



IP Routing Protocol-Independent Commands_ S through T

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send-lifetime

To set the time period during which an authentication key on a key chain is valid to be sent, use the **send-lifetime** command in key chain key configuration mode. To revert to the default value, use the **no** form of this command.

send-lifetime *start-time* {**infinite**| *end-time*| **duration** *seconds*}

no send-lifetime *start-time* {**infinite**| *end-time*| **duration** *seconds*}

Syntax Description

| | |
|--------------------------------|--|
| <i>start-time</i> | Beginning time that the key specified by the key command is valid to be sent. The syntax can be either of the following: <i>hh</i> : <i>mm</i> : <i>ss</i> <i>Month</i> <i>date</i> <i>year</i> <i>hh</i> : <i>mm</i> : <i>ss</i> <i>date</i> <i>Month</i> <i>year</i> <ul style="list-style-type: none"> • <i>hh</i> --hours • <i>mm</i> --minutes • <i>ss</i> -- seconds • <i>Month</i> -- first three letters of the month • <i>date</i> -- date (1-31) • <i>year</i>-- year (four digits) The default start time and the earliest acceptable date is January 1, 1993. |
| infinite | Key is valid to be sent from the <i>start-time</i> value on. |
| <i>end-time</i> | Key is valid to be sent from the <i>start-time</i> value until the <i>end-time</i> value. The syntax is the same as that for the <i>start-time</i> value. The <i>end-time</i> value must be after the <i>start-time</i> value. The default end time is an infinite time period. |
| duration <i>seconds</i> | Length of time (in seconds) that the key is valid to be sent. |

Command Default

Forever (the starting time is January 1, 1993, and the ending time is infinite)

Command Modes

Key chain key configuration (config-keychain-key)

Command History

| Release | Modification |
|-------------|---|
| 11.1 | This command was introduced. |
| 12.4(6)T | Support for IPv6 was added. |
| 12.2(33)SRB | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| 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

Specify a *start-time* value and one of the following values: **infinite**, *end-time*, or **duration** *seconds*.

We recommend running Network Time Protocol (NTP) or some other time synchronization method if you intend to set lifetimes on keys.

If the last key expires, authentication will continue and an error message will be generated. To disable authentication, you must manually delete the last valid key.

Examples

The following example configures a key chain named chain1. The key named key1 will be accepted from 1:30 p.m. to 3:30 p.m. and be sent from 2:00 p.m. to 3:00 p.m. The key named key2 will be accepted from 2:30 p.m. to 4:30 p.m. and be sent from 3:00 p.m. to 4:00 p.m. The overlap allows for migration of keys or a discrepancy in the set time of the router. There is a 30-minute leeway on each side to handle time differences.

```
Router(config)# interface ethernet 0
Router(config-if)# ip rip authentication key-chain chain1
Router(config-if)# ip rip authentication mode md5
!
Router(config)# router rip
Router(config-router)# network 172.19.0.0
Router(config-router)# version 2
!
Router(config)# key chain chain1
Router(config-keychain)# key 1
Router(config-keychain-key)# key-string key1
Router(config-keychain-key)# accept-lifetime 13:30:00 Jan 25 1996 duration 7200
Router(config-keychain-key)# send-lifetime 14:00:00 Jan 25 1996 duration 3600
Router(config-keychain-key)# exit
Router(config-keychain)# key 2
Router(config-keychain-key)# key-string key2
Router(config-keychain-key)# accept-lifetime 14:30:00 Jan 25 1996 duration 7200
Router(config-keychain-key)# send-lifetime 15:00:00 Jan 25 1996 duration 3600
```

The following example configures a key chain named chain1 for EIGRP address-family. The key named key1 will be accepted from 1:30 p.m. to 3:30 p.m. and be sent from 2:00 p.m. to 3:00 p.m. The key named key2 will be accepted from 2:30 p.m. to 4:30 p.m. and be sent from 3:00 p.m. to 4:00 p.m. The overlap allows for migration of keys or a discrepancy in the set time of the router. There is a 30-minute leeway on each side to handle time differences.

```
Router(config)# eigrp virtual-name
Router(config-router)# address-family ipv4 autonomous-system 4453
Router(config-router-af)# network 10.0.0.0
Router(config-router-af)# af-interface ethernet0/0
```

```

Router(config-router-af-interface)# authentication key-chain trees
Router(config-router-af-interface)# authentication mode md5
Router(config-router-af-interface)# exit
Router(config-router-af)# exit
Router(config-router)# exit
Router(config)# key chain chain1
Router(config-keychain)# key 1
Router(config-keychain-key)# key-string key1
Router(config-keychain-key)# accept-lifetime 13:30:00 Jan 25 1996 duration 7200
Router(config-keychain-key)# send-lifetime 14:00:00 Jan 25 1996 duration 3600
Router(config-keychain-key)# exit
Router(config-keychain)# key 2
Router(config-keychain-key)# key-string key2
Router(config-keychain-key)# accept-lifetime 14:30:00 Jan 25 1996 duration 7200
Router(config-keychain-key)# send-lifetime 15:00:00 Jan 25 1996 duration 3600

```

Related Commands

| Command | Description |
|------------------------------------|---|
| accept-lifetime | Sets the time period during which the authentication key on a key chain is received as valid. |
| key | Identifies an authentication key on a key chain. |
| key chain | Defines an authentication key chain needed to enable authentication for routing protocols. |
| key-string (authentication) | Specifies the authentication string for a key. |
| show key chain | Displays authentication key information. |

set automatic-tag

To automatically compute the tag value, use the **set automatic-tag** command in route-map configuration mode. To disable this function, use the **no** form of this command.

set automatic-tag

no set automatic-tag

Syntax Description This command has no arguments or keywords.

Command Default This command is disabled by default.

Command Modes Route-map configuration

| Command History | Release | Modification |
|-----------------|-------------|---|
| | 10.0 | 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 You must have a match clause (even if it points to a “permit everything” list) if you want to set tags.

Use the **route-map** global configuration command and the **match** and **set** route-map configuration commands to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the match criteria--the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the set actions--the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **set** commands specify the actions to be performed when all of the match criteria of a route map are met. When all match criteria are met, all set actions are performed.

Examples The following example configures the Cisco software to automatically compute the tag value for the Border Gateway Protocol (BGP) learned routes:

```
route-map tag
 match as-path 10
 set automatic-tag
!
router bgp 100
 table-map tag
```

Related Commands

| Command | Description |
|------------------------------------|--|
| match as-path | Matches a BGP autonomous system path access list. |
| match community | Matches a BGP community. |
| match interface (IP) | Distributes any routes that have their next hop out one of the interfaces specified. |
| match ip address | Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets. |
| match ip next-hop | Redistributes any routes that have a next hop router address passed by one of the access lists specified. |
| match ip route-source | Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists. |
| match metric (IP) | Redistributes routes with the metric specified. |
| match route-type (IP) | Redistributes routes of the specified type. |
| match tag | Redistributes routes in the routing table that match the specified tags. |
| route-map (IP) | Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set as-path | Modifies an autonomous system path for BGP routes. |
| set community | Sets the BGP communities attribute. |
| set level (IP) | Indicates where to import routes. |
| set local-preference | Specifies a preference value for the autonomous system path. |
| set metric (BGP, OSPF, RIP) | Sets the metric value for a routing protocol. |
| set metric-type | Sets the metric type for the destination routing protocol. |
| set next-hop | Specifies the address of the next hop. |
| set tag (IP) | Sets a tag value of the destination routing protocol. |

| Command | Description |
|----------------|---|
| set weight | Specifies the BGP weight for the routing table. |
| show route-map | Displays all route maps configured or only the one specified. |

set ip next-hop

To indicate where to output packets that pass a match clause of a route map for policy routing, use the **set ip next-hop** command in route-map configuration mode. To delete an entry indicating where to output the packets, use the **no** form of this command.

```
set ip next-hop {ip-address [...ip-address]} dynamic dhcp| encapsulate l3vpn profile-name| peer-address|
recursive [global| vrf vrf-name] ip-address| verify-availability [ip-address sequence track
track-object-number]
```

```
no set ip next-hop {ip-address [...ip-address]} dynamic dhcp| encapsulate l3vpn profile-name| peer-address|
recursive [global| vrf vrf-name] ip-address| verify-availability [ip-address sequence track
track-object-number]
```

Catalyst 3850 Switches

```
set ip next-hop ip-address [...ip-address]
```

```
no set ip next-hop ip-address [...ip-address]
```

Syntax Description

| | |
|------------------------------------|--|
| <i>ip-address</i> | IP address of the next hop to which packets are output. It must be the address of an adjacent router. |
| dynamic dhcp | Dynamically sets the DHCP next hop. |
| encapsulate l3vpn | Sets the encapsulation profile for the L3VPN next hop. |
| <i>profile-name</i> | L3VPN encapsulation profile name. |
| peer-address | Sets the next hop as the Border Gateway Protocol peering address. |
| recursive <i>ip-address</i> | Sets the IP address of the recursive next-hop router. Note The next-hop IP address must be assigned separately from the recursive next-hop IP address. |
| global | (Optional) Sets the global routing table. |
| vrf <i>vrf-name</i> | (Optional) Sets the Virtual Routing and Forwarding instance. |
| verify-availability | Verifies if the next hop is reachable. |
| <i>sequence</i> | (Optional) The sequence to be inserted into the next-hop list. The range is from 1 to 65535. |

| | |
|----------------------------|--|
| track | (Optional) Sets the next hop depending on the state of a tracked object. |
| <i>track-object-number</i> | (Optional) The tracked object number. The range is from 1 to 500. |

Command Default

Packets are forwarded to the next-hop router in the routing table.

Command Modes

Route-map configuration (config-route-map)

Command History

| Release | Modification |
|--------------------------|---|
| 11.0 | This command was introduced. |
| 12.0(28)S | This command was modified. The recursive keyword was added. |
| 12.3(14)T | This command was integrated into Cisco IOS Release 12.3(14)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. |
| Cisco IOS XE Release 2.2 | In Cisco IOS XE Release 2.2, this command was integrated into the Cisco ASR 1000 Series Routers. |
| 12.2(33)SRE | This command was modified. The encapsulate and l3vpn keywords were added. |
| Cisco IOS XE 3.2SE | This command was integrated into Cisco IOS XE Release 3.2SE. The set ip next-hop ip-address [...ip-address] command is available on Catalyst 3850 Series switches. |

Usage Guidelines

An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the *ip-address* argument.

Use the **ip policy route-map** interface configuration command, the **route-map** global configuration command, and the **match** and **set** route-map configuration commands to define conditions for policy routing packets. The **ip policy route-map** command identifies a route map by name. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*--the conditions under which policy routing occurs. The **set** commands specify the *set actions*--particular routing actions to be performed if the criteria enforced by the **match** commands are met.

If the interface associated with the first next hop, which is specified with the **set ip next-hop** command is down, the optionally specified IP addresses are tried in turn.

The set clauses can be used in conjunction with one another. They are evaluated in the following order:

- 1 **set ip next-hop**
- 2 **set interface**
- 3 **set ip default next-hop**
- 4 **set default interface**



Note The **set ip next-hop** and the **set ip default next-hop** commands are similar but have a different order of operations. Configuring the **set ip next-hop** command causes the system to use policy-based routing first and then use the routing table. Configuring the **set ip default next-hop** command causes the system to use the routing table first and then the policy route to the specified next hop.



Note The **set ip next-hop** command does not support Inherit-VRF routing on Cisco 7600 series routers because the **set ip next-hop ip-address** command is treated as equivalent to the **set ip global next-hop ip-address** command on Cisco 7600 series routers. (Inherit-VRF routing enables packets arriving on a VRF interface to be routed by the same outgoing interface.) Therefore, when using Cisco 7600 series routers, we recommend that you use the **set ip vrf vrf next-hop** command to explicitly indicate the VRF from which the next hop is to be chosen. We also recommend that in Cisco 7600 series routers, the **set ip next-hop** command be used only for route maps applied on non-VRF interfaces, where the software behavior and the hardware behavior would be similar.

Examples

The following example shows how packets with a Level 3 length of 3 to 50 bytes are output to the router at IP address 10.14.2.2:

```
interface serial 0
 ip policy route-map thataway
!
route-map thataway
 match length 3 50
 set ip next-hop 10.14.2.2
```

The following example shows how IP address 10.3.3.3 is set as the recursive next-hop address:

```
route-map map_recurse
 set ip next-hop recursive 10.3.3.3
```

Related Commands

| Command | Description |
|----------------------------|---|
| ip policy route-map | Identifies a route map to use for policy routing on an interface. |

| Command | Description |
|--|---|
| match ip address | Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets. |
| match length | Bases policy routing on the Level 3 length of a packet. |
| route-map (IP) | Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set default interface | Indicates where to output packets that pass a match clause of a route map for policy routing and have no explicit route to the destination. |
| set interface | Indicates where to output packets that pass a match clause of a route map for policy routing. |
| set ip default next-hop verify-availability | Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco IOS software has no explicit route to a destination. |

set level (IP)

To indicate where to import routes, use the **setlevel** command in route-map configuration mode. To delete an entry, use the **no** form of this command.

```
set level {level-1| level-2| level-1-2| nssa-only| stub-area| backbone}
```

```
no set level {level-1| level-2| level-1-2| nssa-only| stub-area| backbone}
```

Syntax Description

| | |
|------------------|---|
| level-1 | Imports routes into a Level 1 area. |
| level-2 | Imports routes into a Level 2 subdomain. |
| level-1-2 | Imports routes into Level 1 and Level 2 areas. |
| nssa-only | Imports routes only into NSSA areas. |
| stub-area | Imports routes into an Open Shortest Path First (OSPF) NSSA area. |
| backbone | Imports routes into an OSPF backbone area. |

Command Default

This command is disabled by default. For Intermediate System-to-Intermediate System (IS-IS) destinations, the default value is **level-2**.

Command Modes

Route-map configuration

Command History

| Release | Modification |
|-------------|---|
| 10.0 | 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. |
| 15.0(1)M | This command was modified. The nssa-only keyword was added. |

Usage Guidelines

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the

matchcriteria--the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *setactions*--the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **noroute-map** command deletes the route map.

The **set** route-map configuration commands specify the redistribution *setactions* to be performed when all the match criteria of a route map are met. When all match criteria are met, all set actions are performed.

The **stub-areaandbackbonekeywordshavenoeffectonwhereroutesareimported**.

