Static MAC Address Support on Service Instances and Pseudowires

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The Static MAC Address Support on Service Instances and Pseudowires feature supports configuration of a static MAC address on a pseudoport. Use of a static MAC address for broadband network gateway (BNG) upstream traffic enables traffic forwarding while conserving MAC table resources and limiting the traffic flood by creating multicast groups.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.

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

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Prerequisites for Static MAC Address Support on Service Instances and Pseudowires

- Knowledge of both port and bridge domain limitations.
- Knowledge of service instances.
- Layer 2 virtual forwarding instance (L2VFI) must be integrated with the bridge domain.

Restrictions for Static MAC Address Support on Service Instances and Pseudowires

- Multicast static MAC addresses are not allowed in MAC address security configurations.
- Static MAC addresses are programmed only on switch processors (both active and standby).

Information About Static MAC Address Support on Service Instances and Pseudowires

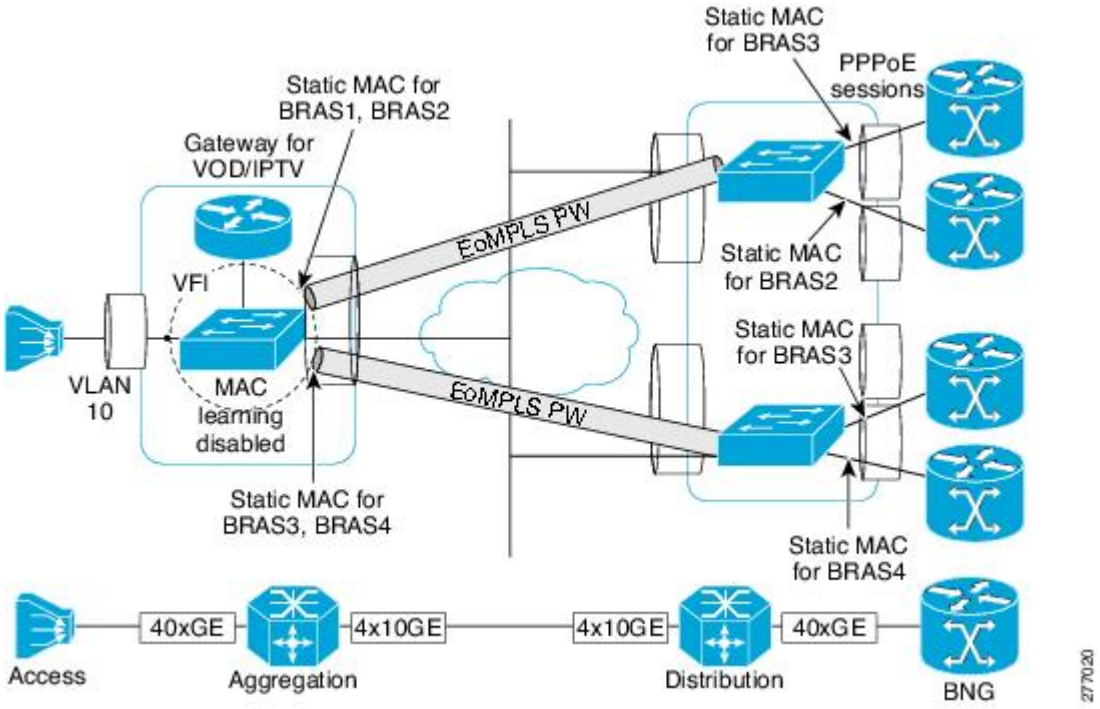
Static MAC Address Support on Service Instances and Pseudowires

Static MAC address configuration on service instances and pseudowires eliminates the need for MAC address learning, which is required for traffic forwarding. In the upstream direction, without MAC address learning, MAC address table resources can be conserved and network resources optimized.

Static MAC address configuration requires L2VFI integration with a bridge domain, which allows a pseudoport to be created on the bridge domain for a pseudowire. After the pseudoport is created, the static MAC configuration can be associated to the bridge domain pseudoport.

Multicast static MAC addresses are allowed on multiple pseudoports in the same bridge domain.

The figure below shows static MAC addresses in a network configured with broadband remote access server (BRAS) redundancy.



When a bridge domain ID is either changed or deleted for a service instance or for an L2VFI, all static MAC addresses are removed.

When a service instance or a pseudowire is deleted, all static MAC addresses on that pseudoport are removed.

