

standby preempt

To configure Hot Standby Router Protocol (HSRP) preemption and preemption delay, use the **standby preempt** command in interface configuration mode. To restore the default values, use the **no** form of this command.

```
standby [group-number] preempt [delay {minimum seconds | reload seconds | sync seconds}]
```

```
no standby [group-number] preempt [delay {minimum seconds | reload seconds | sync seconds}]
```

Syntax Description

<i>group-number</i>	(Optional) Group number on the interface to which the other arguments in this command apply.
delay	(Optional) Required if either the minimum , reload , or sync keywords are specified.
minimum <i>seconds</i>	(Optional) Specifies the minimum delay period in seconds. The <i>seconds</i> argument causes the local router to postpone taking over the active role for a minimum number of seconds since that router was last restarted. The range is from 0 to 3600 seconds (1 hour). The default is 0 seconds (no delay).
reload <i>seconds</i>	(Optional) Specifies the preemption delay, in seconds, after a reload only. This delay period applies only to the first interface-up event after the router has reloaded.
sync <i>seconds</i>	(Optional) Specifies the maximum synchronization period for IP redundancy clients in seconds.

Defaults

The default group number is 0.
 The default delay is 0 seconds; if the router wants to preempt, it will do so immediately.
 By default, the router that comes up later becomes the standby.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
11.3	This command was introduced.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.0(2)T	The minimum and sync keywords were added.
12.2	The behavior of the command changed such that standby preempt and standby priority must be entered as separate commands.
12.2	The reload keyword was added.
12.4(4)T	Support for IPv6 was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Release	Modification
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	The behavior of the command changed such that standby preempt and standby priority must be entered as separate commands.

Usage Guidelines



Note

Cisco IOS 12.2SX software releases earlier than Cisco IOS Release 12.2(33)SXH use the syntax from Cisco IOS Release 12.1, which supports **preempt** as a keyword for the **standby priority** command. Cisco IOS Release 12.2(33)SXH and later releases use Cisco IOS Release 12.2 syntax, which requires **standby preempt** and **standby priority** to be entered as separate commands.

When the **standby preempt** command is configured, the router is configured to preempt, which means that when the local router has a Hot Standby priority higher than the current active router, the local router should attempt to assume control as the active router. If preemption is not configured, the local router assumes control as the active router only if it receives information indicating no router is in the active state (acting as the designated router).

This command is separate from the **standby delay minimum reload** interface configuration command, which delays HSRP groups from initializing for the specified time after the interface comes up.

When a router first comes up, it does not have a complete routing table. If it is configured to preempt, it will become the active router, yet it is unable to provide adequate routing services. Solve this problem by configuring a delay before the preempting router actually preempts the currently active router.

When group number 0 is used, no group number is written to NVRAM, providing backward compatibility.

IP redundancy clients can prevent preemption from taking place. The **standby preempt delay sync seconds** command specifies a maximum number of seconds to allow IP redundancy clients to prevent preemption. When this expires, then preemption takes place regardless of the state of the IP redundancy clients.

The **standby preempt delay reload seconds** command allows preemption to occur only after a router reloads. This provides stabilization of the router at startup. After this initial delay at startup, the operation returns to the default behavior.

The **no standby preempt delay** command will disable the preemption delay but preemption will remain enabled. The **no standby preempt delay minimum seconds** command will disable the minimum delay but leave any synchronization delay if it was configured.

When the **standby follow** command is used to configure an HSRP group to become an IP redundancy client of another HSRP group, the client group takes its state from the master group it is following. Therefore, the client group does not use its timer, priority, or preemption settings. A warning is displayed if these settings are configured on a client group:

```
Router(config-if)# standby 1 preempt delay minimum 300
% Warning: This setting has no effect while following another group.
```

Examples

In the following example, the router will wait for 300 seconds (5 minutes) before attempting to become the active router:

```
interface ethernet 0
 standby ip 172.19.108.254
```

```
standby preempt delay minimum 300
```

standby priority

To configure Hot Standby Router Protocol (HSRP) priority, use the **standby priority** command in interface configuration mode. To restore the default values, use the **no** form of this command.

standby [*group-number*] **priority** *priority*

no standby [*group-number*] **priority** *priority*

Syntax Description

<i>group-number</i>	(Optional) Group number on the interface to which the other arguments in this command apply. The default group number is 0.
<i>priority</i>	Priority value that prioritizes a potential Hot Standby router. The range is from 1 to 255, where 1 denotes the lowest priority and 255 denotes the highest priority. The default priority value is 100. The router in the HSRP group with the highest priority value becomes the active router.

Defaults

The default group number is 0.
The default priority is 100.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
11.3	This command was introduced.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.2	The behavior of the command changed such that standby preempt and standby priority must be entered as separate commands.
12.4(4)T	Support for IPv6 was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	The behavior of the command changed such that standby preempt and standby priority must be entered as separate commands.

Usage Guidelines



Note

Cisco IOS 12.2SX software releases earlier than Cisco IOS Release 12.2(33)SXH use the syntax from Cisco IOS Release 12.1, which supports **preempt** as a keyword for the **standby priority** command. Cisco IOS Release 12.2(33)SXH and later releases use Cisco IOS Release 12.2 syntax, which requires **standby preempt** and **standby priority** to be entered as separate commands.

When group number 0 is used, the number 0 is written to NVRAM, providing backward compatibility.

The assigned priority is used to help select the active and standby routers. Assuming that preemption is enabled, the router with the highest priority becomes the designated active router. In case of ties, the primary IP addresses are compared, and the higher IP address has priority.

Note that the priority of the device can change dynamically if an interface is configured with the **standby track** command and another interface on the router or a tracked object goes down.

When the **standby follow** command is used to configure an HSRP group to become an IP redundancy client of another HSRP group, the client group takes its state from the master group it is following. Therefore, the client group does not use its timer, priority, or preemption settings. A warning is displayed if these settings are configured on a client group:

```
Router(config-if)# standby 1 priority 110  
%Warning: This setting has no effect while following another group.
```

Examples

In the following example, the router has a priority of 120 (higher than the default value):

```
interface ethernet 0  
 standby ip 172.19.108.254  
 standby priority 120  
 standby preempt delay 300
```

Related Commands

Command	Description
standby track	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.

standby redirect

To enable Hot Standby Router Protocol (HSRP) filtering of Internet Control Message Protocol (ICMP) redirect messages, use the **standby redirect** command in interface configuration mode. To disable the HSRP filtering of ICMP redirect messages, use the **no** form of this command.

standby redirect [*timers advertisement holddown*] [**unknown**]

no standby redirect [**unknown**]

Syntax Description

timers	(Optional) Adjusts HSRP router advertisement timers.
<i>advertisement</i>	(Optional) HSRP Router advertisement interval in seconds. This is an integer from 10 to 180. The default is 60 seconds.
<i>holddown</i>	(Optional) HSRP router holddown interval in seconds. This is an integer from 61 to 3600. The default is 180 seconds.
unknown	(Optional) Allows sending of ICMP packets when the next hop IP address contained in the packet is unknown in the HSRP table of real IP addresses and active virtual IP addresses. The no standby redirect unknown command stops the redirects from being sent.

Command Default

HSRP filtering of ICMP redirect messages is enabled if HSRP is configured on an interface.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.1(3)T	This command was introduced.
12.2	The following keywords and arguments were added to the command: <ul style="list-style-type: none"> timers <i>advertisement holdtime</i> unknown
12.3(2)T	The enable and disable keywords were deprecated.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

The **standby redirect** command can be configured globally or on a per-interface basis. When HSRP is first configured on an interface, the setting for that interface will inherit the global value. If the filtering of ICMP redirects is explicitly disabled on an interface, then the global command cannot reenables this functionality.

With the **standby redirect** command enabled, the real IP address of a router can be replaced with a virtual IP address in the next hop address or gateway field of the redirect packet. HSRP looks up the next hop IP address in its table of real IP addresses versus virtual IP addresses. If HSRP does not find a match, the HSRP router allows the redirect packet to go out unchanged. The host HSRP router is redirected to a router that is unknown, that is, a router with no active HSRP groups. You can specify the **no standby redirect unknown** command to stop these redirects from being sent.

Examples

The following example shows how to allow HSRP to filter ICMP redirect messages on interface Ethernet 0:

```
interface ethernet 0
 ip address 10.0.0.1 255.0.0.0
 standby redirect
 standby 1 ip 10.0.0.11
```

The following example shows how to change the HSRP router advertisement interval to 90 seconds and the holddown timer to 270 seconds on interface Ethernet 0:

```
interface ethernet 0
 ip address 10.0.0.1 255.0.0.0
 standby redirect timers 90 270
 standby 1 ip 10.0.0.11
```

Related Commands

Command	Description
show standby	Displays the HSRP information.
show standby redirect	Displays ICMP redirect information on interfaces configured with the HSRP.

standby send arp

To configure Hot Standby Router Protocol (HSRP) to send a single gratuitous ARP packet for each active HSRP group, use the **standby send arp** command in user EXEC or privileged EXEC mode.

standby send arp [*interface-type interface-number* [*group-number*]]

Syntax Description		
<i>interface-type</i>	(Optional) Interface type and number of the interface out of which ARP packets are sent.	
<i>interface-number</i>		
<i>group-number</i>	(Optional) Group number on the interface to which the other arguments in this command apply.	

Command Default HSRP sends gratuitous ARP packets from an HSRP group when it changes to the Active state.

Command Modes User EXEC
Privileged EXEC(#)

Command History	Release	Modification
	12.2(33)SX1	This command was introduced.

Usage Guidelines Use the **standby send arp** command to cause a single gratuitous ARP packet to be sent for each active group. HSRP checks that the virtual IP address is entered correctly in the ARP cache prior to sending a gratuitous ARP packet. If the ARP entry is incorrect then HSRP will try to re-add it. This enables you to ensure that a host ARP cache is updated prior to starting heavy CPU-usage processes or configurations.

Static or alias ARP entries cannot be overwritten by HSRP.

You can use the **standby arp gratuitous** command in interface configuration mode to configure the number of gratuitous ARP packets sent by an active HSRP group, and how often they are sent.

Examples The following example shows how to configure HSRP to check that an ARP cache is refreshed prior to sending a gratuitous ARP packet:

```
Router# standby send arp ethernet0/0 1
```

Related Commands	Command	Description
	debug standby events	Displays events related to HSRP.
	show standby arp gratuitous	Displays the number of gratuitous ARP packets sent by HSRP and how often they are sent.
	standby arp gratuitous	Configures the number of gratuitous ARP packets sent by an active HSRP group, and how often they are sent.

standby sso

To enable the Hot Standby Router Protocol (HSRP) Stateful Switchover (SSO), use the **standby sso** command in global configuration mode. To disable HSRP SSO, use the **no** form of this command.

standby sso

no standby sso

Syntax Description

This command has no arguments or keywords.

Command Default

HSRP SSO is enabled when redundancy mode SSO is configured.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(25)S	This command was introduced.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

Use the **standby sso** command to enable HSRP SSO. This is the default when redundancy mode SSO is configured. When standby SSO is enabled, traffic sent using an HSRP virtual IP address continues through the HSRP group member using the current path while a Route Processor (RP) switchover occurs. The HSRP state is maintained and kept synchronized across the redundant RPs within the chassis.