Examples

In the following example, routes will be imported into the Level 1 area:

```
route-map name
 set level level-1
```

Related Commands

| Command | Description |
|------------------------------|--|
| match as-path | Matches a BGP autonomous system path access list. |
| match community | Matches a BGP community. |
| match interface (IP) | Distributes routes that have their next hop out one of the interfaces specified. |
| match ip address | Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets. |
| match ip next-hop | Redistributes any routes that have a next hop router address passed by one of the access lists specified. |
| match ip route-source | Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists. |
| match metric (IP) | Redistributes routes with the metric specified. |
| match route-type (IP) | Redistributes routes of the specified type. |
| match tag | Redistributes routes in the routing table that match the specified tags. |
| route-map (IP) | Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set automatic-tag | Automatically computes the tag value. |
| set community | Sets the BGP communities attribute. |

| Command | Description |
|------------------------------------|--|
| set ip next-hop | Specifies the address of the next hop. |
| set level (IP) | Indicates where to import routes. |
| set local-preference | Specifies a preference value for the autonomous system path. |
| set metric (BGP, OSPF, RIP) | Sets the metric value for a routing protocol. |
| set metric-type | Sets the metric type for the destination routing protocol. |
| set origin (BGP) | Sets the BGP origin code. |
| set tag (IP) | Sets the value of the destination routing protocol. |

set local-preference

To specify a preference value for the autonomous system paths that pass the route map, use the **set local-preference** command in route-map configuration mode. To delete the entry from the route map, use the **no** form of this command.

set local-preference *number*

no set local-preference

Syntax Description

| | |
|---------------|--|
| <i>number</i> | Preference value. An integer from 0 to 4294967295. |
|---------------|--|

Command Default

Preference value of 100

Command Modes

Route-map configuration (config-route-map)

Command History

| Release | Modification |
|-------------|---|
| 10.0 | 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 local preference attribute is a number that indicates the relative preference of one route over another when there is more than one route to a destination. A higher preference causes a route to be preferred over a route with a lower preference.

This attribute is exchanged between iBGP peers only. That is, the preference is sent to all routers in the local autonomous system only. This attribute is used to determine local policy

You can change the default preference value with the **bgp default local-preference** command.

Examples

The following example sets the local preference to 200 for all routes that are included in access list 1:

```
route-map map-preference
match as-path 1
set local-preference 200
```

Related Commands

| Command | Description |
|-------------------------------------|--|
| bgp default local-preference | Changes the default local preference value. |
| match as-path | Matches a BGP autonomous system path access list. |
| match community | Matches a BGP community. |
| match interface (IP) | Distributes routes that have their next hop out one of the interfaces specified. |
| match ip address | Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets. |
| match ip next-hop | Redistributes any routes that have a next hop router address passed by one of the access lists specified. |
| match ip route-source | Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists. |
| match metric (IP) | Redistributes routes with the metric specified. |
| match route-type (IP) | Redistributes routes of the specified type. |
| match tag | Redistributes routes in the routing table that match the specified tags. |
| route-map (IP) | Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set automatic-tag | Automatically computes the tag value. |
| set community | Sets the BGP communities attribute. |
| set ip next-hop | Specifies the address of the next hop. |
| set level (IP) | Indicates where to import routes. |
| set metric (BGP, OSPF, RIP) | Sets the metric value for a routing protocol. |
| set metric-type | Sets the metric type for the destination routing protocol. |
| set origin (BGP) | Sets the BGP origin code. |

| Command | Description |
|--------------|---|
| set tag (IP) | Sets the value of the destination routing protocol. |

set metric (BGP-OSPF-RIP)

To set the metric value for a routing protocol, use the **setmetric** command in route-map configuration mode. To return to the default metric value, use the **no** form of this command.

set metric *metric-value*

no set metric *metric-value*

Syntax Description

| | |
|---------------------|--|
| <i>metric-value</i> | Metric value; an integer from -294967295 to 294967295. This argument applies to all routing protocols except Enhanced Interior Gateway Routing Protocol (EIGRP). |
|---------------------|--|

Command Default

The dynamically learned metric value.

Command Modes

Route-map configuration (config-route-map)

Command History

| Release | Modification |
|-------------|---|
| 10.0 | 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

We recommend that you consult your Cisco technical support representative before changing the default value.

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria* --the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions* --the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **noroute-map** command deletes the route map.

The **set** route-map configuration commands specify the redistribution *setactions* to be performed when all the match criteria of a route map are met. When all match criteria are met, all set actions are performed.

Examples

The following example sets the metric value for the routing protocol to 100:

```
route-map set-metric
 set metric 100
```

Related Commands

| Command | Description |
|------------------------------|--|
| match as-path | Matches a BGP autonomous system path access list. |
| match community | Matches a BGP community. |
| match interface (IP) | Distributes routes that have their next hop out one of the interfaces specified. |
| match ip address | Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets. |
| match ip next-hop | Redistributes any routes that have a next hop router address passed by one of the access lists specified. |
| match ip route-source | Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists. |
| match metric (IP) | Redistributes routes with the metric specified. |
| match route-type (IP) | Redistributes routes of the specified type. |
| match tag | Redistributes routes in the routing table that match the specified tags. |
| route-map (IP) | Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set automatic-tag | Automatically computes the tag value. |
| set community | Sets the BGP communities attribute. |
| set ip next-hop | Specifies the address of the next hop. |
| set level (IP) | Indicates where to import routes. |
| set local-preference | Specifies a preference value for the autonomous system path. |

| Command | Description |
|------------------------------------|--|
| set metric (BGP, OSPF, RIP) | Sets the metric value for a routing protocol. |
| set metric-type | Sets the metric type for the destination routing protocol. |
| set origin (BGP) | Sets the BGP origin code. |
| set tag (IP) | Sets the value of the destination routing protocol. |

set metric-type

To set the metric type for the destination routing protocol, use the **setmetric-type** command in route-map configuration mode. To return to the default, use the **no** form of this command.

set metric-type command `set metric-type {internal| external| type-1| type-2}`

no set metric-type `{internal| external| type-1| type-2}`

Syntax Description

| | |
|-----------------|---|
| internal | Intermediate System-to-Intermediate System (IS-IS) internal metric, or IGP metric as the MED for BGP. |
| external | IS-IS external metric. |
| type-1 | Open Shortest Path First (OSPF) external Type 1 metric. |
| type-2 | OSPF external Type 2 metric. |

Command Default

This command is disabled by default.

Command Modes

Route-map configuration

Command History

| Release | Modification |
|-------------|---|
| 10.0 | 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

Use the **route-map** global configuration command with **match** and **set** route-map configuration commands to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *matchcriteria*--the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *setactions*--the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **noroute-map** command deletes the route map.

The **set** route-map configuration commands specify the redistribution *setactions* to be performed when all the match criteria of a route map are met. When all match criteria are met, all set actions are performed.

**Note**

This command is not supported for redistributing routes into Border Gateway Protocol (BGP).

Examples

The following example sets the metric type of the destination protocol to OSPF external Type 1:

```
route-map map-type
 set metric-type type-1
```

Related Commands

| Command | Description |
|------------------------------|--|
| match as-path | Matches a BGP autonomous system path access list. |
| match community | Matches a BGP community. |
| match interface (IP) | Distributes routes that have their next hop out one of the interfaces specified. |
| match ip address | Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets. |
| match ip next-hop | Redistributes any routes that have a next hop router address passed by one of the access lists specified. |
| match ip route-source | Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists. |
| match metric (IP) | Redistributes routes with the metric specified. |
| match route-type (IP) | Redistributes routes of the specified type. |
| match tag | Redistributes routes in the routing table that match the specified tags. |
| route-map (IP) | Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set automatic-tag | Automatically computes the tag value. |
| set community | Sets the BGP communities attribute. |
| set ip next-hop | Specifies the address of the next hop. |
| set level (IP) | Indicates where to import routes. |

| Command | Description |
|------------------------------------|--|
| set local-preference | Specifies a preference value for the autonomous system path. |
| set metric (BGP, OSPF, RIP) | Sets the metric value for a routing protocol. |
| set metric-type | Sets the metric type for the destination routing protocol. |
| set origin (BGP) | Sets the BGP origin code. |
| set tag (IP) | Sets the value of the destination routing protocol. |
| set weight | Specifies the BGP weight for the routing table. |

set next-hop

To specify the address of the next hop, use the **set next-hop** command in route-map configuration mode. To delete an entry, use the **no** form of this command.

set next-hop command `set next-hop next-hop`

no set next-hop `next-hop`

Syntax Description

| | |
|-----------------------|------------------------------------|
| <code>next-hop</code> | IP address of the next hop router. |
|-----------------------|------------------------------------|

Command Default

Default next hop address.

Command Modes

Route-map configuration

Command History

| Release | Modification |
|-------------|---|
| 10.0 | 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

You must have a match clause (even if it points to a “permit everything” list) if you want to set tags.

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of match and set commands associated with it. The match commands specify the *match criteria*--the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*--the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **set** route-map configuration commands specify the redistribution *set actions* to be performed when all the match criteria of the router are met. When all match criteria are met, all set actions are performed.

Examples

In the following example, routes that pass the access list have the next hop set to 172.160.70.24:

```
route-map map_hop
match address 5
set next-hop 172.160.70.24
```

Related Commands

| Command | Description |
|------------------------------------|--|
| match as-path | Matches a BGP autonomous system path access list. |
| match community | Matches a BGP community. |
| match interface (IP) | Distributes routes that have their next hop out one of the interfaces specified. |
| match ip address | Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets. |
| match ip next-hop | Redistributes any routes that have a next hop router address passed by one of the access lists specified. |
| match ip route-source | Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists. |
| match metric (IP) | Redistributes routes with the metric specified. |
| match route-type (IP) | Redistributes routes of the specified type. |
| match tag | Redistributes routes in the routing table that match the specified tags. |
| route-map (IP) | Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set automatic-tag | Automatically computes the tag value. |
| set community | Sets the BGP communities attribute. |
| set ip next-hop | Specifies the address of the next hop. |
| set level (IP) | Indicates where to import routes. |
| set local-preference | Specifies a preference value for the autonomous system path. |
| set metric (BGP, OSPF, RIP) | Sets the metric value for a routing protocol. |
| set metric-type | Sets the metric type for the destination routing protocol. |
| set origin (BGP) | Sets the BGP origin code. |

| Command | Description |
|--------------|---|
| set tag (IP) | Sets the value of the destination routing protocol. |
| set weight | Specifies the BGP weight for the routing table. |

set tag (IP)

To set a tag value for a route in a route map, use the **set tag** command in route-map configuration mode. To delete the entry, use the **no** form of this command.

set tag {*tag-value*| *tag-value-dotted-decimal*}

no set tag {*tag-value*| *tag-value-dotted-decimal*}

Syntax Description

| | |
|---------------------------------|---|
| <i>tag-value</i> | Route tag value in plain decimals. The range is from 0 to 4294967295. |
| <i>tag-value-dotted-decimal</i> | Route tag value in dotted decimals. The range is from 0.0.0.0 to 255.255.255.255. |

Command Default

Routes are not tagged.

Command Modes

Route-map configuration (config-route-map)

Command History

| Release | Modification |
|---------------------------|---|
| 10.0 | 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. |
| Cisco IOS XE Release 2.1 | This command was implemented on Cisco ASR 1000 Series Aggregation Services Routers. |
| 15.2(2)S | This command was modified. This command was integrated into Cisco IOS Release 15.2(2)S and the <i>tag-value-dotted-decimal</i> argument was added to support tag values in dotted-decimal format. |
| Cisco IOS XE Release 3.6S | This command was modified. The <i>tag-value-dotted-decimal</i> argument was added to support tag values in dotted-decimal format. |

Usage Guidelines

Use the **set tag** command to set an administrative tag for a route within a route map. Route tags are 32-bit values attached to routes. You can set tag values as plain decimals or dotted decimals. Route tags are used by

route maps to filter routes. The tag value has no impact on routing decisions. It is used to mark or flag routes to prevent routing loops when routes are redistributed between routing protocols.

Examples

The following example shows how to set the tag value of the destination routing protocol to 5:

```
Device(config)# route-map tag
Device(config-route-map)# set tag 5
```

The following example shows how to set the tag value in the dotted-decimal format:

```
Device(config)# route-map tag
Device(config-route-map)# set tag 10.10.10.10
```

Related Commands

| Command | Description |
|--------------------------|---|
| match tag | Filters routes that match specific route tags. |
| route-map (IP) | Defines conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set automatic-tag | Automatically computes the tag value. |

show bfd neighbors

To display a line-by-line listing of existing Bidirectional Forwarding Detection (BFD) adjacencies, use the **show bfd neighbors** command in user EXEC or privileged EXEC mode.

```
show bfd neighbors [client {bgp|eigrp|isis|ospf|rsvp|te-frr}| details| interface-type interface-number|
internal| ipv4 ip-address| ipv6 ipv6-address| vrf vrf-name]
```

Syntax Description

| | |
|--|--|
| client | (Optional) Displays neighbors of a specific client. |
| bgp | (Optional) Displays a Border Gateway Protocol (BGP) client. |
| eigrp | (Optional) Displays an Enhanced Interior Gateway Routing Protocol (EIGRP) client. |
| isis | (Optional) Specifies an Intermediate System-to-Intermediate System (IS-IS) client. |
| ospf | (Optional) Specifies an Open Shortest Path First (OSPF) client. |
| rsvp | (Optional) Specifies a Resource Reservation Protocol (RSVP) client. |
| te-frr | (Optional) Specifies a traffic engineering (TE) Fast Reroute (FRR) client. |
| details | (Optional) Displays all BFD protocol parameters and timers for each neighbor. |
| <i>interface-type interface-number</i> | (Optional) Neighbors at the specified interface. |
| internal | (Optional) Displays internal BFD information. |
| ipv4 | (Optional) Specifies an IPv4 neighbor. If the ipv4 keyword is used without the <i>ip-address</i> argument, all IPv4 sessions are displayed. |
| <i>ip-address</i> | (Optional) IP address of a neighbor in A.B.C.D format. |
| ipv6 | (Optional) Specifies an IPv6 neighbor. If the ipv6 keyword is used without the <i>ipv6-address</i> argument, all IPv6 sessions are displayed. |
| <i>ipv6-address</i> | (Optional) IPv6 address of a neighbor in X:X:X:X::X format. |

| | |
|----------------------------|--|
| vrf <i>vrf-name</i> | (Optional) Displays entries for the specified VPN routing and forwarding (VRF) instance. |
|----------------------------|--|

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

| S Release | Modification |
|------------------|---|
| 12.0(31)S | This command was introduced. |
| 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 | This command was modified. The vrf <i>vrf-name</i> keyword and argument, the client keyword, and the <i>ip-address</i> argument were added. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was modified. The output was modified to display the "OurAddr" field only with the details keyword. |
| 12.2(33)SRE | This command was modified. Support for IPv6 was added. |
| 15.1(2)S | This command was modified. <ul style="list-style-type: none"> • The show bfd neighbors details command output was changed for hardware-offloaded BFD sessions. • The show bfd neighbors command output was changed to display the header type to identify the session type. |
| 15.1(3)S | This command was modified to display information about multihop sessions. |
| 15.2(4)S | This command was modified. The output of the command was enhanced to include Template and Authentication fields for single-hop sessions. |
| 15.1(1)SY | This command was integrated into Cisco IOS Release 15.1(1)SY. |
| 15.4(3)S | This command was implemented on the Cisco ASR 901 Series Aggregation Services Router. |
| T Release | Modification |
| 12.4(4)T | This command was integrated into Cisco IOS Release 12.4(4)T. |
| 12.4(9)T | This command was modified. Support for BFD Version 1 and BFD echo mode was added. |

| S Release | Modification |
|--------------------------|---|
| 15.1(2)T | This command was modified. Support for IPv6 was added. |
| 15.1(1)SG | This command was integrated into Cisco IOS Release 15.1(1)SG. |
| 15.2(1)E | This command was integrated into Cisco IOS Release 15.2(1)E. |
| XE Release | Modification |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

The **show bfd neighbors** command can be used to help troubleshoot the BFD feature.

