PBR Support for Multiple Tracking Options

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The PBR Support for Multiple Tracking Options feature extends the capabilities of object tracking using Cisco Discovery Protocol (CDP) to allow the policy-based routing (PBR) process to verify object availability by using additional methods. The verification method can be an Internet Control Message Protocol (ICMP) ping, User Datagram Protocol (UDP) ping, or an HTTP GET request.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for PBR Support for Multiple Tracking Options" section on page 16.

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

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

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Information About PBR Support for Multiple Tracking Options

To configure the PBR Support for Multiple Tracking Options feature, you should understand the following concepts:

Object Tracking

Object tracking is an independent process that monitors objects such as the following:

- State of the line protocol of an interface
- Existence of an entry in the routing table
- Results of a Service Assurance Agent (SAA) operation, such as a ping

Clients such as Hot Standby Router Protocol (HSRP), Virtual Router Redundancy Protocol (VRRP), Gateway Load Balancing Protocol (GLBP), and (with this feature) PBR can register their interest in specific, tracked objects and then take action when the state of the objects changes.

PBR Support for Multiple Tracking Options Feature Design

The PBR Support for Multiple Tracking Options feature gives PBR access to all the objects that are available through the tracking process. The tracking process provides the ability to track individual objects such as ICMP ping reachability, routing adjacency, an application running on a remote device, a route in the Routing Information Base (RIB), or to track the state of an interface line protocol.

Object tracking functions in the following manner. PBR will inform the tracking process that a certain object should be tracked. The tracking process will in turn notify PBR when the state of that object changes.

How to Configure PBR Support for Multiple Tracking Options

The tasks in this section are divided according to the Cisco IOS Release that you are running because Cisco IOS Release 12.3(14)T introduced new syntax for IP SLAs. This section contains the following tasks:

Configuring PBR Support for Multiple Tracking Options in Cisco IOS Release 12.3(11)T, 12.2(25)S, or Prior Releases

Perform this task to configure PBR support for multiple tracking options. In this task, a route map is created and configured to verify the reachability of the tracked object.

Prerequisite

This task requires the networking device to be running Cisco IOS Release 12.3(11)T, 12.2(25)S, or prior releases.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **rtr** *operation-number*
4. **type echo protocol** *protocol-type target* [**source-ipaddr** *ip-address*]
5. **exit**
6. **rtr schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*}] [**ageout** *seconds*]
7. **track** *object-number* **rtr** *entry-number* [**reachability**]
8. **delay** {**up** *seconds* [**down** *seconds*] | [**up** *seconds*] **down** *seconds*}
9. **exit**
10. **interface** *type number*
11. **ip address** *ip-address mask* [**secondary**]
12. **ip policy route-map** *map-tag*
13. **exit**
14. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
15. **set ip next-hop verify-availability** [*next-hop-address sequence* **track** *object*]
16. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**rtr** *operation-number* **Example:** `Router (config)# rtr 1`	Enters SAA RTR configuration mode and configures an SAA operation.

	Command or Action	Purpose
Step 4	**type echo protocol** *protocol-type target* [**source-ipaddr** *ip-address*] **Example:** `Router (config-rtr)# type echo protocol ipicmpecho 10.1.1.10`	Configures an SAA end-to-end echo response time probe operation.
Step 5	**exit** **Example:** `Router(config-rtr)# exit`	Exits SAA RTR configuration mode and returns the router to global configuration mode.
Step 6	**rtr schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*}] [**ageout** *seconds*] **Example:** `Router(config)# rtr schedule 1 life forever start-time now`	Configures the time parameters for the SAA operation.
Step 7	**track** *object-number* **rtr** *entry-number* [**reachability**] **Example:** `Router(config)# track 123 rtr 1 reachability`	Tracks the reachability of an Response Time Reporter (RTR) object and enters tracking configuration mode.
Step 8	**delay** {**up** *seconds* [**down** *seconds*] | [**up** *seconds*] **down** *seconds*} **Example:** `Router(config-track)# delay up 60 down 30`	(Optional) Specifies a period of time (in seconds) to delay communicating state changes of a tracked object.
Step 9	**exit** **Example:** `Router(config-track)# exit`	Exits tracking configuration mode, and returns the router to global configuration mode.
Step 10	**interface** *type number* **Example:** `Router(config)# interface ethernet 0`	Specifies an interface type and number, and enters interface configuration mode.
Step 11	**ip address** *ip-address mask* [***secondary***] **Example:** `Router(config-if)# ip address 10.1.1.11 255.0.0.0`	Specifies a primary or secondary IP address for an interface. • Refer to the "Configuring IP Addressing" chapter of the Release 12.3 *Cisco IOS IP Configuration Guide* for information on configuring IP addresses.
Step 12	**ip policy route-map** *map-tag* **Example:** `Router(config-if)# ip policy route-map alpha`	Enables policy routing and identifies a route map to be used for policy routing.