If you want the traffic to switch to a redundant device (another chassis) even though the redundant RP is capable of taking over, then the feature can be disabled by using the **no** form of the command. If the command is disabled and if the primary HSRP router fails, the HSRP state is not maintained across RP switchover and traffic targeted to the HSRP virtual IP address is handled by the standby HSRP router.

Examples

The following example shows how to reenabling standby SSO for HSRP if it has been disabled:

```
standby sso
```

Related Commands

Command	Description
debug standby events	Displays standby events related to HSRP.
show standby	Displays HSRP information.

standby timers

To configure the time between hello packets and the time before other routers declare the active Hot Standby or standby router to be down, use the **standby timers** command in interface configuration mode. To restore the timers to their default values, use the **no** form of this command.

standby [*group-number*] **timers** [**msec**] *hellotime* [**msec**] *holdtime*

no standby [*group-number*] **timers** [**msec**] *hellotime* [**msec**] *holdtime*

Syntax Description

<i>group-number</i>	(Optional) Group number on the interface to which the timers apply. The default is 0.
msec	(Optional) Interval in milliseconds. Millisecond timers allow for faster failover.
<i>hellotime</i>	Hello interval (in seconds). This is an integer from 1 to 254. The default is 3 seconds. If the msec option is specified, hello interval is in milliseconds. This is an integer from 15 to 999.
<i>holdtime</i>	Time (in seconds) before the active or standby router is declared to be down. This is an integer from <i>x</i> to 255. The default is 10 seconds. If the msec option is specified, <i>holdtime</i> is in milliseconds. This is an integer from <i>y</i> to 3000. Where: <ul style="list-style-type: none"> <i>x</i> is the <i>hellotime</i> + 50 milliseconds, then rounded up to the nearest 1 second <i>y</i> is greater than or equal to 3 times the <i>hellotime</i> and is not less than 50 milliseconds.

Defaults

The default group number is 0.
The default hello interval is 3 seconds.
The default hold time is 10 seconds.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
10.0	This command was introduced.
11.2	The msec keyword was added.
12.2	The minimum values of <i>hellotime</i> and <i>holdtime</i> in milliseconds changed.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **standby timers** command configures the time between standby hello packets and the time before other routers declare the active or standby router to be down. Routers or access servers on which timer values are not configured can learn timer values from the active or standby router. The timers configured on the active router always override any other timer settings. All routers in a Hot Standby group should use the same timer values. Normally, holdtime is greater than or equal to 3 times the value of hellotime. The range of values for holdtime force the holdtime to be greater than the hellotime. If the timer values are specified in milliseconds, the holdtime is required to be at least three times the hellotime value and not less than 50 milliseconds.

Some HSRP state flapping can occasionally occur if the holdtime is set to less than 250 milliseconds, and the processor is busy. It is recommended that holdtime values less than 250 milliseconds be used on Cisco 7200 platforms or better, and on Fast-Ethernet or FDDI interfaces or better. Setting the **process-max-time** command to a suitable value may also help with flapping.

The value of the standby timer will not be learned through HSRP hellos if it is less than 1 second.

When group number 0 is used, no group number is written to NVRAM, providing backward compatibility.

When the **standby follow** command is used to configure an HSRP group to become an IP redundancy client of another HSRP group, the client group takes its state from the master group it is following. Therefore, the client group does not use its timer, priority, or preemption settings. A warning is displayed if these settings are configured on a client group:

```
Router(config-if)# standby 1 timers 5 15
% Warning: This setting has no effect while following another group.
```

Examples

The following example sets, for group number 1 on Ethernet interface 0, the time between hello packets to 5 seconds, and the time after which a router is considered to be down to 15 seconds:

```
interface ethernet 0
 standby 1 ip
 standby 1 timers 5 15
```

The following example sets, for the Hot Router interface located at 172.19.10.1 on Ethernet interface 0, the time between hello packets to 300 milliseconds, and the time after which a router is considered to be down to 900 milliseconds:

```
interface ethernet 0
 standby ip 172.19.10.1
 standby timers msec 300 msec 900
```

The following example sets, for the Hot Router interface located at 172.18.10.1 on Ethernet interface 0, the time between hello packets to 15 milliseconds, and the time after which a router is considered to be down to 50 milliseconds. Note that the holdtime is larger than three times the hellotime because the minimum holdtime value in milliseconds is 50.

```
interface ethernet 0
 standby ip 172.18.10.1
 standby timers msec 15 msec 50
```

standby track

To configure the Hot Standby Router Protocol (HSRP) to track an object and change the Hot Standby priority on the basis of the state of the object, use the **standby track** command in interface configuration mode. To remove the tracking, use the **no** form of this command.

Cisco IOS XE Release 2.1 and Later Releases

```
standby track {object-number | interface-type interface-number [decrement priority-decrement]}
[shutdown]
```

```
no standby track {object-number | interface-type interface-number}
```

Cisco IOS Release 12.2(33)SXH, 12.2(33)SRB and Later Releases

```
standby track {object-number | interface-type interface-number [decrement priority-decrement]}
[shutdown]
```

```
no standby track {object-number | interface-type interface-number}
```

Cisco IOS Release 12.4(9)T and Later Releases

```
standby track {object-number [priority-decrement] | interface-type interface-number [decrement
priority-decrement]} [shutdown]
```

```
no standby track {object-number | interface-type interface-number}
```

Cisco IOS Release 12.2(15)T and Later Releases

```
standby track {object-number [priority-decrement] | interface-type interface-number [decrement
priority-decrement]}
```

```
no standby track {object-number | interface-type interface-number}
```

Cisco IOS Releases 12.2(13)T, 12.2(14)SX, 12.2(17dSXB), 12.2(33)SRA, and Earlier Releases

```
standby track interface-type interface-number [interface-priority]
```

```
no standby track interface-type interface-number [interface-priority]
```

Syntax Description

<i>object-number</i>	Object number that represents the object to be tracked. The range is from 1 to 500. The default is 1.
<i>interface-type</i>	Interface type (combined with interface number) that will be tracked.
<i>interface-number</i>	Interface number (combined with interface type) that will be tracked.
decrement <i>priority-decrement</i>	(Optional) Amount by which the Hot Standby priority for the router is decremented (or incremented) when the tracked object goes down (or comes back up). The range is from 1 to 255. The default is 10.
shutdown	(Optional) Changes the HSRP group to the Init state on the basis of the state of a tracked object.

<i>interface-priority</i>	(Optional) Amount by which the Hot Standby priority for the router is decremented (or incremented) when the interface goes down (or comes back up). The range is from 0 to 255. The default is 10.
<i>group-number</i>	(Optional) Group number to which the tracking applies.

Command Default There is no tracking.

Command Modes Interface configuration (config-if)

Command History	Release	Modification
	10.3	This command was introduced.
	12.2(15)T	This command was enhanced to allow HSRP to track objects other than the interface line-protocol state.
	12.2(14)SX	Support for this command was introduced on the Cisco 7600 series routers running a Supervisor Engine 720.
	12.2(17d)SXB	This command was integrated into Cisco IOS release 12.2(17d)SXB.
	12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.4(9)T	The shutdown keyword was added.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines This command ties the Hot Standby priority of the router to the availability of its tracked objects. Use the **track interface** command or **track ip route** command to track an interface object or an IP-route object. The HSRP client can register its interest in the tracking process by using the **standby track** command and take action when the object changes.

When a tracked object goes down, the Hot Standby priority decreases by 10. If an object is not tracked, its state changes do not affect the Hot Standby priority. For each object configured for Hot Standby, you can configure a separate list of objects to be tracked.

The optional *priority-decrement* and *interface-priority* arguments specify how much to decrement the Hot Standby priority when a tracked object goes down. When the tracked object comes back up, the priority is incremented by the same amount.

When multiple tracked objects are down, the decrements are cumulative, whether configured with *priority-decrement* or *interface-priority* values or not.

The optional **shutdown** keyword configures the HSRP group to change to the Init state and become disabled rather than having its priority decremented when a tracked object goes down.

Use the **no standby group-number track** command to delete all tracking configuration for a group.

When group number 0 is used, no group number is written to NVRAM, providing backward compatibility.

The **standby track** command syntax prior to Cisco IOS Release 12.2(15)T is still supported. Using the older form of the command syntax will cause a tracked object to be created in the new tracking process. This tracking information can be displayed using the **show track** command.

**Note**

Using the command syntax of **standby track** prior to Cisco IOS Release 12.2(15)T results in the same performance as using the new **standby track** command syntax.

If you configure HSRP to track an interface, and that interface is physically removed as in the case of an Online Insertion and Removal (OIR) operation, then HSRP regards the interface as always down. You cannot remove the HSRP interface-tracking configuration. To prevent this situation, use the **no standby track** command before you physically remove the interface.

If an object is already being tracked by an HSRP group, you cannot change the configuration to use the HSRP Group Shutdown feature that disables the HSRP group. You must first remove the tracking configuration using the **no standby track** command and then reconfigure it using the **standby track** command with the **shutdown** keyword.

Examples

In the following example, the tracking process is configured to track the IP-routing capability of serial interface 1/0. HSRP on Ethernet interface 0/0 then registers with the tracking process to be informed of any changes to the IP-routing state of serial interface 1/0. If the IP state on serial interface 1/0 goes down, the priority of the HSRP group is reduced by 10.

If both serial interfaces are operational, Router A will be the HSRP active router because it has the higher priority. However, if IP routing on serial interface 1/0 in Router A fails, the HSRP group priority will be reduced and Router B will take over as the active router, thus maintaining a default virtual gateway service to hosts on the 10.1.0.0 subnet.

Router A Configuration

```
track 100 interface serial1/0 ip routing
!
interface Ethernet0/0
 ip address 10.1.0.21 255.255.0.0
 standby 1 ip 10.1.0.1
 standby 1 preempt
 standby 1 priority 105
 standby 1 track 100 decrement 10
```

Router B Configuration

```
track 100 interface serial1/0 ip routing
!
interface Ethernet0/0
 ip address 10.1.0.22 255.255.0.0
 standby 1 ip 10.1.0.1
 standby 1 preempt
 standby 1 priority 11
 standby 1 track 100 decrement 10
```

The following example shows how to change the configuration of a tracked object to include the HSRP Group Shutdown feature:

```
no standby 1 track 101 decrement 10
standby 1 track 101 shutdown
```

Related Commands	Command	Description
	show standby	Displays HSRP information.
	show track	Displays information about objects that are tracked by the tracking process.
	standby preempt	Configures HSRP preemption and preemption delay.
	standby priority	Configures Hot Standby priority of potential standby routers.
	track interface	Configures an interface to be tracked and enters tracking configuration mode.
	track ip route	Tracks the state of an IP route and enters tracking configuration mode.

standby use-bia

To configure the Hot Standby Router Protocol (HSRP) to use the burned-in address of the interface as its virtual MAC address, instead of the preassigned MAC address (on Ethernet and FDDI) or the functional address (on Token Ring), use the **standby use-bia** command in interface configuration mode. To restore the default virtual MAC address, use the **no** form of this command.

standby use-bia [**scope interface**]

no standby use-bia

Syntax Description

scope interface (Optional) Specifies that this command is configured just for the subinterface on which it was entered, instead of the major interface.

Command Default

HSRP uses the preassigned MAC address on Ethernet and FDDI, or the functional address on Token Ring.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
11.2	This command was introduced.
12.1	The behavior was modified to allow multiple standby groups to be configured for an interface configured with this command.
12.2(14)SX	Support for this command was added for the Cisco 7600 series routers loaded with a Supervisor Engine 720.
12.2(17d)SXB	Support for this command was extended into Cisco IOS Release 12.2(17d)SXB on the Cisco 7600 series routers loaded with a Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.

