



Implementing IEEE 802.1ah Provider Backbone Bridge

This module provides conceptual and configuration information for IEEE 802.1ah Provider Backbone Bridge on Cisco ASR 9000 Series Routers. The IEEE 802.1ah standard (Ref [4]) provides a means for interconnecting multiple provider bridged networks to build a large scale end-to-end Layer 2 provider bridged network.

Feature History for Implementing IEEE 802.1ah Provider Backbone Bridge

Release	Modification
Release 3.9.1	This feature was introduced on Cisco ASR 9000 Series Routers.

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Prerequisites for Implementing 802.1ah Provider Backbone Bridge

The following prerequisite applies to implementing 802.1ah Provider Backbone Bridge:

- You must be in a user group associated with a task group that includes the proper task IDs. The command reference guides include the task IDs required for each command.
If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
- You must be familiar with the multipoint bridging concepts. Refer to the [Implementing Multipoint Layer 2 Services](#) module.

Information About Implementing 802.1ah Provider Backbone Bridge

To implement 802.1ah, you must understand the following concepts:

- [Benefits of IEEE 802.1ah standard, page 218](#)
- [IEEE 802.1ah Standard for Provider Backbone Bridging Overview, page 218](#)
- [Backbone Edge Bridges, page 221](#)
- [IB-BEB, page 222](#)

Benefits of IEEE 802.1ah standard

The benefits of IEEE 802.1ah provider backbone bridges are as follows:

- Increased service instance scalability
- MAC address scalability

IEEE 802.1ah Standard for Provider Backbone Bridging Overview

The IEEE 802.1ah Provider Backbone Bridge feature encapsulates or decapsulates end user traffic on a Backbone Edge Bridge (BEB) at the edge of the Provider Backbone Bridged Network (PBBN). A Backbone Core Bridge (BCB) based network provides internal transport of the IEEE 802.1ah encapsulated frames within the PBBN. [Figure 10](#) shows a typical 802.1ah PBB network.