The full output for the **details** keyword is not supported on the Route Processor (RP) for the Cisco 12000 Series Internet Router. If you want to enter the **show bfd neighbors** command with the **details** keyword on the Cisco 12000 Series Internet Router, you must enter the command on the line card. Use the **attach slot** command to establish a CLI session with a line card.

In Cisco IOS Release 15.1(2)S and later releases that support BFD hardware offload, the Tx and Rx intervals on both BFD peers must be configured in multiples of 50 milliseconds. If they are not, output from the **show bfd neighbors details** command will show the configured intervals, not the changed ones.

See the “Configuring Synchronous Ethernet on the Cisco 7600 Router with ES+ Line Card” section of the *Cisco 7600 Series Ethernet Services Plus (ES+) and Ethernet Services Plus T (ES+T) Line Card Configuration Guide* for more information about prerequisites and restrictions for hardware offload.

Examples

The following is sample output from the **show bfd neighbors** that shows the status of the adjacency or neighbor:

```
Device# show bfd neighbors
```

```
OurAddr      NeighAddr      LD/RD RH  Holddown(mult) State      Int
172.16.10.1  172.16.10.2    1/6  1    260 (3 )      Up        Fa0/1
```

The following is sample output from the **show bfd neighbors** command when it is entered with the **details** keyword that shows BFD protocol parameters and timers for each neighbor:

```
Device# show bfd neighbors details
```

```
NeighAddr      LD/RD  RH/RS  State  Int
10.1.1.2        1/1    1(RH)  Up     Et0/0
Session state is UP and not using echo function.
OurAddr: 10.1.1.1
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 50000, MinRxInt: 50000, Multiplier: 3 Received MinRxInt: 50000, Received Multiplier:
 3 Holddown (hits): 150(0), Hello (hits): 50(2223) Rx Count: 2212, Rx Interval (ms)
min/max/avg: 8/68/49 last: 0 ms ago Tx Count: 2222, Tx Interval (ms) min/max/avg: 40/60/49
last: 20 ms ago Elapsed time watermarks: 0 0 (last: 0) Registered protocols: CEF Stub
Uptime: 00:01:49
Last packet: Version: 0                - Diagnostic: 0
              I Hear You bit: 1         - Demand bit: 0
              Poll bit: 0              - Final bit: 0
              Multiplier: 3            - Length: 24
              My Discr.: 1             - Your Discr.: 1
              Min tx interval: 50000    - Min rx interval: 50000
              Min Echo interval: 50000
```

show bfd neighbors

The following is sample output from the **show bfd neighbors** command when it is entered on a Cisco 12000 Series Internet Router Route Processor (RP) that shows the status of the adjacency or neighbor:

```
Device# show bfd neighbors

Cleanup timer hits: 0
OurAddr      NeighAddr      LD/RD RH  Holdown(mult)  State  Int
172.16.10.2  172.16.10.1    2/0  0  0  (0 )  Up      Fa6/0
Total Adjs Found: 1
```

The following is sample output from the **show bfd neighbors** command when it is entered in a Cisco 12000 Series Internet Router RP that shows the status of the adjacency or neighbor with the **details** keyword:

```
Device# show bfd neighbors details

Cleanup timer hits: 0
OurAddr      NeighAddr      LD/RD RH  Holdown(mult)  State  Int
172.16.10.2  172.16.10.1    2/0  0  0  (0 )  Up      Fa6/0
Registered protocols: OSPF
Uptime: never
%% BFD Neighbor statistics are not available on RP. Please execute this command on Line Card.
```

The following is sample output from the **show bfd neighbors** command when it is entered on a Cisco 12000 Series Internet Router line card that shows the status of the adjacency or neighbor:

```
Device# attach 6

Entering Console for 8 Port Fast Ethernet in Slot: 6
Type "exit" to end this session
Press RETURN to get started!

Device> show bfd neighbors

Cleanup timer hits: 0
OurAddr      NeighAddr      LD/RD RH  Holdown(mult)  State  Int
172.16.10.2  172.16.10.1    2/1  1  848 (5 )  Up      Fa6/0
Total Adjs Found: 1
```

The following is sample output from the **show bfd neighbors** command when it is entered on a Cisco 12000 Series Internet Router line card that shows the status of the adjacency or neighbor with the **details** keyword:

```
Device# attach 6

Entering Console for 8 Port Fast Ethernet in Slot: 6
Type "exit" to end this session
Press RETURN to get started!
Device> show bfd neighbors details

Cleanup timer hits: 0
OurAddr      NeighAddr      LD/RD RH  Holdown(mult)  State  Int
172.16.10.2  172.16.10.1    2/1  1  892 (5 )  Up      Fa6/0
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 50000, MinRxInt: 1000, Multiplier: 3
Received MinRxInt: 200000, Received Multiplier: 5
Holdown (hits): 1000(0), Hello (hits): 200(193745)
Rx Count: 327406, Rx Interval (ms) min/max/avg: 152/248/196 last: 108 ms ago
Tx Count: 193748, Tx Interval (ms) min/max/avg: 204/440/331 last: 408 ms ago
Last packet: Version: 0
                - Diagnostic: 0
                I Hear You bit: 1 - Demand bit: 0
                Poll bit: 0 - Final bit: 0
                Multiplier: 5 - Length: 24
                My Discr.: 1 - Your Discr.: 2
                Min tx interval: 200000 - Min rx interval: 200000
                Min Echo interval: 0
Uptime: 17:54:07
SSO Cleanup Timer called: 0
SSO Cleanup Action Taken: 0
Pseudo pre-emptive process count: 7728507 min/max/avg: 8/16/8 last: 12 ms ago
IPC Tx Failure Count: 0
IPC Rx Failure Count: 0
```

```
Total Adjs Found: 1
Device>
```

Examples

The following is sample output from the **show bfd neighbors details** command that shows that the BFD neighbor device is running BFD Version 1 and that the BFD session is up and running in echo mode:

```
Device# show bfd neighbors details

OurAddr      NeighAddr    LD/RD  RH/RS    Holddown(mult)  State      Int
172.16.1.2   172.16.1.1   1/6    Up        0 (3)           Up        Fa0/1
Session state is UP and using echo function with 50 ms interval.
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 1000000, MinRxInt: 1000000, Multiplier: 3
Received MinRxInt: 1000000, Received Multiplier: 3
Holddown (hits): 3000(0), Hello (hits): 1000(337)
Rx Count: 341, Rx Interval (ms) min/max/avg: 1/1008/882 last: 364 ms ago
Tx Count: 339, Tx Interval (ms) min/max/avg: 1/1016/886 last: 632 ms ago
Registered protocols: EIGRP
Uptime: 00:05:00
Last packet: Version: 1
              - Diagnostic: 0
                State bit: Up                - Demand bit: 0
                Poll bit: 0                  - Final bit: 0
                Multiplier: 3                - Length: 24
                My Discr.: 6                  - Your Discr.: 1
                Min tx interval: 1000000     - Min rx interval: 1000000
                Min Echo interval: 50000
```

The following is sample output from the **show bfd neighbors** command that displays all IPv6 sessions:

```
Device# show bfd neighbors ipv6 2001::1

OurAddr      NeighAddr    LD/RD  RH/RS    Holddown(mult)  State      Int
2001:DB8:0:ABCD::1  2001:DB8:0:ABCD::2  2/2    Up        0 (3)           Up
Et0/0
2001:DB8:0:1:FFFF:1234::5  2001:DB8:0:1:FFFF:1234::6  4/4    Up        0 (3)           Up
Et1/0
```

The following is a sample output from the **show bfd neighbors**

The following is sample output from the **show bfd neighbors** command:

```
Device# show bfd neighbors

NeighAddr    LD/RD  RH/RS    State      Int
192.0.2.1    4/0    Down     Down       Et0/0
192.0.2.2    5/0    Down     Down       Et0/0
192.0.2.3    6/0    Down     Down       Et0/0
192.0.2.4    7/0    Down     Down       Et0/0
192.0.2.5    8/0    Down     Down       Et0/0
192.0.2.6    11/0   0 (RH)   Fail       Et0/0
2001:DB8::1  9/0    Down     Down       Et0/0
2001:DB8:0:ABCD::1  10/0   Down     Down       Et0/0
2001:DB8::2  1/0    0 (RH)   Fail       Et0/0
2001:DB8:0:1::1  2/0    Down     Down       Et0/0
2001:DB8:0:1:FFFF:1234::5  3/0    Down     Down       Et0/0
```

The following is sample output from the **show bfd neighbors details** command:

```
Device# show bfd neighbors details

IPv4 Sessions
NeighAddr    LD/RD  RH/RS    State      Int
100.0.2.1    127/156  Down     Init       Se0/5/1.1/2/1/1:0
Session Host: Hardware - session negotiated with platform adjusted timer values.
                MinTxInt - configured: 200000 adjusted: 1000000
OurAddr: 100.0.2.2
Handle: 2
Local Diag: 1, Demand mode: 0, Poll bit: 0
MinTxInt: 1000000, MinRxInt: 1000000, Multiplier: 3
Received MinRxInt: 1000000, Received Multiplier: 3
Holddown (hits): 0(0), Hello (hits): 1000(0)
```

```

Rx Count: 5052
Tx Count: 7490
Elapsed time watermarks: 0 0 (last: 0)
Registered protocols: IPv4 Static CEF
Template: software
Downtime: 00:00:05
Last packet: Version: 1           - Diagnostic: 3
              State bit: Down     - Demand bit: 0
              Poll bit: 0         - Final bit: 0
              C bit: 1
              Multiplier: 3       - Length: 24
              My Discr.: 156      - Your Discr.: 0
              Min tx interval: 1000000 - Min rx interval: 1000000
              Min Echo interval: 200000

```

The table below describes the significant fields shown in the displays.

Table 1: show bfd neighbors Field Descriptions

| Field | Description |
|--|---|
| OurAddr | IP address of the interface for which the show bfd neighbors details command was entered. |
| NeighAddr | IPv4 or IPv6 address of the BFD adjacency or neighbor. |
| LD/RD | Local discriminator (LD) and remote discriminator (RD) being used for the session. |
| RH | Remote Heard (RH) Indicates that the remote BFD neighbor has been heard. |
| Holdown (mult) | Detect timer multiplier that is used for this session. |
| State | State of the interface—Up or Down. |
| Int | Interface type and slot/port. |
| Session state is UP and using echo function with 50 ms interval. | BFD is up and running in echo mode. The 50-millisecond interval has been adopted from the bfd command. Note BFD Version 1 and echo mode are supported only in Cisco IOS Release 12.4(9)T and later releases. |
| Rx Count | Number of BFD control packets that are received from the BFD neighbor. |
| Tx Count | Number of BFD control packets that are sent by the BFD neighbor. |
| Tx Interval | The interval, in milliseconds, between sent BFD packets. |
| Registered protocols | Routing protocols that are registered with BFD. |

| Field | Description |
|-----------------------|---|
| Last packet: Version: | <p>BFD version detected and run between the BFD neighbors. The system automatically performs BFD version detection, and BFD sessions between neighbors will run in the highest common BFD version. For example, if one BFD neighbor is running BFD Version 0 and the other BFD neighbor is running Version 1, the session will run BFD Version 0.</p> <p>Note BFD Version 1 and echo mode are supported only in Cisco IOS Release 12.4(9)T and later releases.</p> |
| Diagnostic | <p>A diagnostic code specifying the local system's reason for the last transition of the session from Up to some other state.</p> <p>State values are as follows:</p> <ul style="list-style-type: none"> • 0—No Diagnostic • 1—Control Detection Time Expired • 2—Echo Function Failed • 3—Neighbor Signaled Session Down • 4—Forwarding Plane Reset • 5—Path Down • 6—Concentrated Path Down • 7—Administratively Down |
| I Hear You bit | <p>The I Hear You bit is set to 0 if the transmitting system is either not receiving BFD packets from the remote system or is tearing down the BFD session for some reason. During normal operation, the I Hear You bit is set to 1 to signify that the remote system is receiving the BFD packets from the transmitting system.</p> |
| Demand bit | <p>Demand mode bit. BFD has two modes: asynchronous and demand. If the demand mode is set, the transmitting system prefers to operate in demand mode. The Cisco implementation of BFD supports only asynchronous mode.</p> |
| Poll bit | <p>Indicates that the transmitting system is requesting verification of connectivity or verification of a parameter change.</p> |

| Field | Description |
|-------------------|---|
| Final bit | Indicates that the transmitting system is responding to a received BFD control packet that had a Poll (P) bit set. |
| Multiplier | <p>Detect time multiplier. The negotiated transmit interval multiplied by the detect time multiplier determines the detection time for the transmitting system in BFD asynchronous mode.</p> <p>The detect time multiplier is similar to the hello multiplier in Intermediate System-to-Intermediate System (IS-IS), which is used to determine the hold timer: (hello interval) * (hello multiplier) = hold timer. If a hello packet is not received within the hold-timer interval, it indicates that a failure has occurred.</p> <p>Similarly, for BFD: (transmit interval) * (detect multiplier) = detect timer. If a BFD control packet is not received from the remote system within the detect-timer interval, it indicates that a failure has occurred.</p> |
| Length | Length of the BFD control packet, in bytes. |
| My Discr. | My Discriminator is a unique, nonzero discriminator value generated by the transmitting system used to demultiplex multiple BFD sessions between the same pair of systems. |
| Your Discr. | Your Discriminator is a discriminator that is received from the corresponding remote system. This field reflects the received value of My Discriminator or is zero if that value is unknown. |
| Min tx interval | Minimum transmission interval, in microseconds, that the local system wants to use when sending BFD control packets. |
| Min rx interval | Minimum receipt interval, in microseconds, between received BFD control packets that the system can support. |
| Min Echo interval | <p>Minimum interval, in microseconds, between received BFD control packets that the system can support. If the value is zero, the transmitting system does not support the receipt of BFD echo packets.</p> <p>The Cisco implementation of BFD for Cisco IOS Releases 12.2(18)SXE and 12.0(31)S does not support the use of echo packets.</p> |

