EIGRP Support for Route Map Filtering

The EIGRP Support for Route Map Filtering feature enables Enhanced Interior Gateway Routing Protocol (EIGRP) to interoperate with other protocols to leverage additional routing functionality by filtering inbound and outbound traffic based on complex route map options. Several extended filtering options are introduced to provide EIGRP-specific match choices.

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Finding Feature Information

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

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

Information About EIGRP Support for Route Map Filtering

EIGRP Route Map Support

EIGRP support for route map filtering enables EIGRP to interoperate with other protocols by filtering inbound and outbound traffic based on route map options. Additional EIGRP-specific match choices are available to allow flexibility in fine-tuning EIGRP network operations.

EIGRP supports the route map filtering capability that exists for other routing protocols to filter routes being redistributed into their protocol. For more details about understanding and configuring route maps, see the Enabling Policy Routing section of the Configuring IP Routing Protocol-Independent Features module of the *Cisco IOS XE IP Routing: Protocol-Independent Configuration Guide,* Release 2.

Match options allow EIGRP to filter internal and external routes based on source protocols, to match a metric against a range, and to match on an external protocol metric.

EIGRP can be configured to filter traffic using a route map and the **redistribute** or **distribute-list** command. Using a route map with the **redistribute** command allows routes that are redistributed from the routing table to be filtered with a route map before being admitted into an EIGRP topology table. Routes that are dynamically received from, or advertised to, EIGRP peers can be filtered by adding a route map option to the **distribute-list** command.

A route map may be configured with both the **redistribute** and the **distribute-list** commands in the same routing process. When a route map is used with a **distribute-list** command that is configured for inbound or outbound filtering, route packets that are learned from or advertised to EIGRP peers can be processed with the route map to provide better control of route selection during the route exchange process. Redistribution serves as a mechanism to import routes into the EIGRP topology table from a routing table. A route map configured with the **redistribute** command adds flexibility to the redistribution capability and results in a more specific redistributed route selection.

The use of route maps to filter traffic is the same for both autonomous-system configurations and named configurations. See the Configuring EIGRP module for more information about autonomous system and named configurations.

Demands for EIGRP to interoperate with other protocols and flexibility in fine-tuning network operation necessitate the capability to filter traffic using a route map.

How to Configure EIGRP Support for Route Map Filtering

Setting EIGRP Tags Using a Route Map for Autonomous System Configurations

Perform this task to set EIGRP tags for autonomous system configurations using a route map. The EIGRP metrics used for filtering are configured within a route map. The first match clause defines EIGRP routes that contain an external protocol metric between 400 and 600 inclusive; the second match clause defines EIGRP external routes that match a source protocol of BGP and the autonomous system 45000. When the two match clauses are true, a tag value of the destination routing protocol is set to 5. This route map can be used with the **distribute-list** command, see the Example Setting EIGRP Tags Using a Route Map--Autonomous System Configuration Examples, on page 12 for an example configuration.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
4. **match metric** {*metric-value*| **external** *metric-value*} [**+-** *deviation-number*]
5. **match source-protocol** *source-protocol* [*autonomous-system-number*]
6. **set tag** *tag-value*
7. **exit**
8. **router eigrp** *as-number*
9. **network** *ip-address*
10. **distribute-list route-map** *map-tag* **in**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map metric-range`	Enters route-map configuration mode.
Step 4	**match metric** {*metric-value*| **external** *metric-value*} [+- *deviation-number*] **Example:** `Router(config-route-map)# match metric external 500 +- 100`	Specifies a match clause that filters inbound updates that match an internal or external protocol metric. • *metric-value* --Internal protocol metric, which can be an EIGRP five-part metric. The range is from 1 to 4294967295. • **external** --External protocol metric. The range is from 1 to 4294967295. • +- *deviation-number* --(Optional) Represents a standard deviation. The deviation can be any number. There is no default. **Note** When you specify a metric deviation w inclusively in that range. **Note** The external protocol metric is not the s from EIGRP vectorized metric compon
Step 5	**match source-protocol** *source-protocol* [*autonomous-system-number*] **Example:**	Specifies a match clause that matches external routes from sources that match the source protocol. • *source-protocol* --Protocol to match. The valid keywords are **bgp**, **connected**, **eigrp**, **isis**, **ospf**, **rip**, and **static**. There is no default.