Figure 10 IEEE 802.1ah Provider Backbone Bridge

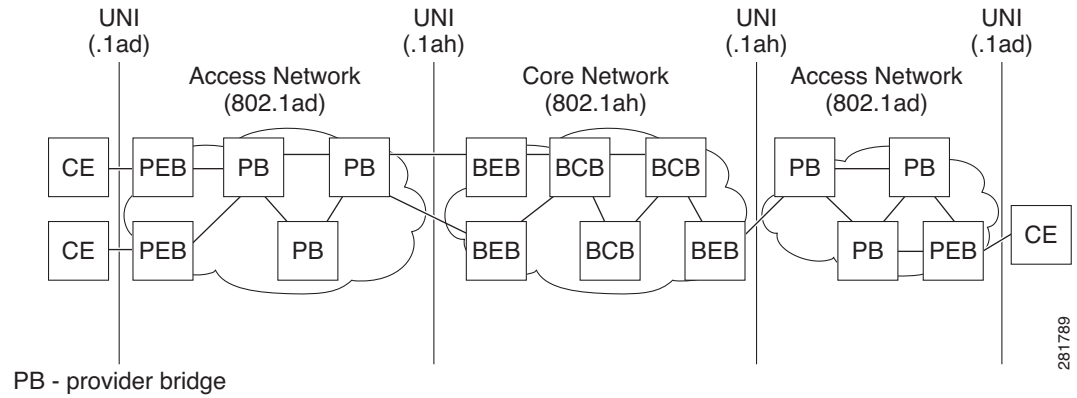
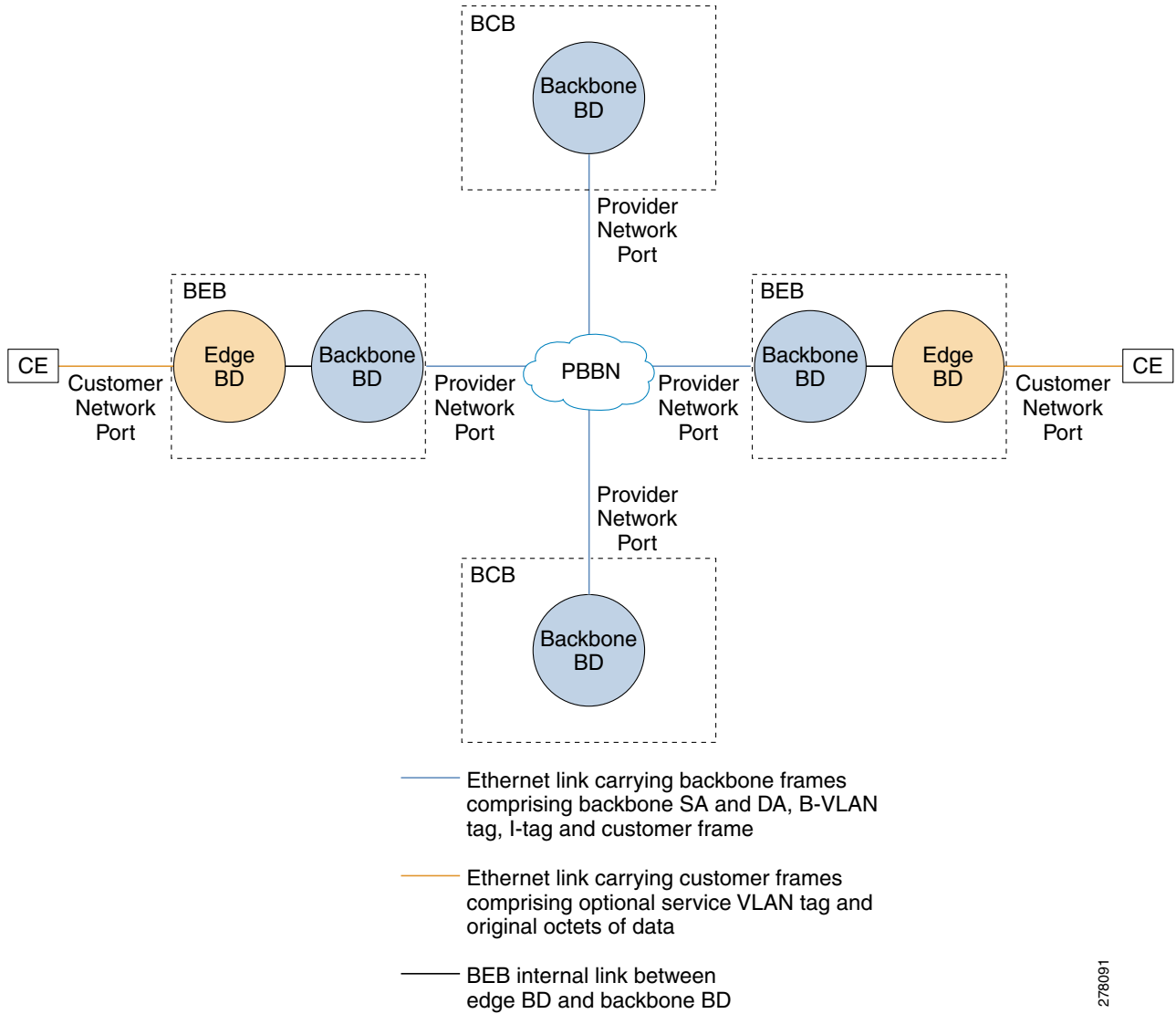


Figure 11 shows a typical provider backbone network topology.

Figure 11 Provider Back Bone Network Topology



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Backbone Edge Bridges

Backbone edge bridges (BEBs) can contain either an I-Component or a B-Component. The I-Component maps service VLAN identifiers (S-VIDs) to service instance identifiers (I-SIDs) and adds a provider backbone bridge (PBB) header without a backbone VLAN tag (B-Tag). The B-Component maps I-SIDs to backbone VLANs (B-VIDs) and adds a PBB header with a B-Tag.

