



Provider Backbone Bridge Commands

The IEEE 802.1ah standard (Ref [4]) provides a means for interconnecting multiple provider bridged networks in order to build a large scale end-to-end Layer 2 provider bridged network.

For detailed information about PBB concepts, configuration tasks, and examples, see the *L2VPN and Ethernet Services Configuration Guide for Cisco ASR 9000 Series Routers*.

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backbone-source-mac

To configure the backbone source MAC address, use the **backbone-source-mac** command in pbb configuration mode. To return to the default behavior, use the **no** form of this command.



Note If the backbone source MAC address is not configured then one of the reserved addresses from the Chassis MAC pool is chosen automatically. To view the reserved address, use the **show l2vpn pbb backbone-source-mac** command.

backbone-source-mac *mac-address*
no backbone-source-mac *mac-address*

Syntax Description *mac address* Backbone source MAC address in hexadecimal format.

Command Default None

Command Modes PBB configuration

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 3.9.1 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID | Operations |
|---------|---------|----------------|
| | l2vpn | read, write |

Examples In the following example, the backbone source MAC address is set to 0045.1200.0404:

```
config
l2vpn
  pbb
    backbone-source-mac 0045.1200.0400
  !
!
```

| Related Commands | Command | Description |
|------------------|---------------------------------|---|
| | pbb, on page 33 | Configures the provider backbone bridge core or edge. |

bgp (EVPN)

To enable Border Gateway Protocol (BGP) in the PBB EVPN configuration, use the **bgp** command in the EVPN configuration or EVPN EVI configuration mode. To disable the BGP configuration, use the **no** form of this command.

```
bgp [rd]
bgp [{rd | route-target }]
no bgp
```

| Syntax Description | rd | Sets the Route Distinguisher. |
|--------------------|---------------------|-------------------------------|
| | route-target | Sets the Route Target. |

Command Default None.

Command Modes EVPN configuration
EVPN EVI configuration

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 4.3.2 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The keyword **route-target** is supported only in the EVPN EVI BGP configuration.

| Task ID | Task ID | Operation |
|---------|---------|----------------|
| | l2vpn | read, write |

This example shows how to enable BGP in the EVPN configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# bgp
RP/0/RSP0/CPU0:router(config-evpn-bgp)#
```

This example shows how to enable BGP in the EVPN EVI configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# evi 2
```

```
RP/0/RSP0/CPU0:router(config-evpn-evi)# bgp  
RP/0/RSP0/CPU0:router(config-evpn-evi-bgp)#
```

Related Commands

| Command | Description |
|------------------------------|---|
| evpn | Enters EVPN configuration mode. |
| evi | Enters the EVPN EVI configuration mode to configure optional BGP settings for a bridge domain or EVI. |
| route-target | Specifies a route target for the VFI. |
| rd | |

bgp route-target

To configure the BGP Import Route-Target for an ethernet segment, use the **bgp route-target** command in EVPN interface ethernet-segment configuration submode. To undo this command, use the **no** form of this command.

bgp route-target *ipv4/v6-address*

| | |
|---------------------------|--|
| Syntax Description | <i>ipv4/v6-address</i> Specifies the route target value as an IPv4 or IPv6 address. The value 0000.0000.0000 is not allowed. |
|---------------------------|--|

| | |
|------------------------|------|
| Command Default | None |
|------------------------|------|

| | |
|----------------------|---|
| Command Modes | EVPN interface ethernet-segment configuration submode |
|----------------------|---|

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 6.0 | This command was introduced. |

| | |
|-------------------------|--|
| Usage Guidelines | This command configuration is mandatory for Ethernet Segment Identifier (ESI) type 0. For ESI type 1, the default route-target is computed from the high-order 6-octet portion of the 9 bytes ESI value. You can use this command to overwrite this computed value for ESI type 1. |
|-------------------------|--|

| Task ID | Task ID | Operation |
|----------------|----------------|------------------|
| | | |

Example

The following example configuration shows how to configure BGP Import Route-Target for an ethernet segment.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet-segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)# bgp route-target ce01.ce01.ce01
```

clear mmrp-flood-optimization statistics

To clear the stored MRP protocol statistics on all the pseudowires or a specific pseudowire, use the **clear mmrp-flood-optimization statistics** command in the EXEC mode.

```
clear mmrp-flood-optimization statistics {all | pw pw-ID neighbor}
```

| Syntax Description | | |
|--------------------|-----------------|--|
| | all | Clear the stored MRP protocol statistics on all the pseudowires. |
| | pw | Indicates a specific pseudowire. |
| | <i>neighbor</i> | Indicates the IP address of the neighbor. |
| | <i>pw-id</i> | Indicates the pseudowire ID. |

Command Default None

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 5.1.2 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID | Operation |
|---------|-------------------|----------------|
| | ethernet-services | read, write |

The following command shows how to clear the MMRP flood optimization statistics:

```
RP/0/RSP0/CPU0:router#clear mmrp-flood-optimization statistics all
```

clear l2vpn forwarding counters bridge-domain mmrp location

To clear the MMRP flood statistics on a given bridge-domain on a specified location, use the **clear l2vpn forwarding counters bridge-domain mmrp location** command in the EXEC command.

clear l2vpn forwarding counters bridge-domain mmrp location *location*

| | |
|---------------------------|--|
| Syntax Description | <i>location</i> Specifies the location in rack/slot/module notation. |
|---------------------------|--|

| | |
|------------------------|------|
| Command Default | None |
|------------------------|------|

| | |
|----------------------|------|
| Command Modes | EXEC |
|----------------------|------|

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 5.1.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

| Task ID | Task ID | Operation |
|----------------|-------------------|------------------|
| | ethernet-services | read, write |

The following command shows how to clear the mmrp flood statistics on a given bridge-domain on a specified location:

```
RP/0/RSP0/CPU0:router#clear l2vpn forwarding counters bridge-domain mmrp location 0/1/1
```


convergence

To enable the switchover of a failed primary link from one PE device to another, use the **convergence** command in the EVPN configuration submenu.

convergence { **mac-mobility** | **reroute** | **nexthop-tracking** }

| Syntax Description | mac-mobility | Enables the MAC mobility convergence. |
|--------------------|-------------------------|---|
| | reroute | Redirects the unicast traffic to backup peer. |
| | nexthop-tracking | Enables the EVPN procedures to be influenced by BGP nexthop reachability. |

Command Default None

Command Modes EVPN configuration submenu

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 7.3.1 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task ID | Operation |
|---------|---------|-------------|
| | l2vpn | read, write |

Example

This example shows how to enable mac-mobility reconvergence:

```
Router# configure
Router(config)# evpn
Router(config-evpn)# ethernet-segment
Router(config-evpn-es)# load-balancing-mode single-flow-active
Router(config-evpn-es)# convergence mac-mobility
```

This example shows how to redirect the unicast traffic to backup peer.

```
Router# configure
Router(config)# evpn
Router(config-evpn)# interface Bundle-Ether100
Router(config-evpn-ac)# ethernet-segment
Router(config-evpn-ac-es)# identifier type 0 00.00.00.00.00.00.05.01.02
Router(config-evpn-ac-es)# convergence
Router(config-evpn-ac-es-conv)# reroute
```

core-de-isolation

To configure the recovery time for the EVPN core isolation group after the core interfaces recover from a network failure, use the **core-de-isolation** command in the EVPN Timers configuration mode.

core-de-isolation *timer value*

| Syntax Description | core-de-isolation <i>timer value</i> Specifies the core isolation group recovery delay timer. The range is from 60 to 300 seconds. The default timer value is 60 seconds. | | | | |
|---------------------------|---|---------|--------------|---------------|------------------------------|
| Command Default | None. | | | | |
| Command Modes | EVPN Timers configuration mode | | | | |
| Command History | <table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 7.6.1</td> <td>This command was introduced.</td> </tr> </tbody> </table> | Release | Modification | Release 7.6.1 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.6.1 | This command was introduced. | | | | |
| Usage Guidelines | When the core links recover, the default recovery delay timer begins. The access interfaces become active after the core-de-isolation timer expires. | | | | |

Example

This example shows how to configure the recovery time for the EVPN core isolation group.

