

Configuring Static Routing

This chapter describes how to configure static route on the router.

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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; you must manually reconfigure static routes when network changes occur. Static routes use less bandwidth than dynamic routes. No CPU cycles are used to calculate and analyze 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.

You should use static routes in environments where network traffic is predictable and where the network design is simple. You should not use static routes in large, constantly changing networks because static routes cannot react to network changes. Most networks use dynamic routes to communicate between routers but may 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).

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. If you want a dynamic route to override a static route, you can specify an administrative distance for the static route. For example, if 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 if you want the dynamic route to override the static route.

Directly Connected Static Routes

You need to 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 address.

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 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.

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.

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 with remote (non directly attached) next hops. If a static route has remote next hops during data forwarding, the next hops are recursively used in the unicast routing table to identify the corresponding directly attached next hops that have reachability to the remote next hops.

Virtualization Support

Static routes support Virtual Routing and Forwarding instances (VRFs). By default, Cisco NX-OS places you in the default VRF unless you specifically configure another VRF.

Prerequisites for Static Routing

Static routing has the following prerequisites:

- The next-hop address for a static route must be reachable or the static route will not be added to the unicast routing table.

Guidelines and Limitations for Static Routing

Static routing has the following configuration guidelines and limitations:

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

Default Settings for Static Routing

Table below lists the default settings for static routing parameters.

Table 1: Default Static Routing Parameters

Parameters	Default
administrative distance	1
RIP feature	disabled

Configuring Static Routing



Note If you are familiar with the Cisco IOS CLI, be aware that the Cisco NX-OS commands for this feature might differ from the Cisco IOS commands that you would use.

Configuring a Static Route

You can configure a static route on the router.

SUMMARY STEPS

1. **configure terminal**
2. **ip route** { *ip-prefix* | *ip-addr ip-mask* } {[*next-hop* | *nh-prefix*] | [*interface next-hop* | *nh-prefix*]} [**tag** *tag-value* [*pref*]
3. (Optional) **show ip static-route**

4. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters configuration mode.

Step 2	**ip route** { *ip-prefix* | *ip-addr ip-mask* } {[*next-hop* | *nh-prefix*] | [*interface next-hop* | *nh-prefix*]} [**tag** *tag-value* [*pref*] **Example:** `switch(config)# ip route 192.0.2.0/8 ethernet 1/2 192.0.2.4`	Configures a static route and the interface for this static route. You can optionally configure the next-hop address. The *pref* value sets the administrative distance. The range is from 1 to 255. The default is 1.
Step 3	(Optional) **show ip static-route** **Example:** `switch(config)# show ip static-route`	Displays information about static routes.
Step 4	(Optional) **copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	Saves this configuration change.

Example

This example shows how to configure a static route:

```
switch# configure terminal
switch(config)# ip route 192.0.2.0/8 192.0.2.10
switch(config)# copy running-config startup-config
```

Use the **no ip static-route** command to remove the static route.

Configuring Virtualization

You can configure a static route in a VRF.

SUMMARY STEPS

1. **configure terminal**
2. **vrf context** *vrf-name*
3. **ip route** { *ip-prefix* | *ip-addr ip-mask* } {[*next-hop* | *nh-prefix*] | [*interface next-hop* | *nh-prefix*]} [**tag** *tag-value* [*pref*]

4. (Optional) **show ip static-route vrf** *vrf-name*
5. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters configuration mode.

Step 2	**vrf context** *vrf-name* **Example:** `switch(config)# vrf context StaticVrf`	Creates a VRF and enters VRF configuration mode.
Step 3	**ip route** { *ip-prefix* | *ip-addr ip-mask* } {[*next-hop* | *nh-prefix*] | [*interface next-hop* | *nh-prefix*]} [**tag** *tag-value* [*pref*] **Example:** `switch(config)# ip route 192.0.2.0/8 ethernet 1/2 192.0.2.4`	Configures a static route and the interface for this static route. You can optionally configure the next-hop address. The *pref* value sets the administrative distance. The range is from 1 to 255. The default is 1.
Step 4	(Optional) **show ip static-route vrf** *vrf-name* **Example:** `switch(config)# show ip static-route`	Displays information about static routes.
Step 5	(Optional) **copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	Saves this configuration change.

Example

This example shows how to configure a static route:

```
switch# configure terminal
switch(config)# vrf context StaticVrf
switch(config-vrf)# ip route 192.0.2.0/8 192.0.2.10
switch(config-vrf)# copy running-config startup-config
```

Verifying the Static Routing Configuration

To display the static routing configuration information, use this command:

Command	Purpose
show ip static-route	Displays the configured static routes.

Configuration Examples for Static Routing

This example shows how to configure static routing:

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

Additional References

For additional information related to implementing static routing, see the following sections:

- Related Documents

Related Documents

Related Topic	Document Title
Static Routing CLI	Cisco Nexus 3000 Series Command Reference