

Static Routing Commands

This module describes the commands used to establish static routes on Cisco ASR 9000 Series Aggregation Services Routers .

For detailed information about static routing concepts, configuration tasks, and examples, see the *Implementing Static Routes on* Cisco ASR 9000 Series Router module in the *Routing Configuration Guide for Cisco ASR 9000 Series Routers*.

- address-family (static), on page 2
- maximum path (static), on page 4
- metric (static), on page 6
- route (static), on page 8
- router static, on page 12
- track (static), on page 14
- vrf (static), on page 16

address-family (static)

To enter various address family configuration modes while configuring static routes, use the **address-family** command in the appropriate configuration mode. To disable support for an address family, use the **no** form of this command.

address-family {**ipv4** | **ipv6**} {**unicast** | **multicast**}
no address-family {**ipv4** | **ipv6**} {**unicast** | **multicast**}

Syntax Description

ipv4	Specifies IP Version 4 address prefixes.
ipv6	Specifies IP Version 6 address prefixes. This option is available only in static router configuration mode.
unicast	Specifies unicast address prefixes.
multicast	Specifies multicast address prefixes. This option is available only in static router configuration mode.

Command Default

All static routes belong to the default VRF if you enter address family configuration mode without entering VRF configuration mode.

Command Modes

Router static configuration

VRF router static configuration

Command History

Release	Modification
Release 3.7.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **address-family** command to enter various address family configuration modes while configuring static routing sessions. From address family configuration mode, you can configure static routes using the **route** command.

Task ID

Task ID	Operations
static	read, write

Examples

The following example shows how to enter IPv6 unicast address family mode:

```
RP/0/RSP0/CPU0:router(config)# router static
RP/0/RSP0/CPU0:router(config-static)# address-family ipv6 unicast
```

```
RP/0/RSP0/CPU0:router(config-static-afi)#
```

Related Commands

Command	Description
route (static), on page 8	Establishes a static route.

maximum path (static)

To change the maximum number of allowable static routes, use the **maximum path** command in static router configuration mode. To remove the **maximum path** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

maximum path {**ipv4** | **ipv6**} *value*
no maximum path {**ipv4** | **ipv6**} *value*

Syntax Description

ipv4 | **ipv6**	Specifies IP Version 4 (IPv4) or IP Version 6 (IPv6) address prefixes.
value	Maximum number of static routes for the given AFI. The range is 1 to 140000.

Command Default

value : 4000

Command Modes

Static router configuration

Command History

Release	Modification
Release 3.7.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

If you use the **maximum path** command to reduce the configured maximum allowed number of static routes for a given table below the number of static routes currently configured, the change is rejected. In addition, if you commit a batch of routes that would, when grouped, push the number of static routes configured above the maximum allowed, the first *n* routes in the batch and the number previously configured are accepted, and the remainder rejected. The *n* argument is the difference between the maximum number allowed and the number previously configured.

Task ID

Task ID	Operations
static	read, write

Examples

The following example shows how to set the maximum number of static IPv4 routes to 100000:

```
RP/0/RSP0/CPU0:router(config-static)# maximum path ipv4 100000
```

The following example shows how to remove the preceding configuration and set the maximum number of static IPv4 routes back to the default:

```
RP/0/RSP0/CPU0:router(config-static)# no maximum path ipv4 100000
```

Related Commands

Command	Description
route (static), on page 8	Enters static router configuration mode.
show route static	Displays the static routes in a routing table.

metric (static)

To set metric values for static routes, use the **metric** command on a route after you have entered address family configuration mode. To disable metric values, use the **no** form of this command.

ip-address | *interface-path-id* [**metric** *metric-value*]
no *ip-address* | *interface-path-id* [**metric** *metric-value*]

Syntax Description

ip-address	The IP address is required and, if the interface-path-id arguments are not specified, then the metric option is not displayed.
interface-path-id	Physical interface or virtual interface path-id.
metric *metric-value*	Set a metric value for a static route based on the available bandwidth. Ideal range is 0 to 32.

Command Default

Metric values are not set.

Command Modes

Static IPv4 address family

Static IPv6 address family

Static VRF IPv4 address family

Static VRF IPv6 address family

Command History

Release	Modification
Release 6.0.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **metric** command to provide metric values for a static route with weights.

Task ID

Task ID	Operation
static	read, write

Example

This example shows how to set the metric value as 5 for a route:

```
RP/0/RSP0/CPU0:router(config)# router static
RP/0/RSP0/CPU0:router(config-static)# address-family ipv4 unicast
```

```
RP/0/RSP0/CPU0:router(config-static-afi)# 1.1.1.1/32 gigabitEthernet 0/0/0/1 metric 5
```

route (static)

To establish static routes, use the **route** command in address family configuration mode. To remove the **route** command from the configuration, use the **no** form of this command.

prefix/mask [**vrf** *vrf-name*] {*ip-address* | *type* *interface-path-id* [*ip-address* | *type* *interface-path-id*] [**behavior** | *utef*] [**track** *track-object-name*] [**tunnel-id** *tunnel-id*] [**vrflabel** *vrf-label*] [*distance*] [**description** *text*] [**tag** *tag*] [**permanent**]}

Syntax Description

prefix / *mask*	IP route prefix and prefix mask for the destination. The network mask can be specified in either of two ways: • The network mask can be a four-part, dotted-decimal address. For example, 255.0.0.0 indicates that each bit equal to 1 means the corresponding address bit is a network address. • The network mask can be indicated as a slash (/) and number. For example, /8 indicates that the first 8 bits of the mask are 1s, and the corresponding bits of the address are the network address.

vrf *vrf-name*	(Optional) Specifies a destination VRF. This option is available when IPv4 address families are specified.
	The following names cannot be used: all, default, and global.
	The following example shows how to configure IPv4 VRF:
	`router static`
	` address-family ipv4 unicast`
	`  10.1.1.0/24 vrf vrf_a 192.168.1.1`
	`router static`
	` vrf vrf_a`
	`  address-family ipv4 unicast`
	`   10.1.1.0/24 192.168.1.1`

ip-address	IP address of the next hop that can be used to reach that network. • For IPv4 address–the IP address is required, not optional, if the interface type and interface-path-id arguments are not specified. You can specify an IP address and an interface type and interface path. • For IPv6 link-local address–the interface type and interface-path-id arguments are required. The route is not valid, if the interface type and interface-path-id arguments are not specified. **Note** A forwarding router's IP address or an interface or virtual interface path ID can be configured, in any order.
behavior	Define the behavior by selecting the appropriate option.
utef	Static programs the utef SID with the context of controller address.

type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function. **Note** A forwarding router's IP address or an interface or virtual interface path ID can be configured, in any order.
distance	(Optional) Administrative distance. Range is 1 to 254.
description *text*	(Optional) Specifies a description of the static route.
tag *tag*	(Optional) Specifies a tag value that can be used as a match for controlling redistribution using route policies. Range is 1 to 4294967295.
permanent	(Optional) Specifies that the route is not removed from the routing table, even if the next-hop interface shuts down or next-hop IP address is not reachable.
track *track-object-name*	Enables object tracking for static route.
tunnel-id *tunnel-id*	Specifies a Tunnel ID.
vrflabel *vrf-label*	Specifies a VRF label.

Command Default

No static route is established.

vrf *vrf-name* : If no VRF is specified, the vrf where the configuration takes place is used.

Command Modes

Address family configuration

Command History

Release	Modification
Release 24.1.1	The *utef* keyword was introduced.
Release 3.7.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

A static route is appropriate when the software cannot build a route to the destination, dynamically.

Static routes have a default administrative distance of 1, in which a low number indicates a preferred route. By default, static routes are preferred to routes learned by routing protocols. You can configure an administrative distance with a static route if you want the static route to be overridden by dynamic routes. For example, you

could have routes installed by the Open Shortest Path First (OSPF) protocol with an administrative distance of 120. To have a static route that would be overridden by an OSPF dynamic route, specify an administrative distance greater than 120.

The routing table considers the static routes that point to an interface as "directly connected." Directly connected networks are advertised by IGP routing protocols if a corresponding **interface** command is contained under the router configuration stanza of that protocol.

A static route is always associated with a VPN routing and forwarding (VRF) instance. The VRF can be the default VRF or a specified VRF. Specifying a VRF allows you to enter VRF configuration mode where you can configure a static route. If you do not specify a VRF you can configure a default VRF static route.

Use the **router static** command to configure static routes. To configure a static route, you must enter router static configuration mode and then enter an address family configuration mode or VRF configuration mode. See the **vrf (static)** command for information on configuring a static route in VRF configuration mode. After you enter an address family mode, you can enter multiple static routes. The following example shows how to configure multiple static routes in IPv4 and IPv6 address family configuration modes:



Note You cannot create a VRF named default, but you can reference the default VRF.

Task ID

Task ID	Operations
static	read, write

The following example shows how to configure the Sink node:

```
Router(config)#router static
Router(config-static)# address-family ipv6 unicast
Router(config-static-afi)#fccc:cc00:9000:fef1::/64 segment-routing srv6 endpoint behavior
utef controller-address fccc:cc00:7::
```

Examples

The following example shows how to configure IPv6 unicast address family static routes:

```
Router(config)# router static
Router(config-static)# address-family ipv6 unicast
Router(config-static-afi)# 2b11::327a:7b00/120 GigabitEthernet0/2/0/7
Router(config-static-afi)# 2b11::327a:7b00/120 GigabitEthernet0/6/0/0
Router(config-static-afi)# 2b11::327a:7b00/120 2b11::2f01:4c
Router(config-static-afi)# 2b11::327a:7b00/120 2b11::2f01:4d
Router(config-static-afi)# 2b11::327a:7b00/120 2b11::2f01:4e
Router(config-static-afi)# 2b11::327a:7b00/120 2b11::2f01:4f
Router(config-static-afi)# 2b11::327a:7b00/120 2b11::2f01:50
```

Related Commands

Command	Description
address-family (static), on page 2	Enters address family configuration mode.

Command	Description
network (BGP)	Specifies a list of networks for the BGP routing process.
show route	Displays the current contents of the routing table.
show route static	Displays the static routes in a routing table.
show route summary	Displays the current contents of the routing table in summary format.
vrf (static)	Enters VRF static route configuration mode.

router static

To enter static router configuration mode, use the **router static** command in global configuration mode. To remove all static route configurations and terminate the static routing process, use the **no** form of this command.

router static
no router static

Syntax Description

This command has no arguments or keywords.

Command Default

No static routing process is enabled.

Command Modes

Global configuration

Command History

Release	Modification
Release 3.7.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
static	read, write
bgp, ospf, hsrp, isis, vrrp, multicast, or network	read, write

Examples

The following example shows how to enter static router configuration mode:

```
RP/0/RSP0/CPU0:router(config)# router static
RP/0/RSP0/CPU0:router(config-static)#
```

Related Commands

Command	Description
address-family (static), on page 2	Enters address family configuration mode.
show route	Displays the current contents of the routing table.
show route static	Displays the static routes in a routing table.
show route summary	Displays the current contents of the routing table in summary format.
route (static), on page 8	Establishes a static route.

Command	Description
vrf (static)	Enters VRF static route configuration mode.

track (static)

To enable object racking for static routes, use the **track** command in an appropriate configuration mode. To disable object tracking, use the **no** form of this command.

ip-address / length [**vrf** *vrf-name*] {*nexthop* | *type interface-path-id*} [**track** *object-name*]
no *ip-address / length* [**vrf** *vrf-name*] {*nexthop* | *type interface-path-id*} [**track** *object-name*]

Syntax Description

ip-address / length	Specifies the destination prefix.
vrf *vrf-name*	Specifies vrf for the nexthop.. This option is available when IPv4 and IPv6 address families are specified. These names cannot be used for *vrf-name*: all, default, and global.
nexthop	Specifies the forwarding router's address.
type	Specifies the interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
object-name	Specifies the name of the object to be tracked. Up to 32 characters are allowed for specifying an object name.

Command Default

Object tracking is disabled. No object is specified for tracking.

Command Modes

Static IPv4 address family

Static VRF IPv4 address family

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

If the specified objects are not existing in IOS XR database, those objects are forward-referenced until created. However, objects that are forward-referenced by the tracking configuration are treated as 'down'.

When a failure between the first hop router and core occurs, the tracking object will go Down. The static router withdraws the primary paths, which were tracking this object and installs the back-up paths, if present.

Task ID

Task ID	Operation
static	read, write

This example shows how to enable tracking for an object *object1*:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#router static
RP/0/RSP0/CPU0:router(config-static)#address-family ipv4 unicast
RP/0/RSP0/CPU0:router(config-static-afi)#100.0.24.0/24 204.0.23.2 track object1
```

vrf (static)

To configure a VPN routing and forwarding (VRF) instance and enter VRF configuration mode, use the **vrf** command in router configuration mode. To remove the VRF instance from the configuration file and restore the system to its default condition, use the **no** form of this command.

vrf *vrf-name*
no vrf *vrf-name*

Syntax Description

vrf-name	Name of the VRF instance. The following names cannot be used: all, default, and global.

Command Default

No default behavior or values

Command Modes

Static router configuration

Command History

Release	Modification
Release 3.7.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **vrf** command to configure a VRF instance. A VRF instance is a collection of VPN routing and forwarding tables maintained at the provider edge (PE) router.

A static route is always associated with a VRF, which is entirely user configurable. Static route is unique within a VRF. A static route can point to a next-hop interface, next-hop IP address, or both, which can be resided in the same VRF configured for the static route or in a different VRF. For example, routes 172.168.40.0/24 and 172.168.50.0/24 are configured as follows:

```
router static
vrf vrf_A
address ipv4 unicast
172.168.40.0/24 loopback 1
172.168.50.0/24 vrf vrf_B 192.168.1.2
```

Routes 172.168.40.0/24 and 172.168.50.0/24 belong to vrf_A. Route 172.168.50.0/24 is not installed in vrf_A until next-hop 192.168.1.2 (a vrf_B route) is reachable.

If you are configuring a default VRF route, you do not need to enter VRF configuration mode. For example, routes 192.168.1.0/24 and 192.168.2.0/24 are configured as follows:

```
router static
 address ipv4 unicast
  192.168.1.0/24 loopback 5
  192.168.2.0/24 10.1.1.1
```

Routes 192.168.1.0/24 and 192.168.2.0/24 are default VRF routes.

Note You cannot create a VRF named default, but you can reference the default VRF.

You must remove IPv4/IPv6 addresses from an interface prior to assigning, removing, or changing a VRF on an IP interface. If this is not done in advance, any attempt to change the VRF on an IP interface is rejected.

Task ID

Task ID	Operations
static	read, write

Examples

The following example shows how to configure a VRF instance and enter VRF configuration mode:

```
RP/0/RSP0/CPU0:router(config)# router static
RP/0/RSP0/CPU0:router(config-static)# vrf vrf-1
RP/0/RSP0/CPU0:router(config-static-vrf)#
```

Related Commands

Command	Description
address-family (static), on page 2	Enters address family configuration mode and allows you to configure a static route.