```
Router# configure
Router(config)# evpn timers
Router(config-evpn-timers)# core-de-isolation 120
Router(config-evpn-timers)# commit
```

debug mmrp-flood-optimization packets

To debug the flood optimization for PBB VPLS feature at the packet level, use the **debug mmrp-flood-optimization packets** command in the EXEC mode.

debug mmrp-flood-optimization packets {**brief** | **full** | **hexdump**} [**direction** {**received** | **sent**}] [**pw neighbor pw-id**]

| Syntax Description | | |
|--------------------|---|------------------------------|
| brief | Brief packet debug. | |
| full | Full packet debug. | |
| hexdump | Raw packet output. | |
| direction | Restricts output to a packet direction. | |
| received | Packets received. | |
| sent | Packets sent. | |
| pw | Specifies a pseudowire to filter. | |
| <i>neighbor</i> | IP address of the neighbor | |
| <i>pw-id</i> | Pseudowire ID. | |
| Command Default | None | |
| Command Modes | EXEC | |
| Command History | Release | Modification |
| | Release 5.1.2 | This command was introduced. |
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. | |
| Task ID | Task ID | Operation |
| | ethernet-services | read, write |

The following command shows how to use the **debug mmrp-flood-optimization packets** command:

```
RP/0/RSP0/CPU0:router#debug mmrp-flood-optimization packets brief
```

debug mmrp-flood-optimization protocol

To debug the flood optimization for PBB VPLS feature at the protocol level, use the **debug mmrp-flood-optimization protocol** command in the EXEC mode.

```
debug mmrp-flood-optimization protocol [isid isid]
```

| | |
|---------------------------|--|
| Syntax Description | isid Specifies the service instance identifier. |
| | <i>isid</i> Service instance identifier. |

| | |
|------------------------|------|
| Command Default | None |
|------------------------|------|

| | |
|----------------------|------|
| Command Modes | EXEC |
|----------------------|------|

| | | |
|------------------------|----------------|------------------------------|
| Command History | Release | Modification |
| | Release 5.1.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

| | | |
|----------------|-------------------|------------------|
| Task ID | Task ID | Operation |
| | ethernet-services | read, write |

The following command shows how to use the debug mmrp-flood-optimization protocol command:

```
RP/0/RSP0/CPU0:router#debug mmrp-flood-optimization protocol isid 3
```

evpn evi

To enable PBB EVPN and set the EVI for the bridge, use the **evpn evi** command in the L2VPN bridge group bridge domain PBB-core configuration mode. To disable PBB EVPN and reset the EVI, use the **no** form of this command.

```
evpn evi evi-id
no evpn evi evi-id
```

Syntax Description *evi-id* Specifies the Ethernet VPN ID to set. The range is from 1 to 65534.

Command Default None.

Command Modes L2VPN bridge group bridge domain PBB core configuration

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 4.3.2 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The VPN ID must be unique globally per network.

| Task ID | Task ID | Operation |
|---------|---------|-------------|
| | l2vpn | read, write |

This example shows how to enable PBB EVPN and set the EVI for the bridge:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# pbb core
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)# evpn evi 2
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)#
```

| Related Commands | Command | Description |
|------------------|---------------------------------|---|
| | evpn | Enters EVPN configuration mode. |
| | l2vpn | Enters L2VPN configuration mode. |
| | pbb, on page 33 | Configures the provider backbone bridge core or edge. |

evpn host ipv4-address duplicate-detection

To enable duplicate detection of host IPv4 address, use the **evpn host ipv4-address duplicate-detection** command in the EVPN configuration mode.

evpn host ipv4-address duplicate-detection [**freeze-time** *freeze-time* | **move-count** *move-count* | **move-interval** *move-interval* | **retry-count** *retry-count*] **disable**

| Syntax Description | | |
|---|--|--|
| freeze-time <i>freeze-time</i> | Length of time to lock the IPv4 address after it has been detected as duplicate. Default is 30 seconds. | |
| move-count <i>move-count</i> | Number of moves to occur within the specified move-interval before freezing the IPv4 address. Default is 5. | |
| move-interval <i>move-interval</i> | Interval to watch for subsequent MAC moves before freezing the IPv4 address. Default is 180 seconds. | |
| retry-count <i>retry-count</i> | Number of times to unfreeze an IPv4 address before freezing it permanently. Default is three times. | |
| disable | Disable duplicate detection of IPv4 addresses. | |

Command Default None

Command Modes EVPN configuration mode

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 6.6.1 | This command was introduced. |

Usage Guidelines None

| Task ID | Task ID | Operation |
|---------|---------|-------------|
| | l2vpn | read, write |

Example

This example shows how to enable duplicate detection of host IPv4 address:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# host ipv4-address duplicate-detection
RP/0/RSP0/CPU0:router(config-evpn-host-ipv4-addr)# move-count 2
RP/0/RSP0/CPU0:router(config-evpn-host-ipv4-addr)# freeze-time 10
RP/0/RSP0/CPU0:router(config-evpn-host-ipv4-addr)# retry-count 2
RP/0/RSP0/CPU0:router(config-evpn-host-ipv4-addr)# commit
```

evpn host ipv6-address duplicate-detection

To enable duplicate detection of host IPv6 address, use the **evpn host ipv6-address duplicate-detection** command in the EVPN configuration mode.

evpn host ipv6-address duplicate-detection [**freeze-time** *freeze-time* | **move-count** *move-count* | **move-interval** *move-interval* | **retry-count** *retry-count*] **disable**

| Syntax Description | Parameter | Description |
|--------------------|---|--|
| | freeze-time <i>freeze-time</i> | Length of time to lock the IPv6 address after it has been detected as duplicate. Default is 30 seconds. |
| | move-count <i>move-count</i> | Number of moves to occur within the specified move-interval before freezing the IPv6 address. Default is 5. |
| | move-interval <i>move-interval</i> | Interval to watch for subsequent MAC moves before freezing the IPv6 address. Default is 180 seconds. |
| | retry-count <i>retry-count</i> | Number of times to unfreeze an IPv6 address before freezing it permanently. Default is three times. |
| | disable | Disable duplicate detection of IPv6 addresses. |

Command Default None

Command Modes EVPN configuration mode

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 6.6.1 | This command was introduced. |

Usage Guidelines None

| Task ID | Task | Operation |
|---------|-------|-------------|
| | l2vpn | read, write |

Example

This example shows how to enable duplicate detection of host IPv6 address:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# host ipv6-address duplicate-detection
RP/0/RSP0/CPU0:router(config-evpn-host-ipv6-addr)# move-count 2
RP/0/RSP0/CPU0:router(config-evpn-host-ipv6-addr)# freeze-time 10
RP/0/RSP0/CPU0:router(config-evpn-host-ipv6-addr)# retry-count 2
RP/0/RSP0/CPU0:router(config-evpn-host-ipv6-addr)# commit
```

etree rt-leaf

To enable EVPN all-active multihoming support with EVPN E-Tree using BGP Route Target (RT) import and export policies, use the **etree rt-leaf** command in the EVPN EVI configuration submenu.

etree rt-leaf

no etree rt-leaf

Syntax Description This command has no keywords or arguments.

Command Default None.

