threshold metric through track timer

threshold metric

To set a threshold metric, use the **threshold metric** command in tracking configuration mode. To remove the threshold metric value, 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.	
number	Threshold value. The range is from 0 to 255. The up threshold default is 254, and the down threshold default is 255.	
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.	

Command Default   No threshold metric is set.

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.
15.3(3)M	This command was integrated into Cisco IOS Release 15.3(3)M.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines   This command is available only for IP-route threshold metric objects tracked by the **track ip route metric threshold** command in global configuration mode.

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 threshold metric is set to 16 for the up threshold and to 20 for the down threshold. The delay period to communicate the changes of a down event of the tracked object to the client process is set to 20 seconds.

```
Router(config)# track 1 ip route 10.22.0.0/16 metric threshold
Router(config-track)# threshold metric up 16 down 20
Router(config-track)# 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.
number	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:

```
Router(config)# track 11 list threshold percentage
Router(config-track)# object 1
Router(config-track)# object 2
Router(config-track)# 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.
number	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 list** *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:

```
Router(config)# track 12 list threshold weight
Router(config-track)# object 1
Router(config-track)# object 2
Router(config-track)# threshold weight up 35 down 22
```

	Command	Description
Related Commands	**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.

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

object-number	Object number in the range from 1 to 1000 representing the interface to be tracked.
interface *type number*	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.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was modified. The valid range for the *object-number* argument increased to 1000.
12.2(50)SY	This command was modified. The valid range for the *object-number* argument increased to 1000.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

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.

As of Cisco IOS Release 15.1(3)T, 15.1(1)S and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a router is dependent upon variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects is dependent upon the available CPU. Testing should be conducted on site to ensure that the service works under the specific site traffic conditions.

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.

```
Router(config)# track 1 interface serial 2/0 line-protocol
Router(config-track)# exit
Router(config)# track 2 interface serial 3/0 line-protocol
Router(config-track)# exit
Router(config)# interface FastEthernet 0/0
Router(config-if)# ip address 10.21.8.32 255.255.255.0
Router(config-if)# glbp 10 weighting 110 lower 95 upper 105
Router(config-if)# glbp 10 weighting track 1
Router(config-if)# 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.

```
Router(config)# track 2 interface serial 2/0 ip routing
Router(config-track)# exit
Router(config)# interface FastEthernet 0/0
Router(config-if)# ip address 10.21.8.32 255.255.255.0
Router(config-if)# glbp 10 weighting 110 lower 95 upper 105
Router(config-if)# 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 abcd

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

object-number	Object number that represents the interface to be tracked. The range is from 1 to 1000.
type number	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.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was modified. The valid range for the *object-number* argument increased to 1000.
12.2(50)SY	This command was modified. The valid range for the *object-number* argument increased to 1000.

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 in 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

As of Cisco IOS Release 15.1(3)T, 15.1(1)S and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a router is dependent upon variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects is dependent upon the available CPU. Testing should be conducted on site to ensure that the service works under the specific site traffic conditions.

Examples

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

```
Router(config)# track 1 interface serial1/0 ip routing
Router(config-track)#
```

Related Commands

Command	Description
show track	Displays HSRP tracking information.

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, GGSN, or PDSN 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

object-number	Number of the object to be tracked. The range is from 1 to 1000.
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.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was modified. The valid range for the *object-number* argument increased to 1000.
12.2(50)SY	This command was modified. The valid range for the *object-number* argument increased to 1000.

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.

As of Cisco IOS Release 15.1(3)T, 15.1(1)S and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a router is dependent upon variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects is dependent upon the available CPU. Testing should be conducted on site to ensure that the service works under the specific site traffic conditions.

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

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

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 track an interface 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** | **ipv6 routing**}
no track *object-number* **interface** *type number* {**line-protocol** | **ip routing** | **ipv6 routing**}

Syntax Description

object-number	Object number that represents the interface to be tracked. The range is from 1 to 1000.
type number	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.
ipv6 routing	Tracks whether IPv6 routing is enabled, whether an IPv6 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	This 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.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was integrated into Cisco IOS Release 15.1(1)S.
12.2(50)SY	This command was integrated into Cisco IOS Release 12.2(50)SY.
15.3(3)M	This command was modified. The **ipv6 routing** keyword was added.

Release	Modification
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

This command reports a state value to clients. A tracked IP or IPv6 routing object is considered up when the following criteria exist:

- IP or IPv6 routing is enabled and active on the interface.

- The state of the interface line protocol is up.

- The interface address is known. The address is configured or received through the Dynamic Host Configuration Protocol (DHCP) or IP Control Protocol (IPCP) negotiation.

Interface IP or IPv6 routing goes down when one of the following criteria exist:

- IP or IPv6 routing is disabled globally.

- The state of the interface line protocol is down.

- The interface address is unknown. The address is not configured or received through DHCP or IPCP negotiation.

A space is not required between the *type* and *number* values.

Tracking the IP or IPv6 routing state of an interface can be more useful in some situations than tracking the interface-line-protocol state, 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, which means that Link Control Protocol negotiated successfully, but IP could be down, which means that IPCP negotiation failed.