The following is sample output from the **show bfd neighbors details** command for BFD sessions offloaded to hardware. The Rx and Tx counts show the number of packets received and transmitted by the BFD session in hardware.

```
Device# show bfd neighbors details

NeighAddr          LD/RD          RH/RS          State          Int
192.0.2.1          298/298       Up             Up             Te7/1.2
Session state is UP and not using echo function.
Session Host: Hardware - session negotiated with platform adjusted timer values.
                Holddown - negotiated: 510000         adjusted: 0
OurAddr: 192.0.2.2
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 170000, MinRxInt: 170000, Multiplier: 3
Received MinRxInt: 160000, Received Multiplier: 3
Holddown (hits): 0(0), Hello (hits): 170(0)
Rx Count: 1256983
Tx Count: 24990
Elapsed time watermarks: 0 0 (last: 0)
Registered protocols: OSPF CEF
Uptime: 18:11:31
Last packet: Version: 1                - Diagnostic: 0
                State bit: Up          - Demand bit: 0
                Poll bit: 0           - Final bit: 0
                Multiplier: 3         - Length: 24
                My Discr.: 298        - Your Discr.: 298
                Min tx interval: 160000 - Min rx interval: 160000
                Min Echo interval: 0
```

The following is sample output from the **show bfd neighbors** command showing a header type identifying the type of session:

```
Device# show bfd neighbors

MPLS-TP Sessions
Interface      LSP type      LD/RD      RH/RS      State
Tunnel-tp1    Working      1/0       Down      Down
Tunnel-tp2    Working      3/0       Down      Down
Tunnel-tp1    Protect      2/0       Down      Down

IPv4 Sessions
NeighAddr          LD/RD      RH/RS      State      Int
192.0.2.1          2/0       Down      Down      Et2/0
```

The following is sample output from the **show bfd neighbors** command for Virtual Circuit Connection Verification (VCCV) sessions:

```
Device# show bfd neighbors

VCCV Sessions
Peer Addr      :VCID      LD/RD      RH/RS      State
198.51.100.1  :100       1/1       Up         Up
```

The following is sample output from the **show bfd neighbors** command for IPv4 and IPv6 sessions:

```
Device# show bfd neighbors

IPv4 Sessions
NeighAddr          LD/RD      RH/RS      State      Int
192.0.2.1          6/0       Down      Down      Et1/0
203.0.113.1       7/6       Up        Up        Et3/0
198.51.100.2      8/7       Up        Up        Et0/0

IPv6 Sessions
NeighAddr          LD/RD      RH/RS      State      Int
2001:DB8::1       1/1       Up        Up        Et0/0
2001:DB8:0:ABCD::1 2/2       Up        Up        Et0/0
2001:DB8::2       3/3       Up        Up        Et0/0
2001:DB8:0:1:FFFF:1234::5 4/4     Up        Up        Et0/0
2001:DB8:0:1::1   5/5       Up        Up        Et0/0
```

The table below describes the significant fields shown in the displays.

Table 2: show bfd neighbors Field Descriptions

| Field | Description |
|-----------|---|
| Interface | Name of the Multiprotocol Label Switching (MPLS) tunnel Transport Profile (TP) interface. |
| LSP type | Type of label-switched path for this session (Working or Protect). |

The following is sample output from the **show bfd neighbors** command for a single-hop session:

```
Device# show bfd neighbors

IPv4 Sessions
NeighAddr          LD/RD          RH/RS    State    Int
192.0.2.6          1/12          Up       Up       Et0/0
Session state is UP and using echo function with 300 ms interval.
Session Host: Software
OurAddr: 192.0.2.12
Handle: 12
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 1000000, MinRxInt: 1000000, Multiplier: 3
Received MinRxInt: 1000000, Received Multiplier: 3
Holddown (hits): 0(0), Hello (hits): 1000(62244)
Rx Count: 62284, Rx Interval (ms) min/max/avg: 1/2436/878 last: 239 ms ago
Tx Count: 62247, Tx Interval (ms) min/max/avg: 1/1545/880 last: 246 ms ago
Elapsed time watermarks: 0 0 (last: 0)
Registered protocols: Stub CEF
Template: my-template
Authentication(Type/Keychain): sha-1/my-chain
Uptime: 00:22:06
Last packet: Version: 1          - Diagnostic: 0
              State bit: Up      - Demand bit: 0
              Poll bit: 0        - Final bit: 0
              Multiplier: 3       - Length: 24
              My Discr.: 12       - Your Discr.: 1
              Min tx interval: 1000000 - Min rx interval: 1000000
              Min Echo interval: 300000
```

The table below describes the significant fields shown in the display.

Table 3: show bfd neighbors Field Descriptions for Single-Hop BFD Sessions

| Field | Description |
|----------------|------------------------------------|
| Template | BFD multihop template name. |
| Authentication | Authentication type and key chain. |

The following is sample output from the **show bfd neighbors** command for an IPv4 multihop session. The section headed "Map information:" has information specific to the multihop session.

```
Device# show bfd neighbors

IPv4 Multihop Sessions
NeighAddr[vrf]          LD/RD          RH/RS    State
192.0.2.20              2/13          Up       Up
Session state is UP and not using echo function.
```

```

Session Host: Software
OurAddr: 192.0.2.21
Handle: 13
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 750000, MinRxInt: 750000, Multiplier: 3
Received MinRxInt: 750000, Received Multiplier: 15
Holddown (hits): 10772(0), Hello (hits): 750(82985)
Rx Count: 82973, Rx Interval (ms) min/max/avg: 24/1334/659 last: 478 ms ago
Tx Count: 82935, Tx Interval (ms) min/max/avg: 1/1141/660 last: 78 ms ago
Elapsed time watermarks: 0 0 (last: 0)
Registered protocols: Xconnect
Map information:
  Destination[vrf]: 192.0.2.1/24
  Source[vrf]: 192.0.2.2/24
  Template: mh
  Authentication (Type/Keychain): md5/qq
  last_tx_auth_seq: 5 last_rx_auth_seq 4
Uptime: 15:12:26
Last packet: Version: 1
              State bit: Up
              Poll bit: 0
              Multiplier: 15
              My Discr.: 13
              Min tx interval: 750000
              Min Echo interval: 0
              - Diagnostic: 0
              - Demand bit: 0
              - Final bit: 0
              - Length: 48
              - Your Discr.: 2
              - Min rx interval: 750000

```

The table below describes the significant fields shown in the display.

Table 4: show bfd neighbors Field Descriptions for Multihop BFD Sessions

| Field | Description |
|------------------|---|
| Destination | BFD map destination address. |
| Source | BFD map source address. |
| Template | BFD multihop template name. |
| Authentication | Authentication type and key chain. |
| last_tx_auth_seq | Last authenticated sequence sent by the peer. |
| last_rx_auth_seq | Last authenticated sequence received by the peer. |

Related Commands

| Command | Description |
|-------------------------|--|
| attach | Connects to a specific line card to execute monitoring and maintenance commands on that line card. |
| show bfd drops | Displays the number of dropped packets in BFD. |
| show bfd summary | Displays summary information for BFD. |

show dampening interface

To display a summary of dampened interfaces, use the **showdampeninginterface** command in user EXEC or privileged EXEC mode.

show dampening interface command `show dampening interface`

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

Command History

| Release | Modification |
|-------------|---|
| 12.0(22)S | This command was introduced. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.2(13)T | This command was integrated into Cisco IOS Release 12.2(13)T. |
| 12.2(18)SXD | This command was integrated into Cisco IOS Release 12.2(18)SXD. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |

Examples

The following is sample output from the **showdampeninginterface** command in privileged EXEC mode:

```
Router# show dampening interface
3 interfaces are configured with dampening.
No interface is being suppressed.
Features that are using interface dampening:
  IP Routing
  CLNS Routing
```

The table below describes the significant fields shown in the sample output of the show dampening interface command.

Table 5: show dampening interface Field Descriptions

| Field | Description |
|---|--|
| ... interfaces are configured with dampening. | Displays the number of interfaces that are configured for event dampening. |
| No interface is being suppressed. | Displays the suppression status of the interfaces that are configured for event dampening. |
| Features that are using interface dampening: | Displays the routing protocols that are configured to perceived interface dampening. |

Related Commands

| Command | Description |
|---------------------------------|--|
| clear counters | Clears the interface counters. |
| dampening | Enables IP event dampening at the interface level. |
| show interface dampening | Displays a summary of the dampening parameters and status. |

show interface dampening

To display dampened interfaces on the local router, use the **showinterface dampening** command in privileged EXEC mode.

show interface dampening command `show interface dampening`

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|-------------|---|
| 12.0(22)S | This command was introduced. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.2(13)T | This command was integrated into Cisco IOS Release 12.2(13)T. |
| 12.2(18)SXD | This command was integrated into Cisco IOS Release 12.2(18)SXD. |
| 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. |

Examples

The following is sample output from the **showinterfacedampening** command:

```
Router# show interface dampening
Flaps Penalty Supp ReuseTm HalfL ReuseV SuppV MaxSTm MaxP Restart
      0      0 FALSE      0      5  1000  2000  20  16000  0
```

The table below describes the significant fields shown in the display.

Table 6: show interface dampening Field Descriptions

| Field | Description |
|---------|---|
| Flaps | Displays the number of times that an interface has flapped. |
| Penalty | Displays the accumulated penalty. |
| Supp | Indicates if the interface is dampened. |
| ReuseTm | Displays the reuse timer. |

| Field | Description |
|---------|-------------------------------------|
| HalfL | Displays the half-life counter. |
| ReuseV | Displays the reuse threshold timer. |
| SuppV | Displays the suppress threshold. |
| MaxSTm | Displays the maximum suppress. |
| MaxP | Displays the maximum penalty. |
| Restart | Displays the restart timer. |

Related Commands

| Command | Description |
|---------------------------------|--|
| clear counters | Clears the interface counters. |
| dampening | Enables IP event dampening at the interface level. |
| show dampening interface | Displays a summary of interface dampening. |

show ip cache policy

To display the cache entries in the policy route cache, use the **show ip cache policy** command in EXEC mode.

show ip cache policy

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History

| Release | Modification |
|-------------|---|
| 11.3 | 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. |

Examples

The following is sample output from the **show ip cache policy** command:

```
Router# show ip cache policy
Total adds 10, total deletes 10
Type Routemap/sequence      Age      Interface      Next Hop
NH  george/10                00:04:31 Ethernet0      192.168.1.2
Int george/30                00:01:23 Serial4        192.168.5.129
```

The table below describes the significant fields shown in the display.

Table 7: show ip cache policy Field Descriptions

| Field | Description |
|---------------|---|
| Total adds | Number of times a cache entry was created. |
| total deletes | Number of times a cache entry or the entire cache was deleted. |
| Type | “NH” indicates the set ip next-hop command. “Int” indicates the set interface command. |
| Routemap | Name of the route map that created the entry; in this example, george. |
| sequence | Route map sequence number. |

| Field | Description |
|-----------|-----------------------------------|
| Age | Age of the cache entry. |
| Interface | Output interface type and number. |
| Next Hop | IP address of the next hop. |

Related Commands

| Command | Description |
|-----------------------|--|
| ip route-cache | Configures the router to export the flow cache entry to a workstation when a flow expires. |

show ip local policy

To display the route map used for local policy routing, if any, use the **showiplocalpolicy** command in EXEC mode.

show ip local policy command **show ip local policy**

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|-------------|---|
| | 11.1 | 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. |

Examples The following is sample output from the **showiplocalpolicy** command:

```
Router# show ip local policy
Local policy routing is enabled, using route map equal
route-map equal, permit, sequence 10
  Match clauses:
    length 150 200
  Set clauses:
    ip next-hop 10.10.11.254
  Policy routing matches: 0 packets, 0 bytes
route-map equal, permit, sequence 20
  Match clauses:
    ip address (access-lists): 101
  Set clauses:
    ip next-hop 10.10.11.14
  Policy routing matches: 2 packets, 172 bytes
```

The table below describes the significant fields shown in the display.

Table 8: show ip local policy Field Descriptions

| Field | Description |
|-----------------|---|
| route-map equal | The name of the route map is equal. |
| permit | The route map contains permit statements. |

| Field | Description |
|---------------------------------|--|
| sequence | The sequence number of the route map, which determines in what order it is processed among other route maps. |
| Match clauses: | Clauses in the route map that must be matched to satisfy the permit or deny action. |
| Set clauses: | Set clauses that will be put into place if the match clauses are met. |
| Policy routing matches: packets | Number of packets that meet the match clauses. |
| bytes | Number of bytes in the packets that meet the match clauses. |

Related Commands

| Command | Description |
|--|---|
| ip policy route-map | Identifies a route map to use for local policy routing. |
| match ip address | Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets. |
| match length | Bases policy routing on the Level 3 length of a packet. |
| route-map (IP) | Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set default interface | Indicates where to output packets that pass a match clause of a route map for policy routing and have no explicit route to the destination. |
| set interface | Indicates where to output packets that pass a match clause of route map for policy routing. |
| set ip default next-hop verify-availability | Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco IOS software has no explicit route to a destination. |
| set ip next-hop | Indicates where to output packets that pass a match clause of a route map for policy routing. |

show ip policy

To display the route map used for policy routing, use the **showippolicy** command in user EXEC or privileged EXEC mode.

show ip policy

Syntax Description This command has no arguments or keywords.