	Command or Action	Purpose
Step 13	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode and returns the router to global configuration mode.
Step 14	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map alpha`	Specifies a route map and enters route-map configuration mode.
Step 15	**set ip next-hop verify-availability** [*next-hop-address sequence* **track** *object*] **Example:** `Router(config-route-map)# set ip next-hop verify-availability 10.1.1.1 10 track 123`	Configures the route map to verify the reachability of the tracked object.
Step 16	**end** **Example:** `Router(config-route-map)# end`	Exits route-map configuration mode and returns the router to global configuration mode.

Configuring PBR Support for Multiple Tracking Options in Cisco IOS Release 12.3(14)T, 12.2(33)SXH, and Later Releases

Perform this task to configure PBR support for multiple tracking options. In this task, a route map is created and configured to verify the reachability of the tracked object.

Prerequisite

This task requires the networking device to be running Cisco IOS Release 12.3(14)T, 12.2(33)SXH, or later releases.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla monitor** *operation-number*
4. **type echo protocol ipIcmpEcho** {*destination-ip-address* | *destination-hostname*} [**source-ipaddr** {*ip-address* | *hostname*} | **source-interface** *interface-name*]
5. **exit**
6. **ip sla monitor schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*}] [**ageout** *seconds*] [**recurring**]
7. **track** *object-number* **rtr** *entry-number* [**reachability** | **state**]
8. **delay** {**up** *seconds* [**down** *seconds*] | [**up** *seconds*] **down** *seconds*}
9. **exit**

10. **interface** *type number*
11. **ip address** *ip-address mask* [**secondary**]
12. **ip policy route-map** *map-tag*
13. **exit**
14. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
15. **set ip next-hop verify-availability** [*next-hop-address sequence* **track** *object*]
16. **end**
17. **show track** *object-number*
18. **show route-map** [*map-name* | **all** | **dynamic**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ip sla monitor** *operation-number* **Example:** `Router(config)# ip sla monitor 1`	Starts a Cisco IOS IP Service Level Agreements (SLAs) operation configuration and enters IP SLA monitor configuration mode.
Step 4	**type echo protocol ipIcmpEcho** {*destination-ip-address* | *destination-hostname*} [**source-ipaddr** {*ip-address* | *hostname*} | **source-interface** *interface-name*] **Example:** `Router(config-sla-monitor)# type echo protocol ipicmpecho 10.1.1.1`	Configures an IP SLAs Internet Control Message Protocol (ICMP) echo probe operation.
Step 5	**exit** **Example:** `Router(config-sla-monitor)# exit`	Exits IP SLA monitor configuration mode and returns the router to global configuration mode.
Step 6	**ip sla monitor schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*}] [**ageout** *seconds*] [**recurring**] **Example:** `Router(config)# ip sla monitor schedule 1 life forever start-time now`	Configures the scheduling parameters for a single Cisco IOS IP SLAs operation. • In this example, the time parameters for the IP SLAs operation are configured.

	Command or Action	Purpose
Step 7	**track** *object-number* **rtr** *entry-number* [**reachability** | **state**] **Example:** `Router(config)# track 123 rtr 1 reachability`	Tracks the reachability of an Response Time Reporter (RTR) object and enters tracking configuration mode.
Step 8	**delay** {**up** *seconds* [**down** *seconds*] | [**up** *seconds*] **down** *seconds*} **Example:** `Router(config-track)# delay up 60 down 30`	(Optional) Specifies a period of time, in seconds, to delay communicating state changes of a tracked object.
Step 9	**exit** **Example:** `Router(config-track)# exit`	Exits tracking configuration mode, and returns the router to global configuration mode.
Step 10	**interface** *type number* **Example:** `Router(config)# interface serial 2/0`	Specifies an interface type and number, and enters interface configuration mode.
Step 11	**ip address** *ip-address mask* [***secondary***] **Example:** `Router(config-if)# ip address 192.168.1.1 255.255.255.0`	Specifies a primary or secondary IP address for an interface. • Refer to the "Configuring IP Addressing" chapter of the *Cisco IOS IP Addressing Services Configuration Guide*, Release 12.4T for information on configuring IP addresses. • In this example, the IP address of the incoming interface is specified. This is the interface on which policy routing is to be enabled.
Step 12	**ip policy route-map** *map-tag* **Example:** `Router(config-if)# ip policy route-map alpha`	Enables policy routing and identifies a route map to be used for policy routing.
Step 13	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode and returns the router to global configuration mode.
Step 14	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map alpha`	Specifies a route map and enters route-map configuration mode.
Step 15	**set ip next-hop verify-availability** [*next-hop-address sequence* **track** *object*] **Example:** `Router(config-route-map)# set ip next-hop verify-availability 10.1.1.1 10 track 123`	Configures the route map to verify the reachability of the tracked object. • In this example, the policy is configured to forward packets received on serial interface 2/0 to 10.1.1.1 if that device is reachable.