Benefits of Static MAC Address Support on Service Instances and Pseudowires

- Facilitates optimization of network resources
- Conserves MAC table resources when used for upstream traffic

How to Configure a Static MAC Address on Service Instances or Pseudowires

Configuring a Static MAC Address on a Service Instance

Perform this task to manually configure a static MAC address on a service instance.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **service instance** *id* **ethernet** [*evc-id*]
5. **encapsulation dot1q** *vlan-id* [**,** *vlan-id*[**-** *vlan-id*]] [**native**]
6. **bridge-domain** *bridge-id* [**split-horizon**[**group** *group-id*]]
7. **mac static address** *mac-addr* [**auto-learn**] [**disable-snooping**]
8. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** `Router(config)# interface ethernet 1/0`	Configures an interface type and enters interface configuration mode.
Step 4	**service instance** *id* **ethernet** [*evc-id*] **Example:** `Router(config-if)# service instance 1 ethernet`	Configures an Ethernet service instance on an interface and enters service instance configuration mode.
Step 5	**encapsulation dot1q** *vlan-id* [**,** *vlan-id*[**-** *vlan-id*]] [**native**] **Example:** `Router(config-if-srv)# encapsulation dot1q 100`	Enables IEEE 802.1Q encapsulation of traffic on a specified subinterface in a VLAN.

	Command or Action	Purpose
Step 6	**bridge-domain** *bridge-id* [**split-horizon**[**group** *group-id*]] **Example:** `Router(config-if-srv)# bridge-domain 100`	Binds a service instance to a bridge domain instance.
Step 7	**mac static address** *mac-addr* [**auto-learn**] [**disable-snooping**] **Example:** `Router(config-if-srv)# mac static address 0000.bbbb.cccc`	Configures a static MAC address.
Step 8	**exit** **Example:** `Router(config-if-srv)# exit`	Returns the CLI to privileged EXEC mode.

Configuring a Static MAC Address on a Pseudowire

Perform this task to manually configure a static MAC address on a Pseudowires.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **l2 vfi** *name* **manual**
4. **vpn** {**vrf** *vrf-name*| **id** *vpn-id*}
5. **bridge-domain** *bridge-id* **vlan** *vlan-name*
6. **neighbor** *remote-router-id vc-id* {**encapsulation** *encapsulation-type* | **pw-class** *pw-name*} [**no-split-horizon**]
7. **mac static address** *mac-addr* [**auto-learn**] [**disable-snooping**]
8. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	Purpose
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**l2 vfi** *name* **manual** **Example:** `Router(config)# l2 vfi test-core manual`	Creates a Layer 2 VFI and enters Layer 2 VFI manual configuration mode.
Step 4	**vpn** {**vrf** *vrf-name*| **id** *vpn-id*} **Example:** `Router(config-vfi)# vpn id 100`	Specifies that the source and destination IP addresses of a virtual private dialup network (VPDN) group belong to a specified Virtual Private Network (VPN) routing and forwarding (VRF) instance,
Step 5	**bridge-domain** *bridge-id* **vlan** *vlan-name* **Example:** `Router(config-vfi)# bridge-domain 100 vlan vlan10`	Configures a VLAN for a bridge domain.
Step 6	**neighbor** *remote-router-id vc-id* {**encapsulation** *encapsulation-type* | **pw-class** *pw-name*} [**no-split-horizon**] **Example:** `Router(config-vfi)# neighbor 209.165.202.129 5 pw-class TestClass`	Specifies the type of tunnel signaling and encapsulation mechanism for each virtual private LAN service (VPLS) peer and enters VFI neighbor configuration mode.
Step 7	**mac static address** *mac-addr* [**auto-learn**] [**disable-snooping**] **Example:** `Router(config-vfi-neighbor)# mac static address 0000.aaaa.bbbb`	Configures a static MAC address.
Step 8	**exit** **Example:** `Router(config-vfi-neighbor)# exit`	Returns the CLI to privileged EXEC mode.

Displaying Configured Static MAC Addresses

Perform this task to display the static MAC addresses that are configured. Output of these commands may be useful for troubleshooting. The **show** commands can be issued in any order.

