HSRP: Global IPv6 Address

IPv6 routing protocols ensure device-to-device resilience and failover. However, in situations in which the path between a host and the first-hop device fails, or the first-hop device itself fails, first hop redundancy protocols (FHRPs) ensure host-to-device resilience and failover.

The Hot Standby Router Protocol (HSRP) protects data traffic in case of a gateway failure.

[other]

A note on link local addresses
The HSRP protocol uses a link local address as part of the protocol and this is not changed by the global address feature. Consider the global address feature as exchanging global addresses within the protocol for use, but the protocol itself still uses link locals for its protocol operation. If you only configure a global address, then there is a link-local address that is automatically allocated using the Extended Unique Identifier (EUI-64) method. You can use the **show standby** command to see the allocated link local address. You can still configure an IPv6 link local address by manual configuration if you require it. Manual configuration takes the group out of the 'implicit link-local' mode and replaces the automatic link local address with the configured one. If the configured one is later removed, but there is still a global address, then another implicit link local address is recalculated and applied.

Finding Feature Information

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

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

Information About HSRP Global IPv6 Address

HSRP: Global IPv6 Address

The HSRP global IPv6 address feature allows users to configure multiple nonlink local addresses as virtual addresses, and it allows for the storage and management of multiple global IPv6 virtual addresses in addition to the existing primary link-local address. If an IPv6 address is used, it must include an IPv6 prefix length. If a link-local address is used, it must not have a prefix.

The figure below depicts a deployment scenario that uses an HSRP IPv6 global virtual interface:
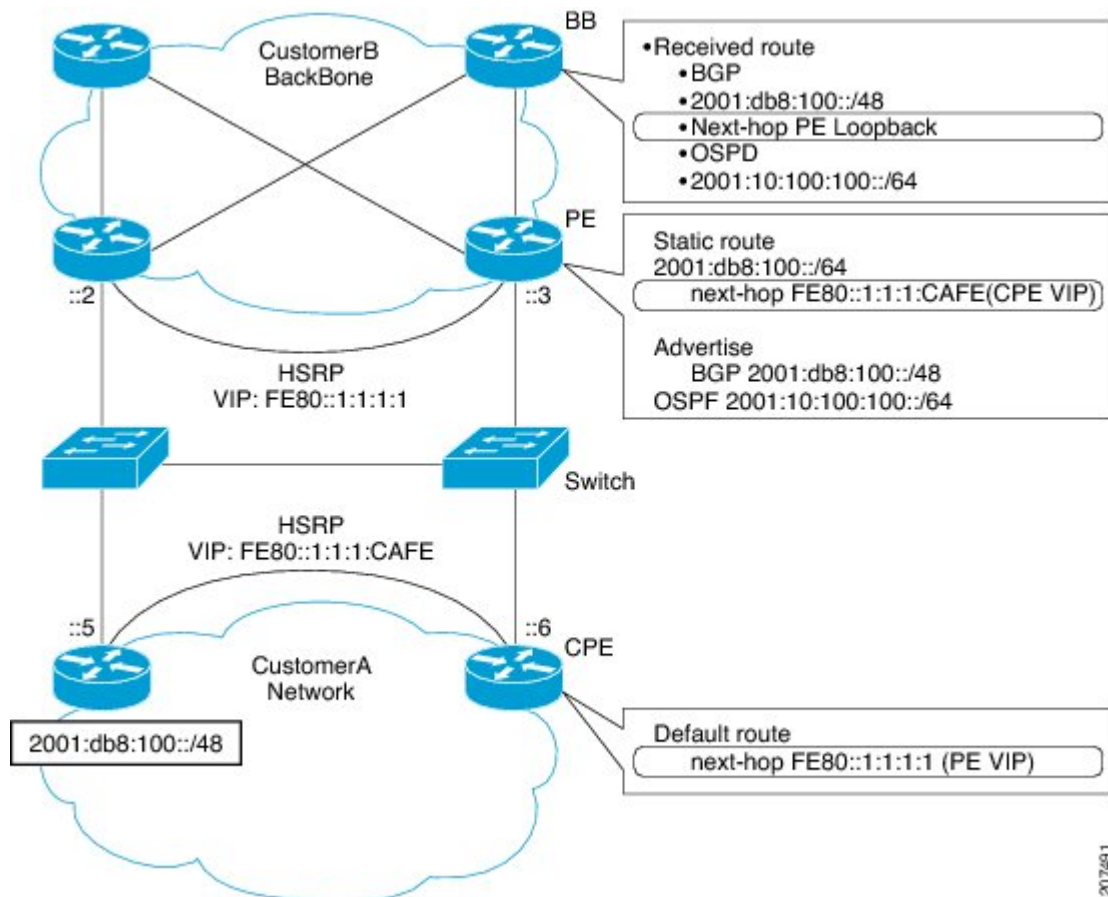
In the figure above, the provider equipment (PE) devices need to inject a route to reach the customer premises equipment (CPE) from the backbone devices. Because there are two CPEs, HSRP is convenient to use. The static route will be set with a link-local next hop (FE80::1:1:1:CAFE). If this address is injected in the backbone, this route is useless with a link-local next hop, as link-local addresses only have scope within the Layer 2 local LAN space. To address this issue, the next hop of the static route toward the virtual address must be set to a non link-local address, so backbone devices can route packets to the PE devices. At the next-hop address