Command Modes EVI configuration submenu

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.1.2 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task ID | Operation |
|----------------|----------------|------------------|
| | l2vpn | read, write |

Example

This example shows how to designate EVPN instance as EVPN E-Tree Route-Target leaf site.

```
Router(config)# evpn
Router(config-evpn)# evi 15
Router(config-evpn-instance)# etree
Router(config-evpn-instance-etree)# rt-leaf
```


flushagain

To configure the MAC flush again timer, use the **flushagain** command in the EVPN Interface Timers configuration or in the EVPN Timers configuration mode. To reset the MAC flushagain timer, use the **no** form of this command.

flushagain *seconds*
no flushagain *seconds*

| | |
|---------------------------|---|
| Syntax Description | <i>seconds</i> Specifies the value in seconds ranging from 0 to 120 seconds. The default value is 60 seconds. |
|---------------------------|---|

| | |
|------------------------|-------|
| Command Default | None. |
|------------------------|-------|

| | |
|----------------------|--|
| Command Modes | EVPN Interface Timers configuration EVPN Timers configuration |
|----------------------|--|

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 4.3.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

| Task ID | Task ID | Operation |
|----------------|----------------|------------------|
| | l2vpn | read, write |

This example shows how to configure the MAC flushagain timer in the EVPN Interface Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# timers
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)# flushagain 20
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)#
```

This example shows how to configure the MAC flushagain timer in the EVPN Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# timers
```

```
RP/0/RSP0/CPU0:router(config-evpn-timers)# flushagain 30
RP/0/RSP0/CPU0:router(config-evpn-timers)#
```

Related Commands

| Command | Description |
|---|---|
| evpn | Enters EVPN configuration mode. |
| interface (EVPN) | Enters the EVPN Interface configuration mode. |
| timers (EVPN), on page 62 | Configures timers that affect the convergence of PBB EVPN in failure scenarios. |
| recovery, on page 42 | Configures the recovery timer. |
| peering, on page 35 | Configures the peering timer. |
| programming, on page 40 | Configures the programming timer. |

flood-time

To enable flooding of traffic to the entire core bridge when the PBB-VPLS Flood Optimization feature is enabled on the core bridge, use the **flood-time** command in the flood optimization for PBB over VPLS global configuration submode.

flood-time *seconds*

Syntax Description

seconds Specifies the flood-time in seconds. Range is from 3 to 600 seconds.

Command Default

Flooding is disabled during convergence events.

Command Modes

Flood optimization for PBB over VPLS global configuration submode.

Command History

| Release | Modification |
|---------------|------------------------------|
| Release 5.1.2 | This command was introduced. |

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Enables flooding of traffic on the entire core bridge when flood-time is enabled on the core bridge. This provides time for MMRP to converge with the affected peer(s) before pruning the traffic. Flooding will be disabled and the core bridge will start pruning the traffic when the flood-time has expired.

Task ID

| Task ID | Operation |
|-------------------|----------------|
| ethernet-services | read, write |

The following example shows how to set the flood-time:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmrp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmrp-flood-opt)# flood-time 80
```

force single-homed

To configure force single-homed, use **force single-homed** command in the global configuration mode. To return to the default behavior, use the **no** form of this command.

force single-homed
no force single-homed

Command Default

None

Command Modes

Global configuration

Command History

| Release | Modification |
|---------------|------------------------------|
| Release 4.3.2 | This command was introduced. |

Usage Guidelines

All EVPN-based access redundancy (EVLAG) designated forwarder elections are disregarded in favor of the legacy MCLAG access protection protocol.

When CE is directly connected to a PE through a physical or bundle port and the redundant connection to another PE is operating an MCLAG redundancy group.

Specifically, the ESI assignment to the interface is no longer used for EVPN-based access redundancy and protection mechanisms and the MCLAG redundancy protocol will control the state of this interface.

With this command only the access protection is relinquished, and EVPN core mechanisms remain operational including any core functionality requiring the use of an ESI. This command is different than assigning ESI-0 to the interface, and functions also with an assigned ESI. With MCLAG control of the interface state, those EVPN core procedures that depend on interface state remain the same.

Use this command to force the interface into single homed EVPN mode and interoperate with MCLAG access protection.

The following example shows how to configure force single-homed.

```
Router# configure
Router(config)# evpn
Router(config-evpn)# interface GigabitEthernet0/0/0/0
Router(config-evpn-ac)# ethernet-segment force single-homed
```

identifier

To set the Ethernet segment identifier value of an interface, use the **identifier** command in the EVPN interface Ethernet-segment configuration mode. To delete the Ethernet segment identifier value, use the **no** form of this command.

identifier system-priority *priority-value* **system-id** *system-id*
no identifier system-priority *priority-value* **system-id** *system-id*

| Syntax Description | |
|------------------------|--|
| system-priority | Specifies the CE system priority (LACP) . |
| <i>priority-value</i> | Specifies the LACP system-priority value. The range is from 0 to ffff. |
| system-id | Specifies the CE system ID (LACP). |
| <i>system-id</i> | Specifies the LACP system ID in the H.H.H format. |

Command Default None.

Command Modes EVPN interface Ethernet segment configuration mode

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 4.3.2 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use this command to overwrite computed Ethernet segment identifier value or to set Ethernet segment identifier value of an interface which is not a bundle. The concatenated value is unique per PE.

| Task ID | Task ID | Operation |
|---------|---------|----------------|
| | l2vpn | read, write |

Example

This example shows how to set the Ethernet segment identifier value of an interface in the EVPN interface Ethernet segment configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
```

```
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)# identifier system-priority 2 system-id 1.1.1
```

Related Commands

| Command | Description |
|---|---|
| ethernet-segment | Enters EVPN interface ethernet segment configuration mode. |
| load-balancing-mode, on page 28 | Sets the load balancing mode of a physical port or bundle to active-active. |
| #unique_227 | |
| backbone-source-mac, on page 3 | Configures the backbone source MAC address. |

identifier type

To configure the Ethernet Segment Identifier (ESI) value for an ethernet segment, use the **identifier type** command in EVPN interface ethernet-segment configuration submode. To undo this command, use the **no** form of this command.

identifier type *esi-type esi-value*
no identifier type *esi-type esi-value*

| | | |
|---------------------------|---|---|
| Syntax Description | <i>esi-type</i> | Specifies the ESI type in the range 0 to 5. The ESI types 0 and 1 are supported. The ESI type 1 is auto-configured. |
| | <i>esi-value</i> | Specifies the Ethernet Segment Identifier value. It is a 9 byte value that depends on the ESI type. |
| Command Default | None | |
| Command Modes | EVPN interface ethernet-segment configuration submode | |
| Command History | Release | Modification |
| | Release 6.0 | This command was introduced. |
| Usage Guidelines | This is an optional command to configure the ESI value for a non-bundle interface or to overwrite the computed ESI value. | |

Example

The following example configuration shows how to configure ESI value for an ethernet segment.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet-segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)# identifier type 0 ce.01.ce.01.ce.01.ce.01.01
```

import from bridge-domain advertise-as-vpn

To import EVPN route type-2 routes from EVI bridge domain into the L3VPN VRF, and advertise as VPNv4 or VPNv6 routes, use the **import from bridge-domain advertise-as-vpn** command in the global configuration mode.



Note This command is only applicable to IOS XR 64-bit on Cisco ASR 9000 Series Routers.

import from bridge-domain advertise-as-vpn

Syntax Description This command has no keywords or arguments.

Command Default None

Command Modes Global configuration

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 6.6.1 | This command was introduced. |

Usage Guidelines The route target of the EVI (BD) must match with at least one import route-target of the L3 VRF.

If the remote node uses BGP VPNv4 or VPNv6 address-family instead of EVPN address-family, use the **import from bridge-domain advertise-as-vpn** command under VRF address-family that allows you to advertise the host-route as BGP VPNv4 or VPNv6 instead of EVPN address-family.

The following example shows how to configure import from bridge-domain advertise-as-vpn.