	Command or Action	Purpose
Step 16	**end** **Example:** `Router(config-route-map)# end`	Exits route-map configuration mode and returns the router to global configuration mode.
Step 17	**show track** *object-number* **Example:** `Router# show track 123`	(Optional) Displays tracking information. • Use this command to verify the configuration. See the display output in the "Examples" section of this task.
Step 18	**show route-map** [*map-name* | **all** | **dynamic**] **Example:** `Router# show ip route alpha`	(Optional) Displays route map information. • In this example, information about the route map named alpha is displayed. See the display output in the "Examples" section of this task.

Examples

The following output from the **show track** command shows that the tracked object 123 is reachable.

```
Router# show track 123

Track 123
  Response Time Reporter 1 reachability
  Reachability is Up
    2 changes, last change 00:00:33
  Delay up 60 secs, down 30 secs
  Latest operation return code: OK
  Latest RTT (millisecs) 20
  Tracked by:
    ROUTE-MAP 0
```

The following output from the **show route-map** command shows information about the route map named alpha that was configured in the task.

```
Router# show route-map alpha

route-map alpha, permit, sequence 10
  Match clauses:
  Set clauses:
    ip next-hop verify-availability 10.1.1.1 10 track 123  [up]
  Policy routing matches: 0 packets, 0 bytes
```

Configuration Examples for PBR Support for Multiple Tracking Options

This section provides the following configuration examples:

- Configuring PBR Support for Multiple Tracking Options in Cisco IOS Release 12.3(11)T, 12.2(25)S, or Prior Releases: Example, page 9
- Configuring PBR Support for Multiple Tracking Options in Cisco IOS Release 12.3(14)T, 12.2(33)SXH, or Later Releases: Example, page 9

Configuring PBR Support for Multiple Tracking Options in Cisco IOS Release 12.3(11)T, 12.2(25)S, or Prior Releases: Example

In the following example, object tracking is configured for PBR on routers running Cisco IOS Release 12.3(11)T, 12.2(25)S, or prior releases.

The configured policy is that packets received on Ethernet 0, should be forwarded to 10.1.1.1 only if that device is reachable (responding to pings). If 10.1.1.1 is not up, then the packets should be forwarded to 10.2.2.2. If 10.2.2.2 is also not reachable, then the policy routing fails and the packets are routed according to the routing table.

Two Response Time Reporters (RTRs) are configured to ping the remote devices. The RTRs are then tracked. Policy routing will monitor the state of the tracked RTRs and make forwarding decisions based on their state.

```
! define and start the rtrs
rtr 1
 type echo protocol ipicmpecho 10.1.1.1
rtr schedule 1 start-time now life forever
!
rtr 2
 type echo protocol ipicmpecho 10.2.2.2
rtr schedule 2 start-time now life forever
!
!track the rtrs
track 123 rtr 1 reachability
track 124 rtr 2 reachability
!
! enable policy routing on the incoming interface
interface ethernet 0
 ip address 10.4.4.4 255.255.255.0
 ip policy route-map beta
!
! 10.1.1.1 is via this interface
interface ethernet 1
 ip address 10.1.1.254 255.255.255.0
!
! 10.2.2.2 is via this interface
interface ethernet 2
 ip address 10.2.2.254 255.255.255.0
!
! define a route-map to set the next-hop depending on the state of the tracked rtrs
route-map beta
 set ip next-hop verify-availability 10.1.1.1 10 track 123
 set ip next-hop verify-availability 10.2.2.2 20 track 124
```

Configuring PBR Support for Multiple Tracking Options in Cisco IOS Release 12.3(14)T, 12.2(33)SXH, or Later Releases: Example

In the following example, object tracking is configured for PBR on routers running Cisco IOS Release 12.3(14)T, 12.2(33)SXH, or later releases.