The **track interface** command supports the tracking of an interface with an IP or IPv6 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:

```
Router(config)# track 1 interface serial1/0 ip routing
Router(config-track)#
```

In the following example, the tracking process is configured to track the IPv6-routing capability of a GigabitEthernet interface 1/0/0:

```
Router(config)# track 1 interface GigabitEthernet 1/0/0 ipv6 routing
Router(config-track)#
```

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** | **ipv6**} **route** *address / prefix-length* {**reachability** | **metric threshold**}
no track *object-number* {**ip** | **ipv6**} **route** *address / prefix-length* {**reachability** | **metric threshold**}

Syntax Description

object-number	Object number that represents the object to be tracked. The range is from 1 to 1000.
ip	Tracks an IP route.
ipv6	Tracks an IPv6 route.
address	IP or IPv6 subnet address to the route that is being tracked.
/prefix-length	Number of bits in the address prefix. A forward slash (/) is required.
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.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was integrated into Cisco IOS Release 15.1(1)S.
12.2(50)SY	This command was integrated into Cisco IOS Release 12.2(50)SY.
15.3(3)M	This command was modified. The **ipv6** keyword was added.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

A tracked IP-route or IPv6-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 for 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 the route is less than or equal to the up threshold.

- State is down if the scaled metric for the 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.

As of Cisco IOS Release 15.1(3)T, 15.1(1)S, and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a router depends on variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects depends on available CPU resources. Testing should be conducted to ensure that the service works under the specific site-traffic conditions.

Examples

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

```
Router(config)# 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:

```
Router(config)# track 1 ip route 10.22.0.0/16 metric threshold
```

In the following example, the tracking process is configured to track the threshold metric using the default threshold metric values for an IPv6 route:

```
Router(config)# track 2 ipv6 route 2001:DB8:0:ABCD::1/10 metric threshold
```

Related Commands

Command	Description
show track	Displays HSRP tracking information.
threshold metric	Sets a threshold metric.

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

object-number	Object number representing the object to be tracked. The range is from 1 to 1000.
operation-number	Number used for the identification of the IP SLAs operation you are tracking.
state	(Optional) Tracks the operation return code.
reachability	(Optional) Tracks whether the route is reachable.

Command Default   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)SXI1	This command was integrated into Cisco IOS Release 12.2(33)SXI1. 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.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was modified. The valid range for the *object-number* argument increased to 1000.
12.2(50)SY	This command was modified. The valid range for the *object-number* argument increased to 1000.

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. The table below shows the state and reachability aspects of IP SLAs operations that can be tracked.

Table 1: 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

As of Cisco IOS Release 15.1(3)T, 15.1(1)S and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a router is dependent upon variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects is dependent upon the available CPU. Testing should be conducted on site to ensure that the service works under the specific site traffic conditions.

Examples

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

```
Router(config)# 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:

```
Router(config)# track 2 ip sla 3 reachability
```

Related Commands

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

track list

To specify a list of obje cts 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

object-number	Object number of the object to be tracked. The range is from 1 to 1000.
boolean	State of the tracked list is based on a boolean calculation. The keywords are as follows: • **and** —Specifies that the list is "up" if all objects are up, or "down" if one or more objects are down. For example when tracking two interfaces, "up" means that both interfaces are up, and "down" means that either interface is down. • **or** —Specifies that the list is "up" if at least one objects is up. For example, when tracking two interfaces, "up" means that either interface is up, and "down" means that both interfaces are down.
threshold	State of the tracked list is based on a threshold. The keywords are as follows: • **percentage** —Specifies that the threshold is based on a percentage. • **weight** —Specifies that the threshold is based on a weight.

Command Default

The object 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.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was modified. The valid range for the *object-number* argument increased to 1000.

Release	Modification
12.2(50)SY	This command was modified. The valid range for the *object-number* argument increased to 1000.

Usage Guidelines
As of Cisco IOS Release 15.1(3)T, 15.1(1)S, and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a router is dependent upon variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects is dependent upon the available CPU. Testing should be conducted on site to ensure that the service works under the specific site traffic conditions.

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:

```
Router(config)# track 1 interface serial2/0 line-protocol
Router(config-track)# exit
Router(config)# track 2 interface serial2/1 line-protocol
Router(config-track)# exit
Router(config)# track 100 list boolean and
Router(config-track)# object 1
Router(config-track)# 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:

```
Router(config)# track 1 interface serial2/0 line-protocol
Router(config-track)# exit
Router(config)# track 2 interface serial2/1 line-protocol
Router(config-track)# exit
Router(config)# track 101 list boolean or
Router(config-track)# object 1
Router(config-track)# 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:

```
Router(config)# track 1 interface serial2/0 line-protocol
Router(config-track)# exit
Router(config)# track 2 interface serial2/1 line-protocol
Router(config-track)# exit
Router(config)# track 102 threshold weight
Router(config-track)# object 1 weight 10
Router(config-track)# object 2 weight 10
Router(config-track)# 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.

Command	Description
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** | **ipv6 route** | {**bgp** | **eigrp** | **isis** | **ospf** | **static**}*resolution-value*}
no track resolution {**ip route** | **ipv6 route** | {**bgp** | **eigrp** | **isis** | **ospf** | **static**}*resolution-value*}

Syntax Description

ip route	IP route for metric resolution for a specified track. The keywords and arguments are as follows:
	• **bgp** —BGP routing protocol. The *resolution-value* argument has a range from 256 to 40000000.
	• **eigrp** —EIGRP routing protocol. The *resolution-value* argument has a range from 256 to 40000000.
	• **isis** —ISIS routing protocol. The *resolution-value* argument has a range from 1 to 1000.
	• **ospf** —OSPF routing protocol. The *resolution-value* argument has a range from 1 to 1562.
	• **static** —Static route. The *resolution-value* argument has a range from 1 to 100000.
ipv6 route	IPv6 route for metric resolution for a specified track. The keywords and arguments are as follows:
	• **bgp** —BGP routing protocol. The *resolution-value* argument has a range from 256 to 40000000. The default value is 2560.
	• **eigrp** —EIGRP routing protocol. The *resolution-value* argument has a range from 256 to 40000000. The default value is 2560.
	• **isis** —ISIS routing protocol. The *resolution-value* argument has a range from 1 to 1000. The default value is 10.
	• **ospf** —OSPF routing protocol. The *resolution-value* argument has a range from 1 to 1562. The default value is 1.
	• **static** —Static route. The *resolution-value* argument has a range from 1 to 100000. The default value is 10.

Command Default   The default threshold metric 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.

Release	Modification
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.
15.3(3)M	This command was modified. The **ipv6 route** keyword was added.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

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 of 0 to 255. The metric resolution for the specified routing protocol is used to do the conversion. There are default values for metric resolution, but the **track resolution** command can be used to change them.

Examples

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

```
Router(config)# 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 rtr

✎

Note Effective with Cisco IOS Release 12.4(20)T, 12.2(33)SXI1, 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

object-number	Object number representing the object to be tracked. The range is from 1 to 500.
operation-number	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)SXI1	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.

Release	Modification
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. The table below shows the state and reachability aspects of IP SLAs operations that can be tracked.

Table 2: 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:

```
Router(config)# track 1 rtr 2 state
```

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

```
Router(config)# track 2 rtr 3 reachability
```

track stub-object

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

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

Syntax Description

object-number	Object number that represents the object to be tracked. The range is from 1 to 1000.

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.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was modified. The valid range for the *object-number* argument increased to 1000.
12.2(50)SY	This command was modified. The valid range for the *object-number* argument increased to 1000.

Usage Guidelines Use the **track stub-object** 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.

As of Cisco IOS Release 15.1(3)T, 15.1(1)S, and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a router is dependent upon variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects is dependent upon the available CPU. Testing should be conducted on site to ensure that the service works under the specific site traffic conditions.

Examples

The following example shows how to create and configure stub object 1 with a default state of up:

```
Router(config)# track 1 stub-object
Router(config-track)# 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 that a tracking process polls a tracked object, use the **track timer** command in global configuration mode. To reset to the default polling interval, use the **no** form of this command.

track timer {**application** | **interface** | **ip** | {**route** | **sla**} | **ipv6 route** | **list** | **stub-object**} {*seconds* | **msec** *milliseconds*}

no track timer {**application** | **interface** | **ip** | {**route** | **sla**} | **ipv6 route** | **list** | **stub-object**} {*seconds* | **msec** *milliseconds*}

Syntax Description

application	Tracks the mobile IP application polling timer.
interface	Tracks the specified interface.
ip	Tracks the specified IP protocol.
route	Tracks the route polling timer.
sla	Tracks the route polling timer.
ipv6 route	Tracks the specified IPv6 protocol.
list	Tracks the boolean list polling timer.
stub-object	Tracks the Embedded Event Manager (EEM) stub polling timer.
seconds	Polling interval, in seconds. The range is from 1 to 3000. The default for interface polling is 1 second, and the default for IP-route polling is 15 seconds.
msec *milliseconds*	Specifies the polling interval in milliseconds. The range is 500 to 5000. All polling frequencies can be configured down to 500 milliseconds, overriding the minimum 1 second interval configured previously.

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, as described in the table below:

Object	Default Polling Interval (seconds)
Application	5
Interface	1
IP route	15
IP SLA	5
IPv6 route	15
List	1
Stub-object	1

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)SRE	This command was modified. The **list** and **sla** keywords were 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.
15.0(1)M	This command was modified. The **application** and **msec** keywords and the *milliseconds* argument were added.
12.2(33)SXI4	This command was integrated into Cisco IOS Release 12.2(33)SXI4.
15.3(3)M	This command was modified. The **ipv6** keyword was added.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Examples

In the following example, the tracking process polls the tracked interface every 3 seconds:

```
Router# configure terminal
Router(config)# track timer interface 3
```

In the following example, the tracking process polls the tracked IPv6 route every 5 seconds:

```
Router# configure terminal
Router(config)# track timer ipv6 route 5
```