```
Router# configure
Router(config)# vrf A
Router(config-vrf)# address-family ipv4 unicast
Router(config-vrf-af)# import from bridge-domain advertise-as-vpn
Router(config-vrf-af)# import route-target 30:30
Router(config-vrf-af)# export route-target 30:30
Router(config-vrf-af)# commit
```


join-time (PBB)

To set the join-time for all active ports, use the **join-time** command in the flood optimization for PBB over VPLS global configuration submode.

join-time *milliseconds*

| Syntax Description | <i>milliseconds</i> Specifies the maximum time for the join timer parameter for all active ports in milliseconds. Range is from 100 to 1000 milliseconds. | | | | |
|---------------------------|---|---------|--------------|-------------------|------------------------------|
| Command Default | 200 milliseconds | | | | |
| Command Modes | Flood optimization for PBB over VPLS global configuration submode. | | | | |
| Command History | <table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.1.2</td> <td>This command was introduced.</td> </tr> </tbody> </table> | Release | Modification | Release 5.1.2 | This command was introduced. |
| Release | Modification | | | | |
| Release 5.1.2 | This command was introduced. | | | | |
| Usage Guidelines | <p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>The join-time parameter is used to jitter the sending of MMRPDUs on multi-point LANs, allowing any transmitted messages to take into account received MMRPDUs from multiple peers if they arrive close together. Transmit opportunities are actually uniformly jittered within the range of 0 to join-time.</p> | | | | |
| Task ID | <table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table> | Task ID | Operation | ethernet-services | read, write |
| Task ID | Operation | | | | |
| ethernet-services | read, write | | | | |

The following example shows how to set the join time on all active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmp-flood-opt)# join-time 300
```

leaveall-time (PBB)

To set the leave-all-time for all active ports, use the **leaveall-time** command in the flood optimization for PBB over VPLS global configuration submode.

leaveall-time *seconds*

| | |
|---------------------------|--|
| Syntax Description | <i>seconds</i> Sets the minimum time in seconds for the leave-all timer parameter for all active ports. Range is from 5 to 30 seconds. |
|---------------------------|--|

| | |
|------------------------|------------|
| Command Default | 10 seconds |
|------------------------|------------|

| | |
|----------------------|--|
| Command Modes | Flood optimization for PBB over VPLS global configuration submode. |
|----------------------|--|

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 5.1.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

The leave-all timer parameter controls how often the leave-all messages are sent. This forces all the peers to re-declare all the attributes, thereby replaying any registrations or deregistrations that may be lost.

| Task ID | Task ID | Operation |
|----------------|-------------------|------------------|
| | ethernet-services | read, write |

The following example shows how to set the leave-all time on all active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmp-flood-opt)# leaveall-time 20
```

leave-time (PBB)

To set the leave-time for all active ports, use the **leave-time** command in the flood optimization for PBB over VPLS global configuration submode.

leave-time *seconds*

| | |
|---------------------------|---|
| Syntax Description | <i>seconds</i> Sets the leave time for all active ports. Range is from 1 to 90 seconds. |
|---------------------------|---|

| | |
|------------------------|------------|
| Command Default | 30 seconds |
|------------------------|------------|

| | |
|----------------------|--|
| Command Modes | Flood optimization for PBB over VPLS global configuration submode. |
|----------------------|--|

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 5.1.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

The **leave-time** command controls how long registrations stay in the leaving state before being removed; that is, it controls when the garbage collection of stale registrations is performed after unregistration.

The **leaveall-time** and the **leave-time** commands together control the garbage collection.

The IEEE specification states that the value of the **leave-time** command must be less than the value of the **leaveall-time** command.

However, in Cisco IOS-XR, processing outages of several seconds can occur during a process restart or Router Processor Fail-Over (RPFO) leading to a loss of messages.

Therefore, a greater default **leave-time** *value* (thrice that of the **leaveall-time** *value* command) increases the robustness of the Multiple MAC Registration Protocol (MMRP) during packet loss or system outage.

| Task ID | Task ID | Operation |
|----------------|-------------------|------------------|
| | ethernet-services | read, write |

The following example shows how to set the leave-time on all active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmrp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmrp-flood-opt)# leave-time 80
```

load-balancing-mode

To set the load balancing mode of a physical port or bundle to active-active, use the **load-balancing-mode** command in the EVPN Interface Ethernet segment configuration mode. To disable the load balancing mode from active-active, use the **no** form of this command.

load-balancing-mode per-service
no load-balancing-mode per-service

| | |
|---------------------------|--|
| Syntax Description | per-service Specifies the per-service load balancing. |
|---------------------------|--|

| | |
|------------------------|------------------------|
| Command Default | Active-active per-flow |
|------------------------|------------------------|

| | |
|----------------------|--|
| Command Modes | EVPN interface Ethernet segment configuration mode |
|----------------------|--|

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 4.3.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

Use this command in a multi-homing configuration to set the redundancy mode to active-active per service.

In this mode, services that are active on one PoA are not active on the other PoA. Services can be represented by an ISID in case of PBB EVPN.

| Task ID | Task ID | Operation |
|----------------|----------------|------------------|
| | l2vpn | read, write |

Example

This example shows how to set the load balancing mode of a physical port or bundle to active-active:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)# load-balancing-mode per-service
RP/0/RSP0/CPU0:router(config-evpn-ac-es)#
```

| Related Commands | Command | Description |
|-------------------------|----------------------------------|--|
| | ethernet-segment | Enters EVPN interface ethernet segment configuration mode. |

| Command | Description |
|--|---|
| backbone-source-mac, on page 3 | Configures the backbone source MAC address. |

mmrp-flood-optimization

To enable flood optimization for PBB over VPLS, use the **mmrp-flood-optimization** command on the core bridge in the PBB core configuration submode. To disable the flood optimization for PBB over VPLS, use the **no** form of this command.

mmrp-flood-optimization
no mmrp-flood-optimization

| | | |
|---------------------------|---|------------------------------|
| Syntax Description | This command has no keywords or arguments. | |
| Command Default | Disabled. | |
| Command Modes | PBB core configuration | |
| Command History | Release | Modification |
| | Release 5.1.2 | This command was introduced. |
| Usage Guidelines | Flood optimization is enabled on all the pseudo-wires in the VFI associated with the core bridge domain. This feature is supported only in the standard full mesh topology of a VPLS network. | |
| Task ID | Task ID | Operation |
| | l2vpn | read, write |

The following example shows how to enable flood optimization for PBB over VPLS:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group pbb
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain pbb-core
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# pbb core
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)# mmrp-flood-optimization
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)# end
```

mac-flush mvrp

To perform a MAC flush on an Ethernet-segment, use the **mac-flush** command in the EVPN interface configuration mode. To disable the MAC flush setting, use the **no** form of this command.

mac-flush mvrp
no mac-flush mvrp

| Syntax Description | mvrp Specifies the MAC flush over MVRP. | | | | |
|---------------------------|---|---------|--------------|---------------|------------------------------|
| Command Default | STP-TCN | | | | |
| Command Modes | EVPN interface configuration | | | | |
| Command History | <table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.3.2</td> <td>This command was introduced.</td> </tr> </tbody> </table> | Release | Modification | Release 4.3.2 | This command was introduced. |
| Release | Modification | | | | |
| Release 4.3.2 | This command was introduced. | | | | |
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. | | | | |
| Task ID | <table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table> | Task ID | Operation | l2vpn | read, write |
| Task ID | Operation | | | | |
| l2vpn | read, write | | | | |

This example shows how to perform the MAC flush over MVRP on an Ethernet segment:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# mac-flush mvrp
RP/0/RSP0/CPU0:router(config-evpn-ac)#
```

| Related Commands | Command | Description |
|------------------|----------------------------------|---|
| | interface (EVPN) | Enters the EVPN Interface configuration mode. |

mode singleton

To enable singleton ICCP mode, use the **mode singleton** command in the Redundancy ICCP group configuration mode. To disable singleton ICCP mode, use the **no** form of this command.

mode singleton
no mode singleton

Syntax Description This command has no arguments or keywords.

Command Default None.

Command Modes Redundancy ICCP group configuration

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 4.3.2 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID | Operation |
|---------|---------|----------------|
| | l2vpn | read, write |

This example shows how to enable singleton ICCP mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# redundancy
RP/0/RSP0/CPU0:router(config-redundancy)# iccp
RP/0/RSP0/CPU0:router(config-redundancy-iccp)# group 1
RP/0/RSP0/CPU0:router(config-redundancy-iccp-group)# mode singleton
RP/0/RSP0/CPU0:router(config-redundancy-iccp-group)#
```


pbb

To configure the provider backbone bridge core or edge, use the **pbb** command in the bridge domain configuration submenu. To return to the default behavior, use the **no** form of this command.

pbb {**edge** **i-sid** *service-id* **core-bridge** *core-bridge-domain-name* | **core**}
no pbb {**edge** **i-sid** *service-id* **core-bridge** *core-bridge-domain-name* | **core**}

| Syntax Description | | |
|--------------------------------|--|---|
| edge | | Configures the PBB edge. |
| i-sid | | Specifies the service instance identifier. The ranges is from 256 to 16777214. Note The 16777215 (0xFFFFFFFF) service instance identifier is reserved for wildcard. |
| <i>service-id</i> | | Service instance identifier. |
| core-bridge | | Specifies the name of the core-bridge domain connected to that edge-bridge domain. |
| <i>core-bridge-domain-name</i> | | Core bridge domain name. |
| core | | Configures the PBB core. |

Command Default None

Command Modes L2VPN bridge group bridge domain configuration

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 3.9.1 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command allows you to enter pbb edge configuration mode or pbb core configuration mode.

| Task ID | Task ID | Operations |
|---------|---------|----------------|
| | l2vpn | read, write |

Examples The following example shows how to configure the PBB edge component:

```
config
l2vpn
```

```

bridge group PBB
  bridge-domain PBB-EDGE
    interface GigabitEthernet0/0/0/38.100
    !
    interface GigabitEthernet0/2/0/30.150
    !
    pbb edge i-sid 1000 core-bridge PBB-CORE
  !
!
!