Command Modes User EXEC Privileged EXEC

| Command History | Release | Modification |
|-----------------|-------------|---|
| | 11.1 | This command was introduced. |
| | 12.3(7)T | The display output was modified to include a label for dynamic route maps. |
| | 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. |

Examples The following is sample output from the **showippolicy** command:

```
Router# show ip policy
Interface      Route map
local         equal
Ethernet0/2   equal
Ethernet0/3   AAA-02/06/04-14:01:26.619-1-AppSpec (Dynamic)
```

The following is sample output from the **showroute-map** command, which relates to the preceding sample display:

```
Router# show route-map
route-map equal, permit, sequence 10
  Match clauses:
    length 150 200
  Set clauses:
    ip next-hop 10.10.11.254
  Policy routing matches: 0 packets, 0 bytes
route-map equal, permit, sequence 20
  Match clauses:
    ip address (access-lists): 101
  Set clauses:
    ip next-hop 10.10.11.14
  Policy routing matches: 144 packets, 15190 bytes
```

The table below describes the significant fields shown in the display.

Table 9: show ip policy Field Descriptions

| Field | Description |
|--------------------------------|--|
| route-map equal | The name of the route map is equal. |
| permit | The route map contains permit statements. |
| sequence | Sequence number of the route map, which determines in what order it is processed among other route maps. |
| Match clauses | Clauses in the route map that must be matched to satisfy the permit or deny action. |
| Set clauses | Set clauses that will be put into place if the match clauses are met. |
| Policy routing matches packets | Number of packets that meet the match clauses. |
| bytes | Number of bytes in the packets that meet the match clauses. |

Related Commands

| Command | Description |
|--|---|
| match ip address | Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets. |
| match length | Bases policy routing on the Level 3 length of a packet. |
| route-map (IP) | Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| set default interface | Indicates where to output packets that pass a match clause of a route map for policy routing and have no explicit route to the destination. |
| set interface | Indicates where to output packets that pass a match clause of route map for policy routing. |
| set ip default next-hop verify-availability | Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco IOS software has no explicit route to a destination. |

| Command | Description |
|------------------------|---|
| set ip next-hop | Indicates where to output packets that pass a match clause of a route map for policy routing. |

show ip protocols

To display the parameters and the current state of the active routing protocol process, use the **show ip protocols** command in privileged EXEC mode.

show ip protocols command `show ip protocols`

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-------------|---|
| 10.0 | This command was introduced. |
| 12.2(15)T | This command was modified. Support for the route-hold timer was integrated into the output. |
| 12.2(28)SB | This command was integrated into Cisco IOS 12.2(28)SB. |
| 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(2)S | This command was modified. The output of the command was modified to display that Routing Information Protocol (RIP) default routes are sent on passive interfaces. |

Usage Guidelines

The information displayed by the **show ip protocols** command is useful in debugging routing operations. Information in the Routing Information Sources field of the **show ip protocols** output can help you identify a router suspected of delivering bad routing information.

Once you configure the **default-information originate on-passive** command, the output of the **show ip protocols** command displays that RIP default routes are sent on passive interfaces.

Examples

The following sample output from the **show ip protocols** command shows Enhanced Interior Gateway Routing Protocol (EIGRP) process 3:

```
Router# show ip protocols
*** IP Routing is NSF aware ***
Routing Protocol is "eigrp 3"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Default networks flagged in outgoing updates
```

```

Default networks accepted from incoming updates
Redistributing: eigrp 3
EIGRP-IPv4 VR(test) Address-Family Protocol for AS(3)
Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
NSF-aware route hold timer is 240
Router-ID: 10.1.1.1
Topology : 0 (base)
Active Timer: 3 min
Distance: internal 90 external 170
Maximum path: 4
Maximum hopcount 100
Maximum metric variance 1
Total Prefix Count: 3
Total Redist Count: 0
Automatic Summarization: disabled
Maximum path: 4
Routing for Networks:
10.0.0.0
Routing Information Sources:
Gateway Distance Last Update
10.1.1.2 90 00:05:10
Distance: internal 90 external 170

```

The table below describes the significant fields shown in the display.

Table 10: show ip protocols Field Descriptions

| Field | Description |
|---|--|
| Routing Protocol is... | Name and autonomous system number of the currently running routing protocol. |
| Outgoing update filter list for all interfaces... | Indicates whether a filter for outgoing routing updates has been specified with the distribute-listout command. |
| Incoming update filter list for all interfaces... | Indicates whether a filter for incoming routing updates has been specified with the distribute-listin command. |
| Redistributing: | Indicates whether route redistribution has been enabled with the redistribute command. |
| EIGRP-IPv4 Protocol for AS(10) | EIGRP instance and autonomous system number. |
| Metric weight | EIGRP metric calculations. |
| NSF-aware route hold timer.. | Route-hold timer value for a nonstop forwarding (NSF)-aware router. |
| Router-ID: 10.1.1.1 | Router ID. |
| Topology | Number of entries in the EIGRP topology table. |
| Active Timer | EIGRP routing active time limit (in minutes). |

| Field | Description |
|------------------------------|--|
| Distance | Internal and external administrative distance. Internal distance is the degree of preference given to EIGRP internal routes. External distance is the degree of preference given to EIGRP external routes. |
| Maximum path | Maximum number of parallel routes that the EIGRP can support. |
| Maximum hopcount | Maximum hop count (in decimal). |
| Maximum metric variance | Metric variance used to find feasible paths for a route. |
| Automatic Summarization | Indicates whether route summarization has been enabled with the auto-summary command. |
| Routing for Networks: | Networks for which the routing process is currently injecting routes. |
| Routing Information Sources: | Lists all the routing sources that the Cisco IOS software is using to build its routing table. The following is displayed for each source: <ul style="list-style-type: none"> • IP address • Administrative distance • Time the last update was received from this source |

Examples

The following sample output from the **show ip protocols** command shows an Intermediate System-to-Intermediate System (IS-IS) process:

```
Router# show ip protocols
Routing Protocol is "isis"
  Sending updates every 0 seconds
  Invalid after 0 seconds, hold down 0, flushed after 0
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: isis
  Address Summarization:
    None
  Routing for Networks:
    Serial0
  Routing Information Sources:
    Distance: (default is 115)
```

The table below describes the significant fields shown in the display.

Table 11: show ip protocols Field Descriptions for an IS-IS Process

| Field | Description |
|---------------------------------|--|
| Routing Protocol is "isis" | Specifies the routing protocol used. |
| Sending updates every 0 seconds | Specifies the time (in seconds) between sending updates. |
| Invalid after 0 seconds | Specifies the value of the invalid parameter. |
| hold down 0 | Specifies the current value of the hold-down parameter. |
| flushed after 0 | Specifies the time (in seconds) after which the individual routing information will be thrown out (flushed). |
| Outgoing update ... | Specifies whether the outgoing filtering list has been set. |
| Incoming update ... | Specifies whether the incoming filtering list has been set. |
| Redistributing | Lists the protocol that is being redistributed. |
| Routing | Specifies the networks for which the routing process is currently injecting routes. |
| Routing Information Sources | Lists all the routing sources the Cisco IOS software is using to build its routing table. For each source, you will see the following displayed: <ul style="list-style-type: none"> • IP address • Administrative distance • Time the last update was received from this source |

Examples

The following sample output from the **show ip protocols** command displays RIP processes:

```
Router# show ip protocols
Routing Protocol is "rip"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Sending updates every 30 seconds, next due in 6 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Sending Default route on Passive interfaces
  Redistributing: rip
  Default version control: send version 2, receive version 2
  Automatic network summarization is not in effect
```

```

Maximum path: 4
Routing for Networks:
 172.19.0.0
 10.2.0.0
 10.3.0.0
Passive Interface(s):
 Ethernet0/0
 Ethernet0/1
 Ethernet0/2
 Ethernet0/3
 Ethernet1/0
 Ethernet1/1
 Ethernet1/2
 Ethernet1/3
Passive Interface(s):
 Serial2/0
 Serial2/1
 Serial2/2
 Serial2/3
 Serial3/0
 Serial3/1
 Serial3/2
 Serial3/3
Routing Information Sources:
 Gateway      Distance    Last Update
Distance: (default is 120)

```

The table below describes the significant fields shown in the display.

Table 12: show ip protocols Field Descriptions for a RIP Process

| Field | Description |
|---|--|
| Routing Protocol is "rip" | Specifies the routing protocol used. |
| Outgoing update ... | Specifies whether the outgoing filtering list has been set. |
| Incoming update ... | Specifies whether the incoming filtering list has been set. |
| Sending updates every 30 seconds | Specifies the time (in seconds) between sending updates. |
| next due in 6 seconds | Specifies when the next update is due to be sent. |
| Invalid after 180 seconds | Specifies the value of the invalid parameter. |
| hold down 180 | Specifies the current value of the hold-down parameter. |
| flushed after 240 | Specifies the time (in seconds) after which the individual routing information will be thrown (flushed) out. |
| Sending Default route on Passive interfaces | Specifies that RIP update packets are sent only with a default route on passive interfaces. |
| Redistributing | Lists the protocol that is being redistributed. |

| Field | Description |
|-----------------------------|--|
| Default version control: | Specifies the version of RIP packets that are sent and received. |
| Routing | Specifies the networks for which the routing process is currently injecting routes. |
| Routing Information Sources | Lists all the routing sources the Cisco IOS software is using to build its routing table. For each source, you will see the following displayed: <ul style="list-style-type: none"> • IP address • Administrative distance • Time the last update was received from this source |

Examples

The following is sample output from the **show ip protocols** command. The output shows that the router is running EIGRP, is NSF-aware, and that the route-hold timer is set to 240 seconds, which is the default value for the route-hold timer.

```
Router# show ip protocols
Routing Protocol is "eigrp 101"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
  EIGRP maximum hopcount 100
  EIGRP maximum metric variance 1
  Redistributing: eigrp 101
  EIGRP NSF-aware route hold timer is 240s
  Automatic network summarization is in effect
  Maximum path: 4
  Routing for Networks:
    10.4.9.0/24
  Routing Information Sources:
    Gateway         Distance      Last Update
  Distance: internal 90 external 170
```

The table below describes the significant fields shown in the display.

Table 13: show ip protocols Field Descriptions for an EIGRP NSF-Aware Process

| Field | Description |
|---------------------------------|---|
| Routing Protocol is "eigrp 101" | Specifies the routing protocol used. |
| Outgoing update ... | Specifies whether the outgoing filtering list has been set. |
| Incoming update ... | Specifies whether the incoming filtering list has been set. |

| Field | Description |
|------------------------------------|--|
| Default networks... | Specifies how these networks will be handled in both incoming and outgoing updates. |
| EIGRP... | Specifies the value of the K0-K5 metrics, and the maximum hop count. |
| Redistributing | Lists the protocol that is being redistributed. |
| EIGRP NSF-Aware... | Displays the route-hold timer value. |
| Automatic network summarization... | Specifies that automatic summarization is enabled. |
| Routing | Specifies the networks for which the routing process is currently injecting routes. |
| Routing Information Sources | Lists all the routing sources the Cisco IOS software is using to build its routing table. For each source, you will see the following displayed: <ul style="list-style-type: none"> • IP address • Administrative distance • Time the last update was received from this source |

Related Commands

| Command | Description |
|--|--|
| auto-summary (EIGRP) | Allows automatic summarization of subnet routes into network-level routes. |
| default-information originate (RIP) | Generates a default route into RIP. |
| distribute-list in (IP) | Filters networks received in updates. |
| distribute-list out (IP) | Suppresses networks from being advertised in updates. |
| redistribute (IP) | Redistributes routes from one routing domain into another routing domain. |

show ip route

To display contents of the routing table, use the **show ip route** command in user EXEC or privileged EXEC mode.

show ip route [*ip-address* [**repair-paths**| **next-hop-override** [**dhcp**]| *mask* [**longer-prefixes**]]| *protocol* [*process-id*]| **list** [*access-list-number* | *access-list-name*]| **static download**| **update-queue**]

Syntax Description

| | |
|---------------------------|---|
| <i>ip-address</i> | (Optional) IP address for which routing information should be displayed. |
| repair-paths | (Optional) Displays the repair paths. |
| next-hop-override | (Optional) Displays the Next Hop Resolution Protocol (NHRP) next-hop overrides that are associated with a particular route and the corresponding default next hops. |
| dhcp | (Optional) Displays routes added by the Dynamic Host Configuration Protocol (DHCP) server. |
| <i>mask</i> | (Optional) Subnet mask. |
| longer-prefixes | (Optional) Displays output for longer prefix entries. |
| <i>protocol</i> | (Optional) The name of a routing protocol or the keyword connected , mobile , static , or summary . If you specify a routing protocol, use one of the following keywords: bgp , eigrp , hello , isis , odr , ospf , nhrp , or rip . |
| <i>process-id</i> | (Optional) Number used to identify a process of the specified protocol. |
| list | (Optional) Filters output by an access list name or number. |
| <i>access-list-number</i> | (Optional) Access list number. |
| <i>access-list-name</i> | (Optional) Access list name. |
| static | (Optional) Displays static routes. |
| download | (Optional) Displays routes installed using the authentication, authorization, and accounting (AAA) route download function. This keyword is used only when AAA is configured. |

| | |
|---------------------|---|
| update-queue | (Optional) Displays Routing Information Base (RIB) queue updates. |
|---------------------|---|

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

| Release | Modification |
|----------------|---|
| 9.2 | This command was introduced. |
| 10.0 | This command was modified. The “D—EIGRP, EX—EIGRP, N1—SPF NSSA external type 1 route” and “N2—OSPF NSSA external type 2 route” codes were included in the command output. |
| 10.3 | This command was modified. The <i>process-id</i> argument was added. |
| 11.0 | This command was modified. The longer-prefixes keyword was added. |
| 11.1 | This command was modified. The “U—per-user static route” code was included in the command output. |
| 11.2 | This command was modified. The “o—on-demand routing” code was included in the command output. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA, and the update-queue keyword was added. |
| 11.3 | This command was modified. The command output was enhanced to display the origin of an IP route in Intermediate System-to-Intermediate System (IS-IS) networks. |
| 12.0(1)T | This command was modified. The “M—mobile” code was included in the command output. |
| 12.0(3)T | This command was modified. The “P—periodic downloaded static route” code was included in the command output. |
| 12.0(4)T | This command was modified. The “ia—IS-IS” code was included in the command output. |
| 12.2(2)T | This command was modified. The command output was enhanced to display information on multipaths to the specified network. |

| Release | Modification |
|---------------------------|---|
| 12.2(13)T | This command was modified. The <i>egp</i> and <i>igrp</i> arguments were removed because the Exterior Gateway Protocol (EGP) and the Interior Gateway Routing Protocol (IGRP) were no longer available in Cisco software. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.2(14)SX | This command was integrated into Cisco IOS Release 12.2(14)SX. |
| 12.3(2)T | This command was modified. The command output was enhanced to display route tag information. |
| 12.3(8)T | This command was modified. The command output was enhanced to display static routes using DHCP. |
| 12.2(27)SBC | This command was integrated into Cisco IOS Release 12.2(27)SBC. |
| 12.2(33)SRE | This command was modified. The dhcp and repair-paths keywords were added. |
| 12.2(33)XNE | This command was integrated into Cisco IOS Release 12.2(33)XNE. |
| Cisco IOS XE Release 2.5 | This command was integrated into Cisco IOS XE Release 2.5. The next-hop-override and nhrp keywords were added. |
| 15.2(2)S | This command was modified. The command output was enhanced to display route tag values in dotted decimal format. |
| Cisco IOS XE Release 3.6S | This command was modified. The command output was enhanced to display route tag values in dotted decimal format. |
| 15.2(4)S | This command was implemented on the Cisco 7200 series router. |
| 15.1(1)SY | This command was integrated into Cisco IOS Release 15.1(1)SY. |
| 15.4(2)S | This command was implemented on the Cisco ASR 901 Series Aggregation Services Router. |