Usage Guidelines



Note

This command is not supported on Cisco 7600 series routers that are configured with a Policy Feature Card, version 2 (PFC2). The PFC2 supports a maximum of 16 unique HSRP-group numbers. You can use the same HSRP-group numbers in different VLANs. If you configure more than 16 HSRP groups, this restriction prevents use of the VLAN number as the HSRP-group number.

For an interface with this command configured, multiple standby groups can be configured. Hosts on the interface must have a default gateway configured. We recommend that you set the **no ip proxy-arp** command on the interface. It is desirable to configure the **standby use-bia** command on a Token Ring interface if there are devices that reject ARP replies with source hardware addresses set to a functional address.

When HSRP runs on a multiple-ring, source-routed bridging environment and the HSRP routers reside on different rings, configuring the **standby use-bia** command can prevent confusion about the routing information field.

Without the **scope interface** keywords, the **standby use-bia** command applies to all subinterfaces on the major interface. The **standby use-bia** command may not be configured both with and without the **scope interface** keywords at the same time.

**Note**

Identically numbered HSRP groups use the same virtual MAC address, which might cause errors if you configure bridge groups.

Examples

In the following example, the burned-in address of Token Ring interface 4/0 will be the virtual MAC address mapped to the virtual IP address:

```
Router(config)# interface token4/0  
Router(config-if)# standby use-bia
```

standby version

To change the version of the Hot Standby Router Protocol (HSRP), use the **standby version** command in interface configuration mode. To change to the default version, use the **no** form of this command.

standby version {1 | 2}

no standby version

Syntax Description

1	Specifies HSRP version 1.
2	Specifies HSRP version 2.

Defaults

HSRP version 1 is the default HSRP version.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.4(4)T	Support for IPv6 was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

HSRP version 2 addresses limitations of HSRP version 1 by providing an expanded group number range of 0 to 4095.

HSRP version 2 does not interoperate with HSRP version 1. An interface cannot operate both version 1 and version 2 because both versions are mutually exclusive. However, the different versions can be run on different physical interfaces of the same router. The group number range is from 0 to 255 for HSRP version 1 and from 0 to 4095 for HSRP version 2. You cannot change from version 2 to version 1 if you have configured groups above 255. Use the **no standby version** command to set the HSRP version to the default version, version 1.

If an HSRP version is changed, each group will reinitialize because it now has a new virtual MAC address.

Examples

The following example shows how to configure HSRP version 2 on an interface with a group number of 500:

```
!
interface vlan500
 standby version 2
```

```
standby 500 ip 172.20.100.10
standby 500 priority 110
standby 500 preempt
standby 500 timers 5 15
```

Related Commands

Command	Description
show standby	Displays HSRP information.

start-forwarding-agent

To start the forwarding agent, use the **start-forwarding-agent** command in CASA-port configuration mode.

start-forwarding-agent *port-number* [*password* [*seconds*]]

Syntax Description

<i>port-number</i>	Port numbers on which the Forwarding Agent will listen for wildcards broadcast from the services manager. This must match the port number defined on the services manager.
<i>password</i>	(Optional) Text password used for generating the MD5 digest.
<i>seconds</i>	(Optional) Duration (in seconds) during which the Forwarding Agent will accept the new and old password. Valid range is from 0 to 3600 seconds. The default is 180 seconds.

Defaults

The default initial number of affinities is 5000.
The default maximum number of affinities is 30,000.

Command Modes

CASA-port configuration (config-casa)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The forwarding agent must be started before you can configure any port information for the forwarding agent.

Examples

The following example specifies that the forwarding agent will listen for wildcard and fixed affinities on port 1637:

```
start-forwarding-agent 1637
```

Related Commands

Command	Description
forwarding-agent	Specifies the port on which the forwarding agent will listen for wildcard and fixed affinities.

sticky (firewall farm datagram protocol)

To assign all connections from a client to the same firewall, use the **sticky** command in firewall farm datagram protocol configuration mode. To remove the client/server coupling, use the **no** form of this command.

```
sticky seconds[netmask netmask] [source | destination]
```

```
no sticky
```

Syntax Description		
<i>seconds</i>		Sticky timer duration in seconds. Valid values range from 0 to 65535.
netmask <i>netmask</i>		(Optional) Places the virtual server as part of a sticky subnet, for coupling of services.
source		(Optional) Bases sticky on source IP address.
destination		(Optional) Bases sticky on destination IP address.

Defaults Virtual servers are not associated with any groups.

Command Modes Firewall farm datagram protocol configuration (config-slb-fw-udp)

Command History	Release	Modification
	12.1(3a)E	This command was introduced.
	12.2(12c)E	The source and destination keywords were added.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples The following example specifies that if a client's subsequent request for a firewall farm is made within 60 seconds of the previous request, then the same firewall is used for the connection:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol datagram
Router(config-slb-fw-udp)# sticky 60
```

Related Commands	Command	Description
	protocol datagram	Enters firewall farm datagram protocol configuration mode.
	show ip slb firewallfarm	Displays information about the firewall farm configuration.
	show ip slb sticky	Displays information about the IOS SLB database.

sticky (firewall farm TCP protocol)

To assign all connections from a client to the same firewall, use the **sticky** command in firewall farm TCP protocol configuration mode. To remove the client/server coupling, use the **no** form of this command.

```
sticky seconds [netmask netmask] [source | destination]
```

```
no sticky
```

Syntax Description

<i>seconds</i>	Sticky timer duration in seconds. Valid values range from 0 to 65535.
netmask <i>netmask</i>	(Optional) Places the virtual server as part of a sticky subnet, for coupling of services.
source	(Optional) Bases sticky on source IP address.
destination	(Optional) Bases sticky on destination IP address.

Defaults

Virtual servers are not associated with any groups.

Command Modes

Firewall farm TCP protocol configuration (config-slb-fw-tcp)

Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(12c)E	The source and destination keywords were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

The following example specifies that if a client's subsequent request for a firewall farm is made within 60 seconds of the previous request, then the same firewall is used for the connection:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol tcp
Router(config-slb-fw-tcp)# sticky 60
```

Related Commands

Command	Description
protocol tcp	Enters firewall farm TCP protocol configuration mode.
show ip slb firewallfarm	Displays information about the firewall farm configuration.
show ip slb sticky	Displays information about the IOS SLB database.

sticky (virtual server)

To assign all connections from a client to the same real server, use the **sticky** command in SLB virtual server configuration mode. To remove the client/server coupling, use the **no** form of this command.

```
sticky { duration [group group-id] [netmask netmask] | gtp imsi [group group-id] | radius
calling-station-id | radius framed-ip [group group-id] | radius username [msid-cisco]
[group group-id] }
```

```
no sticky { duration [group group-id] [netmask netmask] | gtp imsi [group group-id] | radius
calling-station-id | radius framed-ip [group group-id] | radius username [msid-cisco]
[group group-id] }
```

Syntax Description	
<i>duration</i>	Sticky timer duration in seconds. Valid values range from 0 to 65535.
group <i>group-id</i>	(Optional) Places the virtual server in the specified sticky group, for coupling of services. All virtual servers that have the same sticky group ID share the sticky entry for a user. In essence, the group keyword and <i>group-id</i> argument tie multiple virtual servers together. Valid values range from 0 to 255.
netmask <i>netmask</i>	(Optional) Places the virtual server as part of the specified sticky subnet, for coupling of services. Client sessions whose source IP addresses fall within the <i>netmask</i> are directed to the same real server.
gtp imsi	Enables IOS SLB to load-balance general packet radio service (GPRS) Tunneling Protocol (GTP) Packet Data Protocol (PDP) context create requests to the same real server that processed all previous create requests for a given International Mobile Subscriber ID (IMSI).
radius calling-station-id	Enables IOS SLB to create the IOS SLB RADIUS calling-station-ID sticky database and direct RADIUS requests from a given calling station ID to the same service gateway.
radius framed-ip	Enables IOS Server Load Balancing (IOS SLB) to create the IOS SLB RADIUS framed-IP sticky database and direct RADIUS requests and non-RADIUS flows from a given end user to the same service gateway.
radius username	Enables IOS SLB to create the IOS SLB RADIUS username sticky database and direct RADIUS requests from a given end user to the same service gateway.
msid-cisco	(Optional) Enables IOS SLB to support Cisco PDSNs that provide MSID-based access (also known as MSID-based access, Cisco variant).

Defaults

Sticky connections are not tracked.
Virtual servers are not associated with any groups.

Command Modes

SLB virtual server configuration (config-slb-vserver)

Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(2)E	The netmask keyword and <i>netmask</i> argument were added.
12.1(11b)E	The radius framed-ip keywords were added.
12.1(12c)E	The radius username and msid-cisco keywords were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(14)ZA5	The radius calling-station-id keywords were added.
12.2(18)SXE	The gtp imsi keywords were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The last real server that was used for a connection from a client is stored for the set *duration* seconds. If a new connection from the client to the virtual server is initiated during that time, the same real server that was used for the previous connection is chosen for the new connection. If two virtual servers are placed in the same group, coincident connection requests for those services from the same IP address are handled by the same real server.

In Virtual Private Network (VPN) server load balancing, remember the following requirements:

- For IPsec flows, you must specify a sticky connection between the User Datagram Protocol (UDP) virtual server and the Encapsulation Security Payload (ESP) virtual server.
- For PPTP flows, you must specify a sticky connection between the TCP virtual server and the Generic Routing Encapsulation (GRE) virtual server.
- You must specify a *duration* of at least 15 seconds.

In general packet radio service (GPRS) load balancing and the Home Agent Director, the **sticky** command is not supported.

In RADIUS load balancing, remember the following requirements:

- If you configure the **sticky radius framed-ip** command, you must also configure the **virtual** command with the **service radius** keywords specified.
- If you configure the **sticky radius calling-station-id** command or the **sticky radius username** command, you must also configure the **virtual** command with the **service radius** keywords specified, and you must configure the **sticky radius framed-ip** command.
- You cannot configure both the **sticky radius calling-station-id** command and the **sticky radius username** command on the same virtual server.
- If you configure the **sticky radius calling-station-id** command, you must configure all RADIUS maps to match against the RADIUS calling station ID attribute.
- If you configure the **sticky radius username** command, you must configure all RADIUS maps to match against the RADIUS username attribute.

For GTP load balancing:

- IOS SLB creates a sticky database object when it processes the first GTP PDP create request for a given IMSI. IOS SLB removes the sticky object when it receives a notification to do so from the real server, or as a result of inactivity. When the last PDP belonging to an IMSI is deleted on the GGSN, it sends a notification to IOS SLB to remove the sticky object.
- If you configure the **sticky gtp imsi** command, you must also configure the **virtual** command with the **service gtp** keywords specified.