```

The following example shows how to configure the PBB core component:

```

config
l2vpn
bridge group PBB
  bridge-domain PBB-CORE
    interface G0/5/0/10.100
    !
    interface G0/2/0/20.200
    !
  pbb core
!
!
!

```

| Related Commands | Command | Description |
|------------------|--------------------------------------|--|
| | bridge-domain (VPLS) | Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode. |
| | bridge group (VPLS) | Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain. |
| | l2vpn | Enters L2VPN configuration mode. |

peering

To configure the peering timer, use the **peering** command in the EVPN Timers configuration mode. To delete the peering timer, use the **no** form of this command.

peering *seconds*
no peering *seconds*

| | |
|---------------------------|---|
| Syntax Description | <i>seconds</i> Specifies the value in seconds ranging from 0 to 300 seconds. The default value is 45 seconds. |
|---------------------------|---|

| | |
|------------------------|-------|
| Command Default | None. |
|------------------------|-------|

| | |
|----------------------|---------------------------|
| Command Modes | EVPN Timers configuration |
|----------------------|---------------------------|

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 4.3.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

In a single homed Ethernet segment, wait for this timer to expire before advertising BGP route target, Ethernet segment identifier (ESI), and local MAC.

| Task ID | Task ID | Operation |
|---------|---------|----------------|
| | l2vpn | read, write |

This example shows how to configure the peering timer in the EVPN Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# timers
RP/0/RSP0/CPU0:router(config-evpn-timers)# peering 30
RP/0/RSP0/CPU0:router(config-evpn-timers)#
```

| Related Commands | Command | Description |
|------------------|---|---|
| | evpn | Enters EVPN configuration mode. |
| | timers (EVPN), on page 62 | Configures timers that affect the convergence of PBB EVPN in failure scenarios. |
| | flushagain, on page 17 | Configures the MAC flushagain timer. |
| | recovery, on page 42 | Configures the recovery timer. |

| Command | Description |
|---|-----------------------------------|
| programming, on page 40 | Configures the programming timer. |

periodic transmit (PBB)

To enable periodic Multiple MAC Registration Protocol Data Units (MMRPDUs), use the **periodic transmit** command in the flood optimization for PBB over VPLS global configuration submode.

periodic transmit [**interval** *seconds*]

| | |
|---------------------------|---|
| Syntax Description | interval <i>seconds</i> Specifies the periodic transmit interval in seconds. Range is from 2 to 10. If the interval keyword is not specified, then the value defaults to 3 seconds. |
|---------------------------|---|

| | |
|------------------------|--------------------------------|
| Command Default | Periodic MMRPDUs are disabled. |
|------------------------|--------------------------------|

| | |
|----------------------|--|
| Command Modes | Flood optimization for PBB over VPLS global configuration submode. |
|----------------------|--|

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 5.1.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

This command can optionally be used to configure the protocol to replay data periodically. This is in addition to the periodic replay triggered by the leave-all timer. The use of this command will not be necessary in the vast majority of deployments and enabling it can cause a significant increase in CPU usage.

| Task ID | Task ID | Operation |
|----------------|-------------------|------------------|
| | ethernet-services | read, write |

The following example shows how to enable periodic MMRPDUs transmitted on all active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmrp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmrp-flood-opt)# periodic transmit interval 3
```

preferred-nexthop

To choose a particular remote PE in a dual-homed mode to be the nexthop, use the **preferred-nexthop** command in the EVPN configuration submode.

preferred-nexthop [{ **highest-ip** | **lowest-ip** | **modulo** }]

| Syntax Description | highest-ip Selects the highest IP address as the primary nexthop. | | | | |
|---------------------------|---|---------|--------------|---------------|------------------------------|
| | lowest-ip Selects the lowest IP address as the primary nexthop. | | | | |
| | modulo Determines which remote is primary using the formula $EVI \% 2$. | | | | |
| Command Default | None | | | | |
| Command Modes | EVPN configuration submode | | | | |
| Command History | <table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 7.3.1</td> <td>This command was introduced.</td> </tr> </tbody> </table> | Release | Modification | Release 7.3.1 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.3.1 | This command was introduced. | | | | |
| Usage Guidelines | No specific guidelines impact the use of this command. | | | | |
| Task ID | <table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table> | Task ID | Operation | l2vpn | read, write |
| Task ID | Operation | | | | |
| l2vpn | read, write | | | | |

This example shows how to configure the highest IP address as the primary nexthop.

```
Router# configure
Router(config)# evpn
Router(config-evpn)# evi 100
Router(config-evpn-evi)# preferred-nexthop highest-ip
Router(config-evpn-evi)# commit
```

This example shows how to configure the lowest IP address as the backup nexthop.

```
Router# configure
Router(config)# evpn
Router(config-evpn)# evi 100
Router(config-evpn-evi)# preferred-nexthop lowest-ip
Router(config-evpn-evi)# commit
```

This example shows how to configure the primary nexthop using the modulo keyword.

```
Router# configure
```

```
Router(config)# evpn  
Router(config-evpn)# evi 100  
Router(config-evpn-evi)# preferred-nextthop modulo  
Router(config-evpn-evi)# commit
```

programming

To configure the programming timer, use the **programming** command in the EVPN Timers configuration mode. To delete the programming timer, use the **no** form of this command.

programming *microseconds*
no programming *microseconds*

| | |
|---------------------------|---|
| Syntax Description | <i>microseconds</i> Specifies the value in microseconds ranging from 0 to 100000 seconds. The default value is 1500 microseconds. |
|---------------------------|---|

| | |
|------------------------|-------|
| Command Default | None. |
|------------------------|-------|

| | |
|----------------------|---------------------------|
| Command Modes | EVPN Timers configuration |
|----------------------|---------------------------|

| | | |
|------------------------|----------------|------------------------------|
| Command History | Release | Modification |
| | Release 4.3.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

Every time the ES Manager runs DF election, it starts a programming timer to account for the time needed by the hardware to apply the new carving. At the expiry time, the next ES route object is processed or carved, restarting the timer.

| | | |
|----------------|----------------|------------------|
| Task ID | Task ID | Operation |
| | l2vpn | read, write |

This example shows how to configure the programming timer in the EVPN Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router (config)# evpn
RP/0/RSP0/CPU0:router (config-evpn)# timers
RP/0/RSP0/CPU0:router (config-evpn-timers)# programming 5000
RP/0/RSP0/CPU0:router (config-evpn-timers)#
```

| | | |
|-------------------------|---|---|
| Related Commands | Command | Description |
| | evpn | Enters EVPN configuration mode. |
| | timers (EVPN), on page 62 | Configures timers that affect the convergence of PBB EVPN in failure scenarios. |

| Command | Description |
|--|--------------------------------------|
| flushagain, on page 17 | Configures the MAC flushagain timer. |
| recovery, on page 42 | Configures the recovery timer. |
| peering, on page 35 | Configures the peering timer. |

recovery

To configure the recovery timer, use the **recovery** command in the EVPN Interface Timers configuration or in the EVPN Timers configuration mode. To delete the recovery timer, use the **no** form of this command.

recovery *seconds*
no recovery *seconds*

| | |
|---------------------------|---|
| Syntax Description | <i>seconds</i> Specifies the value in seconds ranging from 20 to 3600 seconds. The default value is 20 seconds. |
|---------------------------|---|

| | |
|------------------------|-------|
| Command Default | None. |
|------------------------|-------|

| | |
|----------------------|--|
| Command Modes | EVPN Interface Timers configuration EVPN Timers configuration |
|----------------------|--|

| | | |
|------------------------|----------------|------------------------------|
| Command History | Release | Modification |
| | Release 4.3.2 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

This timer is used to wait before processing the port state UP event in order to give the CE running STP to converge. If the interface is up and all conditions are already met, this timer is skipped to not add any more delays.

| | | |
|----------------|----------------|------------------|
| Task ID | Task ID | Operation |
| | l2vpn | read, write |

This example shows how to configure the recovery timer in the EVPN Interface Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# timers
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)# recovery 50
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)#
```