The configured policy is that packets received on Ethernet 0, should be forwarded to 10.1.1.1 only if that device is reachable (responding to pings). If 10.1.1.1 is not up, then the packets should be forwarded to 10.2.2.2. If 10.2.2.2 is also not reachable, then the policy routing fails and the packets are routed according to the routing table.

Two RTRs are configured to ping the remote devices. The RTRs are then tracked. Policy routing will monitor the state of the tracked RTRs and make forwarding decisions based on their state.

```
! define and start the rtrs
ip sla monitor 1
 type echo protocol ipicmpecho 10.1.1.1
ip sla monitor schedule 1 start-time now life forever
!
ip sla monitor 2
 type echo protocol ipicmpecho 10.2.2.2
ip sla monitor schedule 2 start-time now life forever
!
!track the rtrs
track 123 rtr 1 reachability
track 124 rtr 2 reachability
!
! enable policy routing on the incoming interface
interface ethernet 0
 ip address 10.4.4.4 255.255.255.0
 ip policy route-map beta
!
! 10.1.1.1 is via this interface
interface ethernet 1
 ip address 10.1.1.254 255.255.255.0
!
! 10.2.2.2 is via this interface
interface ethernet 2
 ip address 10.2.2.254 255.255.255.0
!
! define a route-map to set the next-hop depending on the state of the tracked rtrs
route-map beta
 set ip next-hop verify-availability 10.1.1.1 10 track 123
 set ip next-hop verify-availability 10.2.2.2 20 track 124
```

Additional References

The following sections provide references related to the PBR Support for Multiple Tracking Options feature.

Related Documents

Related Topic	Document Title
Object tracking within Cisco IOS software	*Enhanced Object Tracking* feature document, Cisco IOS Release 12.2(15)T
Configuring IP addresses	• "Configuring IP Addressing" chapter in the *Cisco IOS IP Configuration Guide*, Release 12.3 • "Configuring IP Addressing" chapter in the *"Cisco IOS IP Addressing Services Configuration Guide,"* Release 12.4T

Standards

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

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

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

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Command Reference

This section documents only commands that are new or modified.

- **set ip next-hop verify-availability**

set ip next-hop verify-availability

To configure policy routing to verify the reachability of the next hop of a route map before the router performs policy routing to that next hop, use the **set ip next-hop verify-availability** command in route-map configuration mode. To disable this function, use the **no** form of this command.

set ip next-hop verify-availability [*next-hop-address sequence* **track** *object*]

no set ip next-hop verify-availability [*next-hop-address sequence* **track** *object*]

Syntax Description

next-hop-address	(Optional) IP address of the next hop to which packets will be forwarded.
sequence	(Optional) Sequence of next hops. The acceptable range is from 1 to 65535.
track	(Optional) The tracking method is track.
object	(Optional) Object number that the tracking subsystem is tracking. The acceptable range is from 1 to 500.

Command Default

The reachability of the next hop of a route map before a router performs policy routing, is not verified.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.3(4)T	The optional **track** keyword and *next-hop-address*, *sequence*, and *object* arguments were added.
12.3(14)T	The SAA feature (uses **rtr** commands) was replaced by the IP SLAs feature (uses **ip sla** commands).
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 **set ip next-hop verify-availability** command can be used in the following two ways:

- With policy-based routing (PBR) to verify next hop reachability using Cisco Discovery Protocol (CDP).
- With optional arguments to support object tracking using Internet Control Message Protocol (ICMP) ping or an HTTP GET request to verify if a remote device is reachable.

Using CDP Verification

This command is used to verify that the next hop is reachable before the router tries to policy route to it. This command has the following characteristics:

- It causes some performance degradation.
- CDP must be configured on the interface.
- The next hop must be a Cisco device with CDP enabled.
- It is supported in process switching and Cisco Express Forwarding (CEF) policy routing, but is not available in distributed CEF (dCEF) because of the dependency of the CDP neighbor database.

If the router is policy routing packets to the next hop and the next hop is down, the router will try unsuccessfully to use Address Resolution Protocol (ARP) for the next hop (which is down). This behavior will continue indefinitely. To prevent this situation from occurring, use the **set ip next-hop verify-availability** command to configure the router to verify that the next hop of the route map is a CDP neighbor before routing to that next hop.

This command is optional because some media or encapsulations do not support CDP, or it may not be a Cisco device that is sending traffic to the router.

If this command is set and the next hop is not a CDP neighbor, then the router looks to the subsequent next hop, if there is one. If there is no next hop, the packets are not policy routed.

If this command is not set, the packets are either successfully policy routed or remain forever unrouted.