Examples

Examples

The following is sample output from the **show ip route** command when an IP address is not specified:

```
Device# show ip route
```

```
Codes: R - RIP derived, O - OSPF derived,  
       C - connected, S - static, B - BGP derived,
```

```

* - candidate default route, IA - OSPF inter area route,
i - IS-IS derived, ia - IS-IS, U - per-user static route,
o - on-demand routing, M - mobile, P - periodic downloaded static route,
D - EIGRP, EX - EIGRP external, E1 - OSPF external type 1 route,
E2 - OSPF external type 2 route, N1 - OSPF NSSA external type 1 route,
N2 - OSPF NSSA external type 2 route
Gateway of last resort is 10.119.254.240 to network 10.140.0.0
O E2 10.110.0.0 [160/5] via 10.119.254.6, 0:01:00, Ethernet2
E 10.67.10.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
O E2 10.68.132.0 [160/5] via 10.119.254.6, 0:00:59, Ethernet2
O E2 10.130.0.0 [160/5] via 10.119.254.6, 0:00:59, Ethernet2
E 10.128.0.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.129.0.0 [200/129] via 10.119.254.240, 0:02:22, Ethernet2
E 10.65.129.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.10.0.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.75.139.0 [200/129] via 10.119.254.240, 0:02:23, Ethernet2
E 10.16.208.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.84.148.0 [200/129] via 10.119.254.240, 0:02:23, Ethernet2
E 10.31.223.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.44.236.0 [200/129] via 10.119.254.240, 0:02:23, Ethernet2
E 10.141.0.0 [200/129] via 10.119.254.240, 0:02:22, Ethernet2
E 10.140.0.0 [200/129] via 10.119.254.240, 0:02:23, Ethernet2

```

The following sample output from the **show ip route** command includes routes learned from IS-IS Level 2:

```
Device# show ip route
```

```

Codes: R - RIP derived, O - OSPF derived,
C - connected, S - static, B - BGP derived,
* - candidate default route, IA - OSPF inter area route,
i - IS-IS derived, ia - IS-IS, U - per-user static route,
o - on-demand routing, M - mobile, P - periodic downloaded static route,
D - EIGRP, EX - EIGRP external, E1 - OSPF external type 1 route,
E2 - OSPF external type 2 route, N1 - OSPF NSSA external type 1 route,
N2 - OSPF NSSA external type 2 route
Gateway of last resort is not set
10.89.0.0 is subnetted (mask is 255.255.255.0), 3 subnets
C 10.89.64.0 255.255.255.0 is possibly down,
routing via 10.0.0.0, Ethernet0
i L2 10.89.67.0 [115/20] via 10.89.64.240, 0:00:12, Ethernet0
i L2 10.89.66.0 [115/20] via 10.89.64.240, 0:00:12, Ethernet0

```

The following is sample output from the **show ip route ip-address mask longer-prefixes** command. When this keyword is included, the address-mask pair becomes the prefix, and any address that matches that prefix is displayed. Therefore, multiple addresses are displayed. The logical AND operation is performed on the source address 10.0.0.0 and the mask 10.0.0.0, resulting in 10.0.0.0. Each destination in the routing table is also logically ANDed with the mask and compared with 10.0.0.0. Any destinations that fall into that range are displayed in the output.

```
Device# show ip route 10.0.0.0 10.0.0.0 longer-prefixes
```

```

Codes: R - RIP derived, O - OSPF derived,
C - connected, S - static, B - BGP derived,
* - candidate default route, IA - OSPF inter area route,
i - IS-IS derived, ia - IS-IS, U - per-user static route,
o - on-demand routing, M - mobile, P - periodic downloaded static route,
D - EIGRP, EX - EIGRP external, E1 - OSPF external type 1 route,
E2 - OSPF external type 2 route, N1 - OSPF NSSA external type 1 route,
N2 - OSPF NSSA external type 2 route

Gateway of last resort is not set

S 10.134.0.0 is directly connected, Ethernet0
S 10.10.0.0 is directly connected, Ethernet0
S 10.129.0.0 is directly connected, Ethernet0
S 10.128.0.0 is directly connected, Ethernet0
S 10.49.246.0 is directly connected, Ethernet0
S 10.160.97.0 is directly connected, Ethernet0
S 10.153.88.0 is directly connected, Ethernet0
S 10.76.141.0 is directly connected, Ethernet0
S 10.75.138.0 is directly connected, Ethernet0

```

show ip route

```

S    10.44.237.0 is directly connected, Ethernet0
S    10.31.222.0 is directly connected, Ethernet0
S    10.16.209.0 is directly connected, Ethernet0
S    10.145.0.0 is directly connected, Ethernet0
S    10.141.0.0 is directly connected, Ethernet0
S    10.138.0.0 is directly connected, Ethernet0
S    10.128.0.0 is directly connected, Ethernet0
    10.19.0.0 255.255.255.0 is subnetted, 1 subnets
C    10.19.64.0 is directly connected, Ethernet0
    10.69.0.0 is variably subnetted, 2 subnets, 2 masks
C    10.69.232.32 255.255.255.240 is directly connected, Ethernet0
S    10.69.0.0 255.255.0.0 is directly connected, Ethernet0

```

The following sample outputs from the **show ip route** command display all downloaded static routes. A “p” indicates that these routes were installed using the AAA route download function.

```
Device# show ip route
```

```

Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR, P - periodic downloaded static route
       T - traffic engineered route

```

```
Gateway of last resort is 172.16.17.1 to network 10.0.0.0
```

```

    172.31.0.0/32 is subnetted, 1 subnets
P    172.31.229.41 is directly connected, Dialer1 10.0.0.0/8 is subnetted, 3 subnets
P    10.1.1.0 [200/0] via 172.31.229.41, Dialer1
P    10.1.3.0 [200/0] via 172.31.229.41, Dialer1
P    10.1.2.0 [200/0] via 172.31.229.41, Dialer1

```

```
Device# show ip route static
```

```

    172.16.4.0/8 is variably subnetted, 2 subnets, 2 masks
P    172.16.1.1/32 is directly connected, BRI0
P    172.16.4.0/8 [1/0] via 10.1.1.1, BRI0
S    172.31.0.0/16 [1/0] via 172.16.114.65, Ethernet0
S    10.0.0.0/8 is directly connected, BRI0
P    10.0.0.0/8 is directly connected, BRI0
    172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
S    172.16.114.201/32 is directly connected, BRI0
S    172.16.114.205/32 is directly connected, BRI0
S    172.16.114.174/32 is directly connected, BRI0
S    172.16.114.12/32 is directly connected, BRI0
P    10.0.0.0/8 is directly connected, BRI0
P    10.1.0.0/16 is directly connected, BRI0
P    10.2.2.0/24 is directly connected, BRI0
S*  0.0.0.0/0 [1/0] via 172.16.114.65, Ethernet0
S    172.16.0.0/16 [1/0] via 172.16.114.65, Ethernet0

```

The following sample output from the **show ip route static download** command displays all active and inactive routes installed using the AAA route download function:

```
Device# show ip route static download
```

```
Connectivity: A - Active, I - Inactive
```

```

A    10.10.0.0 255.0.0.0 BRI0
A    10.11.0.0 255.0.0.0 BRI0
A    10.12.0.0 255.0.0.0 BRI0
A    10.13.0.0 255.0.0.0 BRI0
I    10.20.0.0 255.0.0.0 172.21.1.1
I    10.22.0.0 255.0.0.0 Serial0
I    10.30.0.0 255.0.0.0 Serial0
I    10.31.0.0 255.0.0.0 Serial1
I    10.32.0.0 255.0.0.0 Serial1
A    10.34.0.0 255.0.0.0 192.168.1.1
A    10.36.1.1 255.255.255.255 BRI0 200 name remotel
I    10.38.1.9 255.255.255.0 192.168.69.1

```

The following sample outputs from the **show ip route nhrp** command display shortcut switching on the tunnel interface:

```
Device# show ip route

Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
Gateway of last resort is not set
10.0.0.0/16 is variably subnetted, 3 subnets, 2 masks
C       10.1.1.0/24 is directly connected, Tunnel0
C       172.16.22.0 is directly connected, Ethernet1/0
H       172.16.99.0 [250/1] via 10.1.1.99, 00:11:43, Tunnel0
       10.11.0.0/24 is subnetted, 1 subnets
C       10.11.11.0 is directly connected, Ethernet0/0
```

```
Device# show ip route nhrp

H       172.16.99.0 [250/1] via 10.1.1.99, 00:11:43, Tunnel0
```

The following are sample outputs from the **show ip route** command when the **next-hop-override** keyword is used. When this keyword is included, the NHRP next-hop overrides that are associated with a particular route and the corresponding default next hops are displayed.

```
=====
1) Initial configuration
=====

Device# show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
       + - replicated route

Gateway of last resort is not set
10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       10.2.1.0/24 is directly connected, Loopback1
L       10.2.1.1/32 is directly connected, Loopback1
       10.0.0.0/24 is subnetted, 1 subnets
S       10.10.10.0 is directly connected, Tunnel0
       10.11.0.0/24 is subnetted, 1 subnets
S       10.11.11.0 is directly connected, Ethernet0/0

Device# show ip route next-hop-override

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
       + - replicated route

Gateway of last resort is not set
10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       10.2.1.0/24 is directly connected, Loopback1
L       10.2.1.1/32 is directly connected, Loopback1
       10.0.0.0/24 is subnetted, 1 subnets
S       10.10.10.0 is directly connected, Tunnel0
       10.11.0.0/24 is subnetted, 1 subnets
```

show ip route

```
S      10.11.11.0 is directly connected, Ethernet0/0
```

```
Device# show ip cef
```

```
Prefix          Next Hop          Interface
.
.
.
10.2.1.255/32   receive          Loopback1
10.10.10.0/24   attached         Tunnel0 <<<<<<<<
10.11.11.0/24   attached         Ethernet0/0
172.16.0.0/12   drop
.
.
.
```

```
2) Add a next-hop override
```

```
address = 10.10.10.0
mask = 255.255.255.0
gateway = 10.1.1.1
interface = Tunnel0
```

```
Device# show ip route
```

```
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP
+ - replicated route
```

```
Gateway of last resort is not set
```

```
10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      10.2.1.0/24 is directly connected, Loopback1
L      10.2.1.1/32 is directly connected, Loopback1
10.0.0.0/24 is subnetted, 1 subnets
```

```
S      10.10.10.0 is directly connected, Tunnel0
      10.11.0.0/24 is subnetted, 1 subnets
S      10.11.11.0 is directly connected, Ethernet0/0
```

```
Device# show ip route next-hop-override
```

```
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP
+ - replicated route
```

```
Gateway of last resort is not set
```

```
10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      10.2.1.0/24 is directly connected, Loopback1
L      10.2.1.1/32 is directly connected, Loopback1
10.0.0.0/24 is subnetted, 1 subnets
```

```
S      10.10.10.0 is directly connected, Tunnel0
      [NHO][1/0] via 10.1.1.1, Tunnel0
      10.11.0.0/24 is subnetted, 1 subnets
S      10.11.11.0 is directly connected, Ethernet0/0
```

```
Device# show ip cef
```

```
Prefix          Next Hop          Interface
.
.
.
10.2.1.255/32   receive          Loopback1
10.10.10.0/24   attached         Tunnel0
```

```

10.10.10.0/24      10.1.1.1          Tunnel0
10.11.11.0/24     attached          Ethernet0/0
10.12.0.0/16 drop
.
.
.

```

```

=====
3) Delete a next-hop override
   address = 10.10.10.0
   mask = 255.255.255.0
   gateway = 10.11.1.1
   interface = Tunnel0
=====

```

Device# **show ip route**

```

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
       + - replicated route

```

Gateway of last resort is not set

```

10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       10.2.1.0/24 is directly connected, Loopback1
L       10.2.1.1/32 is directly connected, Loopback1
S       10.0.0.0/24 is subnetted, 1 subnets
S       10.10.10.0 is directly connected, Tunnel0
S       10.11.0.0/24 is subnetted, 1 subnets
S       10.11.11.0 is directly connected, Ethernet0/0

```

Device# **show ip route next-hop-override**

```

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
       + - replicated route

```

Gateway of last resort is not set

```

10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       10.2.1.0/24 is directly connected, Loopback1
L       10.2.1.1/32 is directly connected, Loopback1
S       10.0.0.0/24 is subnetted, 1 subnets
S       10.10.10.0 is directly connected, Tunnel0
S       10.11.0.0/24 is subnetted, 1 subnets
S       10.11.11.0 is directly connected, Ethernet0/0

```

Device# **show ip cef**

```

Prefix          Next Hop          Interface
.
.
.
10.2.1.255/32   receive          Loopback10.10.10.0/24
10.10.10.0/24   attached         Tunnel0
10.11.11.0/24   attached         Ethernet0/0
10.120.0.0/16 drop
.
.
.