This example shows how to configure the recovery timer in the EVPN Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# timers
```

```
RP/0/RSP0/CPU0:router(config-evpn-timers)# recovery 300  
RP/0/RSP0/CPU0:router(config-evpn-timers)#
```

| Related Commands | Command | Description |
|------------------|---|---|
| | evpn | Enters EVPN configuration mode. |
| | interface (EVPN) | Enters the EVPN Interface configuration mode. |
| | timers (EVPN), on page 62 | Configures timers that affect the convergence of PBB EVPN in failure scenarios. |
| | flushagain, on page 17 | Configures the MAC flushagain timer. |
| | peering, on page 35 | Configures the peering timer. |
| | programming, on page 40 | Configures the programming timer. |

rewrite ingress tag push

To configure the backbone VLAN ID for a PBB core bridge, use the **rewrite ingress tag push** command in the PBB core configuration mode. To return to the default behavior, use the **no** form of this command.

rewrite ingress tag push dot1ad *vlan-id* **symmetric**

| Syntax Description | dot1ad | Indicates that the IEEE 802.1ad provider bridges encapsulation type is used. |
|--------------------|------------------|--|
| | <i>vlan-id</i> | VLAN ID. Range is from 1 to 4094. |
| | symmetric | Specifies that all rewrites must be symmetric. |

Command Default None

Command Modes PBB core configuration

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 3.9.1 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID | Operations |
|---------|---------|----------------|
| | l2vpn | read, write |

Examples

The following example shows how to configure the backbone VLAN ID for the PBB core bridge:

```

config
l2vpn
  bridge group PBB
    bridge-domain PBB-CORE
      interface G0/5/0/10.100
      !
      interface G0/2/0/20.200
      !
    pbb core
      rewrite ingress tag push dot1ad 100 symmetric
  !

```

!
!

| Related Commands | Command | Description |
|------------------|--------------------------------------|--|
| | bridge-domain (VPLS) | Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode. |
| | bridge group (VPLS) | Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain. |
| | l2vpn | Enters L2VPN configuration mode. |
| | pbb, on page 33 | Configures the provider backbone bridge core or edge. |

service-carving

To specify a list of service identifiers as active and standby services, use the **service-carving** command in the EVPN Ethernet segment configuration mode.

```
service-carving { manual [ primary service-id-range secondary service-id-range ] } | {
preference-based [ access-driven | weight preference-df-weight ] }
```

Syntax Description

| | |
|-----------------------------|--|
| manual | Specifies service identifiers or EVI-list services manually. |
| primary | Specifies the primary services list. |
| secondary | Specifies the secondary services list. |
| <i>service-id-range</i> | Specifies the services list notation in the range 100, 201-300, 401. The range is within 256 to 16777214. |
| preference-based | Specifies preference-based service carving. |
| access-driven | Specifies access-driven DF election. |
| weight | Specifies the preference value. |
| <i>preference-df-weight</i> | Specifies the preference DF weight. The range is from 0 to 65535 unless access-driven is configured, in which case it will be 0 to 32767. Default is 32767 when not configured. |

Command Default

Automatic service carving

Command Modes

EVPN interface Ethernet segment configuration mode

Command History

| Release | Modification |
|---------------|---|
| Release 6.1.2 | This command was introduced. |
| Release 7.3.1 | The following keywords are added: <ul style="list-style-type: none"> • preference-based • access-driven |

Usage Guidelines

None

Task ID

| Task ID | Operation |
|---------|----------------|
| l2vpn | read, write |

Example

This example shows how to specify a list of service identifiers as active and standby services:

```
Router# configure
Router(config)# evpn
Router(config-evpn)# interface bundle-ether 1
Router(config-evpn-ac)# ethernet segment
Router(config-evpn-ac-es)# service-carving manual primary 201-300 secondary 400-500
Router(config-evpn-ac-es)# commit
```

Example

This example shows how to specify EVPN access-driven DF election:

```
Router#configure
Router(config)#evpn
Router(config-evpn)#interface Bundle-Ether1
Router(config-evpn-ac)#ethernet-segment
Router(config-evpn-ac-es)#identifier type 0 01.11.00.00.00.00.00.01
Router(config-evpn-ac-es)#load-balancing-mode port-active
Router(config-evpn-ac-es)#service-carving preference-based
Router(config-evpn-ac-es-sc-pref)#weight 100
Router(config-evpn-ac-es-sc-pref)#access-driven
Router(config-evpn-ac-es-sc-pref)#commit
```

show l2vpn bridge-domain pbb

To display the provider backbone bridge details, use the **show l2vpn bridge-domain pbb** command in EXEC mode.

show l2vpn bridge-domain pbb {**core** [{**brief**|**detail**|**hardware**|**private**}]|**edge** [{**brief**|**core-bridge**|**detail**|**hardware**|**private**}]|**i-sid** *service-id* [{**brief**|**detail**|**hardware**|**private**}]}

Syntax Description

| | |
|--------------------|--|
| core | Displays the PBB core. |
| edge | Displays the PBB edge. |
| i-sid | Displays the service instance identifier. |
| <i>service-id</i> | Service ID. |
| brief | Displays brief information about the PBB core, edge or service instance identifier. |
| detail | Displays detailed information about the PBB core, edge or service instance identifier. |
| hardware | Displays hardware information. |
| private | Displays private information about the PBB core, edge or service instance identifier. |
| core-bridge | Displays the name of the core-bridge domain connected to the edge-bridge domain. |

Command Default

None

Command Modes

l2vpn

Command History

| Release | Modification |
|---------------|------------------------------|
| Release 3.9.1 | This command was introduced. |

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

| Task ID | Operations |
|---------|------------|
| l2vpn | read |

Examples

The following examples shows the output from the **show l2vpn bridge-domain pbb** command:

```
#show l2vpn bridge-domain isid 1234
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 1234
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
```



```

Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 0
  List of ACs:
    Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0

```

For IOS-XR 5.3.1 and earlier releases.

```

#show l2vpn bridge-domain detail isid 1234
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
  Type: pbb-edge, I-SID: 1234
  Core-bridge: pbb-bd2
  MAC learning: enabled
  MAC withdraw: disabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  MTU: 1500
  Filter MAC addresses:
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state is up
    XC ID 0x2000001
    MAC learning: enabled
    Flooding:
      Broadcast & Multicast: enabled
      Unknown unicast: enabled
    MAC aging time: 300 s, Type: inactivity
    MAC limit: 4000, Action: none, Notification: syslog
    MAC limit reached: yes
    Split Horizon Group: none
    DHCPv4 snooping: disabled
    IGMP Snooping profile:
    Storm Control: disabled
    Unknown-unicast-bmac: 666.777.888
    CMAC to BMAC Mapping Table:
      CMAC          |          BMAC
      -----
      222.333.444   |    777.888.999
      333.444.555   |    888.999.111
    Statistics:
      packet totals: receive 3919680,send 9328
      byte totals:  receive 305735040,send 15022146

List of ACs:
  AC: GigabitEthernet0/1/0/0, state is up
  Type Ethernet
  MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  Static MAC addresses:

```

show l2vpn bridge-domain pbb

```

0000.0000.0000
0001.0002.0003
Statistics:
  packet totals: receive 3919680,send 9328
  byte totals: receive 305735040,send 15022146

#show l2vpn bridge-domain pbb edge
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
  Type: pbb-edge, I-SID: 1234
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 2
List of ACs:
  Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0

Bridge group: g2, bridge-domain: pbb-bd3, id: 3, state: up, ShgId: 0, MSTi: 0
  Type: pbb-edge, I-SID: 2345
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  EDGE, state: up, Static MAC addresses: 2
List of ACs:
  Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0