If you want to selectively verify availability of only some next hops, you can configure different route map entries (under the same route map name) with different criteria (using access list matching or packet size matching), and then use the **set ip next-hop verify-availability** command selectively.

Using Object Tracking

With optional arguments to support object tracking, this command allows PBR to make decisions based on the following criteria:

- ICMP ping reachability to a remote device.
- Application running on a remote device (for example, the device responds to an HTTP GET request).
- A route exists in the Routing Information Base (RIB) (for example, policy route only if 10.2.2.0/24 is in the RIB).
- Interface state (for example, packets received on E0 should be policy routed out E1 only if E2 is down).

Object tracking functions in the following manner. PBR will inform the tracking process that it is interested in tracking a certain object. The tracking process will in turn notify PBR when the state of the object changes. This notification is done via registries and is event driven.

The tracking subsystem is responsible for tracking the state of an object. The object can be an IP address that is periodically being pinged by the tracking process. The state of the object (up or down) is stored in a track report data structure. The tracking process will create the tracking object report. Then the exec process that is configuring the route map can query the tracking process to determine if a given object exists. If the object exists, the tracking subsystem can start tracking it and read the initial state of the object. If the object changes state, the tracking process will notify all the clients that are tracking this process that the state of the object has changed. So, the route map structure that PBR is using can be updated to reflect the current state of the object in the track report. This interprocess communication is done by means of registries and the shared track report.

Note If the CDP and object tracking commands are mixed, the tracked next hops will be tried first.

Examples

The following configuration sample demonstrates the use of the **set ip next-hop verify-availability** command to configure the router to verify that the next hop of the route map is a CDP neighbor before routing to that next hop. In this example, the next hop 10.0.0.8 in the route map named "Example1" will be verified as a CDP neighbor before the router tries to policy-route to it.

```
ip cef
interface ethernet0/0/1
 ip policy route-map Example1
route-map Example1 permit 10
 match ip address 1
 set ip precedence priority
 set ip next-hop 10.0.0.8
 set ip next-hop verify-availability
route-map Example1 permit 20
 match ip address 101
 set interface Ethernet0/0/3
 set ip tos max-throughput
```

Using Object Tracking

The following configuration sample shows a configuration used to track an object:

```
! Configure the objects to be tracked.
! Object 123 will be up if the router can ping 10.1.1.1.
! Object 124 will be up if the router can ping 10.2.2.2.
ip sla monitor 1
 type echo protocol ipicmpecho 10.1.1.1
ip sla monitor schedule 1 start-time now life forever
!
ip sla monitor 2
 type echo protocol ipicmpecho 10.2.2.2
ip sla monitor schedule 2 start-time now life forever
!
track 123 rtr 1 reachability
track 124 rtr 2 reachability
!
! Enable policy routing using route-map alpha on Ethernet 0.
interface ethernet 0
 ip address 10.4.4.254 255.255.255.0
 ip policy route-map alpha
!
! 10.1.1.1 is via this interface
interface ethernet 1
 ip address 10.1.1.254 255.255.255.0

! 10.2.2.2 is via this interface
interface ethernet 2
 ip address 10.2.2.254 255.255.255.0
!
! Configure a route-map to set the next-hop to 10.1.1.1 if object 123 is up. If object 123
! is down, the next hop will be set to 10.2.2.2 if object 124 is up. If object 124 is also
! down, then policy routing fails and unicast routing will route the packet.
route-map alpha
 set ip next-hop verify-availability 10.1.1.1 10 track 123
 set ip next-hop verify-availability 10.2.2.2 20 track 124
```

Related Commands

Command	Description
show route-map	Displays the configured route maps.
show track	Displays information about objects that are tracked by the tracking process.
track	Tracks the state of an interface, an ip route, or a response time reporter.

Feature Information for PBR Support for Multiple Tracking Options

Table 1 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for PBR Support for Multiple Tracking Options

Feature Name	Releases	Feature Information
PBR Support for Multiple Tracking Options	12.3(4)T 12.2(25)S 12.2(33)SXH	The PBR Support for Multiple Tracking Options feature extends the capabilities of object tracking using Cisco Discovery Protocol (CDP) to allow the policy-based routing (PBR) process to verify object availability by using additional methods. The verification method can be an Internet Control Message Protocol (ICMP) ping, User Datagram Protocol (UDP) ping, or an HTTP GET request. Due to syntax changes for IP SLAs, a new task and configuration example were introduced in the Cisco IOS Release 12.2(33)SXH. The following commands were introduced or modified by this feature: **set ip next-hop verify-availability**.