



EIGRP Over the Top

The EIGRP Over the Top feature enables a single end-to-end routing domain between two or more Enhanced Interior Gateway Routing Protocol (EIGRP) sites that are connected using a private or a public WAN connection. This module provides information about the EIGRP Over the Top feature and how to configure it.

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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 at the end of this module.

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 Over the Top

EIGRP Over the Top Overview

The EIGRP Over the Top feature enables a single end-to-end Enhanced Interior Gateway Routing Protocol (EIGRP) routing domain that is transparent to the underlying public or private WAN transport that is used for connecting disparate EIGRP customer sites. When an enterprise extends its connectivity across multiple sites through a private or a public WAN connection, the service provider mandates that the enterprise use an additional routing protocol, typically the Border Gateway Protocol (BGP), over the WAN links to ensure end-to-end routing. The use of an additional protocol causes additional complexities for the enterprise, such

as additional routing processes and sustained interaction between EIGRP and the routing protocol to ensure connectivity, for the enterprise. With the EIGRP Over the Top feature, routing is consolidated into a single protocol (EIGRP) across the WAN, which provides the following benefits:

- There is no dependency on the type of WAN connection used.
- There is no dependency on the service provider to transfer routes.
- There is no security threat because the underlying WAN has no knowledge of enterprise routes.
- This feature simplifies dual carrier deployments and designs by eliminating the need to configure and manage EIGRP-BGP route distribution and route filtering between customer sites.
- This feature allows easy transition between different service providers.
- This feature supports both IPv4 and IPv6 environments.

How EIGRP Over the Top Works

The EIGRP Over the Top solution can be used to ensure connectivity between disparate Enhanced Interior Gateway Routing Protocol (EIGRP) sites. This feature uses EIGRP on the control plane and Locator ID Separation Protocol (LISP) encapsulation on the data plane to route traffic across the underlying WAN architecture. EIGRP is used to distribute routes between customer edge (CE) devices within the network, and the traffic forwarded across the WAN architecture is LISP encapsulated. Therefore, to connect disparate EIGRP sites, you must configure the **neighbor** command with LISP encapsulation on every CE in the network.

If your network has many CEs, then you can use EIGRP Route Reflectors (E-RRs) to form a half-mesh topology and ensure connectivity among all CEs in the network. An E-RR is an EIGRP peer that receives EIGRP route updates from CEs in the network and reflects these updates to other EIGRP CE neighbors without changing the next hop or metrics for the routes. An E-RR can also function as a CE in the network. You must configure E-RRs with the **remote-neighbors source** command to enable E-RRs to listen to unicast messages from peer CE devices and reflect the messages to other EIGRP CE neighbors. You must configure the CEs with the **neighbor** command to allow them to identify the E-RRs in their network and exchange routes with the E-RRs. Upon learning routes from E-RRs, the CEs install these routes into their routing information base (RIB). You can use dual or multiple E-RRs for redundancy. The CEs form adjacencies with all E-RRs configured in the network, thus enabling multihop remote neighborhood amongst themselves.

How to Configure EIGRP Over the Top

Configuring EIGRP Over the Top on a CE Device

You must enable the EIGRP Over the Top feature on all customer edge (CE) devices in the network so that the CEs know how to reach the Enhanced Interior Gateway Routing Protocol (EIGRP) Route Reflector configured in the network. Perform the following task to configure the EIGRP Over the Top feature on a CE device and enable Locator ID Separation Protocol (LISP) encapsulation for traffic across the underlying WAN.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router eigrp** *virtual-name*
4. **address-family ipv4 autonomous-system** *as-number*
5. **neighbor** {*ip-address* | *ipv6-address*} *interface-type interface-number* [**remote maximum-hops** [**lisp-encap** [*lisp-id*]]]
6. **network** *ip-address*[*wildcard-mask*]
7. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>virtual-name</i> Example: Device(config)# router eigrp test	Configures an EIGRP routing process and enters router configuration mode.
Step 4	address-family ipv4 autonomous-system <i>as-number</i> Example: Device(config-router)# address-family ipv4 autonomous-system 100	Enters address family configuration mode and configures an EIGRP routing instance.
Step 5	neighbor { <i>ip-address</i> <i>ipv6-address</i> } <i>interface-type interface-number</i> [remote maximum-hops [lisp-encap [<i>lisp-id</i>]]] Example: Device(config-router-af)# neighbor 10.0.0.1 gigabitethernet 0/0/1 remote 2 lisp-encap 1	Defines a neighboring device with which an EIGRP device can exchange routing information.

	Command or Action	Purpose
Step 6	network <i>ip-address</i> [<i>wildcard-mask</i>] Example: Device(config-router-af)# network 192.168.0.0 255.255.0.0	Specifies the network for the EIGRP routing process. In this case, configure all routes that the CE needs to be aware of.
Step 7	end Example: Device(config-router-af)# end	Exits address family configuration mode and returns to privileged EXEC mode.

Configuring EIGRP Route Reflectors

Perform this task to configure a customer edge (CE) device in a network to function as an Enhanced Interior Gateway Routing Protocol (EIGRP) Route Reflector.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router eigrp** *virtual-name*
4. **address-family ipv4 unicast autonomous-system** *as-number*
5. **af-interface** *interface-type interface-number*
6. **no next-hop-self**
7. **no split-horizon**
8. **exit**
9. **remote-neighbors source** *interface-type interface-number* **unicast-listen lisp-encap**
10. **network** *ip-address*
11. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.

	Command or Action	Purpose
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>virtual-name</i> Example: Device(config)# router eigrp test	Configures an EIGRP routing process and enters router configuration mode.
Step 4	address-family ipv4 unicast autonomous-system <i>as-number</i> Example: Device(config-router)# address-family ipv4 unicast autonomous-system 100	Enters address family configuration mode and configures an EIGRP routing instance.
Step 5	af-interface <i>interface-type interface-number</i> Example: Device(config-router-af)# af-interface gigabitethernet 0/0/1	Enters address family interface configuration mode and configures interface-specific EIGRP commands.
Step 6	no next-hop-self Example: Device(config-router-af-interface)# no next-hop-self	Instructs EIGRP to use the received next hop and not the local outbound interface address as the next hop to be advertised to neighboring devices. Note If no next-hop-self is not configured, the data traffic will flow through the EIGRP Route Reflector.
Step 7	no split-horizon Example: Device(config-router-af-interface)# no split-horizon	Disables EIGRP split horizon.
Step 8	exit Example: Device(config-router-af-interface)# exit	Exits address family interface configuration mode and returns to address family configuration mode.
Step 9	remote-neighbors source <i>interface-type interface-number</i> unicast-listen lisp-encap Example: Device(config-router-af)# remote-neighbors	Enables remote neighbors to accept inbound connections from any remote IP address.

	Command or Action	Purpose
	source gigabitethernet 0/0/1 unicast-listen lisp-encap	
Step 10	network <i>ip-address</i> Example: Device(config-router-af)# network 192.168.0.0	Specifies a network for the EIGRP routing process. • Enter all network routes that the EIGRP Route Reflector needs to be aware of.
Step 11	end Example: Device(config-router-af)# end	Exits address family configuration mode and returns to privileged EXEC mode

Configuration Examples for EIGRP Over the Top

Example: Configuring EIGRP Over the Top on a CE Device

The following example shows you how to configure the customer edge (CE) device in the network to advertise local routes to the Enhanced Interior Gateway Routing Protocol (EIGRP) Route Reflectors.

```
Device> enable
Device# configure terminal
Device(config)# router eigrp test
Device(config-router)# address-family ipv4 unicast autonomous-system 100
Device(config-router-af)# neighbor 10.0.0.2 gigabitethernet 0/0/1 remote 3 lisp-encap 1
Device(config-router-af)# network 192.168.0.0
Device(config-router-af)# network 192.168.1.0
Device(config-router-af)# network 192.168.2.0
Device(config-router-af)# end
```

Example: Configuring EIGRP Route Reflectors

```
Device> enable
Device# configure terminal
Device(config)# router eigrp test
Device(config-router)# address-family ipv4 unicast autonomous-system 100
Device(config-router-af)# af-interface gigabitethernet 0/0/1
Device(config-router-af-interface)# no next-hop-self
Device(config-router-af-interface)# no split-horizon
Device(config-router-af-interface)# exit
Device(config-router-af)# remote-neighbors source gigabitethernet 0/0/1 unicast-listen
lisp-encap 1
Device(config-router-af)# network 192.168.0.0
Device(config-router-af)# end
```

Feature Information for EIGRP Over the Top

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.

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Table 1: Feature Information for EIGRP Over the Top

Feature Name	Releases	Feature Information
EIGRP Over the Top	15.3(3)S 15.4(1)T	<p>The EIGRP Over the Top feature enables a single end-to-end routing domain between two or (EIGRP) more Enhanced Interior Gateway Routing Protocol sites that are connected using a private or public WAN connection.</p> <p>The following commands were introduced or modified: remote-neighbor (EIGRP), neighbor (EIGRP), and show ip eigrp neighbors.</p>