	Command or Action	Purpose
	`Router(config-route-map)# match source-protocol bgp 45000`	• *autonomous-system-number* --(Optional) Autonomous system number. The *autonomous-system-number* argument is not applicable to the **connected**, **static**, and **rip** keywords. The range is from 1 to 65535. There is no default.
Step 6	**set tag** *tag-value* **Example:** `Router(config-route-map)# set tag 5`	Sets a tag value on the route in the destination routing protocol when all the match criteria of a route map are met.
Step 7	**exit** **Example:** `Router(config-route-map)# exit`	Exits route-map configuration mode and returns to global configuration mode.
Step 8	**router eigrp** *as-number* **Example:** `Router(config)# router eigrp 1`	Configures the EIGRP routing process and enters router configuration mode.
Step 9	**network** *ip-address* **Example:** `Router(config-router)# network 172.16.0.0`	Specifies a network for the EIGRP routing process.
Step 10	**distribute-list route-map** *map-tag* **in** **Example:** `Router(config-router)# distribute-list route-map metric-range in`	Filters networks received in updates.

Setting EIGRP Tags Using a Route Map for Named Configurations

Perform this task to set EIGRP tags for named configurations using a route map. The EIGRP metrics used for filtering are configured within a route map. The first match clause defines EIGRP routes that contain an external protocol metric between 400 and 600 inclusive; the second match clause defines EIGRP external routes that match a source protocol of BGP and the autonomous system 45000. When the two match clauses are true, a tag value of the destination routing protocol is set to 5. This route map can be used with the **distribute-list** command, see the Example Setting EIGRP Tags Using a Route Map--Named Configuration Examples, on page 12 for an example configuration.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]

4. **set metric** *bandwidth delay reliability loading mtu*
5. **match ip route-source** {*access-list-number*| *access-list-name*} [*...access-list-number* | *...access-list-name*]
6. **match metric** {*metric-value*| **external** *metric-value*} [**+-** *deviation-number*]
7. **match source-protocol** *source-protocol* [*autonomous-system-number*]
8. **set tag** *tag-value*
9. **exit**
10. **router eigrp** *virtual-instance-name*
11. Do one of the following:
    - **address-family ipv4** [**multicast**] [**unicast**] [**vrf** *vrf-name*] **autonomous-system** *autonomous-system-number*
    - **address-family ipv6** [**unicast**] [**vrf** *vrf-name*] **autonomous-system** *autonomous-system-number*
12. **network** *ip-address* [*wildcard-mask*]
13. **af-interface** {**default** | *interface-type interface-number*}
14. **next-hop-self**
15. **exit-af-interface**
16. **topology** {**base** | *topology-name* **tid** *number*}
17. **distribute-list route-map** *map-tag* **in**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map metric-range`	Enters route-map configuration mode.
Step 4	**set metric** *bandwidth delay reliability loading mtu* **Example:** `Router(config-route-map)# set metric 10000 10 255 1 1500`	(Optional) Sets the metric value for EIGRP in a route map.