The IEEE 802.1ah standard specifies the following three types of BEBs:

- The B-BEB contains the B-Component of the MAC-in-MAC bridge. It validates the I-SIDs and maps the frames onto the backbone VLAN (B-VLAN). It also switches traffic based on the B-VLANs within the core bridge.
- The I-BEB contains the I-Component of the MAC-in-MAC bridge. It performs B-MAC encapsulation and inserts the I-SIDs based on the provider VLAN tags (S-tags), customer VLAN tags (C-tags), or S-tag/C-tag pairs.
- The IB-BEB contains one or more I-Components and a single B-Component interconnected via a LAN segment.

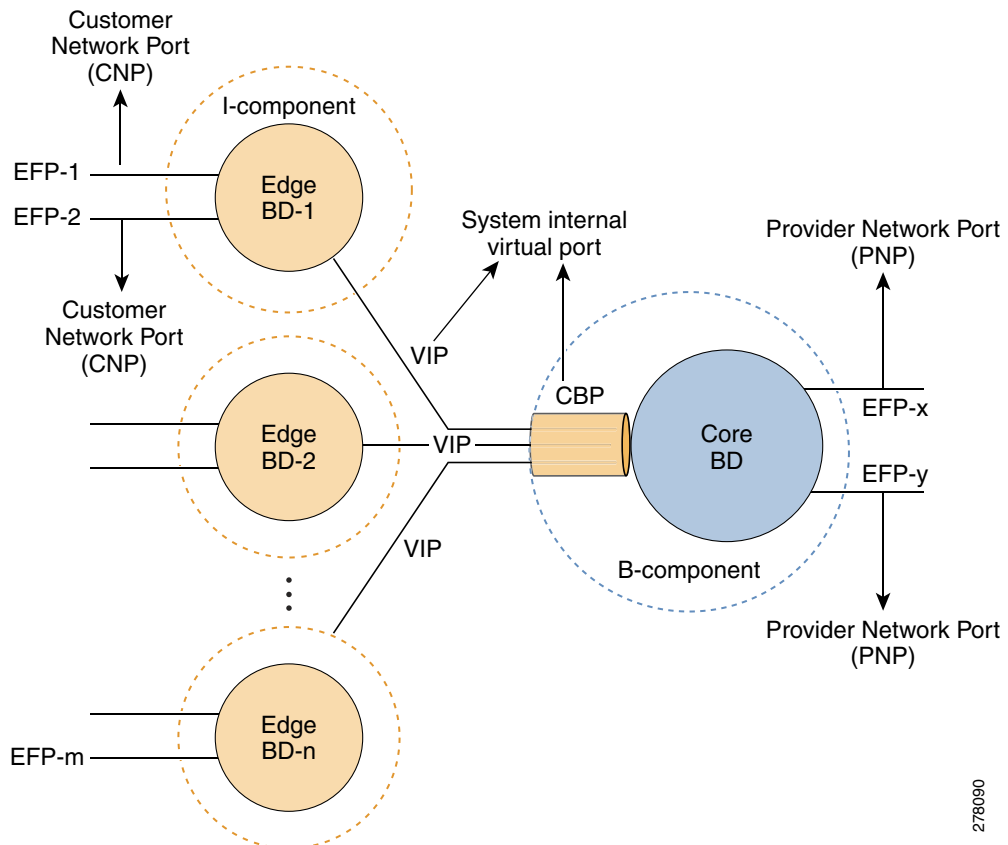


Note

Only IB-BEBs are supported on Cisco ASR 9000 Series Routers. Cisco IOS XR supports IB-BEB bridge type at the Edge node.

Figure 12 shows the PBB bridge component topology on the Cisco ASR 9000 Series Routers.

Figure 12 PBB Bridge Component Topology on Cisco ASR 9000 Series Routers



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IB-BEB

The IB-BEB contains both the I-Component and the B-Component. The bridge selects the B-MAC and inserts the I-SID based on the provider VLAN tag (S-tag), the customer VLAN tag (C-tag), or both the S-tag and the C-tag. It validates the I-SIDs and it transmits and receives frames on the B-VLAN.