SUMMARY STEPS

1. **enable**
2. **show bridge-domain** [[*bridge-id*] [**c-mac**] [**mac**{**security** [**address** | **last violation** | **statistics**] | **static address**| **table**[*mac-address* | **aging-time** | **count**]}] | **split-horizon** [**group** {*group-number* | **all** | **none**}] | **stats**]
3. **show ethernet service instance** [**detail** | **id** *id* **interface** *type number* [**detail** | **mac** {**security** [**address** | **last violation** | **statistics**] | **static address**}] | **platform** | **stats**] | **interface** *type number* [**detail** | **platform** | **stats** | **summary**] | **mac security** [**address** | **last violation** | **statistics**] | **platform** | **policy-map** | **stats** | **summary**]
4. **show vfi** [**checkpoint** [**summary**] | **mac static address** | **memory** [**detail**] | **name** *vfi-name* [**checkpoint** | **mac static address**] | **neighbor** *ip-addr* **vcid** *vcid* **mac static address**]
5. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show bridge-domain** [[*bridge-id*] [**c-mac**] [**mac**{**security** [**address**	**last violation**	**statistics**]	**static address**	**table**[*mac-address*	**aging-time**	**count**]}]	**split-horizon** [**group** {*group-number*	**all**	**none**}]	**stats**] **Example:** `Router# show bridge-domain 100 mac static address`	Display bridge-domain information.
Step 3	**show ethernet service instance** [**detail**	**id** *id* **interface** *type number* [**detail**	**mac** {**security** [**address**	**last violation**	**statistics**]	**static address**}]	**platform**	**stats**]	**interface** *type number* [**detail**	**platform**	**stats**	**summary**]	**mac security** [**address**	**last violation**	**statistics**]	**platform**	**policy-map**	**stats**	**summary**] **Example:** `Router# show ethernet service instance id 1 interface ethernet 0/0 mac static address`	Displays information about Ethernet service instances.

	Command or Action	Purpose
Step 4	**show vfi** [**checkpoint** [**summary**] | **mac static address** | **memory** [**detail**] | **name** *vfi-name* [**checkpoint** | **mac static address**] | **neighbor** *ip-addr* **vcid** *vcid* **mac static address**] **Example:** `Router# show vfi name VFI2 mac static address`	Displays information about a VFI.
Step 5	**exit** **Example:** `Router# exit`	Returns the CLI to user EXEC mode.

Configuration Examples for Static MAC Address Support on Service Instances and Pseudowires

Example Configuring a Static MAC Address on a Service Instance

```
Router> enable
Router# configure terminal
Router(config)# interface ethernet 1/0
Router(config-if)# service instance 1 ethernet
Router(config-if-srv)# encapsulation dot1q 100
Router(config-if-srv)# bridge-domain 100
Router(config-if-srv)# mac static address 0000.bbbb.cccc
Router(config-if-srv)# exit
```

Example Configuring a Static MAC Address on a Pseudowire

```
Router> enable
Router# configure terminal
Router(config)# l2 vfi test-core manual
Router(config-vfi)# vpn id 100
Router(config-vfi)# bridge-domain 100 vlan vlan10
Router(config-vfi)# neighbor 209.165.202.129 5 pw-class TestClass
Router(config-vfi-neighbor)# mac static address 0000.aaaa.bbbb
Router(config-vfi-neighbor)# exit
```

Additional References

Related Documents

Related Topic	Document Title
Configuration guide	*Cisco IOS Carrier Ethernet Configuration Guide*, Release 12.2SR
Carrier Ethernet commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	*Cisco IOS Carrier Ethernet Command Reference*
Cisco IOS commands: master list of commands with complete command syntax, command mode, command history, defaults, usage guidelines, and examples	Cisco IOS Master Command List, All Releases

Standards

Standard	Title
None	--

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	--

Technical Assistance

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

Feature Information for Static MAC Address Support on Service Instances and Pseudowires

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

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

Table 1 Feature Information for Static MAC Address Support on Service Instances and Pseudowires

Feature Name	Releases	Feature Information
Static Mac for Open (Infrastructure)	12.2(33)SRE	The Static MAC Address Support on Service Instances and Pseudowires feature supports configuration of a static MAC address on a pseudoport. Use of a static MAC address for BNG upstream traffic enables traffic forwarding while conserving MAC table resources and limiting traffic flooding by creating multicast groups. The following commands were introduced or modified: **mac static address**, **neighbor**, **show bridge domain**, **show ethernet service instance**, **show vfi**.