resolution, the active HSRP group member will reply to neighbor solicitation (NS) messages sent to the non link-local address.

Jitter timers

Jitter timers are used in HSRP. They are recommended for timers running on services that work realtime and scale. Jitter timers are intended to significantly improve the reliability of HSRP, and other FHRP protocols, by reducing the chance of bunching of HSRP groups operations, and thus help reduce CPU and network traffic spikes. In the case of HSRP, a given device may have up to 4000 operational groups configured. In order to distribute the load on the device and network, the HSRP timers use a jitter. A given timer instance may take up to 20% more than the configured value. For example, for a hold time set to 15 seconds, the actual hold time may take 18 seconds.

In HSRP, the Hello timer (which sends the Hello Packet) has a negative Jitter, while the Holddown timer (which checks for failure of a peer) has a positive jitter.

How to Enable HSRP Global IPv6 Address

Enabling and Verifying an HSRP Group for IPv6 Operation

In this task, when you enter the **standby ipv6** command, a modified EUI-64 format interface identifier is generated in which the EUI-64 interface identifier is created from the relevant HSRP virtual MAC address

In IPv6, a device on the link advertises in RA messages any site-local and global prefixes, and its willingness to function as a default device for the link. RA messages are sent periodically and in response to device solicitation messages, which are sent by hosts at system startup

A node on the link can automatically configure site-local and global IPv6 addresses by appending its interface identifier (64 bits) to the prefixes (64 bits) included in the RA messages. The resulting 128-bit IPv6 addresses configured by the node are then subjected to duplicate address detec tion to ensure their uniqueness on the link. If the prefixes advertised in the RA messages are globally unique, then the IPv6 addresses configured by the node are also guaranteed to be globally unique. Device solicitation messages, which have a value of 133 in the Type field of the ICMPv6 packet header, are sent by hosts at system startup so that the host can immediately auto-configure without needing to wait for the next scheduled RA message.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ipv6 unicast-routing**
4. **interface** *type number*
5. **standby** [*group-number*] **ipv6** {*ipv6-global-address* | *ipv6-address/prefix-length* | *ipv6-prefix/prefix-length* | *link-local-address* | **autoconfig**}
6. **standby** [*group-number*] **preempt** [**delay minimum** *seconds* | **reload** *seconds* | **sync** *seconds*]
7. **standby** [*group-number*] **priority** *priority*
8. **exit**
9. **show standby** [*type number* [*group*]] [**all** | **brief**]
10. **show ipv6 interface** [**brief**] [*interface-type interface-number*] [**prefix**]