The IEEE 802.1ah on Provider Backbone Bridges feature supports all services mandated by the IEEE 802.1ah standard and extends the services to provide additional functionality as follows:

- S-Tagged Service:
 - In multiplexed environments each S-tag maps to an I-SID and may be retained or removed.
 - In bundled environments multiple S-tags map to the same I-SID and the S-tags must be retained.
- C-Tagged Service:
 - In multiplexed environments each C-tag maps to an I-SID and may be retained or removed.
 - In bundled environments multiple C-tags map to the same I-SID and the C-tags must be retained.
- S/C-Tagged Service:
 - In multiplexed environments each S-tag/C-tag pair maps to an I-SID. The S-tag or the S-tag/C-tag pair may be retained or removed.
 - In bundled environments multiple S-tag/C-tags pairs map to the same I-SID and the S-tag/C-tag pair must be retained.
- Port-based Service
 - A port-based service interface is delivered on a Customer Network Port (CNP). A port-based service interface may attach to a C-VLAN Bridge, 802.1d bridge, router or end-station. The service provided by this interface forwards all frames without an S-Tag over the backbone on a single backbone service instance. A port-based interface discards all frames with an S-Tag that have non-null VLAN IDs.

The following example shows how to configure a port-based service:

```
interface GigabitEthernet0/0/0/10.100 12transport
encapsulation untagged
--> Creates an EFP for untagged frames.

interface GigabitEthernet0/0/0/10.101 12transport
encapsulation dot1ad priority-tagged
--> Creates an EFP for null S-tagged frames.

interface GigabitEthernet0/0/0/10.102 12transport
encapsulation dot1q priority-tagged
--> Creates an EFP for null C-tagged frames:

interface GigabitEthernet0/0/0/10.103 12transport
encapsulation dot1q any
--> Creates an EFP for C-tagged frames:
```



Note

To configure a port-based service, all the above EFPs must be added to the same edge bridge domain.

How to Implement 802.1ah Provider Backbone Bridge

This section contains the following procedures:

- [Restrictions for Implementing 802.1ah Provider Backbone Bridge, page 223](#)
- [Configuring Ethernet Flow Points on CNP and PNP Ports, page 223](#)
- [Configuring PBB Edge Bridge Domain and Service Instance ID, page 225](#)
- [Configuring the PBB Core Bridge Domain, page 226](#)
- [Configuring Backbone VLAN Tag under the PBB Core Bridge Domain, page 228](#)
- [Configuring Backbone Source MAC Address, page 230 \(optional\)](#)
- [Configuring Unknown Unicast Backbone MAC under PBB Edge Bridge Domain, page 233 \(optional\)](#)
- [Configuring Static MAC addresses under PBB Edge Bridge Domain, page 235 \(optional\)](#)

Restrictions for Implementing 802.1ah Provider Backbone Bridge

The following features are not supported:

- Cross-connect based point to point services over MAC-in-MAC
- One Edge bridge to multiple Core bridge mapping
- I type backbone edge bridge (I-BEB) and B type backbone edge bridge (B-BEB)
- IEEE 802.1ah over VPLS
- Multiple source B-MAC addresses per chassis
- Direct encapsulation of 802.1ah formatted packets natively over an MPLS LSP encapsulation

Configuring Ethernet Flow Points on CNP and PNP Ports

Perform this task to configure an Ethernet flow point (EFP) on the customer network port (CNP) or the provider network port (PNP).