Examples

The following example specifies that if a client's subsequent request for a virtual server is made within 60 seconds of the previous request, then the same real server is used for the connection. This example also places the virtual server in group 10.

```
Router(config)# ip slb vserver VS1
Router(config-slb-vserver)# sticky 60 group 10
```

Related Commands

Command	Description
show ip slb sticky	Displays information about the IOS SLB database.
show ip slb vservers	Displays information about the virtual servers defined to IOS SLB.
virtual	Configures the virtual server attributes.

synguard (virtual server)

To limit the rate of TCP SYNchronize sequence numbers (SYNs) handled by a virtual server to prevent a SYN flood denial-of-service attack, use the **synguard** command in SLB virtual server configuration mode. To remove the threshold, use the **no** form of this command.

```
synguard syn-count [interval]
```

```
no synguard
```

Syntax Description

<i>syn-count</i>	Number of unacknowledged SYNs that are allowed to be outstanding to a virtual server. Valid values range from 0 (off) to 4294967295. The default is 0.
<i>interval</i>	(Optional) Interval, in milliseconds, for SYN threshold monitoring. Valid values range from 50 to 5000. The default is 100 milliseconds (ms).

Defaults

The default number of unacknowledged SYNs that are allowed to be outstanding to a virtual server is 0 (off).
The default interval is 100 ms.

Command Modes

SLB virtual server configuration (config-slb-vserver)

Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

In general packet radio service (GPRS) load balancing and the Home Agent Director, the **synguard** command has no meaning and is not supported.

Examples

The following example sets the threshold of unacknowledged SYNs to 50:

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# synguard 50
```

Related Commands

Command	Description
show ip slb vservers	Displays information about the virtual servers defined to IOS SLB.
virtual	Configures the virtual server attributes.

threshold metric

To set a threshold metric other than the default value, use the **threshold metric** command in tracking configuration mode. To disable the threshold metric, use the **no** form of this command.

threshold metric { *up number* [*down number*] | *down number* [*up number*]}

no threshold metric

Syntax Description

up	Specifies the up threshold. The state is up if the scaled metric for that route is less than or equal to the up threshold. The default up threshold is 254.
down	Specifies the down threshold. The state is down if the scaled metric for that route is greater than or equal to the down threshold. The default down threshold is 255.
<i>number</i>	Threshold value. The range is from 0 to 255.

Command Default

No threshold is configured.

Command Modes

Tracking configuration (config-track)

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

This command is available only to IP-route threshold metric objects tracked by the **track ip route metric threshold** global configuration command.

The default up and down threshold values are 254 and 255, respectively. With these values, IP-route threshold tracking gives the same result as IP-route reachability tracking.

Examples

In the following example, the tracking process is tracking the IP-route threshold metric. The metric default value is changed to 16 for the up threshold and to 20 for the down threshold.

```
track 1 ip route 10.22.0.0/16 metric threshold
  threshold metric up 16 down 20
  delay down 20
```

Related Commands

Command	Description
track ip route	Tracks the state of IP routing and enters tracking configuration mode.

threshold percentage

To set a threshold percentage for a tracked object in a list of objects, use the **threshold percentage** command in tracking configuration mode. To disable the threshold percentage, use the **no** form of this command.

threshold percentage { **up** *number* [**down** *number*] | **down** *number* [**up** *number*]}

no threshold percentage

Syntax Description

up	Specifies the up threshold.
down	Specifies the down threshold.
<i>number</i>	Threshold value. The range is from 0 to 100.

Command Default

No threshold percentage is configured.

Command Modes

Tracking configuration (config-track)

Command History

Release	Modification
12.3(8)T	This command was introduced
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

When you configure a tracked list using the **track** *object-number* **list** command, there are two keywords available: **boolean** and **threshold**. If you specify the **threshold** keyword, you can specify either the **percentage** or **weight** keywords. If you specify the **percentage** keyword, then the **weight** keyword is unavailable. If you specify the **weight** keyword, then the **percentage** keyword is unavailable.

You should configure the up percentage first. The valid range is from 1 to 100. The down percentage depends on what you have configured for up. For example, if you configure 50 percent for up, you will see a range from 0 to 49 percent for down.

Examples

In the following example, the tracked list 11 is configured to measure the threshold using an up percentage of 50 and a down percentage of 32:

```
track 11 list threshold percentage
  object 1
  object 2
  threshold percentage up 50 down 32
```

Related Commands

Command	Description
threshold weight	Sets a threshold weight for a tracked object in a list of objects.
track list	Specifies a list of objects to be tracked and the thresholds to be used for comparison.

threshold weight

To set a threshold weight for a tracked object in a list of objects, use the **threshold weight** command in tracking configuration mode. To disable the threshold weight, use the **no** form of this command.

threshold weight { **up** *number* [**down** *number*] | **down** *number* [**up** *number*]}

no threshold weight [{**up** *number* [**down** *number*] | **down** *number* [**up** *number*]}]

Syntax Description

up	Specifies the up threshold.
down	Specifies the down threshold.
<i>number</i>	Threshold value. The range is from 1 to 255.

Command Default

No threshold weight is configured.

Command Modes

Tracking configuration (config-track)

Command History

Release	Modification
12.3(8)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

When you configure a tracked list of objects using the **track** *object-number* **list** command, there are two keywords available: **boolean** and **threshold**. If you specify the **threshold** keyword, you can specify either the **percentage** or **weight** keywords. If you specify the **weight** keyword, then the **percentage** keyword is unavailable. If you specify the **percentage** keyword, then the **weight** keyword is unavailable.

You should configure the up weight first. The valid range is from 1 to 255. The available down weight depends on what you have configured for the up weight. For example, if you configure 25 for up, you will see a range from 0 to 24 for down.

Examples

In the following example, the tracked list 12 is configured to measure a threshold using a specified weight:

```
track 12 list threshold weight
  object 1
  object 2
  threshold weight up 35 down 22
```

Related Commands

Command	Description
threshold percentage	Sets a threshold percentage for a tracked object in a list of objects.
track list	Specifies a list of objects to be tracked and the thresholds to be used for comparison.

timeout (custom UDP probe)

To set a timeout for custom User Datagram Protocol (UDP) probes, use the **timeout** command in custom UDP probe configuration mode. To restore the default timeout, use the **no** form of this command.

timeout *seconds*

no timeout

Syntax Description	<i>seconds</i>	Time, in seconds, that IOS SLB waits for a response packet from the server after sending a custom UDP probe request packet. Valid range is 1 to 255. The default value is 30 seconds.
---------------------------	----------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Defaults The default custom UDP probe timeout is 30 seconds.

Command Modes Custom UDP probe configuration

Command History	Release	Modification
	12.2(33)SRB	This command was introduced.

Examples In the following example the custom UDP probe timeout is set to 20 seconds:

```
Router(config)# ip slb probe PROBE6 custom udp
Router(config-slb-probe)# timeout 20
```

Related Commands	Command	Description
	ip slb probe custom udp	Configures a custom User Datagram Protocol (UDP) probe name and enters custom UDP probe configuration mode.
	show ip slb probe	Displays information about an IOS Server Load Balancing (IOS SLB) probe.

track

To configure an interface to be tracked where the Gateway Load Balancing Protocol (GLBP) weighting changes based on the state of the interface, use the **track** command in global configuration mode. To remove the tracking, use the **no** form of this command.

```
track object-number interface type number {line-protocol | ip routing}
```

```
no track object-number interface type number {line-protocol | ip routing}
```

Syntax Description

<i>object-number</i>	Object number in the range from 1 to 500 representing the interface to be tracked.
interface <i>type number</i>	Interface type and number to be tracked.
line-protocol	Tracks whether the interface is up.
ip routing	Tracks whether IP routing is enabled, an IP address is configured on the interface, and the interface state is up, before reporting to GLBP that the interface is up.

Command Default

The state of the interfaces is not tracked.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(14)S	This command was introduced.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use the **track** command in conjunction with the **glbp weighting** and **glbp weighting track** commands to configure parameters for an interface to be tracked. If a tracked interface on a GLBP router goes down, the weighting for that router is reduced. If the weighting falls below a specified minimum, the router will lose its ability to act as an active GLBP virtual forwarder.

Examples

In the following example, Fast Ethernet interface 0/0 tracks whether serial interfaces 2/0 and 3/0 are up. If either serial interface goes down, the GLBP weighting is reduced by the default value of 10. If both serial interfaces go down, the GLBP weighting will fall below the lower threshold and the router will no longer be an active forwarder. To resume its role as an active forwarder, the router must have both tracked interfaces back up, and the weighting must rise above the upper threshold.

```

track 1 interface serial 2/0 line-protocol
track 2 interface serial 3/0 line-protocol
interface FastEthernet 0/0
ip address 10.21.8.32 255.255.255.0
glbp 10 weighting 110 lower 95 upper 105
glbp 10 weighting track 1
glbp 10 weighting track 2

```

In the following example, Fast Ethernet interface 0/0 tracks whether serial interface 2/0 is enabled for IP routing, whether it is configured with an IP address, and whether the state of the interface is up. If serial interface 2/0 goes down, the GLBP weighting is reduced by a value of 20.

```

track 2 interface serial 2/0 ip routing
interface FastEthernet 0/0
ip address 10.21.8.32 255.255.255.0
glbp 10 weighting 110 lower 95 upper 105
glbp 10 weighting track 2 decrement 20

```

Related Commands

Command	Description
glbp weighting	Specifies the initial weighting value of a GLBP gateway.
glbp weighting track	Specifies an object to be tracked that affects the weighting of a GLBP gateway.

track application

To track the presence of Home Agent (HA), Gateway GPRS Support Node (GGSN), or Packet Data Serving Node (PDSN), traffic on a router and to enter tracking configuration mode, use the **track application** command in global configuration mode. To disable tracking of HA, General Packet Radio Service (GPRS), or GGSN traffic, use the no form of this command.

```
track object-number application {home-agent | ggsn | pdsn}
```

```
no track object-number application {home-agent | ggsn | pdsn}
```

Syntax Description		
<i>object-number</i>	Number of the object to be tracked. The range is from 1 to 500.	
home-agent	Tracks Home Agent traffic on a router.	
ggsn	Tracks GGSN traffic on a router.	
pdsn	Tracks PDSN traffic on a router.	

Command Default Home Agent, GGSN, and PDSN traffic is not tracked.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.4(11)T	This command was introduced.

Usage Guidelines Use this command to monitor the presence of Home Agent, PDSN, and GGSN traffic on a router for mobile wireless applications.

When a redundant pair of Home Agents running HSRP between them loses connectivity, both HSRP nodes become active. Once the connectivity is restored between the two nodes, a graceful way is needed to restore proper HSRP states without losing Home Agent bindings. During the time of no connectivity, one of the nodes will continue to process Home Agent, GGSN, or PDSN traffic while the other will not. The node that continues to process traffic needs to remain active once connectivity is restored. To ensure that the active node remains in the active state, the priority of the HSRP group member that does not process Home Agent traffic is reduced. Reducing the priority of the node that is not processing Home Agent traffic ensures that this node will become the standby after connectivity is restored. When connectivity is restored, the normal Home Agent state synchronization will get all bindings back into the inactive node and, depending on the preempt configuration, it may switch over again. This state synchronization ensures that no Mobile IP, GGSN or PDSN bindings are lost.



Note The **home-agent**, **ggsn**, or **pdsn** keywords do not appear in the CLI if the corresponding application is not present in the Cisco IOS image.

■ track application

Examples

The following example shows how to configure a router to track home agent traffic:

