

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 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 13 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

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	• Enter your password if prompted.
	Router> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Router# configure terminal	
Step 3	route-map map-tag [permit deny] [sequence-number]	Enters route-map configuration mode.
	Example:	
	Router(config) # route-map metric-range	
Step 4	match metric {metric-value external metric-value} [+- deviation-number]	Specifies a match clause that filters inbound updates that match an internal or external protocol metric.
	Example:	• <i>metric-value</i> Internal protocol metric, which can be an EIGRP five-part metric. The range is from 1 to 4294967295.
	Router(config-route-map)# match metric external 500 +- 100	• externalExternal protocol metric. The range is from 1 to 4294967295.
		• +- <i>deviation-number</i> (Optional) Represents a standard deviation. The deviation can be any number. There is no default.
		Note When you specify a metric deviation with the + and - keywords, the router will match any metric that falls inclusively in that range.

	Command or Action	Purpose
		Note The external protocol metric is not the same as the EIGRP assigned route metric, which is a figure computed from EIGRP vectorized metric components (delay, bandwidth, reliability, load, and MTU).
Step 5	match source-protocol source-protocol [autonomous-system-number]	Specifies a match clause that matches external routes from sources that match the source protocol.
	Example: Router(config-route-map) # match source-protocol bgp 45000	• source-protocolProtocol to match. The valid keywords are bgp, connected, eigrp, isis, ospf, rip, and static. There is no default.
		• <i>autonomous-system-number</i> (Optional) Autonomous system number. The <i>autonomous-system-number</i> 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	Sets a tag value on the route in the destination routing protocol when all the match criteria of a route map are met.
	Example:	
	Router(config-route-map)# set tag 5	
Step 7	exit	Exits route-map configuration mode and returns to global configuration mode.
	Example:	
	Router(config-route-map)# exit	
Step 8	router eigrp as-number	Configures the EIGRP routing process and enters router configuration mode.
	Example:	
	Router(config)# router eigrp 1	
Step 9	network ip-address	Specifies a network for the EIGRP routing process.
	Example:	
	Router(config-router)# network 172.16.0.0	
Step 10	distribute-list route-map map-tag in	Filters networks received in updates.
	Example:	
	Router(config-router)# distribute-list route-map metric-range in	

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 13 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 [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

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	Enter your password if prompted.
	Router> enable	

	Command or Action	Purpose
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Router# configure terminal	
Step 3	route-map map-tag [permit deny] [sequence-number]	Enters route-map configuration mode.
	Example:	
	Router(config) # route-map metric-range	
Step 4	set metric bandwidth delay reliability loading mtu	(Optional) Sets the metric value for EIGRP in a route map.
	Example: Router(config-route-map) # set metric 10000 10	
	255 1 1500	
Step 5	match ip route-source {access-list-number access-list-name} [access-list-number access-list-name]	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
	Example:	
	Router(config-route-map) # match ip route-source 5 80	
Step 6	match metric {metric-value external metric-value} [+- deviation-number]	Specifies a match clause that includes EIGRP routes that match an internal or external protocol metric.
	Example:	• <i>metric-value</i> Internal protocol metric, which can be an EIGRP five-part metric. The range is from 1 to 4294967295.
	Router(config-route-map)# match metric external 500 +- 100	• externalExternal protocol metric. The range is from 1 to 4294967295.
		• +- <i>deviation-number</i> (Optional) Represents a standard deviation. The deviation can be any number. There is no default.
		Note When you specify a metric deviation with the + and - keywords, the router will match any metric that falls inclusively in that range. Note The external protocol metric is not the same as the EIGRP assigned route metric, which is a figure computed from EIGRP vectorized metric components

	Command or Action	Purpose
Step 7	match source-protocol source-protocol [autonomous-system-number]	Specifies a match clause that includes EIGRP external routes that match a source protocol.
	Example: Router(config-route-map) # match source-protocol bgp 45000	 source-protocolProtocol 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	<pre>set tag tag-value Example: Router(config-route-map) # set tag 5</pre>	Sets a tag value on the route in the destination routing protocol when all the match criteria of a route map are met.
Step 9	exit	Exits route-map configuration mode and returns to global configuration mode.
	Example:	
	Router(config-route-map)# exit	
Step 10	router eigrp virtual-instance-name	Configures the EIGRP routing process and enters router configuration mode.
	Example:	
	Router(config)# router eigrp virtual-name1	
Step 11	Do one of the following: • address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number	Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.
	• address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number	
	Example:	
	Router(config-router)# address-family ipv4 autonomous-system 45000	
Step 12	network ip-address [wildcard-mask]	Specifies a network for the EIGRP routing process.
	Example:	
	Router(config-router-af)# network 172.16.0.0	