SUMMARY STEPS

1. **configure**
2. **interface** *type interface-path-id.subinterface l2transport*
3. **encapsulation dot1q** *vlan-id*
or
encapsulation dot1ad *vlan-id*
or
encapsulation dot1ad *vlan-id dot1q* *vlan-id*
4. **end**
or
commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>configure</p> <p>Example: RP/0/RSP0/CPU0:router# configure</p>	Enters global configuration mode.
Step 2	<p>interface <i>type interface-path-id.subinterface</i> l2transport</p> <p>Example: RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet0/0/0/10.100 l2transport</p>	Configures an interface for L2 switching.
Step 3	<p>encapsulation dot1q <i>vlan-id</i> or encapsulation dot1ad <i>vlan-id</i> or encapsulation dot1ad <i>vlan-id dot1q</i> <i>vlan-id</i></p> <p>Example: RP/0/RSP0/CPU0:router(config-subif)# RP/0/RSP0/CPU0:router(config-subif)# encapsulation dot1q 100 or encapsulation dot1ad 100 or encapsulation dot1ad 100 dot1q 101</p>	Assigns the matching VLAN ID and Ethertype to the interface.
Step 4	<p>end or commit</p> <p>Example: RP/0/RSP0/CPU0:router(config-subif)# end or RP/0/RSP0/CPU0:router(config-subif)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.

Configuring PBB Edge Bridge Domain and Service Instance ID

Perform this task to configure a PBB edge domain and the service ID.

SUMMARY STEPS

1. **configure**
2. **l2vpn**
3. **bridge group** *group-name*
4. **bridge-domain** *domain-name*
5. **interface** *type interface-path-id.subinterface*
6. **pbb edge i-sid** *service-id core-bridge core-bridge-name*
7. **end**
or
commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RSP0/CPU0:router# configure	Enters global configuration mode.
Step 2	l2vpn Example: RP/0/RSP0/CPU0:router(config)# l2vpn	Enters L2VPN configuration mode.
Step 3	bridge group <i>bridge-group-name</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn)#bridge group pbb	Enters configuration mode for the named bridge group. This command creates a new bridge group or modifies the existing bridge group if it already exists. A bridge group organizes bridge domains.
Step 4	bridge-domain <i>domain-name</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg)#bridge-domain pbb-edge	Enters configuration mode for the named bridge domain. This command creates a new bridge domain or modifies the existing bridge domain if it already exists.
Step 5	interface <i>type interface-path-id.subinterface</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#interface GigabitEthernet0/5/0/0.20	Assigns the matching VLAN Id and Ethertype to the interface. This EFP is considered as the CNP for the Edge bridge.

	Command or Action	Purpose
Step 6	<pre>pbb edge i-sid <i>service-id</i> core-bridge <i>core-bridge-name</i></pre> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# pbb edge i-sid 1000 core-bridge pbb-core</p>	<p>Configures the bridge domain as PBB edge with the service identifier and the assigned core bridge domain, and enters the PBB edge configuration submode.</p> <p>This command also creates the Virtual instance port (VIP) that associates the PBB Edge bridge domain to the specified Core bridge domain.</p> <p>All the interfaces (bridge ports) under this bridge domain are treated as the customer network ports (CNP).</p>
Step 7	<pre>end or commit</pre> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-edge)# end or RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-edge)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.

Configuring the PBB Core Bridge Domain

Perform this task to configure the PBB core bridge domain.

SUMMARY STEPS

1. **configure**
2. **l2vpn**
3. **bridge group** *group-name*
4. **bridge-domain** *domain-name*
5. **interface** *type interface-path-id.subinterface*
6. **pbb core**
7. **end**
or
commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>configure</p> <p>Example: RP/0/RSP0/CPU0:router# configure</p>	Enters global configuration mode.
Step 2	<p>l2vpn</p> <p>Example: RP/0/RSP0/CPU0:router(config)# l2vpn</p>	Enters L2VPN configuration mode.
Step 3	<p>bridge group <i>bridge-group-name</i></p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn)#bridge group pbb</p>	Enters configuration mode for the named bridge group. This command creates a new bridge group or modifies the existing bridge group if it already exists. A bridge group organizes bridge domains.
Step 4	<p>bridge-domain <i>domain-name</i></p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg)#bridge-domain pbb-core</p>	Enters configuration mode for the named bridge domain. This command creates a new bridge domain or modifies the existing bridge domain if it already exists.
Step 5	<p>interface type interface-path-id.subinterface</p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#interface GigabitEthernet0/5/0/0.20</p>	Assigns the matching VLAN Id and Ether type to the interface.

