device(config)# bridge-domain 20	Configures the bridge domain ID.
Step 4	<b>member vni <i>number</i></b> <b>Example:</b> Device(config-bdomain)# member vni 7777	Configures member virtual network identifier (VNI).
Step 5	<b>member Port-channel <i>number</i> service-instance <i>id</i></b> <b>Example:</b> Device(config-bdomain)# member Port-channell service-instance 20	Configures port channel and service instance.
Step 6	<b>exit</b> <b>Example:</b> Device(config-bdomain)# exit	Exits bridge domain mode and returns to global configuration mode.
Step 7	<b>interface Loopback <i>number</i></b> <b>Example:</b> Device(config-if)# interface Loopback10	Specifies a loopback interface.
Step 8	<b>ip address</b> <b>Example:</b> Device(config-if)# ip address 77.1.1.1 255.255.255.255	Configures IP address.
Step 9	<b>ip pim sparse-dense-mode</b> <b>Example:</b>	Enables PIM to operate in sparse or dense mode.



	Command or Action	Purpose
	<code>Device(config-if)# ip pim sparse-dense-mode</code>	
<b>Step 10</b>	<b>exit</b> <b>Example:</b> <code>Device(config-if)# exit</code>	Exits interface configuration mode and returns to global configuration mode.
<b>Step 11</b>	<b>interface nve</b> <b>Example:</b> <code>Device(config)# interface nve1</code>	Configures network virtualization endpoint interface.
<b>Step 12</b>	<b>member vni <i>number</i> mcast-group <i>address</i></b> <b>Example:</b> <code>Device(config-if)# member vni 7777 mcast-group 232.1.1.1</code>	Configures VNI information.
<b>Step 13</b>	<b>source-interface Loopback</b> <b>Example:</b> <code>Device(config-if)# source-interface Loopback10</code>	Configures interface loopback.
<b>Step 14</b>	<b>no shutdown</b> <b>Example:</b> <code>Device(config-if)# no shutdown</code>	Restarts the interface.
<b>Step 15</b>	<b>end</b> <b>Example:</b> <code>Device(config-if)# end</code>	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
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface Port-channel</b> <i>number</i> <b>Example:</b> Device(config)# interface Port-channel1	Configures ethernet channel of interfaces.
<b>Step 4</b>	<b>switchport</b> <i>group-id</i> <b>Example:</b> Device(config-if)# switchport	Sets the interface as an Ethernet interface.
<b>Step 5</b>	<b>switchport trunk encapsulation dot1q</b> <b>Example:</b> Device(config-r-ic)# switchport trunk encapsulation dot1q	Defines the encapsulation format as IEEE 802.1Q (dot1q) for the specified interface.
<b>Step 6</b>	<b>switchport trunk allowed vlan 20-50</b> <b>Example:</b> Device(config-r-ic)# switchport trunk allowed vlan 20-50	Specifies that only certain VLANs are allowed on the specified trunk.
<b>Step 7</b>	<b>switchport mode trunk</b> <b>Example:</b> Device(config-r-ic)# switchport mode trunk	Sets the interface as an Ethernet trunk port.
<b>Step 8</b>	<b>exit</b> <b>Example:</b> Device(config-r-ic)# exit	Exits interface mode and returns to global configuration mode
<b>Step 9</b>	<b>interface GigabitEthernet3/1</b> <b>Example:</b> Device(config-if)# interface GigabitEthernet3/1	Enters the interface configuration mode on the Gigabit Ethernet interface.

	Command or Action	Purpose
Step 10	<b>switchport</b> <b>Example:</b> Device(config-if)# switchport	Configures the interface port.
Step 11	<b>switchport trunk encapsulation dot1q</b> <b>Example:</b> Device(config-if)# switchport trunk encapsulation dot1q	Defines the encapsulation format as IEEE 802.1Q (dot1q) for the specified interface.
Step 12	<b>switchport trunk allowed vlan 20-50</b> <b>Example:</b> Device(config-if)# switchport trunk allowed vlan 20-50	Specifies that only certain VLANs are allowed on the specified trunk.
Step 13	<b>switchport mode trunk</b> <b>Example:</b> Device(config-if)# switchport mode trunk	Sets the interface as an Ethernet trunk port.
Step 14	<b>channel-group number mode</b> <b>Example:</b> Device(config-if)# channel-group 1 mode active	Configures the port in a channel group and sets the mode.
Step 15	<b>end</b> <b>Example:</b> 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

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**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

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

Channel group 2

Port	Flags	State	LACP port Priority	Admin Key	Oper Key	Port Number	Port 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-channell.EFP20	16908305	None	FRWD	182, (created)
20	nve1.VNI7777	16908307	None	FRWD	268, (created)
40	Port-channell.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-channell 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-channell.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
    
```

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# 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-channell service-instance 20
!

bridge-domain 40
member vni 8888
member Port-channell 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-channell
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

```

## Example: Configuring VXLAN HA on Multicast Mode

```

    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-channell1 service-instance 20
!

bridge-domain 40
 member vni 8888
 member Port-channell1 service-instance 40
!
interface Loopback10
 ip address 77.1.1.1 255.255.255.255
```

## Example: Configuring VXLAN HA on Unicast Mode

```

!
interface Loopback11
 ip address 88.1.1.1 255.255.255.255
!
interface Port-channell1
 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-channell1 service-instance 20
!

bridge-domain 40
 member vni 8888
 member Port-channell1 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
Cisco IOS commands	<a href="#">Cisco IOS Master Command List, All Releases</a>
Carrier Ethernet commands	<a href="#">Cisco IOS Carrier Ethernet Command Reference</a>

### 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.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

# 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](http://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	<p>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.</p> <p>The following commands were introduced by this feature: <b>show lacp internal, show nve interface nve1, show nve peers, show 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</b></p>