	Command or Action	Purpose
Step 5	**match ip route-source** {*access-list-number*| *access-list-name*} [*...access-list-number* | *...access-list-name*] **Example:** `Router(config-route-map)# match ip route-source 5 80`	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
Step 6	**match metric** {*metric-value*| **external** *metric-value*} [+- *deviation-number*] **Example:** `Router(config-route-map)# match metric external 500 +- 100`	Specifies a match clause that includes EIGRP routes that match an internal or external protocol metric. • *metric-value* --Internal protocol metric, which can be an EIGRP five-part metric. The range is from 1 to 4294967295. • **external** --External protocol metric. The range is from 1 to 4294967295. • +- *deviation-number* --(Optional) Represents a standard deviation. The deviation can be any number. There is no default. **Note** When you specify a metric deviation with t inclusively in that range. **Note** The external protocol metric is not the same from EIGRP vectorized metric components
Step 7	**match source-protocol** *source-protocol* [*autonomous-system-number*] **Example:** `Router(config-route-map)# match source-protocol bgp 45000`	Specifies a match clause that includes EIGRP external routes that match a source protocol. • *source-protocol* --Protocol to match. The valid keywords are **bgp**, **connected**, **eigrp**, **isis**, **ospf**, **rip**, and **static**. There is no default. • *autonomous-system-number* --(Optional) Autonomous system number. The *autonomous-system-number* argument is not applicable to the **connected**, **static**, and **rip** keywords. The range is from 1 to 65535. There is no default.
Step 8	**set tag** *tag-value* **Example:** `Router(config-route-map)# set tag 5`	Sets a tag value on the route in the destination routing protocol when all the match criteria of a route map are met.

	Command or Action	Purpose
Step 9	**exit** **Example:** `Router(config-route-map)# exit`	Exits route-map configuration mode and returns to global configuration mode.
Step 10	**router eigrp** *virtual-instance-name* **Example:** `Router(config)# router eigrp virtual-name1`	Configures the EIGRP routing process and enters router configuration mode.
Step 11	Do one of the following: • **address-family ipv4** [**multicast**] [**unicast**] [**vrf** *vrf-name*] **autonomous-system** *autonomous-system-number* • **address-family ipv6** [**unicast**] [**vrf** *vrf-name*] **autonomous-system** *autonomous-system-number* **Example:** `Router(config-router)# address-family ipv4 autonomous-system 45000`	Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.
Step 12	**network** *ip-address* [*wildcard-mask*] **Example:** `Router(config-router-af)# network 172.16.0.0`	Specifies a network for the EIGRP routing process.
Step 13	**af-interface** {**default** | *interface-type interface-number*} **Example:** `Router(config-router-af)# af-interface default`	Enters address family interface configuration mode to configure interface-specific EIGRP commands.
Step 14	**next-hop-self** **Example:** `Router(config-router-af-interface)# next-hop-self`	Enables EIGRP to advertise routes with the local outbound interface address as the next hop.
Step 15	**exit-af-interface** **Example:** `Router(config-router-af-interface)# exit-af-interface`	Exits address-family interface configuration mode.
Step 16	**topology** {**base** | *topology-name* **tid** *number*} **Example:** `Router(config-router-af)# topology base`	Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology configuration mode.

	Command or Action	Purpose
Step 17	**distribute-list route-map** *map-tag* **in** **Example:** `Router(config-router-af-topology)# distribute-list route-map metric-range in`	Filters networks received in updates.

Configuring EIGRP Route-map for Distribute-list in IPv6

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router eigrp** *virtual-instance-name*
4. **address-family ipv6** [**unicast**] [**vrf** *vrf-name*] **autonomous-system** *autonomous-system-number*
5. **topology** {**base** | *topology-name* **tid** *number*}
6. **distribute-list route-map** *map-tag* **in**
7. **distribute-list route-map** *map-tag* **out**
8. **exit-af-toplogy**
9. **exit-address-family**
10. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
11. **match ipv6 address** {**prefix-list** *prefix-list-name* | *access-list-name*}
12. **set tag** *tag-value*
13. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
14. **match interface** *interface-type interface-number* [*...interface-type interface-number*]
15. **set tag** *tag-value*
16. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
17. **match metric** *bandwidth delay reliability loading mtu*
18. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
19. **match ipv6 address** {**prefix-list** *prefix-list-name* | *access-list-name*}
20. **set tag** *tag-value*
21. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
22. **match interface** *interface-type interface-number* [*...interface-type interface-number*]
23. **set tag** *tag-value*
24. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
25. **match metric** *bandwidth delay reliability loading mtu*
26. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable**	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: `Router> enable`	• Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**router eigrp** *virtual-instance-name* **Example:** `Router(config)# router eigrp virtual1`	Configures the EIGRP routing process and enters router configuration mode.
Step 4	**address-family ipv6** [**unicast**] [**vrf** *vrf-name*] **autonomous-system** *autonomous-system-number* **Example:** `Router(config-router)# address-family ipv6 autonomous-system 1`	Enters address family configuration mode to configure an EIGRP IPv6 routing instance.
Step 5	**topology** {**base** | *topology-name* **tid** *number*} **Example:** `Router(config-router-af)# topology base`	Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology configuration mode.
Step 6	**distribute-list route-map** *map-tag* **in** **Example:** `Router(config-router-af-topology)# distribute-list route-map map_in in`	Enables filtering of the networks received in EIGRP updates.
Step 7	**distribute-list route-map** *map-tag* **out** **Example:** `Router(config-router-af-topology)# distribute-list route-map map_out out`	Enables suppressing of networks from being advertised in the EIGRP updates.
Step 8	**exit-af-toplogy** **Example:** `Router(config-router-af-topology)# exit-af-topology`	Exits address-family topology configuration mode.
Step 9	**exit-address-family** **Example:** `Router(config-router-af)# exit-address-family`	Exits address-family configuration mode.