```

The table below describes the significant fields shown in the displays:

Table 14: show ip route Field Descriptions

| Field | Description |
|------------------|---|
| Codes (Protocol) | <p>Indicates the protocol that derived the route. It can be one of the following values:</p> <ul style="list-style-type: none"> • B—BGP derived • C—Connected • D—Enhanced Interior Gateway Routing Protocol (EIGRP) • EX—EIGRP external • H—NHRP • i—IS-IS derived • ia—IS-IS • L—Local • M—Mobile • o—On-demand routing • O—Open Shortest Path First (OSPF) derived • P—Periodic downloaded static route • R—Routing Information Protocol (RIP) derived • S—Static • U—Per-user static route • +—Replicated route |
| Codes (Type) | <p>Type of route. It can be one of the following values:</p> <ul style="list-style-type: none"> • *—Indicates the last path used when a packet was forwarded. This information is specific to nonfast-switched packets. • E1—OSPF external type 1 route • E2—OSPF external type 2 route • IA—OSPF interarea route • L1—IS-IS Level 1 route • L2—IS-IS Level 2 route • N1—OSPF not-so-stubby area (NSSA) external type 1 route • N2—OSPF NSSA external type 2 route |

| Field | Description |
|------------------|---|
| 10.110.0.0 | Indicates the address of the remote network. |
| [160/5] | The first number in brackets is the administrative distance of the information source; the second number is the metric for the route. |
| via 10.119.254.6 | Specifies the address of the next device to the remote network. |
| 0:01:00 | Specifies the last time the route was updated (in hours:minutes:seconds). |
| Ethernet2 | Specifies the interface through which the specified network can be reached. |

Examples

The following is sample output from the **show ip route** command when an IP address is specified:

```
Device# show ip route 10.0.0.1
Routing entry for 10.0.0.1/32
  Known via "isis", distance 115, metric 20, type level-1
  Redistributing via isis
  Last update from 10.191.255.251 on Fddi1/0, 00:00:13 ago
  Routing Descriptor Blocks:
  * 10.22.22.2, from 10.191.255.247, via Serial2/3
    Route metric is 20, traffic share count is 1
    10.191.255.251, from 10.191.255.247, via Fddi1/0
    Route metric is 20, traffic share count is 1
```

When an IS-IS router advertises its link-state information, the router includes one of its IP addresses to be used as the originator IP address. When other routers calculate IP routes, they store the originator IP address with each route in the routing table.

The preceding example shows the output from the **show ip route** command for an IP route generated by IS-IS. Each path that is shown under the Routing Descriptor Blocks report displays two IP addresses. The first address (10.22.22.2) is the next-hop address. The second is the originator IP address from the advertising IS-IS router. This address helps you determine the origin of a particular IP route in your network. In the preceding example, the route to 10.0.0.1/32 was originated by a device with IP address 10.191.255.247.

The table below describes the significant fields shown in the display.

Table 15: show ip route with IP Address Field Descriptions

| Field | Description |
|-------------------------------|--|
| Routing entry for 10.0.0.1/32 | Network number and mask. |
| Known via... | Indicates how the route was derived. |
| Redistributing via... | Indicates the redistribution protocol. |

| Field | Description |
|---------------------------------|---|
| Last update from 10.191.255.251 | Indicates the IP address of the router that is the next hop to the remote network and the interface on which the last update arrived. |
| Routing Descriptor Blocks | Displays the next-hop IP address followed by the information source. |
| Route metric | This value is the best metric for this Routing Descriptor Block. |
| traffic share count | Indicates the number of packets transmitted over various routes. |

The following sample output from the **show ip route** command displays the tag applied to the route 10.22.0.0/16. You must specify an IP prefix to see the tag value. The fields in the display are self-explanatory.

```
Device# show ip route 10.22.0.0

Routing entry for 10.22.0.0/16
  Known via "isis", distance 115, metric 12
  Tag 120, type level-1
  Redistributing via isis
  Last update from 172.19.170.12 on Ethernet2, 01:29:13 ago
  Routing Descriptor Blocks:
    * 172.19.170.12, from 10.3.3.3, via Ethernet2
      Route metric is 12, traffic share count is 1
      Route tag 120
```

Examples

The following example shows that IP route 10.8.8.0 is directly connected to the Internet and is the next-hop (option 3) default gateway. Routes 10.1.1.1 [1/0], 10.3.2.1 [24/0], and 172.16.2.2 [1/0] are static, and route 10.0.0.0/0 is a default route candidate. The fields in the display are self-explanatory.

```
Device# show ip route

Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is 10.0.19.14 to network 0.0.0.0
10.0.0.0/24 is subnetted, 1 subnets
C 10.8.8.0 is directly connected, Ethernet1
  10.0.0.0/32 is subnetted, 1 subnets
S 10.1.1.1 [1/0] via 10.8.8.1
  10.0.0.0/32 is subnetted, 1 subnets
S 10.3.2.1 [24/0] via 10.8.8.1
  172.16.0.0/32 is subnetted, 1 subnets
S 172.16.2.2 [1/0] via 10.8.8.1
  10.0.0.0/28 is subnetted, 1 subnets
C 10.0.19.0 is directly connected, Ethernet0
  10.0.0.0/24 is subnetted, 1 subnets
C 10.15.15.0 is directly connected, Loopback0
S* 10.0.0.0/0 [1/0] via 10.0.19.14
```

The following sample output from the **show ip route repair-paths** command shows repair paths marked with the tag [RPR]. The fields in the display are self-explanatory:

```
Device# show ip route repair-paths

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
       + - replicated route, % - next hop override

Gateway of last resort is not set

    10.0.0.0/32 is subnetted, 3 subnets
C       10.1.1.1 is directly connected, Loopback0
B       10.2.2.2 [200/0] via 172.16.1.2, 00:31:07
         [RPR][200/0] via 192.168.1.2, 00:31:07
B       10.9.9.9 [20/0] via 192.168.1.2, 00:29:45
         [RPR][20/0] via 192.168.3.2, 00:29:45
    172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.16.1.0/24 is directly connected, Ethernet0/0
L       172.16.1.1/32 is directly connected, Ethernet0/0
    192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, Serial2/0
L       192.168.1.1/32 is directly connected, Serial2/0
B       192.168.3.0/24 [200/0] via 172.16.1.2, 00:31:07
         [RPR][200/0] via 192.168.1.2, 00:31:07
B       192.168.9.0/24 [20/0] via 192.168.1.2, 00:29:45
         [RPR][20/0] via 192.168.3.2, 00:29:45
B       192.168.13.0/24 [20/0] via 192.168.1.2, 00:29:45
         [RPR][20/0] via 192.168.3.2, 00:29:45

Device# show ip route repair-paths 10.9.9.9

>Routing entry for 10.9.9.9/32
> Known via "bgp 100", distance 20, metric 0
> Tag 10, type external
> Last update from 192.168.1.2 00:44:52 ago
> Routing Descriptor Blocks:
> * 192.168.1.2, from 192.168.1.2, 00:44:52 ago, recursive-via-conn
>   Route metric is 0, traffic share count is 1
>   AS Hops 2
>   Route tag 10
>   MPLS label: none
> [RPR]192.168.3.2, from 172.16.1.2, 00:44:52 ago
>   Route metric is 0, traffic share count is 1
>   AS Hops 2
>   Route tag 10
>   MPLS label: none
```

Related Commands

| Command | Description |
|-------------------------------|--|
| show interfaces tunnel | Displays tunnel interface information. |
| show ip route summary | Displays the current state of the routing table in summary format. |

show ip route summary

To display the current state of the routing table, use the **show ip routes summary** command in privileged EXEC mode.

show ip route summary

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|-------------|---|
| 10.0 | This command was introduced. |
| 12.3(2)T | The number of multipaths supported by the routing table was added to the output. |
| 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. |
| 12.2SX | 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. |

Examples

The following is sample output from the **show ip routes summary** command:

```
Router# show ip route summary
IP routing table name is Default-IP-Routing-Table(0)
IP routing table maximum-paths is 16
Route Source    Networks    Subnets    Overhead    Memory (bytes)
connected      0           3           126         360
static         1           2           126         360
eigrp 109      747        12          31878       91080
internal       3           3           360
Total          751        17          32130       92160
```

[show ip route summary](#) describes the significant fields shown in the display.

Table 16: show ip route summary Field Descriptions

| Field | Description |
|--------------------------------------|--|
| IP routing table name is... | Displays routing table type and table ID. |
| IP routing table maximum-paths is... | Number of parallel routes supported by this routing table. |

| Field | Description |
|--------------|--|
| Route Source | Routing protocol name, or the connected , static , or internal keyword. "Internal" indicates those routes that are in the routing table that are not owned by any routing protocol. |
| Networks | Number of prefixes that are present in the routing table for each route source. |
| Subnets | Number of subnets that are present in the routing table for each route source, including host routes. |
| Overhead | Any additional memory involved in allocating the routes for the particular route source other than the memory specified in the Memory field. |
| Memory | Number of bytes allocated to maintain all the routes for the particular route source. |

show ip route supernets-only

To display information about supernets, use the **show ip route supernets-only** command in privileged EXEC mode.

show ip route supernets-only command **show ip route supernets-only**

Syntax Description This command has no arguments or keywords.

Command Modes Privileged EXEC

| Command History | Release | Modification |
|-----------------|-------------|---|
| | 10.0 | 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. |

Examples The following is sample output from the **show ip route supernets-only** command. This display shows supernets only; it does not show subnets.

```
Router# show ip route supernets-only
Codes: R - RIP derived, O - OSPF derived
       C - connected, S - static, B - BGP derived
       i - IS-IS derived, D - EIGRP derived
       * - candidate default route, IA - OSPF inter area route
       E1 - OSPF external type 1 route, E2 - OSPF external type 2 route
       L1 - IS-IS level-1 route, L2 - IS-IS level-2 route
       EX - EIGRP external route
Gateway of last resort is not set
B    172.16.0.0 (mask is 255.255.0.0) [20/0] via 172.16.72.30, 0:00:50
B    192.0.0.0 (mask is 255.0.0.0) [20/0] via 172.16.72.24, 0:02:50
```

The table below describes the significant fields shown in the display.

Table 17: show ip route supernets-only Field Descriptions

| Field | Description |
|----------------------------------|---|
| B | Border Gateway Protocol (BGP) derived, as shown in list of codes. |
| 172.16.0.0 (mask is 255.255.0.0) | Supernet IP address. |
| [20/0] | Administrative distance (external/internal). |

| Field | Description |
|------------------|--|
| via 172.16.72.30 | Next hop IP address. |
| 0:00:50 | Age of the route (how long ago the update was received). |

show ipv6 route

To display contents of the IPv6 routing table, use the **show ipv6 route** command in user EXEC or privileged EXEC mode.

show ipv6 route [*ipv6-address*| *ipv6-prefix/prefix-length* [**longer-prefixes**]] [*protocol*] | [**repair**] | [**updated** | **boot-up**] [*day month*] [*time*]] | **interface** *type number* | **nd** | **nsf** | **table** *table-id* | **watch**

Syntax Description

| | |
|------------------------|---|
| <i>ipv6-address</i> | (Optional) Displays routing information for a specific IPv6 address. |
| <i>ipv6-prefix</i> | (Optional) Displays routing information for a specific IPv6 network. |
| <i>/prefix-length</i> | (Optional) The length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address). A slash mark must precede the decimal value. |
| longer-prefixes | (Optional) Displays output for longer prefix entries. |
| <i>protocol</i> | (Optional) The name of a routing protocol or the keyword connected , local , mobile , or static . If you specify a routing protocol, use one of the following keywords: bgp , isis , eigrp , ospf , or rip . |
| repair | (Optional) Displays routes with repair paths. |
| updated | (Optional) Displays routes with time stamps. |
| boot-up | (Optional) Displays routing information since bootup. |
| <i>day month</i> | (Optional) Displays routes since the specified day and month. |
| <i>time</i> | (Optional) Displays routes since the specified time, in <i>hh:mm</i> format. |
| interface | (Optional) Displays information about the interface. |
| <i>type</i> | (Optional) Interface type. |
| <i>number</i> | (Optional) Interface number. |
| nd | (Optional) Displays only routes from the IPv6 Routing Information Base (RIB) that are owned by Neighbor Discovery (ND). |

| | |
|------------------------------|---|
| nsf | (Optional) Displays routes in the nonstop forwarding (NSF) state. |
| repair | (Optional) |
| table <i>table-id</i> | (Optional) Displays IPv6 RIB table information for the specified table ID. The table ID must be in hexadecimal format. The range is from 0 to 0xFFFFFFFF. |
| watch | (Optional) Displays information about route watchers. |

Command Default

If none of the optional syntax elements is chosen, all IPv6 routing information for all active routing tables is displayed.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

| Release | Modification |
|-------------|--|
| 12.2(2)T | This command was introduced. |
| 12.2(8)T | This command was modified. The isis keyword was added, and the I1 - ISIS L1, I2 - ISIS L2, and IA - ISIS interarea fields were included in the command output. |
| 12.0(21)ST | This command was integrated into Cisco IOS Release 12.0(21)ST. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22)S. The timer information was removed, and an indicator was added to display IPv6 Multiprotocol Label Switching (MPLS) interfaces. |
| 12.2(13)T | This command was modified. The timer information was removed, and an indicator was added to display IPv6 MPLS virtual interfaces. |
| 12.2(14)S | This command was modified. The longer-prefixes keyword was added. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.2(25)SG | This command was integrated into Cisco IOS Release 12.2(25)SG. |
| 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. |

| Release | Modification |
|----------------------------|---|
| Cisco IOS XE Release 2.1 | This command was implemented on Cisco ASR 1000 Series Aggregation Services Routers. |
| 12.4(24)T | This command was modified in a release earlier than Cisco IOS Release 12.4(24)T. The table , nsf , watch , and updated keywords and the <i>day</i> , <i>month</i> , <i>table-id</i> , and <i>time</i> arguments were added. |
| 15.2(2)S | This command was modified. The command output was enhanced to include route tag values in dotted-decimal format. |
| Cisco IOS XE Release 3.6S | This command was modified. The command output was enhanced to include route tag values in dotted-decimal format. |
| 15.1(1)SY | The nd keyword was added. |
| Cisco IOS XE Release 3.2SE | This command was integrated into Cisco IOS XE Release 3.2SE. |
| 15.2(2)SA2 | This command was implemented on the Cisco ME 2600X Series Ethernet Access Switches. |

Usage Guidelines

The **show ipv6 route** command provides output similar to the **show ip route** command, except that the information is IPv6-specific.

When the *ipv6-address* or *ipv6-prefix/prefix-length* argument is specified, the longest match lookup is performed from the routing table, and only route information for that address or network is displayed. When a routing protocol is specified, only routes for that protocol are displayed. When the **connected**, **local**, **mobile**, or **static** keyword is specified, only the specified type of route is displayed. When the **interface** keyword and *type* and *number* arguments are specified, only routes for the specified interface are displayed.