	Command or Action	Purpose
Step 13	af-interface { default interface-type interface-number}	Enters address family interface configuration mode to configure interface-specific EIGRP commands.
	Example:	
	Router(config-router-af)# af-interface default	
Step 14	next-hop-self	Enables EIGRP to advertise routes with the local outbound interface address as the next hop.
	Example:	
	Router(config-router-af-interface)# next-hop-self	
Step 15	exit-af-interface	Exits address-family interface configuration mode.
	Example:	
	Router(config-router-af-interface) # exit-af-interface	
Step 16	topology {base topology-name tid number}	Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology
	Example:	configuration mode.
	Router(config-router-af)# topology base	
Step 17	distribute-list route-map map-tag in	Filters networks received in updates.
	Example:	
	Router(config-router-af-topology)# distribute-list route-map metric-range in	

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

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	• Enter your password if prompted.
	Router> enable	

	Command or Action	Purpose
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Router# configure terminal	
Step 3	router eigrp virtual-instance-name	Configures the EIGRP routing process and enters router configuration mode.
	Example:	
	Router(config)# router eigrp virtual1	
Step 4	address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number	Enters address family configuration mode to configure an EIGRP IPv6 routing instance.
	Example:	
	Router(config-router) # address-family ipv6 autonomous-system 1	
Step 5	topology {base topology-name tid number}	Configures an EIGRP process to route IP traffic under the specified topology instance and enters address
	Example:	family topology configuration mode.
	Router(config-router-af)# topology base	
Step 6	distribute-list route-map map-tag in	Enables filtering of the networks received in EIGRP updates.
	Example:	
	Router(config-router-af-topology)# distribute-list route-map map_in in	
Step 7	distribute-list route-map map-tag out	Enables suppressing of networks from being advertised in the EIGRP updates.
	Example:	and a second sec
	Router(config-router-af-topology)# distribute-list route-map map_out out	
Step 8	exit-af-toplogy	Exits address-family topology configuration mode.
	Example:	
	Router(config-router-af-topology)# exit-af-topology	
Step 9	exit-address-family	Exits address-family configuration mode.
	Example:	
	Router(config-router-af)# exit-address-family	
Step 10	route-map map-tag [permit deny] [sequence-number]	Enters route-map configuration mode.

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

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

	Command or Action	Purpose
Step 26	end	Exits route-map configuration mode and returns to privileged EXEC mode.
	Example:	
	Router(config-route-map)# end	

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 \bar{1}0000 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
route-map map out permit 50
match metric \overline{1}0000 \ 100 \ 255 \ 200 \ 1024
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
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 www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for EIGRP Support for Route Map Filtering

Feature Name	Releases	Feature Information
EIGRPv6 Route-map support for Distribute-list	Cisco IOS XE Release 3.17S	The EIGRPv6 Route-map support for Distribute-list feature enables EIGRP route-map in the distribute list for IPv6 networks. The following commands were introduced or modified by this feature: match metric, match tag, show interface, match ipv6 address, match route-type, match ipv6 next-hop, set tag set metric, address-family, topology.

Feature Name	Releases	Feature Information
EIGRP Support for Route Map Filtering	Cisco IOS XE Release 2.1	The EIGRP Support for Route Map Filtering feature enables EIGRP to interoperate with other protocols by filtering inbound and outbound traffic based on complex route map options. Several extended filtering options are introduced to provide EIGRP-specific match choices.
		In Cisco IOS XE Release 2.1, this feature was introduced on the Cisco ASR 1000 Series Aggregation Services Routers.
		The following commands were introduced or modified by this feature: match metric (IP), match source-protocol, ip eigrp topology.
		In Cisco IOS XE Release 2.5, the following command was introduced or modified for this feature: show eigrp address-family topology

Feature Information for EIGRP Support for Route Map Filtering