Bridge group: g2, bridge-domain: pbb-bd4, id: 4, state: up, ShgId: 0, MSTi: 0
  Type: pbb-edge, I-SID: 3456
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 2
List of ACs:
  Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0

#show l2vpn bridge-domain pbb-core
Bridge group: g2, bridge-domain: pbb-bd2, id: 2, state: up, ShgId: 0, MSTi: 0
  Type: pbb-core
  Number of associated pbb-edge BDs: 1
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Core, state: up
List of ACs:
  Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0

#show l2vpn bridge-domain pbb-core detail
Bridge group: g2, bridge-domain: pbb-bd2, id: 2, state: up, ShgId: 0, MSTi: 0
  Type: pbb-core
  Number of associated pbb-edge BDs: 1
  MAC learning: enabled
  MAC withdraw: disabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes

```

```

Security: disabled
DHCPv4 snooping: disabled
MTU: 1500
Filter MAC addresses:
ACs: 1 (1 up), PBB: 1
List of PBBs:
  PBB Core, state is up
    Vlan-id: 1; XC ID 0x2000001
    MAC learning: enabled
    Flooding:
      Broadcast & Multicast: enabled
      Unknown unicast: enabled
    MAC aging time: 300 s, Type: inactivity
    MAC limit: 600, Action: none, Notification: syslog
    MAC limit reached: no
    Security: disabled
    Split Horizon Group: none
    DHCPv4 snooping: profile foo
    IGMP Snooping profile:
    Storm Control: disabled
List of ACs:
  AC: GigabitEthernet0/1/0/0, state is up
    Type Ethernet
    MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
    MAC learning: enabled
    Flooding:
      Broadcast & Multicast: enabled
      Unknown unicast: enabled
    MAC aging time: 300 s, Type: inactivity
    MAC limit: 4000, Action: none, Notification: syslog
    MAC limit reached: yes
    Security: disabled
    DHCPv4 snooping: disabled
    Static MAC addresses:
      0000.0000.0000
      0001.0002.0003
    Statistics:
      packet totals: receive 3919680,send 9328
      byte totals: receive 305735040,send 15022146
  
```

```

#show l2vpn bridge-domain pbb-edge core-bridge core-bd brief
Bridge Group/???????????????????? ID      State      Num ACs/up  Num PWs/up
Bridge-Domain Name
-----
bg/pbb-bd1  ??????????????????????????????1      up          0/0  ??????????0/0
bg/pbb-bd2  ??????????????????????????????2      up          0/0  ??????????0/0
bg/pbb-bd3  ??????????????????????????????3      up          0/0  ??????????0/0
  
```

```

RP/0/0/CPU0:ios#show l2vpn bridge-domain pbb edge core-bridge bd
Bridge group: bg, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 4001
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 0 (0 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 2
...

Bridge group: bg, bridge-domain: pbb-bd2, id: 2, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 4002
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 0 (0 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
  
```

```
show l2vpn bridge-domain pbb
```

```
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 1
...

Bridge group: bg, bridge-domain: pbb-bd3, id: 3, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 4003
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 0 (0 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 0
...
```

Related Commands

| Command | Description |
|---------------------------------|---|
| pbb, on page 33 | Configures the provider backbone bridge core or edge. |

show l2vpn forwarding bridge pbb

To display the PBB bridge forwarding information, use the **show l2vpn forwarding bridge pbb** command in EXEC mode.

```
show l2vpn forwarding bridge pbb core [{debug | detail | hardware | location | private}] | edge
[{{core-bridge | debug | detail | hardware | location | private}}] | i-sid service-id [{debug | detail | hardware
| location | private}]
```

| Syntax Description | Option | Description |
|--------------------|-----------------------------------|--|
| | debug | Displays the debug information. |
| | core | Displays the PBB core. |
| | edge | Displays the PBB edge. |
| | i-sid <i>service-id</i> | Displays the service instance identifier. |
| | brief | Displays brief information about the PBB core, edge or service instance identifier. |
| | detail | Displays detailed information about the PBB core, edge or service instance identifier. |
| | hardware | Displays hardware information. |
| | private | Displays private information about the PBB core, edge or service instance identifier. |
| | core-bridge | Displays the name of the core-bridge domain connected to the edge-bridge domain. |

Command Default None

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 3.9.1 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | l2vpn | read |

Examples

The following example shows the output from the **show l2vpn forwarding pbb backbone-source-mac** command:

show l2vpn forwarding bridge pbb

```
#show l2vpn forwarding backbone-source-mac location 0/1/CPU0  
333.444.555
```

Related Commands

| Command | Description |
|---------------------------------|---|
| pbb, on page 33 | Configures the provider backbone bridge core or edge. |

show l2vpn forwarding pbb backbone-source-mac

To display the provider backbone source MAC forwarding information, use the **show l2vpn forwarding pbb backbone-source-mac** command in EXEC mode.

```
show l2vpn forwarding pbb backbone-source-mac {debug [{detail | location | private}] | detail
[ {debug | location node-id} ] | location node-id | private}
```

Syntax Description

| | |
|-----------------|---|
| debug | Displays the debug information. |
| detail | Displays the detailed PBB forwarding information. |
| location | Specifies the location. |
| <i>node-id</i> | Node ID. |
| private | Displays private information. |

Command Default

None

Command Modes

EXEC

Command History

| Release | Modification |
|---------------|------------------------------|
| Release 3.9.1 | This command was introduced. |

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

| Task ID | Operations |
|---------|------------|
| l2vpn | read |

Examples

The following example shows the output from the **show l2vpn forwarding pbb backbone-source-mac** command:

```
#show l2vpn forwarding backbone-source-mac location 0/1/CPU0
333.444.555
```

Related Commands

| Command | Description |
|---------------------------------|---|
| pbb, on page 33 | Configures the provider backbone bridge core or edge. |

show l2vpn pbb backbone-source-mac

To display the provider backbone source MAC information, use the **show l2vpn pbb backbone-source-mac** command in EXEC mode.

show l2vpn pbb backbone-source-mac

Syntax Description This command has no keywords or arguments.

Command Default None

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 3.9.1 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | l2vpn | read |

Examples The following example shows the output from the **show l2vpn pbb backbone-source-mac** command:

```
#show l2vpn pbb backbone-source-mac
0111.0222.0333
```

| Related Commands | Command | Description |
|------------------|---------------------------------|---|
| | pbb, on page 33 | Configures the provider backbone bridge core or edge. |

show mmrp-flood-optimization

To display the MMRP flood optimization information, use the **show mmrp-flood-optimization** command in the EXEC mode.

```
show mmrp-flood-optimization [{summary | mad [pw neighbor pw-id] | statistics [pw neighbor pw-id] | registrations [received] [core-bridge bridge-domain-name : group-name] [isid isid]}]
```

| Syntax | Description |
|---------------------------|--|
| summary | Displays the summary of the current timer values, total number of core bridges, pseudowires, I-SIDs configured, declarations, and registrations. |
| mad | Displays the current state of the MRP Attribute Declaration (MAD) component on a pseudowire, for each active attribute value (that is, group B-MAC). |
| pw | Indicates the pseudowire. |
| <i>neighbor</i> | Indicates the IP address of the neighbor. |
| <i>pw-id</i> | Indicates the pseudowire ID. |
| statistics | Displays the packet statistics per pseudowire. |
| registrations | Displays the I-SIDs that are declared and a list of peers that have made registrations for those I-SIDs |
| received | Displays all the I-SIDs where registrations have been received, even if those I-SIDs are not configured locally. |
| core-bridge | Displays the information about a specific core-bridge. |
| <i>bridge-domain-name</i> | Core bridge domain name. |
| <i>group-name</i> | Group name. |
| isid | Displays information of a specific service instance identifier. |
| <i>isid</i> | Service instance identifier. |
| Command Default | None |
| Command Modes | EXEC |

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 5.1.2 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID | Operation |
|---------|-------------------|----------------|
| | ethernet-services | read, write |

The following example shows the output from the **show mmrp-flood-optimization summary** command.