```
Router(config)# track 4 application home-agent
```

Related Commands

Command	Description
ip mobile home-agent	Enables home agent service.
router mobile	Enables Mobile IP on the router.
service cdma pdsn	Enables PDSN service.
service gprs ggsn	Specifies that the router or Cisco IOS instance functions as a GGSN.

track interface

To configure an interface to be tracked and to enter tracking configuration mode, use the **track interface** command in global configuration mode. To remove the tracking, use the **no** form of this command.

track *object-number* **interface** *type number* {**line-protocol** | **ip routing**}

no track *object-number* **interface** *type number* {**line-protocol** | **ip routing**}

Syntax Description		
	<i>object-number</i>	Object number that represents the interface to be tracked. The range is from 1 to 500.
	<i>type number</i>	Interface type and number to be tracked. No space is required between the values.
	line-protocol	Tracks the state of the interface line protocol.
	ip routing	Tracks whether IP routing is enabled, whether an IP address is configured on the interface, and whether the interface state is up before reporting to the tracking client that the interface is up.

Command Default No interface is tracked.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.2(15)T	This command was introduced.
	12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
	12.3(11)T	The track interface ip routing command was enhanced to allow the tracking of an IP address on an interface that was acquired through DHCP or PPP IPCP.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(18)SXF	This command was introduced on the Supervisor Engine 720.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines This command reports a state value to clients. A tracked IP-routing object is considered up when the following criteria exist:

- IP routing is enabled and active on the interface.
- The interface line-protocol state is up.
- The interface IP address is known. The IP address is configured or received through the Dynamic Host Configuration Protocol (DHCP) or IP Control Protocol (IPCP) negotiation.

Interface IP routing will go down when one of the following criteria exist:

- IP routing is disabled globally.
- The interface line-protocol state is down.
- The interface IP address is unknown. The IP address is not configured or received through DHCP or IPCP negotiation.

No space is required between the *type number* values.

Tracking the IP-routing state of an interface using the **track interface ip routing** command can be more useful in some situations than just tracking the line-protocol state using the **track interface line-protocol** command, especially on interfaces for which IP addresses are negotiated. For example, on a serial interface that uses the Point-to-Point Protocol (PPP), the line protocol could be up (link control protocol [LCP] negotiated successfully), but IP could be down (IPCP negotiation failed).

The **track interface ip routing** command supports the tracking of an interface with an IP address acquired through any of the following methods:

- Conventional IP address configuration
- PPP/IPCP
- DHCP
- Unnumbered interface

Examples

In the following example, the tracking process is configured to track the IP-routing capability of serial interface 1/0:

```
track 1 interface serial1/0 ip routing
```

Related Commands

Command	Description
show track	Displays HSRP tracking information.

track ip route

To track the state of an IP route and to enter tracking configuration mode, use the **track ip route** command in global configuration mode. To remove the tracking, use the **no** form of this command.

```
track object-number ip route ip-address/prefix-length { reachability | metric threshold }
```

```
no track object-number ip route ip-address/prefix-length { reachability | metric threshold }
```

Syntax Description		
<i>object-number</i>		Object number that represents the object to be tracked. The range is from 1 to 500.
<i>ip-address</i>		IP subnet address to the route that is being tracked.
<i>prefix-length</i>		The number of bits that comprise the address prefix. A slash must precede the value.
reachability		Tracks whether the route is reachable.
metric threshold		Tracks the threshold metric. The default up threshold is 254 and the default down threshold is 255.

Command Default The route to the subnet address is not tracked.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.2(15)T	This command was introduced.
	12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines A tracked IP-route object is considered up and reachable when a routing-table entry exists for the route and the route is not inaccessible.

To provide a common interface to tracking clients, route metric values are normalized to the range of 0 to 255, where 0 is connected and 255 is inaccessible. The resulting value is compared against threshold values to determine the tracking state as follows:

- State is up if the scaled metric for that route is less than or equal to the up threshold.
- State is down if the scaled metric for that route is greater than or equal to the down threshold.

The tracking process uses a per-protocol configurable resolution value to convert the real metric to the scaled metric. The metric value communicated to clients is always such that a lower metric value is better than a higher metric value.

Use the **threshold metric** tracking configuration command to specify a threshold metric other than the default threshold metric.

Examples

In the following example, the tracking process is configured to track the reachability of 10.22.0.0/16:

```
track 1 ip route 10.22.0.0/16 reachability
```

In the following example, the tracking process is configured to track the threshold metric using the default threshold metric values:

```
track 1 ip route 10.22.0.0/16 metric threshold
```

Related Commands

Command	Description
show track	Displays HSRP tracking information.
threshold metric	Sets a threshold metric other than the default value.

track ip sla

To track the state of a Cisco IOS IP Service Level Agreements (SLAs) operation and to enter tracking configuration mode, use the **track ip sla** command in global configuration mode. To remove the tracking, use the **no** form of this command.

track *object-number* **ip sla** *operation-number* {**state** | **reachability**}

no track *object-number* **ip sla** *operation-number* {**state** | **reachability**}

Syntax Description

<i>object-number</i>	Object number representing the object to be tracked. The range is from 1 to 500.
<i>operation-number</i>	Number used for the identification of the IP SLAs operation you are tracking.
state	Tracks the operation return code.
reachability	Tracks whether the route is reachable.

Defaults

IP SLAs tracking is disabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.4(20)T	This command was introduced. This command replaces the track rtr command.
12.2(33)SX11	This command was integrated into Cisco IOS Release 12.2(33)SX11. This command replaces the track rtr command.
Cisco IOS XE Release 2.4	This command was integrated into Cisco IOS XE Release 2.4. This command replaces the track rtr command.
12.2(33)SRE	This command was integrated into Cisco IOS XE 12.2(33)SRE. This command replaces the track rtr command.

Usage Guidelines

Every IP SLAs operation maintains an operation return-code value. This return code is interpreted by the tracking process. The return code may return OK, OverThreshold, and several other return codes. Different operations may have different return-code values, so only values common to all operation types are used.

Two aspects of an IP SLAs operation can be tracked: state and reachability. The difference between these aspects relates to the acceptance of the OverThreshold return code. [Table 100](#) shows the state and reachability aspects of IP SLAs operations that can be tracked.

Table 100 Comparison of State and Reachability Operations

Tracking	Return Code	Track State
State	OK	Up
	(all other return codes)	Down
Reachability	OK or over threshold	Up
	(all other return codes)	Down

Examples

The following example shows how to configure the tracking process to track the state of IP SLAs operation 2:

```
track 1 ip sla 2 state
```

The following example shows how to configure the tracking process to track the reachability of IP SLAs operation 3:

```
track 2 ip sla 3 reachability
```

track list

To specify a list of objects to be tracked and the thresholds to be used for comparison, use the **track list** command in global configuration mode. To disable the tracked list, use the **no** form of this command.

track *object-number* **list** **boolean** {**and** | **or**} | **threshold** {**weight** | **percentage**}

no track *object-number* **list** **boolean** {**and** | **or**} | **threshold** {**weight** | **percentage**}

Syntax Description	
<i>object-number</i>	Object number of the object to be tracked. Range is from 1 to 500.
boolean	State of the tracked list is based on a boolean calculation. The keywords are as follows: <ul style="list-style-type: none"> and—Specifies that the list is “up” if <i>all</i> objects are up, or “down” if <i>one or more</i> objects are down. For example when tracking two interfaces, “up” means that <i>both</i> interfaces are up, and “down” means that <i>either</i> interface is down. or—Specifies that the list is “up” if <i>at least</i> one objects is up. For example, when tracking two interfaces, “up” means that <i>either</i> interface is up, and “down” means that <i>both</i> interfaces are down.
threshold	State of the tracked list is based on a threshold. The keywords are as follows: <ul style="list-style-type: none"> percentage—Specifies that the threshold is based on a percentage. weight—Specifies that the threshold is based on a weight.

Command Default The list is not tracked.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.3(8)T	This command was introduced.
	12.2(30)S	This command was integrated into Cisco IOS Release 12.2(30)S.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command was implemented on the Cisco 7304 router.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Examples A track list object may be configured to track two serial interfaces when both serial interfaces are “up” and when either serial interface is “down,” for example:

```
track 1 interface serial2/0 line-protocol
track 2 interface serial2/1 line-protocol
```

```
track 100 list boolean and  
  object 1  
  object 2
```

A track list object may be configured to track two serial interfaces when either serial interface is “up” and when both serial interfaces are “down,” for example:

```
track 1 interface serial2/0 line-protocol
track 2 interface serial2/1 line-protocol
track 101 list boolean or
  object 1
  object 2
```

A track list object may be configured to track two serial interfaces when both serial interfaces are “up” and when both serial interface is “down,” for example:

```
track 1 interface serial2/0 line-protocol
track 2 interface serial2/1 line-protocol
track 102 threshold weight
  object 1 weight 10
  object 2 weight 10
  threshold weight up 20 down 0
```

The configuration shown above provides some hysteresis in case one of the serial interfaces is flapping.

Related Commands

Command	Description
show track	Displays tracking information.
threshold weight	Specifies a threshold weight for a tracked list.
track list threshold percentage	Tracks a list of objects as to the up and down object states using a threshold percentage.
track list threshold weight	Tracks a list of objects as to the up and down object states using a threshold weight.
track object	Tracks an object for a tracked list as to the up and down object states.

track resolution

To specify resolution parameters for a tracked object, use the **track resolution** command in global configuration mode. To disable this functionality, use the **no** form of this command.

```
track resolution ip route { eigrp resolution-value | isis resolution-value | ospf resolution-value |
static resolution-value }
```

```
no track resolution ip route { eigrp resolution-value | isis resolution-value | ospf resolution-value
| static resolution-value }
```

Syntax Description

ip route	IP route for metric resolution for a specified track. The keywords and arguments are as follows: <ul style="list-style-type: none"> • eigrp—EIGRP routing protocol. The <i>resolution-value</i> argument has a range from 256 to 40000000. • isis—ISIS routing protocol. The <i>resolution-value</i> argument has a range from 1 to 1000. • ospf—OSPF routing protocol. The <i>resolution-value</i> argument has a range from 1 to 1562. • static—Static route. The <i>resolution-value</i> argument has a range from 1 to 100000.
-----------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Command Default

The track **ip route metric resolution** default values are used.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.3(8)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

The **track ip route** command causes tracking of a route in the routing table. If a route exists in the table, the metric value is converted into a number in the range from 0 to 255. The metric resolution for the specified routing protocol is used to do the conversion. There are default values for the metric resolution but the track resolution command can be used to change the metric resolution default values.

Examples

In the following example, the EIGRP routing protocol has a resolution value of 280.

```
track resolution ip route eigrp 280
```

Related Commands

Command	Description
show track	Displays tracking information.
threshold percentage	Specifies a threshold percentage for a tracked list.
threshold weight	Specifies a threshold weight for a tracked list.
track list threshold percentage	Specifies a percentage threshold for a tracked list.
track list threshold weight	Specifies a weight threshold for a tracked list.
track object	Tracks an object for a tracked list as to the up and down object states.

track rtr



Note

Effective with Cisco IOS Release 12.4(20)T, 12.2(33)SX11, 12.2(33)SRE and Cisco IOS XE Release 2.4, the **track rtr** command is replaced by the **track ip sla** command. See the **track ip sla** command for more information.

To track the state of a Cisco IOS IP Service Level Agreements (SLAs) operation and to enter tracking configuration mode, use the **track rtr** command in global configuration mode. To remove the tracking, use the **no** form of this command.