	Command or Action	Purpose
Step 10	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map map1 permit 10`	Enters route-map configuration mode. • Specifies route map name and set action to redistribute the route if the match criteria are met.
Step 11	**match ipv6 address** {**prefix-list** *prefix-list-name* | *access-list-name*} **Example:** `Router(config-route-map)# match ipv6 address acl1`	Specifies an IPv6 access list to match for redistributing routes that have been advertised by routers and access servers.
Step 12	**set tag** *tag-value* **Example:** `Router(config-route-map)# set tag 10`	Sets a tag value for the route in the route map.
Step 13	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map map1 permit 20`	Specifies route map name and set action to redistribute the route if the match criteria are met.
Step 14	**match interface** *interface-type interface-number* [*...interface-type interface-number*] **Example:** `Router(config-route-map)# match interface ethernet 0/0`	Specifies the next hop out of the interface to distribute the associated routes.
Step 15	**set tag** *tag-value* **Example:** `Router(config-route-map)# set tag 20`	Sets a tag value for the route in the route map.
Step 16	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map map1 permit 30`	Specifies route map name and set action to redistribute the route if the match criteria are met.
Step 17	**match metric** *bandwidth delay reliability loading mtu* **Example:** `Router(config-route-map)# match metric 10000 100 255 100 1500`	Specifies the metric value for EIGRP in a route map.
Step 18	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map map2 permit 10`	Enters route-map configuration mode. • Specifies route map name and set action to redistribute the route if the match criteria are met.

	Command or Action	Purpose
Step 19	**match ipv6 address** {**prefix-list** *prefix-list-name* | *access-list-name*} **Example:** `Router(config-route-map)# match ipv6 address acl1`	Specifies an IPv6 access list to match for redistributing routes that have been advertised by routers and access servers.
Step 20	**set tag** *tag-value* **Example:** `Router(config-route-map)# set tag 10`	Sets a tag value for the route in the route map.
Step 21	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map map2 permit 20`	Specifies route map name and set action to redistribute the route if the match criteria are met.
Step 22	**match interface** *interface-type interface-number* [*...interface-type interface-number*] **Example:** `Router(config-route-map)# match interface ethernet 0/0`	Specifies the next hop out of the interface to distribute the associated routes.
Step 23	**set tag** *tag-value* **Example:** `Router(config-route-map)# set tag 20`	Sets a tag value for the route in the route map.
Step 24	**route-map** *map-tag* [**permit** | **deny**] [*sequence-number*] **Example:** `Router(config)# route-map map2 permit 30`	Specifies route map name and set action to redistribute the route if the match criteria are met.
Step 25	**match metric** *bandwidth delay reliability loading mtu* **Example:** `Router(config-route-map)# match metric 1000 100 255 200 1800`	Specifies the metric value for EIGRP in a route map.
Step 26	**end** **Example:** `Router(config-route-map)# end`	Exits route-map configuration mode and returns to privileged EXEC mode.