	Command or Action	Purpose
Step 6	<p>pbb core</p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# pbb core</p>	<p>Configures the bridge domain as PBB core and enters the PBB core configuration submode.</p> <p>This command also creates an internal port known as Customer bridge port (CBP).</p> <p>All the interfaces (bridge ports) under this bridge domain are treated as the provider network ports (PNP).</p>
Step 7	<p>end or commit</p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)# end or RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.

Configuring Backbone VLAN Tag under the PBB Core Bridge Domain

Perform this task to configure the backbone VLAN tag under the PBB core bridge domain.

SUMMARY STEPS

- configure**
- l2vpn**
- bridge group** *group-name*
- bridge-domain** *domain-name*
- interface** *type interface-path-id.subinterface*
- interface** *type interface-path-id.subinterface*
- pbb core**
- rewrite ingress tag push dot1ad** *vlan-id symmetric*
- end**
or
commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RSP0/CPU0:router# configure	Enters global configuration mode.
Step 2	l2vpn Example: RP/0/RSP0/CPU0:router(config)# l2vpn	Enters L2VPN configuration mode.
Step 3	bridge group <i>bridge-group-name</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn)#bridge group pbb	Enters configuration mode for the named bridge group. This command creates a new bridge group or modifies the existing bridge group if it already exists. A bridge group organizes bridge domains.
Step 4	bridge-domain <i>domain-name</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg)#bridge-domain pbb-core	Enters configuration mode for the named bridge domain. This command creates a new bridge domain or modifies the existing bridge domain if it already exists.
Step 5	interface type interface-path-id.subinterface Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#interface GigabitEthernet0/5/0/0.20	Assigns the matching VLAN Id and Ethertype to the interface.
Step 6	interface type interface-path-id.subinterface Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)#interface GigabitEthernet0/5/0/1.15	Adds an interface to a bridge domain that allows packets to be forwarded and received from other interfaces that are part of the same bridge domain. The interface now becomes an attachment circuit on this bridge domain.
Step 7	pbb core Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#pbb core	Configures the bridge domain as PBB core and enters the PBB core configuration submenu. This command also creates an internal port known as Customer bridge port (CBP). All the interfaces (bridge ports) under this bridge domain are treated as the provider network ports (PNP).

	Command or Action	Purpose
Step 8	<pre>rewrite ingress tag push dot1ad vlan-id symmetric</pre> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb- core)# rewrite ingress tag push dot1ad 100 symmetric</pre>	<p>Configures the backbone VLAN tag in the Mac-in-MAC frame and also, sets the tag rewriting policy.</p> <p>Note All PNPs in a Core bridge domain use the same backbone VLAN.</p>
Step 9	<pre>end or commit</pre> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb- core)# end or RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb- core)# commit</pre>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.

Configuring Backbone Source MAC Address

The backbone source MAC address (B-SA) is a unique address for a backbone network. Each Cisco ASR 9000 Series Router has one backbone source MAC address. If B-SA is not configured, then the largest MAC in the EEPROM is used as the PBB B-SA.



Note

The backbone source MAC address configuration is optional. If you do not configure the backbone source MAC address, the Cisco ASR 9000 Series Routers allocate a default backbone source MAC address from the chassis backplane MAC pool.

Perform this task to configure the backbone source MAC address.

SUMMARY STEPS

1. **configure**
2. **l2vpn**
3. **pbb**
4. **backbone-source-mac** *mac-address*
5. **end**
or
commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RSP0/CPU0:router# configure	Enters global configuration mode.
Step 2	l2vpn Example: RP/0/RSP0/CPU0:router(config)# l2vpn	Enters L2VPN configuration mode.
Step 3	pbb Example: RP/0/RSP0/CPU0:router(config-l2vpn)# pbb	Enters PBB configuration mode.