```
RP/0/RSP0/CPU0:router#show mmrp-flood-optimization summary
Core Bridges:          4
Pseudowires:          100
I-SIDs configured:     2000
Total MMRP declarations: 200000
Registrations received: 220000

Flood Time:           disabled
Leaveall Time:         10000 ms
Leave Time:            30000 ms
Join Time:            200 ms
Transmit Period:     1000 ms
```

The following example shows the output from the **show mmrp-flood-optimization mad** command.

```
RP/0/RSP0/CPU0:router#show mmrp-flood-optimization mad
Core-Bridge: PBB-VPLS-Core1 PW: neighbor 1.2.3.4, pwid 87
Participant Type: Full; Point-to-Point: Yes
Admin Control: Applicant Normal; Registrar Normal

LeaveAll Passive (next in 5.92s); periodic disabled
Leave in 25.70s; Join not running
Last peer 0293.6926.9585; failed registrations: 0

I-SID      B-MAC          Applicant          Registrar
-----
          1 001E.8300.0001 Very Anxious Observer Leaving
16777216 001E.83FF.FFFF Quiet Passive      Empty
```

staggered-bringup-timer

To stagger the bring-up of bundle interfaces after startup-cost-in timer expiry, use the **staggered-bringup-timer** command in the EVPN configuration mode.

staggered-bringup-timer *duration*

| Syntax Description | <i>duration</i> Specify the stagger time period. By default, the stagger time is 5000ms and maximum configurable stagger time is 300s. | | | | |
|---------------------------|---|---------|--------------|---------------|------------------------------|
| Command Default | By default, the stagger time is 5000 milliseconds. | | | | |
| Command Modes | EVPN configuration mode | | | | |
| Command History | <table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 7.2.1</td> <td>This command was introduced.</td> </tr> </tbody> </table> | Release | Modification | Release 7.2.1 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.2.1 | This command was introduced. | | | | |
| Usage Guidelines | No specific guidelines impact the use of this command. | | | | |
| Task ID | <table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table> | Task ID | Operation | l2vpn | read, write |
| Task ID | Operation | | | | |
| l2vpn | read, write | | | | |

This example shows how to configure stagger period:

```
Router# configure
Router(config)# evpn
Router(config-evpn)# staggered-bringup-timer 200s
Router(config-evpn-es)# commit
```

static-mac-address

To map a customer destination MAC address to backbone destination MAC address, use the **static-mac-address** command in the PBB edge configuration mode. To return to the default behavior, use the **no** form of this command.

```
static-mac-address cust-mac-address bmac bmac-mac-address
no static-mac-address cust-mac-address bmac bmac-mac-address
```

| Syntax Description | |
|-------------------------|--|
| <i>cust-mac-address</i> | Customer destination MAC address in hexadecimal format. |
| bmac | Specifies that the static backbone MAC address must be mapped with the customer MAC address. |
| <i>bmac-mac-address</i> | Static backbone MAC address in hexadecimal format. |

Command Default None

Command Modes PBB edge configuration mode

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 3.9.1 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID | Operations |
|---------|---------|----------------|
| | l2vpn | read, write |

Examples The following example shows how to map the customer MAC address with the backbone MAC address:

```
interface GigabitEthernet0/0/0/0.1 l2transport encapsulation dot1q 10 !
interface GigabitEthernet0/0/0/0.2 l2transport encapsulation dot1q 2 !
interface GigabitEthernet0/0/0/1
 shutdown
!
interface GigabitEthernet0/0/0/2
 shutdown
!
interface GigabitEthernet0/0/0/3
 shutdown
!
interface GigabitEthernet0/0/0/4
```

```

shutdown
!
l2vpn
bridge group bg12
  bridge-domain bd1
    interface GigabitEthernet0/0/0/0.1
      static-mac-address 0002.0003.0004
    !
    interface GigabitEthernet0/0/0/0.2
    !
  pbb edge i-sid 1000 core-bridge bd2
    static-mac-address 0006.0007.0008 bmac 0004.0005.0006
  !
!
!
end
!

```

The following example shows the output of the **show l2vpn bridge-domain** command:

```

##sh l2vpn bridge-domain m mac-address mroute

Mac Address      Type      Learned from/          LC learned      Mapped to
                Filtered on              Resync Age
-----
0002.0003.0004  static   Gi0/0/0/0.1           N/A             N/A             N/A
0006.0007.0008  static   BD id: 0               N/A             N/A             0004.0005.0006

```



Note To resynchronize the MAC table from the network processors, use the **l2vpn resynchronize forwarding mac-address-table location** *<r/s/i>* command.

| Related Commands | Command | Description |
|------------------|--------------------------------------|--|
| | bridge-domain (VPLS) | Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode. |
| | bridge group (VPLS) | Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain. |
| | pbb, on page 33 | Configures the provider backbone bridge core or edge. |
| | l2vpn | Enters L2VPN configuration mode. |

timers (EVPN)

To configure timers that affect the convergence of PBB EVPN in failure scenarios, use the **timers** command in the EVPN interface configuration or in the EVPN configuration mode. To delete the timer configuration, use the **no** form of this command.

```
timers [{flushagain | recovery | peering | programming}]
no timers [{flushagain | recovery | peering | programming}]
```

| Syntax Description | | |
|--------------------|--------------------|--------------------------------------|
| | flushagain | Specifies the MAC flush again timer. |
| | recovery | Specifies the recovery timer. |
| | peering | Specifies the peering timer. |
| | programming | Specifies the programming timer. |

Command Default None.

Command Modes EVPN interface configuration
EVPN configuration

| Command History | Release | Modification |
|-----------------|---------------|------------------------------|
| | Release 4.3.2 | This command was introduced. |

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The timers are configured globally in the EVPN configuration mode whereas in the EVPN interface configuration mode, the timers are configured per Ethernet.

The keywords **peering** and **programming** are supported only in the EVPN configuration mode.

| Task ID | Task | Operation |
|---------|-------|----------------|
| | l2vpn | read, write |

This example shows how to configure timers in the EVPN Interface configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# timers
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)#
```

This example shows how to configure timers in the EVPN configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# timers
RP/0/RSP0/CPU0:router(config-evpn-timers)#
```

| Related Commands | Command | Description |
|------------------|---|---|
| | evpn | Enters EVPN configuration mode. |
| | interface (EVPN) | Enters the EVPN Interface configuration mode. |
| | recovery, on page 42 | Configures the recovery timer. |
| | flushagain, on page 17 | Configures the MAC flushagain timer. |
| | peering, on page 35 | Configures the peering timer. |
| | programming, on page 40 | Configures the programming timer. |

unknown-unicast-bmac

To configure the unknown unicast backbone MAC address for a PBB edge bridge, use the **unknown-unicast-bmac** command in the PBB edge configuration mode. To return to the default behavior, use the **no** form of this command.

unknown-unicast-bmac *mac-address*
no unknown-unicast-bmac *mac-address*

| | |
|---------------------------|--|
| Syntax Description | <i>mac-address</i> Unknown unicast backbone MAC address in hexadecimal format. |
|---------------------------|--|

| | |
|------------------------|------|
| Command Default | None |
|------------------------|------|

| | |
|----------------------|------------------------|
| Command Modes | PBB edge configuration |
|----------------------|------------------------|

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 3.9.1 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

| Task ID | Task ID | Operations |
|----------------|----------------|-------------------|
| | l2vpn | read, write |

| | |
|-----------------|--|
| Examples | The following example shows how to configure the unknown unicast backbone MAC address for a PBB edge bridge: |
|-----------------|--|

```

config
l2vpn
  bridge group PBB
    bridge-domain PBB-EDGE
      interface GigabitEthernet0/0/0/38.100
      !
      interface GigabitEthernet0/2/0/30.150
      !
    pbb edge i-sid 1000 core-bridge PBB-CORE
      unknown-unicast-bmac 0123.8888.8888
  !

```


!
!

| Related Commands | Command | Description |
|------------------|--------------------------------------|--|
| | bridge-domain (VPLS) | Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode. |
| | bridge group (VPLS) | Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain. |
| | l2vpn | Enters L2VPN configuration mode. |
| | pbb, on page 33 | Configures the provider backbone bridge core or edge. |