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ipv6 unicast-routing** **Example:** `Device(config)# ipv6 unicast-routing`	Enables the forwarding of IPv6 unicast datagrams. • The **ipv6 unicast-routing** command must be enabled for HSRP for IPv6 to work.
Step 4	**interface** *type number* **Example:** `Device(config)# interface ethernet 0/0`	Specifies an interface type and number, and places the device in interface configuration mode.
Step 5	**standby** [*group-number*] **ipv6** {*ipv6-global-address* | *ipv6-address/prefix-length* | *ipv6-prefix/prefix-length* | *link-local-address* | **autoconfig**} **Example:** `Device(config-if)# standby 1 ipv6 autoconfig`	Activates the HSRP in IPv6. If an IPv6 address is used, it must include an IPv6 prefix length. If a link-local address is used, it must not have a prefix.
Step 6	**standby** [*group-number*] **preempt** [**delay minimum** *seconds* | **reload** *seconds* | **sync** *seconds*] **Example:** `Device(config-if)# standby 1 preempt`	Configures HSRP preemption and preemption delay.
Step 7	**standby** [*group-number*] **priority** *priority* **Example:** `Device(config-if)# standby 1 priority 110`	Configures HSRP priority.
Step 8	**exit** **Example:** `Device(config-if)# exit`	Returns to privileged EXEC mode.

	Command or Action	Purpose
Step 9	**show standby** [*type number* [*group*]] [**all** | **brief**] **Example:** `Device# show standby`	Displays HSRP information.
Step 10	**show ipv6 interface** [**brief**] [*interface-type interface-number*] [**prefix**] **Example:** `Device# show ipv6 interface ethernet 0/0`	Displays the usability status of interfaces configured for IPv6.

Configuration Example for HSRP Global IPv6 Address

Example: Configuring HSRP Global IPv6 Addresses

This example shows three HSRP global IPv6 addresses with an explicitly configured link-local address:

```
Device(config)# interface ethernet 0/0
Device(config-if)# no ip address
Device(config-if)# ipv6 address 2001::DB8:1/64
Device(config-if)# standby 1 ipv6 FE80::1:CAFE
Device(config-if)# standby 1 ipv6 2001::DB8:2/64
Device(config-if)# standby 1 ipv6 2001:DB8::3/64
Device(config-if)# standby 1 ipv6 2001:DB8::4/64
Device(config-if)# exit
```

Additional References for HSRP Global IPv6 Address

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Command List, All Releases
HSRP commands	*Cisco IOS First Hop Redundancy Protocols Command Reference*
Troubleshooting HSRP	*Hot Standby Router Protocol: Frequently Asked Questions*
IPv6 addressing and connectivity	*IPv6 Configuration Guide*

Related Topic	Document Title
IPv6 commands	*Cisco IOS IPv6 Command Reference*
Cisco IOS IPv6 features	Cisco IOS IPv6 Feature Mapping

RFCs

RFCs	Title
RFCs for IPv6	*IPv6 RFCs*

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 HSRP: Global IPv6 Address

Table 1: Feature Information for HSRP: Global IPv6 Address

Feature Name	Releases	Feature Information
HSRP: Global IPv6 Address	Cisco IOS XE 3.6E	The HSRP global IPv6 address feature allows users to configure multiple non-link local addresses as virtual addresses. In Cisco IOS Release Cisco IOS XE Release 3.6E, this feature is supported on the following platforms: • Cisco Catalyst 3850 Series Switches • Cisco Catalyst 3650 Series Switches • Cisco Catalyst 4500E Supervisor Engine 7L-E • Cisco Catalyst 4500-X Series Switches • Cisco Catalyst 4500E Supervisor Engine 8-E The following commands were introduced or modified: **standby ipv6**.