	Command or Action	Purpose
Step 4	<p>backbone-source-address <i>mac-address</i></p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-pbb)# backbone-source-address 0045.1200.04</p>	Configures the backbone source MAC address.
Step 5	<p>end OR commit</p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-pbb)# end OR RP/0/RSP0/CPU0:router(config-l2vpn-pbb)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.

Configuring Unknown Unicast Backbone MAC under PBB Edge Bridge Domain

Perform this task to configure the unknown unicast backbone MAC under the PBB edge bridge domain.

SUMMARY STEPS

1. **configure**
2. **l2vpn**
3. **bridge group** *group-name*
4. **bridge-domain** *domain-name*
5. **interface** *type interface-path-id.subinterface*
6. **pbb edge i-sid** *service-id core-bridge core-bridge-name*
7. **unknown-unicast-bmac** *mac-address*
8. **end**
or
commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RSP0/CPU0:router# configure	Enters global configuration mode.
Step 2	l2vpn Example: RP/0/RSP0/CPU0:router(config)# l2vpn	Enters L2VPN configuration mode.
Step 3	bridge group <i>bridge-group-name</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn)#bridge group pbb	Enters configuration mode for the named bridge group. This command creates a new bridge group or modifies the existing bridge group if it already exists. A bridge group organizes bridge domains.
Step 4	bridge-domain <i>domain-name</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg)#bridge-domain pbb-edge	Enters configuration mode for the named bridge domain. This command creates a new bridge domain or modifies the existing bridge domain if it already exists.
Step 5	interface <i>type interface-path-id.subinterface</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#interface GigabitEthernet0/5/0/0.20	Assigns the matching VLAN Id and Ethertype to the interface.

Command or Action	Purpose
<p>Step 6</p> <pre>pbb edge i-sid <i>service-id</i> core-bridge <i>core-bridge-name</i></pre> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# pbb edge i-sid 1000 core-bridge pbb-core</p>	<p>Configures the bridge domain as PBB edge with the service identifier and the assigned core bridge domain and enters the PBB edge configuration submode.</p> <p>This command also creates the Virtual instance port (VIP) that associates the PBB Edge bridge domain to the specified Core bridge domain.</p> <p>All the interfaces (bridge ports) under this bridge domain are treated as the customer network ports (CNP).</p>
<p>Step 7</p> <pre>unknown-unicast-bmac <i>mac-address</i></pre> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-edge)# unknown-unicast-bmac 1.1.1</p>	<p>Configures unknown unicast backbone MAC address.</p> <p>Note On Trident linecards, once you configure the unknown unicast BMAC, the BMAC is used to forward customer traffic with multicast, broadcast and unknown unicast destination MAC address.</p>
<p>Step 8</p> <pre>end or commit</pre> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-edge)# end or RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-edge)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> • When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> – Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. – Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. – Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. • Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.

Configuring Static MAC addresses under PBB Edge Bridge Domain

Perform this task to configure the static MAC addresses under the PBB edge bridge domain.

SUMMARY STEPS

1. **configure**
2. **l2vpn**
3. **bridge group** *group-name*
4. **bridge-domain** *domain-name*
5. **interface** *type interface-path-id.subinterface*
6. **interface** *type interface-path-id.subinterface*
7. **pbb edge i-sid** *service-id* **core-bridge** *core-bridge-name*
8. **static-mac-address** *cda-mac-address* **bmac** *bda-mac-address*
9. **end**
or
commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RSP0/CPU0:router# configure	Enters global configuration mode.
Step 2	l2vpn Example: RP/0/RSP0/CPU0:router(config)# l2vpn	Enters L2VPN configuration mode.
Step 3	bridge group <i>bridge-group-name</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn)#bridge group pbb	Enters configuration mode for the named bridge group. This command creates a new bridge group or modifies the existing bridge group if it already exists. A bridge group organizes bridge domains.
Step 4	bridge-domain <i>domain-name</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg)#bridge-domain pbb-edge	Enters configuration mode for the named bridge domain. This command creates a new bridge domain or modifies the existing bridge domain if it already exists.
Step 5	interface <i>type interface-path-id.subinterface</i> Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#interface GigabitEthernet0/5/0/0.20	Assigns the matching VLAN Id and Ethertype to the interface.

