VRF Commands

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address-family ipv4

To set an address family ipv4 in vrf configuration mode use the **address-family ipv4** command. To remove the IPv4 address-family, use the **no** form of this command.

address-family ipv4 { **bgp** [*next-hop*] | **export** [*map*] | **import** [*map*] | **maximum** [*routes*] | **mdt** [*auto-discovery* | *data* | *default* | *log-reuse* | *mtu* | *overlay* | *preference*] | **route-replicate** [*from* | *recursion-policy*] | **route-target** [*export* | *import*] }
no address-family ipv4 { **bgp** [*next-hop*] | **export** [*map*] | **import** [*map*] | **maximum** [*routes*] | **mdt** [*auto-discovery* | *data* | *default* | *log-reuse* | *mtu* | *overlay* | *preference*] | **route-replicate** [*from* | *recursion-policy*] | **route-target** [*export* | *import*] }

Syntax Description

bgp	A standardized exterior gateway protocol designed to exchange routing and reachability information.
next-hop	IP address of the next hop in the traffic flow.
export	Allows vrf table to be exported to the global table or another vrf.
map	VRF definition or global table.

import	Allows global table or another vrf table to be imported to vrf.
map	VRF definition or global table.
maximum	Specifies the max number of routes.
routes	<0 – 42949677295>
mdt	Specifies an IPv4 multicast distribution tree (MDT) address family session.
auto-discovery	Enables BGP MVPN discovery for GRE in multicast code.
data	Specifies a range of addresses to be used in the data multicast distribution tree (MDT) pool.
default	Configures a default multicast distribution tree (MDT) group for a vrf.
log-reuse	Enables the recording of data multicast distribution tree (MDT) reuse.
mtu	Defines the largest size of packets that an interface can transmit.
overlay	Specifies a protocol as the overlay.
preference	Specifies a preference for a particular MDT type (MLDP or PIM).
route-replicate	Replicates routes into the base topology within the specified address family.
from	Defines a vrf where network resides.
recursion-policy	
route-target	Specifies the target where routes are ether sent or received.
export	Allows a vrf table to be exported to the global table or another vrf.
import	Allows a global table or another vrf table to be imported to vrf.

Command Default

None

Command Modes

VRF configuration (config-vrf)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco SD-WAN Manager CLI templates.

Usage Guidelines

The **address-family ipv4** command under the vrf definition allows you to configure routing sessions and other related configuration commands.

Example

The following example shows the how to configure **address-family ipv4** prefixes from vrf 77.

```
Device(config)# vrf definition 77
Device(config-vrf)# address-family ipv4
Device(config-ipv4)# exit-address-family
```

address-family ipv6

To set an address family ipv6 in vrf configuration mode use the **address-family ipv6** command. To remove the IPv6 address-family, use the **no** form of this command.

address-family ipv6 { **bgp** [*next-hop*] | **import** [*map*] | **mdt** [*auto-discovery* | *data* | *default* | *log-reuse* | *mtu* | *overlay* | *preference*] }
no address-family ipv6 { **bgp** [*next-hop*] | **import** [*map*] | **mdt** [*auto-discovery* | *data* | *default* | *log-reuse* | *mtu* | *overlay* | *preference*] }

Syntax Description

bgp	A standardized exterior gateway protocol designed to exchange routing and reachability information.
next-hop	IP address of the next hop in the traffic flow.
import	Allows global table or another vrf table to be imported to vrf.
map	VRF definition or global table.
mdt	Specifies an IPv6 multicast distribution tree (MDT) address family session.
auto-discovery	Enables BGP MVPN discovery for GRE in multicast code.
data	Specifies a range of addresses to be used in the data multicast distribution tree (MDT) pool.
default	Configures a default multicast distribution tree (MDT) group for a vrf.
log-reuse	Enables the recording of data multicast distribution tree (MDT) reuse.
mtu	Defines the largest size of packets that an interface can transmit.
overlay	Specifies a protocol as the overlay.
preference	Specifies a preference for a particular MDT type (MLDP or PIM).

Command Default

None

Command Modes

VRF configuration (config-vrf)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco SD-WAN Manager CLI templates.

Usage Guidelines

The **address-family ipv6** command under the vrf definition allows you to configure routing sessions and other related configuration commands.

Example

The following example shows the how to configure **address-family ipv6** prefixes from vrf 77.

```
Device(config)# vrf definition 77
Device(config-vrf)# address-family ipv6
Device(config-ipv6)# exit-address-family
```

description (VRF definition)

To assign a helpful description to a virtual routing and forwarding (VRF) instance, use the **description** command in VRF definition configuration mode. To remove the description, use the **no** form of this command.

description *string*
no description

Syntax Description

string	Description of a VRF (up to 244 characters).

Command Default

This command has no default arguments or keywords.

Command Modes

VRF definition configuration mode (config-vrf)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For the usage guideline, see description (VRF definition)

Examples

```
Device(config)# vrf definition 1
Device(config-vrf)# description vrf instance 1
```

ip vrf

To define a VPN routing and forwarding (VRF) instance and to enter VRF configuration mode, use the **ip vrf** command in global configuration mode. To remove a VRF instance, use the **no** form of this command.

Supported Parameters

vrf-name	Name assigned to a VRF.

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.6.1a	Command qualified for use in Cisco SD-WAN Manager CLI templates.

Usage Guidelines

For more information about this command, see the Cisco IOS XE ip vrf command.

Examples

The following example shows how to import a route map to a VRF instance named VPN1:

```
Router(config)# ip vrf vpn1
Router(config-vrf)# rd 100:2
Router(config-vrf)# route-target both 100:2
Router(config-vrf)# route-target import 100:1
```

rd (VPLS)

To specify a route distinguisher (RD) to distribute endpoint information in a Virtual Private LAN Service (VPLS) configuration, use the **rd** command in L2 VFI configuration or VFI autodiscovery configuration mode. To remove the manually configured RD and return to the automatically generated RD, use the **no** form of this command.

rd {*autonomous-system-number*:*nn* | *ip-address*:*nn*}
no rd {*autonomous-system-number*:*nn* | *ip-address*:*nn*}

Syntax Description

autonomous-system-number:*nn*	Specifies a 16-bit autonomous system number (ASN) and 32-bit arbitrary number. The ASN does not have to match the local autonomous system number.
ip-address:*nn*	Specifies a 32-bit IP address and a 16-bit arbitrary number. Only IPv4 addresses are supported.

Command Default

VPLS autodiscovery automatically generates a RD using the Border Gateway Protocol (BGP) autonomous system number and the configured virtual forwarding instance (VFI) VPN ID.

Command Modes

VRF definition configuration mode (config-vrf)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For the usage guideline, see rd (VPLS)

Examples

```
Device(config)# vrf definition 1
Device(config-vrf)# rd 1:2
```

redistribute vrf

To redistribute routes that are replicated between global VRF and service VPN and between inter-service VPNs, use the **redistribute vrf** command in router configuration mode. To stop such redistribution, use the **no** form of this command.

redistribute vrf *vrf-name protocol* [**metric** *bandwidth-metric delay-metric reliability-metric effective-bandwidth-metric mtu-bytes*] **subnets** [**route-map** *route-map-name*]
no redistribute vrf *vrf-name protocol* **subnets** [**metric** *bandwidth-metric delay-metric reliability-metric effective-bandwidth-metric mtu-bytes*] [**route-map** *route-map-name*]

Syntax Description

vrf-name	The name of the VRF from which routes are replicated.
protocol	Type of protocol of the source route. Some of the keywords require an argument. The valid keywords and arguments are: • **bgp** *autonomous-system-number* : Border Gateway Protocol (BGP). • **connected** : Connected routes. • **eigrp** *autonomous-system-number* : Enhanced Interior Gateway Routing Protocol (EIGRP). • **ospf** *process-id* : Open Shortest Path First (OSPF). • **static** : Static routes. • **nhrp** : Next Hop Resolution Protocol (NHRP) routes.
route-map-name	(Optional) Name of a route map that filters out routes that shouldn't be redistributed back to the original protocol.
metric	(Optional) Specifies the metric for redistributed routes.
bandwidth-metric	(Optional) Maximum bandwidth of the route in kilobits per second (kb/s). The range is 1 to 4294967295.
delay-metric	(Optional) EIGRP route delay metric in microseconds. The range is 1 to 4294967295.
reliability-metric	(Optional) EIGRP reliability metric. The range is 0 to 255. An EIGRP metric of 255 signifies 100 percent reliability.
effective-bandwidth-metric	(Optional) Effective bandwidth of the route. The range is 1 to 255. The effective bandwidth of 255 denotes 100 percent load.
mtu-bytes	(Optional) Smallest allowed value for the maximum transmission unit (MTU) in bytes. The range is 1 to 65535.
subnets	(Optional) Specifies redistribution of routes into OSPF. When routes are redistributed into OSPF, only routes that are not subnetted are redistributed if the **subnets** keyword is not specified. This is not applicable for connected protocol type. This can be configured for bgp, nhrp, ospf, ospfv3, and static protocol types. By default, no subnets are defined.

Command Default

No routes are redistributed.

Command Modes

Router topology configuration (config-router-af-topology)

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.5.1a	Command qualified for use in Cisco SD-WAN Manager CLI templates.
Cisco IOS XE Catalyst SD-WAN Release 17.6.1a	Support is added for BGP as the destination protocol when redistributing between the global VRF and service VPNs.
Cisco IOS XE Catalyst SD-WAN Release 17.9.1a	Support is added for redistrbuting between service VRFs on the same edge device site.

Examples

The following example shows how to redistribute global VRF routes into VRF EIGRP that were replicated from global BGP to service VPN:

```
Device(config)# vrf definition 1
Device(config-vrf)# address-family ipv4
Device(config-ipv4)# route-replicate from vrf global unicast bgp 56
Device(config-ipv4)# exit-address-family
Device(config-vrf)# exit
Device(config)# router eigrp test
Device(config-router)# ! Redistribute routes that were replicated from vrf global into
eigrp.
Device(config-router)# address-family ipv4 unicast vrf red autonomous-system 1
Device(config-router-af)# topology base
Device(config-router-af-topology)# redistribute vrf global bgp 50000 metric 1000000 10 255
 1 1500
```

The following example shows how to redistribute global VRF routes into VRF BGP that were replicated from global BGP to Service VPN:

```
Device(config)# vrf definition 102
Device(config-vrf)# address-family ipv4
Device(config-ipv4)# route-replicate from vrf 102 unicast global bgp 50000
Device(config-ipv4)# exit-address-family
Device(config-vrf)# exit
Device(config)# router bgp 50000
Device(config-router)# ! Redistribute routes that were replicated from service vrf to bgp.
Device(config-router)# address-family ipv4 vrf 102
Device(config-router-af-topology)# redistribute vrf global bgp 50000 route-map BGP-route-map
```

The following example shows how to redistribute global VRF routes into VRF OSPF that were replicated from global BGP into VRF:

```
Device(config)# vrf definition 2
Device(config-vrf)# address-family ipv4
Device(config-ipv4)# route-replicate from vrf global unicast bgp 77
Device(config-ipv4)# exit-address-family
Device(config-vrf)# exit
Device(config)# router ospf 1 vrf test
Device(config-router)# ! Redistribute routes that were replicated from vrf global into ospf.
Device(config-router)# redistribute vrf global bgp 77
```

The following example shows how to redistribute routes via OSPF that were replicated from VRF 1:

```
Device(config)# vrf definition 2
Device(config-vrf)# rd 1:2
Device(config-vrf)# address-family ipv4
Device(config-ipv4)# route-replicate from vrf 1 unicast static route-map VRF1_TO_VRF2
Device(config-ipv4)# exit-address-family
Device(config)# router ospf 2 vrf 2
Device(config-router)# redistribute vrf 1 static route-map VRF1_TO_VRF2
```

route-replicate (VRF address family)

To replicate routes from another topology and Virtual Routing and Forwarding (VRF), use the **route-replicate** command in VRF address-family configuration mode. To stop replicating routes, use the **no** form of this command.

route-replicate from vrf *source-vrf-name* **unicast** *protocol* [**route-map** *map-tag*]
no route-replicate from vrf *source-vrf-name* **unicast** *protocol* [**route-map** *map-tag*]

Syntax Description

from	Specifies the topology where route replication is enabled.
vrf *source-vrf-name*	Specifies the name of the VRF from which routes are replicated.
unicast	Specifies a unicast SAFI.
protocol	Type of protocol of the source route. Some keywords require an argument. Valid keywords and arguments are: • **bgp** *autonomous-system-number*: Border Gateway Protocol (BGP). • **connected**: Connected routes. • **eigrp** *autonomous-system-number*: Enhanced Interior Gateway Routing Protocol (EIGRP). • **ospf** *process-id*: Open Shortest Path First (OSPF). • **static**: Static routes.
route-map *map-tag*	(Optional) Specifies the name of a route map that filters routes that shouldn't be replicated.

Command Default

No routes are replicated.

Command Modes

VRF address family configuration (config-ipv4)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.5.1a	Command qualified for use in Cisco SD-WAN Manager CLI templates.

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.9.1a	Support for route replication between service VPNs at the same edge device site.

Usage Guidelines

Route replication creates a link to a route in a routing information base (RIB) that is in a different VRF.

Examples

The following example redistributes global VRF BGP routes into VRF EIGRP that were replicated from VRF global into 1:

```
Device(config)# vrf definition 1
Device(config-vrf)# address-family ipv4
Device(config-ipv4)# route-replicate from vrf global unicast bgp 56
Device(config-ipv4)# exit-address-family
Device(config-vrf)# exit
Device(config)# router eigrp test
Device(config-router)# ! Redistribute routes that were replicated from vrf global into
eigrp.
Device(config-router)# address-family ipv4 unicast vrf red autonomous-system 1
Device(config-router-af)# topology base
Device(config-router-af-topology)# redistribute vrf global bgp 56
```

The following example redistributes global VRF EIGRP routes into BGP that were replicated from VRF global:

```
Device(config)# vrf definition 1
Device(config-vrf)# address-family ipv4
Device(config-ipv4)# route-replicate from vrf global unicast eigrp 56
Device(config-ipv4)# exit-address-family
Device(config-vrf)# exit
Device(config)# router bgp test
Device(config-router)# address-family ipv4 unicast vrf 10
Device(config-router-af)# redistribute vrf global bgp 56
Device(config-router-af)# exit-address-family
```

The following example shows how to redistribute routes via OSPF that were replicated from VRF 1 into VRF 2:

```
Device(config)# vrf definition 2
Device(config-vrf)# rd 1:2
Device(config-vrf)# address-family ipv4
Device(config-ipv4)# route-replicate from vrf 1 unicast static route-map VRF1_TO_VRF2
Device(config-ipv4)# exit-address-family
Device(config)# router ospf 2 vrf 2
Device(config-router)# redistribute vrf 1 static route-map VRF1_TO_VRF2
```

route-target

To create a route-target extended community for a Virtual Private Network (VPN) routing and forwarding (VRF) instance, use the **route-target** command in VRF configuration or in VRF address family configuration mode. To disable the configuration of a route-target community option, use the **no** form of this command.

route-target [**export** | **import**] *route-target-ext-community*

no route-target [**export** | **import**] *route-target-ext-community*

Syntax Description

import	(Optional) Imports routing information from the target VPN extended community.
export	Optional) Exports routing information to the target VPN extended community.
route-target-ext-community	The route-target extended community attributes to be added to the VRF's list of import, export, or both (import and export) route-target extended communities.

Command Default

A VRF has no route-target extended community attributes associated with it.

Command Modes

VRF definition configuration mode (config-vrf)

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For the usage guideline, see route-target

Examples

```
Device(config)# vrf definition 1
Device(config-vrf)# default route-target export 101:3

Device(config)# vrf definition 1
Device(config-vrf)# default route-target import 102:3
```

service tcp-keepalives-in

To generate keepalive packets on idle incoming network connections (initiated by the remote host), use the **service tcp-keepalives-in** command in global configuration mode . To disable the keepalives, use the **no**form of this command.

service tcp-keepalives-in
no service tcp-keepalives-in

Syntax Description

This command has no arguments or keywords.

Command Default

Disabled

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.3.1a	Command qualified for use in Cisco vManage CLI templates.

Examples

In the following example, keepalives on incoming TCP connections are generated:

```
Device(config)# service tcp-keepalives-in
```

service tcp-keepalives-out

To generate keepalive packets on idle outgoing network connections (initiated by a user), use the **service tcp-keepalives-out** command in global configuration mode . To disable the keepalives, use the **no**form of this command.

service tcp-keepalives-out
no service tcp-keepalives-out

Syntax Description

This command has no arguments or keywords.

Command Default

Disabled

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.3.1a	Command qualified for use in Cisco vManage CLI templates.

Examples

In the following example, keepalives on outgoing TCP connections are generated:

```
Device(config)# service tcp-keepalives-out
```

service tcp-small-servers

To enable small TCP servers such as the Echo, use the **service tcp-small-servers** command in global configuration mode. To disable the TCP server, use the **no** form of this command.

service tcp-small-servers
no service tcp-small-servers

Command Default

TCP small servers are disabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.3.1a	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE service tcp small servers command.

Examples

The following example shows how to enable small TCP servers:

```
Device(config)# service tcp-small-servers
```

service udp-small-servers

To enable small User Datagram Protocol (UDP) servers such as the Echo, use the **service udp-small-servers** command in global configuration mode. To disable the UDP server, use the **no** form of this command.

service udp-small-servers
no service udp-small-servers

Command Default

UDP small servers are disabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.3.1a	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE service udp small servers command.

Examples

The following example shows how to enable small UDP:

```
Router(config)# service udp-small-servers
```

vrf definition

To configure a virtual routing and forwarding (VRF) routing-table instance and enter VRF configuration mode, use the **vrf definition** command in global configuration mode. To remove a VRF routing table, use the **no** form of this command.

vrf definition *vrf-number*
no vrf definition *vrf-number*

Syntax Description

vrf-number	Number assigned to a VRF.

Command Default

No VRFs are defined. No import or export lists are associated with a VRF. No route maps are associated with a VRF.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For the usage guideline, see vrf definition

Examples

```
Device(config)# vrf definition 1
```