Configuration Examples for EIGRP Support for Route Map Filtering

Example Setting EIGRP Tags Using a Route Map--Autonomous System Configuration Examples

The following example shows how to configure a route map to match an EIGRP external protocol metric route with an allowable deviation of 100, a source protocol of BGP, and an autonomous system 45000. When the two match clauses are true, the tag value of the destination routing protocol is set to 5. The route map is used to distribute incoming packets for an EIGRP process.

```
Router(config)# route-map metric-range
Router(config-route-map)# match metric external 500 +- 100
Router(config-route-map)# match source-protocol bgp 45000
Router(config-route-map)# set tag 5
Router(config-route-map)# exit
Router(config)# router eigrp 1
Router(config-router)# network 172.16.0.0
Router(config-router)# distribute-list route-map metric_range in
```

The following example shows how to configure a route map to match EIGRP routes with a metric of 110, 200, or an inclusive range of 700 to 800. When the match clause is true, the tag value of the destination routing protocol is set to 10. The route map is used to redistribute EIGRP packets.

```
Router(config)# route-map metric-eigrp
Router(config-route-map)# match metric 110 200 750 +- 50
Router(config-route-map)# set tag 10
Router(config-route-map)# exit
Router(config)# router eigrp 1
Router(config-router)# network 172.21.1.0/24
Router(config-router)# redistribute eigrp route-map metric-eigrp
```

Example Setting EIGRP Tags Using a Route Map--Named Configuration Examples

The following example shows how to configure a route map to match an EIGRP external protocol metric route with an allowable deviation of 100, a source protocol of BGP, and an autonomous system 45000. When the two match clauses are true, the tag value of the destination routing protocol is set to 5. The route map is used to distribute incoming packets for an EIGRP process.

```
Router(config)# route-map metric_range
Router(config-route-map)# match metric external 500 +- 100
Router(config-route-map)# match source-protocol bgp 45000
Router(config-route-map)# set tag 5
Router(config-route-map)# exit
Router(config)# router eigrp virtual-name
Router(config-router)# address-family ipv4 autonomous-system 45000
Router(config-router-af)# network 172.21.1.0/24
```

```
Router(config-router-af)# topology base
Router(config-router-af-topology)# distribute-list route-map metric_range in
```

The following example shows how to configure a route map to match EIGRP routes with a metric of 110, 200, or an inclusive range of 700 to 800. When the match clause is true, the tag value of the destination routing protocol is set to 10. The route map is used to redistribute EIGRP packets.

```
Router(config)# route-map metric_eigrp
Router(config-route-map)# match metric 110 200 750 +- 50
Router(config-route-map)# set tag 10
Router(config-route-map)# exit
Router(config)# router eigrp virtual-name
Router(config-router)# address-family ipv4 autonomous-system 45000
Router(config-router-af)# network 172.21.1.0/24
Router(config-router-af)# topology base
Router(config-router-af-topology)# distribute-list route-map metric-range in
```

Example Configuring EIGRP Route-map for Distribute-list in IPv6

The following example shows how to configure EIGRP route maps for distribute list in IPv6.

```
enable
configure terminal
router eigrp test
 address-family ipv6 unicast autonomous-system 1
 topology base
 distribute-list route-map map_in
 distribute-list route-map map_out
 exit-af-topology
 exit-address-family
route-map map_in permit 10
 match ipv6 address acl1
 set tag 15
 route-map map_in permit 20
 match interface Ethernet0/0
 set tag 25
 route-map map_in permit 30
 match metric 10000 1000 255 255 1024
 route-map map_out permit 20
 match ipv6 address acl1
 set tag 25
 route-map map_out permit 40
 match interface Ethernet0/0
 set tag 35
 route-map map_out permit 50
 match metric 10000 100 255 200 1024
end
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases

Related Topic	Document Title
EIGRP overview and configuration	Configuring EIGRP
EIGRP commands including syntax, usage guidelines, and examples	*Cisco IOS IP Routing: EIGRP Command Reference*

Standards

Standard	Title
None	--

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	--

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for EIGRP Support for Route Map Filtering

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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