Examples

The following is sample output from the **show ipv6 route** command when no keywords or arguments are specified:

```
Device# show ipv6 route

IPv6 Routing Table - 9 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       I1 - ISIS L1, I2 - ISIS L2, IA - IIS interarea
B   2001:DB8:4::2/48 [20/0]
    via FE80::A8BB:CCFF:FE02:8B00, Serial6/0
L   2001:DB8:4::3/48 [0/0]
    via ::, Ethernet1/0
C   2001:DB8:4::4/48 [0/0]
    via ::, Ethernet1/0
LC  2001:DB8:4::5/48 [0/0]
    via ::, Loopback0
L   2001:DB8:4::6/48 [0/0]
    via ::, Serial6/0
C   2001:DB8:4::7/48 [0/0]
    via ::, Serial6/0
S   2001:DB8:4::8/48 [1/0]
    via 2001:DB8:1::1, Null
L   FE80::/10 [0/0]
    via ::, Null0
```

```
L   FF00::/8 [0/0]
    via ::, Null0
```

The table below describes the significant fields shown in the display.

Table 18: show ipv6 route Field Descriptions

| Field | Description |
|-------------------------------|--|
| Codes: | Indicates the protocol that derived the route. Values are as follows: <ul style="list-style-type: none"> • B—BGP derived • C—Connected • I1—ISIS L1—Integrated IS-IS Level 1 derived • I2—ISIS L2—Integrated IS-IS Level 2 derived • IA—ISIS interarea—Integrated IS-IS interarea derived • L—Local • R—RIP derived • S—Static |
| 2001:DB8:4::2/48 | Indicates the IPv6 prefix of the remote network. |
| [20/0] | The first number in brackets is the administrative distance of the information source; the second number is the metric for the route. |
| via FE80::A8BB:CCFF:FE02:8B00 | Specifies the address of the next device to the remote network. |

When the *ipv6-address* or *ipv6-prefix/prefix-length* argument is specified, only route information for that address or network is displayed. The following is sample output from the **show ipv6 route** command when IPv6 prefix 2001:DB8::/35 is specified. The fields in the display are self-explanatory.

```
Device# show ipv6 route 2001:DB8::/35

IPv6 Routing Table - 261 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
B 2001:DB8::/35 [20/3]
    via FE80::60:5C59:9E00:16, Tunnell
```

When you specify a protocol, only routes for that particular routing protocol are shown. The following is sample output from the **show ipv6 route bgp** command. The fields in the display are self-explanatory.

```
Device# show ipv6 route bgp

IPv6 Routing Table - 9 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
      I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
```

show ipv6 route

```
B 2001:DB8:4::4/64 [20/0]
   via FE80::A8BB:CCFF:FE02:8B00, Serial6/0
```

The following is sample output from the **show ipv6 route local** command. The fields in the display are self-explanatory.

```
Device# show ipv6 route local

IPv6 Routing Table - 9 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
L 2001:DB8:4::2/128 [0/0]
   via ::, Ethernet1/0
LC 2001:DB8:4::1/128 [0/0]
   via ::, Loopback0
L 2001:DB8:4::3/128 [0/0]
   via ::, Serial6/0
L FE80::/10 [0/0]
   via ::, Null0
L FF00::/8 [0/0]
   via ::, Null0
```

The following is sample output from the **show ipv6 route** command when the 6PE multipath feature is enabled. The fields in the display are self-explanatory.

```
Device# show ipv6 route

IPv6 Routing Table - default - 19 entries
Codes:C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
.
.
.
B 2001:DB8::/64 [200/0]
   via ::FFFF:172.16.0.1
   via ::FFFF:172.30.30.1
```

Related Commands

| Command | Description |
|--------------------------------|--|
| ipv6 route | Establishes a static IPv6 route. |
| show ipv6 interface | Displays IPv6 interface information. |
| show ipv6 route summary | Displays the current contents of the IPv6 routing table in summary format. |
| show ipv6 tunnel | Displays IPv6 tunnel information. |

show key chain

To display authentication key information, use the **showkeychain** command in EXEC mode.

show key chain command `show key chain [name-of-chain]`

Syntax Description

| | |
|----------------------|---|
| <i>name-of-chain</i> | (Optional) Name of the key chain to display, as named in the keychain command. |
|----------------------|---|

Command Default

Information about all key chains is displayed.

Command Modes

EXEC

Command History

| Release | Modification |
|-------------|---|
| 11.1 | 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. |

Examples

The following is sample output from the **showkeychain** command:

```
Router# show key chain
Key-chain trees:
  key 1 -- text "chestnut"
    accept lifetime (always valid) - (always valid) [valid now]
    send lifetime (always valid) - (always valid) [valid now]
  key 2 -- text "birch"
    accept lifetime (00:00:00 Dec 5 1995) - (23:59:59 Dec 5 1995)
    send lifetime (06:00:00 Dec 5 1995) - (18:00:00 Dec 5 1995)
```

Related Commands

| Command | Description |
|------------------------|---|
| accept-lifetime | Sets the time period during which the authentication key on a key chain is received as valid. |
| key | Identifies an authentication key on a key chain. |
| key chain | Enables authentication for routing protocols. |

| Command | Description |
|------------------------------------|---|
| key-string (authentication) | Specifies the authentication string for a key. |
| send-lifetime | Sets the time period during which an authentication key on a key chain is valid to be sent. |

show route-map

To display static and dynamic route maps configured on the router, use the **show route-map** command in user EXEC or privileged EXEC mode.

show route-map [*map-name*] **dynamic** [*dynamic-map-name*] **application** [*application-name*]]] **all** [**detailed**]

Syntax Description

| | |
|-------------------------|---|
| <i>map-name</i> | (Optional) Name of a specific route map. |
| dynamic | (Optional) Displays dynamic route map information. |
| <i>dynamic-map-name</i> | (Optional) Name of a specific, dynamic route map. |
| application | (Optional) Displays dynamic route maps based on applications. |
| <i>application-name</i> | (Optional) Name of a specific application. |
| all | (Optional) Displays all static and dynamic route maps. |
| detailed | (Optional) Displays details of access control lists (ACLs) that have been used in match clauses for dynamic route maps. |

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------|---|
| 10.0 | This command was introduced. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22)S, and support for Continue clauses was included in the command output. |
| 12.2(27)SBA | This command was modified. The output was enhanced to display dynamically assigned route maps in VPN routing and forwarding (VRF) tables. |
| 12.2(15)T | This command was modified. An additional counter-collect policy routing statistic was added to the command output. |
| 12.3(2)T | This command was modified. Support for Continue clauses was included in the command output. |
| 12.2(17b)SXA | This command was integrated into Cisco IOS Release 12.2(17b)SXA. |

| Release | Modification |
|---------------------------|---|
| 12.3(7)T | This command was modified. The dynamic , application , and all keywords were added. |
| 12.0(28)S | This command was modified. Support for the recursive next-hop clause was added to the command output. |
| 12.3(14)T | This command was modified. Support for the recursive next-hop clause, map display extension functionality, and the detailed keyword was added. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| Cisco IOS XE Release 2.2 | This command was integrated into Cisco IOS XE Release 2.2. |
| 15.0(1)M | This command was modified. The detailed keyword was removed. |
| 15.2(2)S | This command was modified. The command output was enhanced to display route tag values in dotted-decimal format. |
| Cisco IOS XE Release 3.6S | This command was modified. The command output was enhanced to display route tag values in dotted-decimal format. |
| 15.1(1)SY | This command was integrated into Cisco IOS Release 15.1(1)SY. |

Usage Guidelines

The **show route-map** command displays information about route maps configured on the router. The output will vary depending on the keywords included with the command and the Cisco software image running on your router.

Examples

Examples

The following is sample output from the **show route-map** command when no keywords or arguments are used:

```
Device# show route-map

route-map ROUTE-MAP-NAME, permit, sequence 10
  Match clauses:
    ip address (access-lists): 1
    metric 10
  Continue: sequence 40
  Set clauses:
    as-path prepend 10
  Policy routing matches: 0 packets, 0 bytes
route-map ROUTE-MAP-NAME, permit, sequence 20
  Match clauses:
    ip address (access-lists): 2
    metric 20
  Set clauses:
    as-path prepend 10 10
  Policy routing matches: 0 packets, 0 bytes
route-map ROUTE-MAP-NAME, permit, sequence 30
  Match clauses:
  Continue: to next entry 40
```

```

Set clauses:
  as-path prepend 10 10 10
Policy routing matches: 0 packets, 0 bytes
route-map ROUTE-MAP-NAME, deny, sequence 40
Match clauses:
  community (community-list filter): 20:2
Set clauses:
  local-preference 100
Policy routing matches: 0 packets, 0 bytes
route-map LOCAL-POLICY-MAP, permit, sequence 10
Match clauses:
Set clauses:
  community 655370
Policy routing matches: 0 packets, 0 bytes

```

The following sample output from the **show route-map** command displays information about route tags:

```

Device# show route-map

route-map STATIC, permit, sequence 10
Match clauses:
  ip address (access-lists): 1
Set clauses:
  metric 56 100 255 1 1500
  tag 1.1.1.1
Policy routing matches: 0 packets, 0 bytes
route-map STATIC, permit, sequence 20
Match clauses:
  ip address (access-lists): 2
Set clauses:
  metric 56 100 255 1 1500
  tag 1.1.1.2
Policy routing matches: 0 packets, 0 bytes

```

The following sample output from the **show route-map** command shows Multiprotocol Label Switching (MPLS)-related route map information:

```

Device# show route-map

route-map OUT, permit, sequence 10
Match clauses:
  ip address (access-lists): 1
Set clauses:
  mpls label
Policy routing matches: 0 packets, 0 bytes

route-map IN, permit, sequence 10
Match clauses:
  ip address (access-lists): 2
  mpls label
Set clauses:
Policy routing matches: 0 packets, 0 bytes

```

The following is sample output from the **show route-map dynamic** command:

```

Device# show route-map dynamic

route-map AAA-02/06/04-14:01:26.619-1-AppSpec, permit, sequence 0, identifier 1137954548
Match clauses:
  ip address (access-lists): PBR#1 PBR#2
Set clauses:
Policy routing matches: 0 packets, 0 bytes
route-map AAA-02/06/04-14:01:26.619-1-AppSpec, permit, sequence 1, identifier 1137956424
Match clauses:
  ip address (access-lists): PBR#3 PBR#4
Set clauses:
Policy routing matches: 0 packets, 0 bytes
route-map AAA-02/06/04-14:01:26.619-1-AppSpec, permit, sequence 2, identifier 1124436704
Match clauses:
  ip address (access-lists): PBR#5 PBR#6
  length 10 100

```

```

Set clauses:
  ip next-hop 172.16.1.1
  ip gateway 172.16.1.1
Policy routing matches: 0 packets, 0 bytes
Current active dynamic routemaps = 1

```

The following is sample output from the **show route-map dynamic application** command:

```
Device# show route-map dynamic application
```

```

Application - AAA
Number of active routemaps = 1

```

When you specify an application name, dynamic routes for that application are displayed. The following is sample output from the **show route-map dynamic application** command when you specify the name of the application:

```
Device# show route-map dynamic application AAA
```

```

AAA
Number of active rmaps = 2
AAA-02/06/04-14:01:26.619-1-AppSpec
AAA-02/06/04-14:34:09.735-2-AppSpec

```

```
Device# show route-map dynamic AAA-02/06/04-14:34:09.735-2-AppSpec
```

```

route-map AAA-02/06/04-14:34:09.735-2-AppSpec, permit, sequence 0, identifier 1128046100
Match clauses:
  ip address (access-lists): PBR#7 PBR#8
Set clauses:
Policy routing matches: 0 packets, 0 bytes
route-map AAA-02/06/04-14:34:09.735-2-AppSpec, permit, sequence 1, identifier 1141277624
Match clauses:
  ip address (access-lists): PBR#9 PBR#10
Set clauses:
Policy routing matches: 0 packets, 0 bytes
route-map AAA-02/06/04-14:34:09.735-2-AppSpec, permit, sequence 2, identifier 1141279420
Match clauses:
  ip address (access-lists): PBR#11 PBR#12
  length 10 100
Set clauses:
  ip next-hop 172.16.1.12
  ip gateway 172.16.1.12
Policy routing matches: 0 packets, 0 bytes
Current active dynamic routemaps = 2

```

The following is sample output from the **show route-map dynamic detailed** command:

```
Device# show route-map dynamic detailed
```

```

route-map AAA-01/20/04-22:03:10.799-1-AppSpec, permit, sequence 1, identifier 29675368
Match clauses:
ip address (access-lists):
Extended IP access list PBR#3
1 permit icmp 0.0.16.12 1.204.167.240 10.1.1.0 0.0.0.255 syn dscp af12 log-input fragments

Extended IP access list PBR#4
1 permit icmp 0.0.16.12 1.204.167.240 10.1.1.0 0.0.0.255 syn dscp af12 log-input fragments

Set clauses:
ip next-hop 172.16.1.14
ip gateway 172.16.1.14
Policy routing matches: 0 packets, 0 bytes

```

The following is sample output from the **show route-map dynamic** command when a VRF is configured for VRF autoclassification:

```
Device# show route-map dynamic
```

```

route-map None-06/01/04-21:14:21.407-1-IP VRF, permit, sequence 0
identifier 1675771000

```

```

Match clauses:
Set clauses: vrf vrf1
Policy routing matches: 0 packets, 0 bytes
Current active dynamic routemaps = 1

```

The table below describes the significant fields shown in the displays.

Table 19: show route-map Field Descriptions

| Field | Description |
|--------------------------|---|
| Route-map ROUTE-MAP-NAME | Name of the route map. |
| Permit | Indicates that the route is redistributed based on set actions. |
| Sequence | Number that indicates the position of the new route map in the list of configured route maps. |
| Match clauses | Match criteria or conditions based on which the route map is redistributed. |
| Continue | Displays the configuration of a continue clause and the next route-map entry to which the clause is sent. |
| Set clauses | Specific redistribution actions to be performed if the match command criteria are met. |
| Tag | Tag for routes to the remote network. |
| Policy routing matches | Number of packets and bytes that have been filtered by policy routing. |

Related Commands

| Command | Description |
|-----------------------------|---|
| redistribute (IP) | Redistributes routes from one routing domain into another routing domain. |
| route-map (IP) | Defines conditions for redistributing routes from one routing protocol into another, or enables policy routing. |
| match interface (IP) | Distributes any route that has the next hop out of one of the specified interfaces. |
| match ip next-hop | Redistributes any route that has a next-hop router address that is passed by one of the specified access lists. |
| match tag | Filters routes that match specific route tags. |

