



## CHAPTER 8

# Configuring Static Routing

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This chapter describes how to configure static routing on the Cisco 1000 Series Connected Grid Routers (*hereafter* referred to as the Cisco CG-OS router). The system software for the router is identified as the Cisco CG-OS software.

This chapter includes the following sections:

- [Information About Static Routing, page 8-1](#)
- [Prerequisites for Static Routing, page 8-3](#)
- [Guidelines and Limitations for Static Routing, page 8-3](#)
- [Default Settings, page 8-3](#)
- [Configuring Static Routing, page 8-3](#)
- [Verifying the Static Routing Configuration, page 8-4](#)
- [Configuration Example for Static Routing, page 8-4](#)

## Information About Static Routing

Routers forward packets using either route information from route table entries that you manually configure or the route information that is calculated using dynamic routing algorithms.

Static routes, which define explicit paths between two routers, cannot be automatically updated. Static routes must be manually configured when network changes occur. Static routes use less bandwidth than dynamic routes. Additionally, the router uses no CPU cycles when calculating and analyzing routing updates.

You can supplement dynamic routes with static routes where appropriate. You can redistribute static routes into dynamic routing algorithms but you cannot redistribute routing information calculated by dynamic routing algorithms into the static routing table.

Cisco recommends that you use static routes in environments where network traffic is predictable and where the network design is simple. Large, constantly changing networks are not compatible with static routes because they cannot react to network changes. Most networks use dynamic routes to communicate between routers but might have one or two static routes configured for special cases. Static routes are also useful for specifying a gateway of last resort (a default router to which all unroutable packets are sent).

Static routing applies to both IPv4 and IPv6 environments.

This section includes the following topics:

- [Administrative Distance, page 8-2](#)

- [Directly Connected Static Routes, page 8-2](#)
- [Fully Specified Static Routes, page 8-2](#)
- [Floating Static Routes, page 8-2](#)
- [Remote Next Hops for Static Routes, page 8-3](#)

## Administrative Distance

An administrative distance is the metric used by routers to choose the best path when there are two or more routes to the same destination from two different routing protocols. An administrative distance guides the selection of one routing protocol (or static route) over another, when more than one protocol adds the same route to the unicast routing table. Each routing protocol is prioritized in order of most to least reliable using an administrative distance value.

Static routes have a default administrative distance of 1. A router prefers a static route to a dynamic route because the router considers a route with a low number to be the shortest. When you want a dynamic route to override a static route, you can specify an administrative distance for the static route. For example, when you have two dynamic routes with an administrative distance of 120, you would specify an administrative distance that is greater than 120 for the static route when you want the dynamic route to override the static route.

## Directly Connected Static Routes

You must specify only the output interface (the interface on which all packets are sent to the destination network) in a directly connected static route. The router assumes the destination is directly attached to the output interface and the packet destination is used as the next-hop address. The next hop can be an interface, only for point-to-point interfaces. For broadcast interfaces, the next hop must be an IPv4/IPv6 address.

## Fully Specified Static Routes

You must specify either the output interface (the interface on which all packets are sent to the destination network) or the next-hop address in a fully specified static route. You can use a fully specified static route when the output interface is a multi-access interface and you need to identify the next-hop address. The next-hop address must be directly attached to the specified output interface.

## Floating Static Routes

A floating static route is a static route that the router uses to back up a dynamic route. You must configure a floating static route with a higher administrative distance than the dynamic route that it backs up. In this instance, the router prefers a dynamic route to a floating static route. You can use a floating static route as a replacement if the dynamic route is lost.

**Note**

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By default, a router prefers a static route to a dynamic route because a static route has a smaller administrative distance than a dynamic route.

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## Remote Next Hops for Static Routes

You can specify the next-hop address of a neighboring router that is not directly connected to the router for static routes by using remote (not directly attached) next-hops. When a static route has remote next hops during data forwarding, the routing table uses the next hops entries to identify the corresponding directly attached next hops that have access to the remote next hops.

## Prerequisites for Static Routing

Identify the IP addresses for use as static routes

## Guidelines and Limitations for Static Routing

You can specify an interface as the next-hop address for a static route only for point-to-point interfaces such as generic routing encapsulation (GRE) tunnels.

When the next-hop address for a static route is unreachable, the router does not add the static route to the unicast routing table.

## Default Settings

Table 8-1 lists the default setting for the static routing administrative distance parameter.

**Table 8-1** Default Static Routing Parameters

Parameters	Default
administrative distance	1

## Configuring Static Routing

This section includes the following topics:

- [Configuring a Static Route, page 8-3](#)
- [Verifying the Static Routing Configuration, page 8-4](#)

## Configuring a Static Route

You can configure a static route on the router.

### BEFORE YOU BEGIN

No prerequisites.

## DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>	Enters configuration mode.
Step 2	<b>ip route</b> { <i>ip-prefix</i>   <i>ip-addr ip-mask</i> } { <i>[next-hop   nh-prefix]</i>   <i>[interface next-hop   nh-prefix]</i> } [ <b>tag</b> <i>tag-value</i> [ <i>pref</i> ]	Configures a static route and the interface for this static route. You can optionally configure the next-hop address. The <i>preference</i> value sets the administrative distance. The range is from 1 to 255. The default is 1.
	<b>ipv6 route</b> <i>ipv6-prefix</i> { <i>nh-prefix</i>   <i>link-local-nh-prefix</i> }   ( <i>nexthop</i>   <i>link-local-nexthop</i> [ <i>interface</i> ]) [ <b>tag</b> <i>tag-value</i> [ <i>pref</i> ]	Configures a static route and the interface for this static route. You can optionally configure the next-hop address. The <i>preference</i> value sets the administrative distance. The range is from 1 to 255. The default is 1.
Step 3	<b>show {ip   ipv6} static-route</b>	(Optional) Displays information about static routes.
Step 4	<b>copy running-config startup-config</b>	(Optional) Saves this configuration change.

## EXAMPLE

This example shows how to configure a IPv4 static route.

```
router# configure terminal
router(config)# ip route 192.0.2.0/8 ethernet 2/1 192.0.2.4
router(config)# copy running-config startup-config
```

This example shows how to configure a IPv6 static route.

```
router# configure terminal
router(config)# ipv6 route 2001:0DB8::/48 6::6 ethernet 2/1
router(config)# copy running-config startup-config
```

To remove the static route, use the **no {ip | ipv6} static-route** command.

## Verifying the Static Routing Configuration

To display the static routing configuration, perform one of the following tasks.

Command	Purpose
<b>show ip static-route</b>	Displays the configured static routes.
<b>show ipv6 static-route</b>	Displays the configured static routes.

## Configuration Example for Static Routing

This example shows how to configure a IPv4 static route.

```
configure terminal
ip route 192.0.2.0/8 192.0.2.10
copy running-config startup-config
```