```
track object-number rtr operation-number {state | reachability}
```

```
no track object-number rtr operation-number {state | reachability}
```

Syntax Description		
	<i>object-number</i>	Object number representing the object to be tracked. The range is from 1 to 500.
	<i>operation-number</i>	Number used for the identification of the IP SLAs operation you are tracking.
	state	Tracks the operation return code.
	reachability	Tracks whether the route is reachable.

Command Default IP SLAs tracking is disabled.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.3(4)T	This command was introduced.
	12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
	12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
	12.4(20)T	This command was replaced. This command was replaced by the track ip sla command.
	12.2(33)SX11	This command was replaced. This command was replaced by the track ip sla command.
	Cisco IOS XE Release 2.4	This command was replaced. This command was replaced by the track ip sla command.
	12.2(33)SRE	This command was replaced. This command was replaced by the track ip sla command.

Usage Guidelines

Every IP SLAs operation maintains an operation return-code value. This return code is interpreted by the tracking process. The return code may return OK, OverThreshold, and several other return codes. Different operations may have different return-code values, so only values common to all operation types are used.

Two aspects of an IP SLAs operation can be tracked: state and reachability. The difference between these aspects relates to the acceptance of the OverThreshold return code. [Table 100](#) shows the state and reachability aspects of IP SLAs operations that can be tracked.

Table 101 **Comparison of State and Reachability Operations**

Tracking	Return Code	Track State
State	OK	Up
	(all other return codes)	Down
Reachability	OK or over threshold	Up
	(all other return codes)	Down

Examples

The following example shows how to configure the tracking process to track the state of IP SLAs operation 2:

```
track 1 rtr 2 state
```

The following example shows how to configure the tracking process to track the reachability of IP SLAs operation 3:

```
track 2 rtr 3 reachability
```

track stub

To create a stub object that can be tracked by Embedded Event Manager (EEM) and to enter tracking configuration mode, use the **track stub** command in global configuration mode. To remove the stub object, use the **no** form of this command.

track *object-number* **stub**

no track *object-number* **stub**

Syntax Description

<i>object-number</i>	Object number that represents the object to be tracked. The range is from 1 to 500.
----------------------	-------------------------------------------------------------------------------------

Command Default

No stub objects are created.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.4(2)T	This command was introduced.
12.2(31)SB3	This command was integrated into Cisco IOS Release 12.2(31)SB3.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines

Use the **track stub** command to create a stub object, which is an object that can be tracked and manipulated by an external process, EEM. After the stub object is created, the **default-state** command can be used to set the default state of the stub object.

EEM is a distributed, scalable, and customized approach to event detection and recovery offered directly in a Cisco IOS device. EEM offers the ability to monitor events and take informational or corrective action when the monitored events occur or when a threshold is reached. An EEM policy is an entity that defines an event and the actions to be taken when that event occurs.

Examples

In the following example, stub object 1 is created and configured with a default state of up.

```
track 1 stub
  default-state up
```

Related Commands

Command	Description
default-state	Sets the default state for a stub object.
show track	Displays tracking information.

track timer

To specify the interval in which the tracking process polls the tracked object, use the **track timer** command in tracking configuration mode. To disable this functionality, use the **no** form of this command.

track timer {**interface** | **ip route**} *seconds*

no track timer {**interface** | **ip route**} *seconds*

Syntax Description

interface	Tracks the specified interface.
ip route	Tracks the specified IP route.
<i>seconds</i>	Interval (in seconds) in which the tracking process polls the object. The range is from 1 to 3000. The interface polling interval default is 1 second, and the IP-route polling interval default is 15 seconds.

Command Default

If you do not use the **track timer** command to specify a polling interval, a tracked object will be tracked at the default polling interval.

Command Modes

Tracking configuration (config-track)

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Examples

In the following example, the tracking process is configured to poll the tracked interface every 3 seconds:

```
track timer interface 3
```

url (WSP probe)

To specify the URL path that a Wireless Session Protocol (WSP) probe is to request from the server, use the **url** command in WSP probe configuration mode. To restore the default settings, use the **no** form of this command.

url *[path]*

no url *[path]*

Syntax Description	<i>path</i> (Optional) Path from the server. This argument is case-sensitive.
---------------------------	-------------------------------------------------------------------------------

Defaults	If no URL path is specified, the default is /.
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Command Modes	WSP probe configuration (config-slb-probe)
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Command History	Release	Modification
	12.1(5a)E	This command was introduced.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples	The following example configures a ping probe named PROBE3, enters WSP probe configuration mode, and configures the probe to request URL path http://localhost/test.txt:
-----------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------

```
Router(config)# ip slb probe PROBE3 wsp
Router(config-slb-probe)# url http://localhost/test.txt
```

Related Commands	Command	Description
	ip slb probe wsp	Configures a Wireless Session Protocol (WSP) probe name and enters WSP probe configuration mode.
	show ip slb probe	Displays information about an IOS Server Load Balancing (IOS SLB) probe.

username (IOS SLB)

To configure an ASCII regular expression string to be matched against the username attribute for RADIUS load balancing, use the **username (IOS SLB)** command in SLB RADIUS map configuration mode. To delete the username match string, use the **no** form of this command.

username *string*

no username *string*

Syntax Description

string

ASCII regular expression string to be matched against the username attribute in the RADIUS payload.

For information about regular expressions and how to use them in Cisco IOS software configurations, refer to the “Understanding Regular Expressions” section of the “Using the Cisco IOS Command-Line Interface” chapter of the *Cisco IOS Configuration Fundamentals Configuration Guide*:

http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_cli-basics.html

Defaults

None

Command Modes

SLB RADIUS map configuration (config-slb-radius-map)

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

For a given IOS SLB RADIUS map, you can configure a single **calling-station-id** command or a single **username (IOS SLB)** command, but not both.

Examples

The following example specifies that, for IOS SLB RADIUS map 1, string **...?525*** is to be matched against the username attribute in the RADIUS payload:

```
Router(config)# ip slb map 1 radius
Router(config-slb-radius-map)# username ...?525*
```

Related Commands

Command	Description
calling-station-id	Configures an ASCII regular expression string to be matched against the calling station ID attribute in the RADIUS payload.
ip slb map	Configures an IOS SLB protocol map and enters SLB map configuration mode.

Command	Description
show ip slb map	Displays information about IOS SLB protocol maps.

virtual

To configure virtual server attributes, use the **virtual** command in SLB virtual server configuration mode. To remove the attributes, use the **no** form of this command.

Encapsulation Security Payload (ESP) and Generic Routing Encapsulation (GRE) Protocols

```
virtual ip-address [netmask [group]] {esp | gre | protocol}
```

```
no virtual ip-address [netmask [group]] {esp | gre | protocol}
```

TCP and User Datagram Protocol (UDP)

```
virtual ip-address [netmask [group]] {tcp | udp} [port | any] [service service]
```

```
no virtual ip-address [netmask [group]] {tcp | udp} [port | any] [service service]
```

Syntax Description

<i>ip-address</i>	IP address for this virtual server instance, used by clients to connect to the server farm.
<i>netmask</i>	(Optional) IP network mask for transparent web cache load balancing. The default is 0.0.0.0 (all subnets).
group	(Optional) Allows the virtual subnet to be advertised. If you do not specify the group keyword, the virtual subnet cannot be advertised.
esp	Performs load balancing for only Encapsulation Security Payload (ESP) connections.
gre	Performs load balancing for only Generic Routing Encapsulation (GRE) connections.
<i>protocol</i>	Protocol for which load balancing is performed. The valid range is 2 to 127.
tcp	Performs load balancing for only TCP connections.
udp	Performs load balancing for only User Datagram Protocol (UDP) connections.

<i>port</i>	<p>(Optional) IOS Server Load Balancing (IOS SLB) virtual port (the TCP or UDP port number or port name). If specified, only the connections for the specified port on the server are load-balanced. The ports and the valid name or number for the <i>port</i> argument are as follows:</p> <ul style="list-style-type: none"> • All ports: any 0 • Access Service Network (ASN) R6: asn r6 2231 • Connectionless secure Wireless Session Protocol (WSP): wsp-wtls 9202 • Connectionless WSP: wsp 9200 • Connection-oriented secure WSP: wsp-wtp-wtls 9203 • Connection-oriented WSP: wsp-wtp 9201 • Domain Name System: dns 53 • File Transfer Protocol: ftp 21 • General packet radio service (GPRS) tunneling protocol (GTP): gtp 3386 • HTTP over Secure Socket Layer: https 443 • Internet Key Exchange (IKE): isakmp 500 • Mapping of airline traffic over IP, Type A: matip-a 350 • Network News Transport Protocol: nntp 119 • Post Office Protocol v2: pop2 109 • Post Office Protocol v3: pop3 110 • Simple Mail Transport Protocol: smtp 25 • Telnet: telnet 23 • X.25 over TCP (XOT): xot 1998 • World Wide Web (HTTP): www 80 <p>Specify a port number of 0 to configure an all-port virtual server (that is, a virtual server that accepts flows destined for all ports except GTP ports).</p>
any	(Optional) Performs load balancing on all ports.

service <i>service</i>	<p>(Optional) Couples connections associated with a given service, such as HTTP or Telnet, so all related connections from the same client use the same real server. The following are the valid types of connection coupling:</p> <ul style="list-style-type: none"> • asn r6—Enables ASN R6 load balancing. • ftp—Couples FTP data connections with the control session that created them. • gtp—Enables GPRS load balancing without general packet radio service (GPRS) tunneling protocol (GTP) cause code inspection enabled, which allows load-balancing decisions to be made using Layer 5 information. You can balance UDP flows without awareness of GTP by omitting the service gtp keywords. • gtp-inspect—Enables GPRS load balancing with GTP cause code inspection enabled. • ipmobile—Enables the Home Agent Director. • per-packet—Does not maintain connection objects for packets destined for this virtual server. • radius—Enables IOS SLB to build RADIUS session objects for RADIUS load balancing.
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Defaults

No default behavior or values.

Command Modes

SLB virtual server configuration (config-slb-vserver)

Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(5a)E	The wsp , wsp-wtp , wsp-wtls , and wsp-wtp-wtls keywords were added.
12.1(9)E	The gtp option was added as a new value on the <i>service</i> argument.
12.1(11b)E	The following keywords, arguments, and options were added: <ul style="list-style-type: none"> • The esp, gre, and all keywords • The <i>protocol</i> argument • The isakmp option on the <i>port</i> argument • The per-packet and radius options on the <i>service</i> argument The wsp , wsp-wtp , wsp-wtls , and wsp-wtp-wtls keywords were changed to options for the <i>port</i> argument.
12.1(12c)E	The group keyword was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Release	Modification
12.1(13)E3	The gtp-inspect option was added as a new value on the <i>service</i> argument.
12.2(14)ZA2	The ipmobile option was added as a new value on the <i>service</i> argument.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	The asn r6 option was added on the <i>service</i> argument.

Usage Guidelines

The **no virtual** command is allowed only if the virtual server was removed from service by the **no inservice** command.

For some applications, it is not feasible to configure all the virtual server TCP or UDP port numbers for IOS SLB. To support such applications, you can configure IOS SLB virtual servers to accept flows destined for all ports. To configure an all-port virtual server, specify a port number of 0 or any.



Note

In general, you should use port-bound virtual servers instead of all-port virtual servers. When you use all-port virtual servers, flows can be passed to servers for which no application port exists. When servers reject these flows, IOS SLB might fail the server and remove it from load balancing.

Specifying port 9201 for connection-oriented WSP mode also activates the Wireless Application Protocol (WAP) finite state machine (FSM), which monitors WSP and drives the session FSM accordingly.

In RADIUS load balancing, IOS SLB maintains session objects in a database to ensure that re-sent RADIUS requests are load-balanced to the same real server.

Examples

The following example specifies that the virtual server with the IP address 10.0.0.1 performs load balancing for TCP connections for the port named www. The virtual server processes HTTP requests.

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# virtual 10.0.0.1 tcp www
```

The following example specifies that the virtual server with the IP address 10.0.0.13 performs load balancing for UDP connections for all ports. The virtual server processes HTTP requests.

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# virtual 10.0.0.13 udp 0
```

Related Commands

Command	Description
ip slb vserver	Identifies a virtual server.
show ip slb vservers	Displays information about the virtual servers defined to IOS Server Load Balancing (IOS SLB).

vrrp authentication

To authenticate Virtual Router Redundancy Protocol (VRRP) packets received from other routers in the group, use the **vrrp authentication** command in interface configuration mode. To disable VRRP authentication, use the **no** form of this command.

```
vrrp group authentication {text-string | text text-string | md5 {key-chain key-chain | key-string
[0 | 7] key-string [timeout seconds]}}
```

```
no vrrp group authentication {text-string | text text-string | md5 {key-chain key-chain |
key-string [0 | 7] key-string [timeout seconds]}}
```

Syntax Description

<i>group</i>	Virtual router group number for which authentication is being configured. The group number is configured with the vrrp ip command. The valid range is 1 to 255.
<i>text-string</i>	Plain text authentication. There is no default value.
text <i>text-string</i>	Plain text authentication. The <i>text-string</i> argument is the authentication string and can be up to eight alphanumeric characters. There is no default value.
md5	<p>Message digest 5 (MD5) authentication. The arguments and keywords are as follows:</p> <ul style="list-style-type: none"> • key-chain—Authentication using a live key and key ID. The <i>key-chain</i> argument specifies a string and must match the assigned key-chain name using the key chain command. • key-string—Specifies the secret key for the MD5 authentication string. The arguments and keywords are as follows: <ul style="list-style-type: none"> – 0—(Optional) The key is unencrypted. – 7—(Optional) The key is encrypted. – <i>key-string</i>—Up to 64 characters. It is recommended that the string be at least 16 characters. No prefix to the <i>key-string</i> argument means that the key is unencrypted. – timeout <i>seconds</i> —(Optional) Duration in seconds that VRRP will accept message digests based on both the old and new keys. <p>Note The key-string authentication method is encrypted if the service password-encryption command has been specified.</p>

Command Default

VRRP authentication is disabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.0(18)ST	This command was introduced.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(14)T	The md5 , key-string , 0 , 7 , and key-chain keywords were added. The <i>text-string</i> , <i>key-string</i> , and <i>key-chain</i> arguments were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(31)SG	This command was integrated into Cisco IOS Release 12.2(31)SG.
12.2(17d)SXB	This command was integrated into Cisco IOS Release 12.2(17d)SXB.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

VRRP does not accept a virtual router group number 0 and never has an empty group. The valid range for the VRRP group is 1 to 255.

When a VRRP packet arrives from another router in the VRRP group, its authentication string is compared to the string configured on the local system. If the strings match, the message is accepted. If they do not match, the packet is discarded. The authentication string is sent unencrypted in all VRRP messages when using the **vrrp authentication text** *text-string* option.

All routers within the VRRP group must be configured with the same authentication string. If the same authentication string is not configured, the routers in the VRRP group will not communicate with each other and any misconfigured router in the group will change its state to master.

If password encryption is configured with the **service password-encryption** command, the software saves the *key-string* as encrypted text.

**Note**

Plain text authentication is not meant to be used for security. It simply provides a way to prevent a router that does not belong to a configured VRRP group from participating in it.

The **timeout** *seconds* keyword and argument specify the duration that the VRRP group will accept message digests based on both the old and new keys. This option allows time for configuration of all routers in a group with the new key. VRRP route flapping can be minimized by changing the keys on all the routers, provided that the master router is changed last. The master router should have its key string changed no later than one holdtime period, specified by the **vrrp timers advertise** interface configuration command, after the backup routers. This procedure ensures that the backup routers do not time out the master router.

Examples

The following example shows how to configure an authentication text string of x30dn78k:

```
vrrp 1 authentication x30dn78k
```

The following example shows how to configure an MD5 key string:

```
interface Ethernet0/1
description ed1-cat5a-7/10
vrrp 1 ip 10.21.0.10
vrrp 1 priority 110
```

```
vrrp 1 authentication md5 key-string f00c4s
```

The key ID for key-string authentication is always zero. If a key chain is configured with a key ID of zero, then the following configuration will work:

Router 1

```
key chain vrrp1
  key 0
  key-string 54321098452103ab
!
interface Ethernet0/1
  vrrp 1 ip 10.21.0.10
  vrrp 1 authentication md5 key-chain vrrp1
```

Router 2

```
interface Ethernet0/1
  vrrp 1 ip 10.21.0.10
  vrrp 1 authentication md5 key-string 54321098452103ab
```

Related Commands

Command	Description
key chain	Enables authentication for routing protocols.
service password-encryption	Encrypts passwords.
vrrp ip	Enables VRRP and identifies the IP address of the virtual router.
vrrp timers advertise	Configures the interval between successive advertisements by the master virtual router in a VRRP group.

vrrp description

To assign a description to the Virtual Router Redundancy Protocol (VRRP) group, use the **vrrp description** command in interface configuration mode. To remove the description, use the **no** form of this command.

vrrp group description text

no vrrp group description

Syntax Description

<i>group</i>	Virtual router group number. The group number range is from 1 to 255.
<i>text</i>	Text (up to 80 characters) that describes the purpose or use of the group.

Command Default

There is no description of the VRRP group.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.0(18)ST	This command was introduced.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Examples

The following example enables VRRP on Ethernet interface 0. VRRP group 1 is described as Building A — Marketing and Administration.

```
interface ethernet 0
 ip address 10.0.1.1 255.255.255.0
!
 vrrp 1 ip 10.0.1.20
 vrrp 1 description Building A - Marketing and Administration
```

Related Commands

Command	Description
vrrp ip	Enables VRRP and identifies the IP address of the virtual router.

vrrp ip

To enable the Virtual Router Redundancy Protocol (VRRP) on an interface and identify the IP address of the virtual router, use the **vrrp ip** command in interface configuration mode. To disable VRRP on the interface and remove the IP address of the virtual router, use the **no** form of this command.

```
vrrp group ip ip-address [secondary]
```

```
no vrrp group ip ip-address [secondary]
```

Syntax Description

<i>group</i>	Virtual router group number. The group number range is from 1 to 255.
<i>ip-address</i>	IP address of the virtual router.
secondary	(Optional) Indicates additional IP addresses supported by this group.

Command Default

VRRP is not configured on the interface.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.0(18)ST	This command was introduced.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(31)SG	This command was integrated into Cisco IOS Release 12.2(31)SG.
12.2(17d)SXB	This command was integrated into Cisco IOS Release 12.2(17d)SXB.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

The **vrrp ip** command activates VRRP on the configured interface. The first IP address specified in the VRRP configuration is used as the primary address for the virtual router. For VRRP to elect a designated router, at least one router on the cable must have been configured with the primary address of the virtual router. Configuration of the primary address on the master router always overrides a primary address that is currently in use.

VRRP does not support address learning. All addresses must be configured.

All routers in the VRRP group must be configured with the same primary address for the virtual router. If different primary addresses are configured, the routers in the VRRP group will not communicate with each other and any misconfigured routers in the group will change their state to master.

Configure this command once without the **secondary** keyword to indicate the virtual router IP address. If you want to indicate additional IP addresses supported by this group, then do so and include the **secondary** keyword.

**Note**

You can configure the primary IP address of a VRRP group with the same address as the interface. When VRRP is configured in this manner, the router that has the interface IP address is always the master router. Removing the VRRP configuration from a router configured in this way and leaving the IP address of the interface active is considered a misconfiguration because duplicate IP addresses on the LAN will result. If you have configured VRRP in this way and need to remove the VRRP configuration, you can change the interface address to a different value. Alternately, you can also remove all VRRP group members that are using the virtual address equal to the interface address on the router. To avoid a period of duplicate address warnings, deconfigure all VRRP routers in the group. This leaves the address owner router the last to be deconfigured, which avoids duplicate address warnings.

VRRP must be in the master state for proxy Address Resolution Protocol (ARP) to use the VRRP virtual MAC address.

Examples

The following example shows how to enable VRRP on Ethernet interface 0. The VRRP group is 1. IP address 10.0.1.20 is the address of the virtual router.

```
interface ethernet 0
 ip address 10.0.1.1 255.255.255.0
 ip address 10.0.2.1 255.255.255.0 secondary
!
 vrrp 1 ip 10.0.1.20
 vrrp 1 ip 10.0.2.20 secondary
```

Related Commands

Command	Description
show vrrp	Displays a summary or detailed status of one or all configured VRRP groups.

vrrp preempt

To configure the router to take over as master virtual router for a Virtual Router Redundancy Protocol (VRRP) group if it has higher priority than the current master virtual router, use the **vrrp preempt** command in interface configuration mode. To disable this function, use the **no** form of this command.

```
vrrp group preempt [delay minimum seconds]
```

```
no vrrp group preempt
```

Syntax Description

<i>group</i>	Virtual router group number of the group for which preemption is being configured. The group number is configured with the vrrp ip command. The group number range is from 1 to 255.
delay minimum <i>seconds</i>	(Optional) Number of seconds that the router will delay before issuing an advertisement claiming master ownership. The default delay is 0 seconds.

Defaults

This command is enabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.0(18)ST	This command was introduced.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(31)SG	This command was integrated into Cisco IOS Release 12.2(31)SG.
12.2(17d)SXB	This command was integrated into Cisco IOS Release 12.2(17d)SXB.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

By default, the router being configured with this command will take over as master virtual router for the group if it has a higher priority than the current master virtual router. You can configure a delay, which will cause the VRRP router to wait the specified number of seconds before issuing an advertisement claiming master ownership.



Note

The router that is the IP address owner will preempt, regardless of the setting of this command.

Examples

The following example configures the router to preempt the current master virtual router when its priority of 200 is higher than that of the current master virtual router. If the router preempts the current master virtual router, it waits 15 seconds before issuing an advertisement claiming it is the master virtual router.

```
vrrp 1 preempt delay minimum 15  
vrrp 1 priority 200
```

Related Commands

Command	Description
vrrp ip	Enables VRRP and identifies the IP address of the virtual router.
vrrp priority	Sets the priority level of the router within a VRRP group.

vrrp priority

To set the priority level of the router within a Virtual Router Redundancy Protocol (VRRP) group, use the **vrrp priority** command in interface configuration mode. To remove the priority level of the router, use the **no** form of this command.

vrrp *group* **priority** *level*

no vrrp *group* **priority** *level*

Syntax Description

<i>group</i>	Virtual router group number. The group number range is from 1 to 255.
<i>level</i>	Priority of the router within the VRRP group. The range is from 1 to 254. The default is 100.

Defaults

level: 100

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.0(18)ST	This command was introduced.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

Use this command to control which router becomes the master virtual router.

Examples

The following example configures the router with a priority of 254:

```
vrrp 1 priority 254
```

Related Commands	Command	Description
	vrrp ip	Enables VRRP and identifies the IP address of the virtual router.
	vrrp preempt	Configures the router to take over as master virtual router for a VRRP group if it has higher priority than the current master virtual router.

vrrp shutdown

To disable the Virtual Router Redundancy Protocol (VRRP) group on an interface, use the **vrrp shutdown** command in interface configuration mode.

vrrp group shutdown

Syntax Description	<i>group</i> Virtual router group number. The group number range is from 1 to 255.						
Defaults	Enabled						
Command Modes	Interface configuration (config-if)						
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>12.3(11)T</td> <td>This command was introduced.</td> </tr> <tr> <td>Cisco IOS XE Release 2.1</td> <td>This command was integrated into Cisco IOS XE Release 2.1.</td> </tr> </tbody> </table>	Release	Modification	12.3(11)T	This command was introduced.	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
Release	Modification						
12.3(11)T	This command was introduced.						
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.						
Usage Guidelines	When a VRRP group has been configured using the vrrp group ip command, the protocol is fully operational. The vrrp shutdown command is not displayed on the router, and to disable the protocol for one group, you must explicitly specify the group using the vrrp shutdown command.						
Examples	<p>The following example shows how to disable one VRRP group on Ethernet interface 0/1 (group 1) while retaining the VRRP group on Ethernet interface 0/2 (group 2).</p> <pre>interface ethernet0/1 ip address 10.0.1.1 255.255.255.0 vrrp 1 ip 10.0.1.254 vrrp 1 shutdown ! interface ethernet0/2 ip address 10.0.42.1 255.255.255.0 vrrp 2 ip 10.0.42.254</pre>						
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show vrrp</td> <td>Displays a summary or detailed status of one or all configured VRRP groups.</td> </tr> </tbody> </table>	Command	Description	show vrrp	Displays a summary or detailed status of one or all configured VRRP groups.		
Command	Description						
show vrrp	Displays a summary or detailed status of one or all configured VRRP groups.						

vrrp sso

To enable Virtual Router Redundancy Protocol (VRRP) support of Stateful Switchover (SSO) if it has been disabled, use the **vrrp sso** command in global configuration mode. To disable VRRP support of SSO, use the **no** form of this command.

vrrp sso

no vrrp sso

Syntax Description This command has no arguments or keywords.

Command Default VRRP support of SSO is enabled by default.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.2(33)SRC	This command was introduced.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
	12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines Use this command to enable VRRP support of SSO if it has been manually disabled by the **no vrrp sso** command.

Examples The following example shows how to disable VRRP support of SSO:

```
Router(config)# no vrrp sso
```

Related Commands	Command	Description
	debug vrrp all	Displays debugging messages for VRRP errors, events, and state transitions.
	debug vrrp ha	Displays debugging messages for VRRP high availability.
	show vrrp	Displays a brief or detailed status of one or all configured VRRP groups.

vrrp timers advertise

To configure the interval between successive advertisements by the master virtual router in a Virtual Router Redundancy Protocol (VRRP) group, use the **vrrp timers advertise** command in interface configuration mode. To restore the default value, use the **no** form of this command.

```
vrrp group timers advertise [msec] interval
```

```
no vrrp group timers advertise [msec] interval
```

Syntax Description

<i>group</i>	Virtual router group number. The group number range is from 1 to 255.
msec	(Optional) Changes the unit of the advertisement time from seconds to milliseconds. Without this keyword, the advertisement interval is in seconds.
<i>interval</i>	Time interval between successive advertisements by the master virtual router. The unit of the interval is in seconds, unless the msec keyword is specified. The default is 1 second. The valid range is 1 to 255 seconds. When the msec keyword is specified, the valid range is 50 to 999 milliseconds.

Defaults

interval: 1 second

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.0(18)ST	This command was introduced.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(31)SG	This command was integrated into Cisco IOS Release 12.2(31)SG.
12.2(17d)SXB	This command was integrated into Cisco IOS Release 12.2(17d)SXB.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

The advertisements being sent by the master virtual router communicate the state and priority of the current master virtual router.

The **vrrp timers advertise** command configures the time between successive advertisement packets and the time before other routers declare the master router to be down. Routers or access servers on which timer values are not configured can learn timer values from the master router. The timers configured on

the master router always override any other timer settings. All routers in a VRRP group must use the same timer values. If the same timer values are not set, the routers in the VRRP group will not communicate with each other and any misconfigured router will change its state to master.

Examples

The following example shows how to configure the master virtual router to send advertisements every 4 seconds:

```
vrrp 1 timers advertise 4
```

Related Commands

Command	Description
vrrp ip	Enables VRRP and identifies the IP address of the virtual router.
vrrp timers learn	Configures the router, when it is acting as backup virtual router for a VRRP group, to learn the advertisement interval used by the master virtual router.

vrrp timers learn

To configure the router, when it is acting as backup virtual router for a Virtual Router Redundancy Protocol (VRRP) group, to learn the advertisement interval used by the master virtual router, use the **vrrp timers learn** command in interface configuration mode. To prevent the local router from learning the advertisement interval of the master virtual router, use the **no** form of this command.

vrrp group timers learn

no vrrp group timers learn

Syntax Description

<i>group</i>	Virtual router group number to which the command applies. The group number range is from 1 to 255.
--------------	----------------------------------------------------------------------------------------------------

Defaults

Disabled; the local router calculates the downtime of the master virtual router based on the advertisement interval of the local router as configured by the **vrrp timers advertise** command.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.0(18)ST	This command was introduced.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(31)SG	This command was integrated into Cisco IOS Release 12.2(31)SG.
12.2(17d)SXB	This command was integrated into Cisco IOS Release 12.2(17d)SXB.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

If this command is configured, when the local router is acting as a backup virtual router for the group, it will learn the advertisement interval of the current master virtual router from its master advertisements. The local router will use that value to calculate how long it should wait before deciding that the master virtual router has gone down. This command synchronizes timers with the current master virtual router.

Examples

The following example configures the router, when it is acting as backup virtual router, to learn the advertisement interval from the advertisements of the current master virtual router:

```
vrrp 1 timers learn
```

Related Commands

Command	Description
vrrp ip	Enables VRRP and identifies the IP address of the virtual router.
vrrp timers advertise	Configures the interval between successive advertisements by the master virtual router in a VRRP group.

vrrp track

To configure the Virtual Router Redundancy Protocol (VRRP) to track an object, use the **vrrp track** command in interface configuration mode. To disable the tracking, use the **no** form of this command.

```
vrrp group track object-number [decrement priority]
```

```
no vrrp group track object-number [decrement priority]
```

Syntax Description

<i>group</i>	Group number to which the tracking applies. The group number range is from 1 to 255.
<i>object-number</i>	Object number in the range from 1 to 500 representing the object to be tracked.
decrement <i>priority</i>	(Optional) Amount by which the priority for the router is decremented (or incremented) when the tracked object goes down (or comes back up). The default value is 10. Decrements can be set to any value between 1 and 255.

Defaults

The default decrement value is 10. The range is from 1 and 255.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.3(2)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

You can configure VRRP to track specific objects, such as an interface or IP route, that can alter the priority level of a virtual router for a VRRP group. The tracked objects are first defined using the **track interface** or **track ip route** global configuration command. The client process, in this case VRRP, registers interest in tracking these objects and can then be notified when the tracked object changes state.

Examples

In the following example, the tracking process is configured to track the IP routing capability of serial interface 1/0. VRRP on Ethernet interface 0/0 then registers with the tracking process to be informed of any changes to the IP routing state of serial interface 1/0. If the IP state on serial interface 1/0 goes down, then the priority of the VRRP group is reduced by 10.

If both serial interfaces are operational, then Router A will be the master virtual router because it has the higher priority.

However, if IP routing on serial interface 1/0 in Router A fails, then the HSRP group priority will be reduced and Router B will take over as the master virtual router, thus maintaining a default virtual gateway service to hosts on the 10.1.0.0 subnet.

Router A Configuration

```
!  
track 100 interface serial1/0 ip routing  
!  
interface Ethernet0/0  
  ip address 10.1.0.21 255.255.0.0  
  vrrp 1 ip 10.1.0.1  
  vrrp 1 priority 105  
  vrrp 1 track 100 decrement 10
```

Router B Configuration

```
!  
track 100 interface serial1/0 ip routing  
!  
interface Ethernet0/0  
  ip address 10.1.0.22 255.255.0.0  
  vrrp 1 ip 10.1.0.1  
  vrrp 1 priority 100  
  vrrp 1 track 100 decrement 10
```

Related Commands

Command	Description
track interface	Configures an interface to be tracked.
track ip route	Tracks the state of an IP route.

weight (firewall farm real server)

To specify a real server's capacity, relative to other real servers in the firewall farm, use the **weight** command in firewall farm real server configuration mode. To restore the default weight value, use the **no** form of this command.

weight *setting*

no weight

Syntax Description

<i>setting</i>	Weight setting to use for the real server predictor algorithm. Valid settings range from 1 to 255. The default weight setting is 8.
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Defaults

The default setting to use for the real server predictor algorithm is 8.

Command Modes

Firewall farm real server configuration (config-slb-fw-real)

Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

The following example specifies the relative weights of three real servers as 16, 8 (by default), and 24, respectively:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# real 10.10.1.1
Router(config-slb-fw-real)# weight 16
Router(config-slb-fw-real)# inservice
Router(config-slb-fw-real)# exit
Router(config-slb-fw)# real 10.10.1.2
Router(config-slb-fw-real)# inservice
Router(config-slb-fw-real)# exit
Router(config-slb-fw)# real 10.10.1.3
Router(config-slb-fw-real)# weight 24
```

Related Commands

Command	Description
real (server farm)	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
show ip slb firewallfarm	Displays information about the firewall farm configuration.
show ip slb reals	Displays information about the real servers.

weight (real server)

To specify a real server's capacity, relative to other real servers in the server farm, use the **weight** command in SLB real server configuration mode. To restore the default weight value, use the **no** form of this command.

weight *setting*

no weight

Syntax Description	<i>setting</i>	Weight setting to use for the real server predictor algorithm. Valid settings range from 1 to 255. The default weight setting is 8.
---------------------------	----------------	-------------------------------------------------------------------------------------------------------------------------------------

Defaults The default setting to use for the real server predictor algorithm is 8.

Command Modes SLB real server configuration (config-slb-sfarm)

Command History	Release	Modification
	12.0(7)XE	This command was introduced.
	12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
	12.2	This command was integrated into Cisco IOS Release 12.2.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines The static weights you define using this command are overridden by the weights calculated by Dynamic Feedback Protocol (DFP). If DFP is removed from the network, IOS Server Load Balancing (IOS SLB) reverts to these static weights.

Examples The following example specifies the relative weights of three real servers as 16, 8 (by default), and 24, respectively:

```
Router(config)# ip slb serverfarm PUBLIC
!----First real server
Router(config-slb-sfarm)# real 10.10.1.1
!----Assigned weight of 16
Router(config-slb-real)# weight 16
!----Enabled
Router(config-slb-real)# inservice
Router(config-slb-real)# exit
!----Second real server
Router(config-slb-sfarm)# real 10.10.1.2
!----Enabled with default weight
Router(config-slb-real)# inservice
```

■ **weight (real server)**

```

Router(config-slb-real)# exit
!-----Third real server
Router(config-slb-sfarm)# real 10.10.1.3
!-----Assigned weight of 24, not enabled
Router(config-slb-real)# weight 24

```

Related Commands

Command	Description
real (server farm)	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
show ip slb reals	Displays information about the real servers.
show ip slb serverfarms	Displays information about the server farm configuration.