	Command or Action	Purpose
Step 6	<p>interface type interface-path-id.subinterface</p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)#interface GigabitEthernet0/5/0/1.15</p>	<p>Adds an interface to a bridge domain that allows packets to be forwarded and received from other interfaces that are part of the same bridge domain. The interface now becomes an attachment circuit on this bridge domain.</p>
Step 7	<p>pbb edge i-sid service-id core-bridge <i>core-bridge-name</i></p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#pbb edge i-sid 1000 core-bridge pbb-core</p>	<p>Configures the bridge domain as PBB edge with the service identifier and the assigned core bridge domain and enters the PBB edge configuration submenu.</p> <p>This command also creates the Virtual instance port (VIP) that associates the PBB Edge bridge domain to the specified Core bridge domain.</p> <p>All the interfaces (bridge ports) under this bridge domain are treated as the customer network ports (CNP).</p>
Step 8	<p>static-mac-address cda-mac-address bmac <i>bda-mac-address</i></p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-edge)#static-mac-address 0033.3333.3333 bmac 0044.4444.4444</p>	<p>Configures the static CMAC to BMAC mapping under the PBB Edge submenu.</p>
Step 9	<p>end or commit</p> <p>Example: RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-edge)# end or RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-edge)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: Uncommitted changes found, commit them before exiting (yes/no/cancel)? [cancel]: <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.

Configuration Examples for Implementing 802.1ah Provider Backbone Bridge

This section provides the following configuration examples:

- [Configuring Ethernet Flow Points: Example, page 237](#)
- [Configuring PBB Edge Bridge Domain and Service Instance ID: Example, page 237](#)
- [Configuring PBB Core Bridge Domain: Example, page 238](#)
- [Configuring Backbone VLAN Tag: Example, page 238](#)
- [Configuring Backbone Source MAC Address: Example, page 238](#)
- [Configuring Static Mapping and Unknown Unicast MAC Address under the PBB Edge Bridge Domain, page 239](#)

Configuring Ethernet Flow Points: Example

The following example shows how to configure Ethernet flow points:

```
config
interface GigabitEthernet0/0/0/10.100 12transport
 encapsulation dot1q 100
or
 encapsulation dot1ad 100
or
 encapsulation dot1ad 100 dot1q 101
```

Configuring PBB Edge Bridge Domain and Service Instance ID: Example

The following example shows how to configure the PBB edge bridge domain:

```
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
  !
!
```

Configuring PBB Core Bridge Domain: Example

The following example shows how to configure the PBB core bridge domain:

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

Configuring Backbone VLAN Tag: Example

The following example shows how to configure the backbone VLAN tag:

```
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
    !
  !
!
```

Configuring Backbone Source MAC Address: Example

The following example shows how to configure the backbone source MAC address:

```
config
l2vpn
  pbb
    backbone-source-mac 0045.1200.04
  !
!
```

Configuring Static Mapping and Unknown Unicast MAC Address under the PBB Edge Bridge Domain

The following example shows how to configure static mapping and unknown unicast MAC address under the PBB edge bridge domain:

```

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
      static-mac-address 0033.3333.3333 bmac 0044.4444.4444
      unknown-unicast-bmac 0123.8888.8888
    !
  !
!
```

Additional References

The following sections provide references related to implementing 802.1ah on Cisco ASR 9000 Series Routers.

Related Documents

Related Topic	Document Title
802.1ah commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	<i>Provider Backbone Bridge Commands module in Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Command Reference</i>

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIBs	MIBs Link
—	To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport