Configure Service-Side VRRP on Cisco IOS XE Catalyst SD-WAN Edges

Contents

Introduction

This document describes how to Configure Service-Side VRRP on Cisco IOS® XE Catalyst SD-WAN Edges via Feature Templates, Configuration Groups and CLI.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Cisco Catalyst Software-Defined Wide Area Network (SD-WAN)
- Virtual Router Redundancy Protocol (VRRP) basic operation
- Manager Graphic User Interface (GUI)
- Configuration Groups

Components Used

- Cisco IOS® XE Catalyst SD-WAN Edges 17.9.4a
- Cisco Catalyst SD-WAN Manager 20.12.4

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

The Virtual Router Redundancy Protocol (VRRP) is a LAN-side protocol that provides redundant gateway service for switches and other IP end stations. In the Cisco SD-WAN software, you configure VRRP on an interface, and typically on a subinterface, within a Virtual Private Network (VPN).

VRRP is only supported with service-side VPNs (VPN 0 and 512 do not support VRRP).

Configure

Network Diagram

Network Diagram
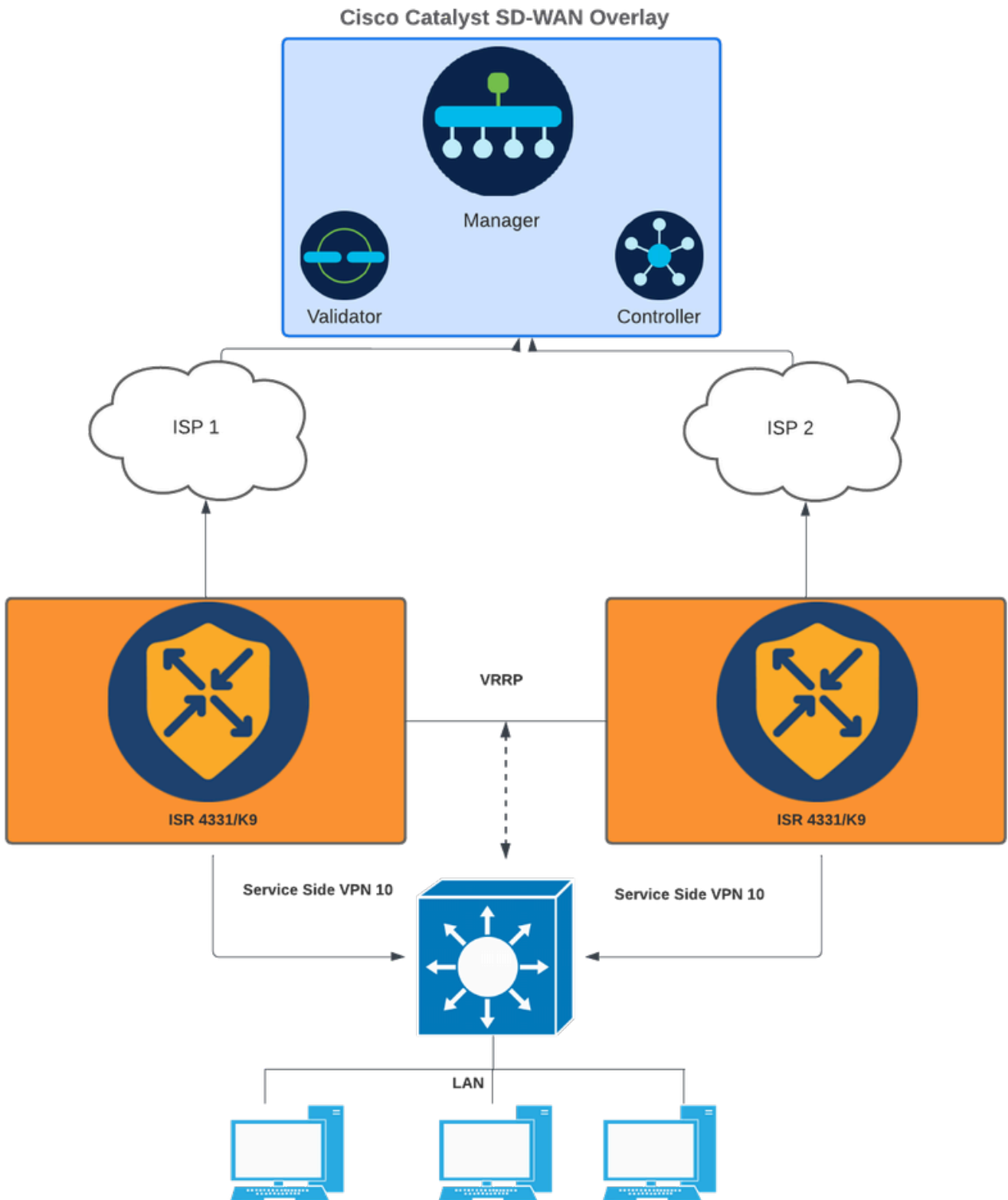
Configurations
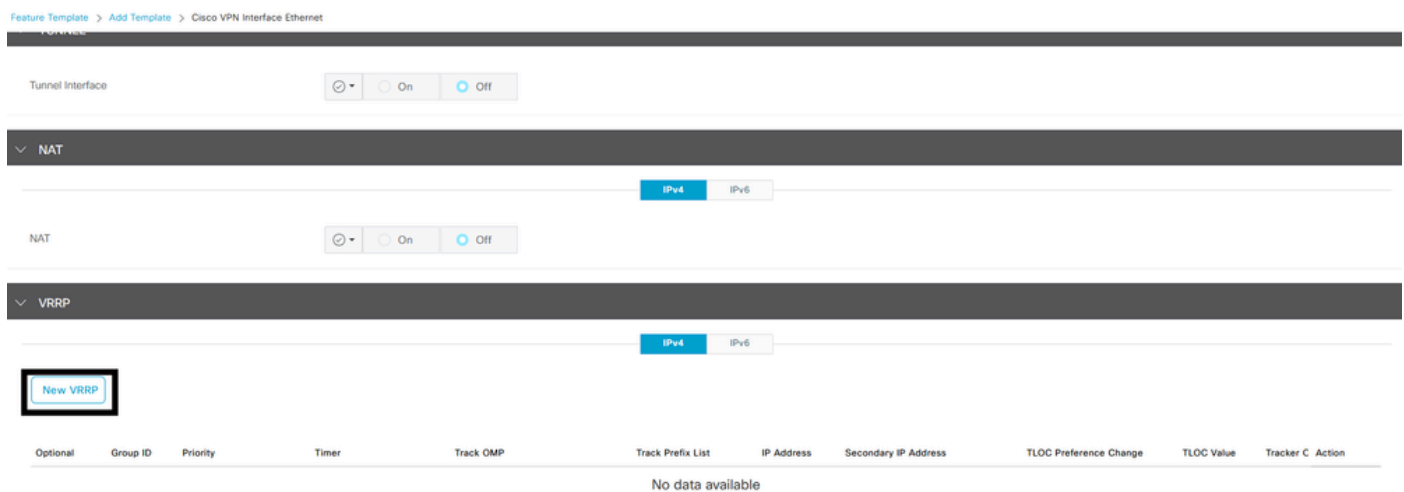
This can be achieved in three ways:

1 - Via Device Feature Templates:

In SD-WAN Manager, navigate to **Configuration > Templates > Feature templates.**

If there is already a feature template created for the service-side interface, search the template name and click **Edit**.

If no feature template was created for the service-side interface, click **Add template**, search for the **device model**, and select **Cisco VPN Interface Ethernet**.

Click **VRRP** tab and **New VRRP**.

VRRP Tab

Configure the VRRP parameters:

Group ID: Range 1 through 255.

Priority: Range: 1 through 254 . Priority level of the router. The router with the highest priority is elected as the primary VRRP router. If two routers have the same priority, the one with the higher IP address is elected as the primary VRRP router.

Timer (milliseconds): Range 100 through 40950 milliseconds. Specify how often the primary VRRP router sends VRRP advertisement messages. If subordinate routers miss three consecutive VRRP advertisements, they elect a new primary VRRP routers. It is recommended to use 1000ms as default value.

Track OMP (optional)

Track Prefix List (optional)

IP Address: Virtual IP Address that must be different that both router interfaces, but in the same subnet (local and peer).

Note: When the timer is 100 ms for the VRRP feature template on Cisco IOS® XE Catalyst SD-WAN devices, the VRRP fails if the traffic is high on LAN interface. It is recommended to setup default

✎ timer 1000ms or higher.

VRRP Configuration Example Primary Device

Click **Add** and then **Save.**

Proceed with the same process for the VRRP peer/standby (except for the VRRP priority, all the values must match).

VRRP Configuration Example Standby Device

Add the VPN Interface Ethernet feature template to the device template under desired Service VPN, and click **Save.**

Screen to push changes to the device appears to complete the process.

CLI equivalent

Primary:

```
interface GigabitEthernet0/0/1
<snipped>
  vrf forwarding 10
  ip address 192.168.23.2 255.255.255.0
  no ip redirects
  ip mtu 1496
  vrrp 1 address-family ipv4
   timers advertise 1000
   priority 200
   vrrpv2
   address 192.168.23.1 primary
  exit-vrrp
arp timeout 1200
end
```

Standby:

```
interface GigabitEthernet0/0/1
<snipped>
  vrf forwarding 10
  ip address 192.168.23.3 255.255.255.0
  no ip redirects
  ip mtu 1496
  vrrp 1 address-family ipv4
   timers advertise 1000
   priority 150
   vrrpv2
   address 192.168.23.1 primary
   exit-vrrp
arp timeout 1200
end
```

2 - Via Configuration Groups:

Navigate to **Configuration > Configuration Groups.**

Navigate to the exist **Configuration Group**, and select **Edit**.

Navigate to **Service Profile** section, and look for the feature LAN interface.

Click **Edit Feature.**

In the new tab, click **VRRP** section, and then **Add VRRP IPv4.**

Configure the VRRP parameters:

Group ID: Range 1 through 255.

Priority: Range: 1 through 254 . Priority level of the router. The router with the highest priority is elected as the primary VRRP router. If two routers have the same priority, the one with the higher IP address is elected as the primary VRRP router.

Timer (milliseconds): Range 100 through 40950 milliseconds. Specify how often the primary VRRP router sends VRRP advertisement messages. If subordinate routers miss three consecutive VRRP advertisements, they elect a new primary VRRP routers. It is recommended to use 1000ms as default value.

Track OMP (optional)

Track Prefix List (optional)

IP Address: Virtual IP Address that must be different that both router interfaces, but in the same subnet (local and peer).

Note: When the timer is 100 ms for the VRRP feature template on Cisco IOS XE Catalyst SD-WAN devices, the VRRP fails if the traffic is high on LAN interface. It is recommended to setup default timer 1000ms or higher.

VRRP Configuration Example Primary

Then, click **Add** button.

Validate that configuration is added, and click **Save.**

Edit Ethernet Interface Feature

LAN / Service VPN / Ethernet Interface

Name*
VPN_Corporate_Users_10_Interface

Description
LAN Interface

Associated VPN
Corporate_Users

Basic Configuration   NAT   **VRRP**   ARP   ACL/QoS   Advanced

∨ IPv4 Settings

VRRP IPv4 (1) (Maximum: 1)

Add VRRP IPv4

Group ID	Priority	Timer	Track OMP	IP Address	VRRP Secondary	Tloc Prefix Change	Tloc Prefix Change Value	Tracking	Action
⊕ 1	⊕ 200	⊘ 1000	⊘ false	⊕ 192.168.23.1		⊘ false			✎ 🗑

\> IPv6 Settings

Cancel   **Save**

Save VRRP Configuration

After that, deploy the changes in the Primary device.

Proceed with the same process for the VRRP peer/standby (except for the VRRP priority, all the values must match).

Add VRRP IPv4

Group ID*

⊕ ⌄ 1

Priority*

⊕ ⌄ 150

Timer*

⊘ ⌄ 1000

Track OMP*

⊘ ⌄ ☐✕

IP Address*

⊕ ⌄ 192.168.23.1

Tloc Prefix Change*

⊘ ⌄ ☐✕

VRRP IP Address Secondary

Add VRRP IP Address Secondary

VRRP Tracking Object

Add VRRP Tracking Object

Cancel   **Add**

VRRP Configuration Example Standby

3 - Via CLI:

CLI Example configuration.

Primary

<#root>

Device#

config-transaction

Device (config)#

interface GigabitEthernet0/0/1

Device (config-if)#

vrrp 1 address-family ipv4

Device (config-if-vrrp)#

timers advertise 1000

```
Device (config-if-vrrp)#

priority 200


Device (config-if-vrrp)#

 vrrpv2


Device (config-if-vrrp)#

address 192.168.23.1 primary


Device (config-if-vrrp)#

commit
```

Standby:

```
<#root>

Device#

config-transaction


Device (config)#

interface GigabitEthernet0/0/1


Device (config-if)#

vrrp 1 address-family ipv4


Device (config-if-vrrp)#

timers advertise 1000


Device (config-if-vrrp)#

priority 150


Device (config-if-vrrp)#

vrrpv2


Device (config-if-vrrp)#

address 192.168.23.1 primary


Device (config-if-vrrp)#

commit
```

Verify

<#root>

Device#

show vrrp all

Vlan10 - Group 1 - Address-Family IPv4

State is MASTER

State duration 2 hours 0 mins 49 secs

Virtual IP address is 192.168.23.1

Virtual MAC address is 0000.5E00.0164
Advertisement interval is 1000 msec
Preemption enabled
Priority is 200

Master Router is 192.168.23.2 (local), priority is 200

Master Advertisement interval is 1000 msec (expires in 256 msec)
Master Down interval is unknown
FLAGS: 1/1

<#root>

Device#

show vrrp detail

Vlan10 - Group 1 - Address-Family IPv4

State is MASTER

State duration 2 hours 0 mins 55 secs

Virtual IP address is 192.168.23.1

Virtual MAC address is 0000.5E00.0164
Advertisement interval is 1000 msec
Preemption enabled
Priority is 200

Master Router is 192.168.23.2 (local), priority is 200

Master Advertisement interval is 1000 msec (expires in 717 msec)

```
Master Down interval is unknown
FLAGS: 1/1
VRRPv3 Advertisements: sent 27392 (errors 0) - rcvd 1220
VRRPv2 Advertisements: sent 27392 (errors 0) - rcvd 4
Group Discarded Packets: 0
VRRPv2 incompatibility: 0
IP Address Owner conflicts: 0
Invalid address count: 0
IP address configuration mismatch : 0
Invalid Advert Interval: 0
Adverts received in Init state: 0
Invalid group other reason: 0
Group State transition:
Init to master: 1 (Last change Mon Nov 27 11:04:00.406)
Init to backup: 3 (Last change Mon Nov 27 15:29:29.265)
Backup to master: 5 (Last change Mon Nov 27 15:29:32.914)
Master to backup: 3 (Last change Mon Nov 27 10:38:15.722)
Master to init: 2 (Last change Mon Nov 27 15:25:12.248)
Backup to init: 1 (Last change Mon Nov 27 10:35:32.215)
```

<#root>

Device#

show vrrp internal

```
GroupId:100 AF:IPv4 Interface:Vlan10
ref_cnt:3 flags:0 vrrs_hdl:1
mac_programmed:1 vrrp_mcast_join_v4:1
if_ctx_:0x7F43DE017178
if_oper_state:1
system_ctx_:0x7F43DE029FA0
```

primary address: 192.168.23.1

```
operational:1 is_active:1 match_addr:1 compatv2:1
```

shutdown:0 cfg_shutdown:0 priority:200 cfg_priority:200

```
state_ctx_:0x7F43DE02A040
hybernation:0 preempt:enabled state_time:2 hours 0 mins 59 secs
preempt_delay:0 secs master_priority:0
ready_to_preempt:90 master_reason:0
timer_ctx_:0x7F43DE02A0B8
master_down_timer:0 msec use_learned_timer:0
master_adv_interval:1000 cfg_adv_interval:1000 master_down_interval:0
comms_ctx_:0x7F43DE02A0F8
v2rtr_valid:1 listen:1
track_ctx_:0x7F43DE02A178
track_count:0 decrement:0 force_shutdown:0
```

<#root>

```
Device#

show vrrp statistics

VRRP Global Statistics:
Dropped Packets : 0

VRRP Statistics for Vlan10


Header Discarded Packets: 0
Invalid TTL/Hop Limit: 0
Invalid Checksum: 0
Invalid Version: 0
Invalid Msg Type: 0
Invalid length/Incomplete packet: 0
Invalid group no: 0
Invalid packet other reason: 0

VRRP Statistics for Vlan10 - Group 1 - Address-Family IPv4

State is MASTER



State duration 2 hours 1 mins 3 secs


VRRPv3 Advertisements: sent 27401 (errors 0) - rcvd 1220
VRRPv2 Advertisements: sent 27401 (errors 0) - rcvd 4
Group Discarded Packets: 0
VRRPv2 incompatibility: 0
IP Address Owner conflicts: 0
Invalid address count: 0
IP address configuration mismatch : 0
Invalid Advert Interval: 0
Adverts received in Init state: 0
Invalid group other reason: 0
Group State transition:
Init to master: 1 (Last change Mon Nov 27 11:04:00.406)
Init to backup: 3 (Last change Mon Nov 27 15:29:29.265)
Backup to master: 5 (Last change Mon Nov 27 15:29:32.914)
Master to backup: 3 (Last change Mon Nov 27 10:38:15.722)
Master to init: 2 (Last change Mon Nov 27 15:25:12.248)
Backup to init: 1 (Last change Mon Nov 27 10:35:32.215)
```

Useful debugs:

<#root>

debug vrrp all detail

<#root>

debug vrrp error

<#root>

```
debug vrrp packet
```

<#root>

```
debug vrrp process
```

<#root>

```
debug vrrp state
```