



## Configuring VRRP

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This chapter describes how to configure the Virtual Router Redundancy Protocol (VRRP) on the Cisco NX-OS device.

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### Information About VRRP

VRRP allows for transparent failover at the first-hop IP router by configuring a group of routers to share a virtual IP address. VRRP selects a master router in that group to handle all packets for the virtual IP address. The remaining routers are in standby and take over if the master router fails.

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## VRRP Operation

A LAN client can determine which router should be the first hop to a particular remote destination by using a dynamic process or static configuration. Examples of dynamic router discovery are as follows:

- Proxy ARP—The client uses the Address Resolution Protocol (ARP) to get the destination it wants to reach, and a router responds to the ARP request with its own MAC address.
- Routing protocol—The client listens to dynamic routing protocol updates (for example, from Routing Information Protocol [RIP]) and forms its own routing table.
- ICMP Router Discovery Protocol (IRDP) client—The client runs an Internet Control Message Protocol (ICMP) router discovery client.

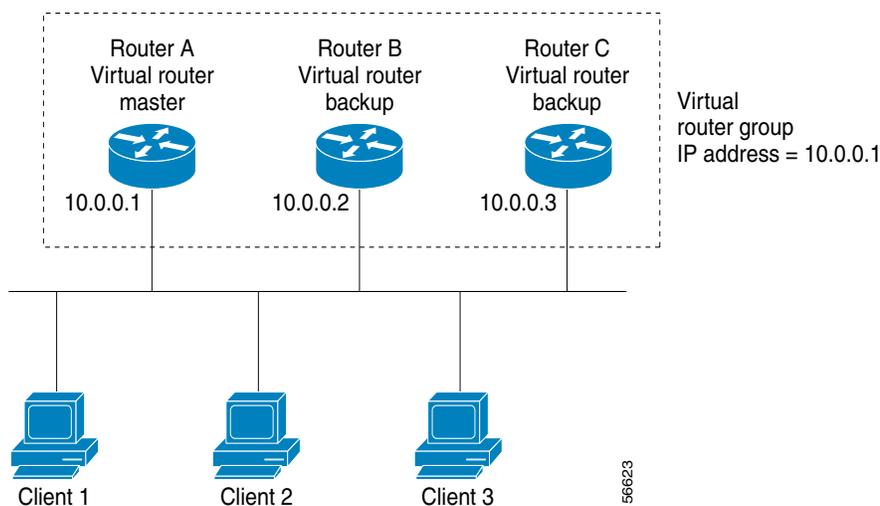
The disadvantage to dynamic discovery protocols is that they incur some configuration and processing overhead on the LAN client. Also, if a router fails, the process of switching to another router can be slow.

An alternative to dynamic discovery protocols is to statically configure a default router on the client. Although, this approach simplifies client configuration and processing, it creates a single point of failure. If the default gateway fails, the LAN client is limited to communicating only on the local IP network segment and is cut off from the rest of the network.

VRRP can solve the static configuration problem by enabling a group of routers (a VRRP group) to share a single virtual IP address. You can then configure the LAN clients with the virtual IP address as their default gateway.

Figure 18-1 shows a basic VLAN topology. In this example, Routers A, B, and C form a VRRP group. The IP address of the group is the same address that was configured for the Ethernet interface of Router A (10.0.0.1).

**Figure 18-1 Basic VRRP Topology**



Because the virtual IP address uses the IP address of the physical Ethernet interface of Router A, Router A is the master (also known as the IP address owner). As the master, Router A owns the virtual IP address of the VRRP group and forwards packets sent to this IP address. Clients 1 through 3 are configured with the default gateway IP address of 10.0.0.1.

Routers B and C function as backups. If the master fails, the backup router with the highest priority becomes the master and takes over the virtual IP address to provide uninterrupted service for the LAN hosts. When router A recovers, it becomes the master again. For more information, see the “[VRRP Router Priority and Preemption](#)” section.

**Note**

Packets received on a routed port destined for the VRRP virtual IP address terminate on the local router, regardless of whether that router is the master VRRP router or a backup VRRP router. These packets include ping and Telnet traffic. Packets received on a Layer 2 (VLAN) interface destined for the VRRP virtual IP address terminate on the master router.

## VRRP Benefits

The benefits of VRRP are as follows:

- **Redundancy**—Enables you to configure multiple routers as the default gateway router, which reduces the possibility of a single point of failure in a network.
- **Load sharing**—Allows traffic to and from LAN clients to be shared by multiple routers. The traffic load is shared more equitably among available routers.
- **Multiple VRRP groups**—Supports multiple VRRP groups on a router physical interface if the platform supports multiple MAC addresses. Multiple VRRP groups enable you to implement redundancy and load sharing in your LAN topology.
- **Multiple IP addresses**—Allows you to manage multiple IP addresses, including secondary IP addresses. If you have multiple subnets configured on an Ethernet interface, you can configure VRRP on each subnet.
- **Preemption**—Enables you to preempt a backup router that has taken over for a failing master with a higher priority backup router that has become available.
- **Advertisement protocol**—Uses a dedicated Internet Assigned Numbers Authority (IANA) standard multicast address (224.0.0.18) for VRRP advertisements. This addressing scheme minimizes the number of routers that must service the multicasts and allows test equipment to accurately identify VRRP packets on a segment. IANA has assigned the IP protocol number 112 to VRRP.
- **VRRP tracking**—Ensures that the best VRRP router is the master for the group by altering VRRP priorities based on interface states.

## Multiple VRRP Groups

You can configure multiple VRRP groups on a physical interface. For the number of supported VRRP groups, see the *Cisco Nexus 9000 Series NX-OS Verified Scalability Guide*.

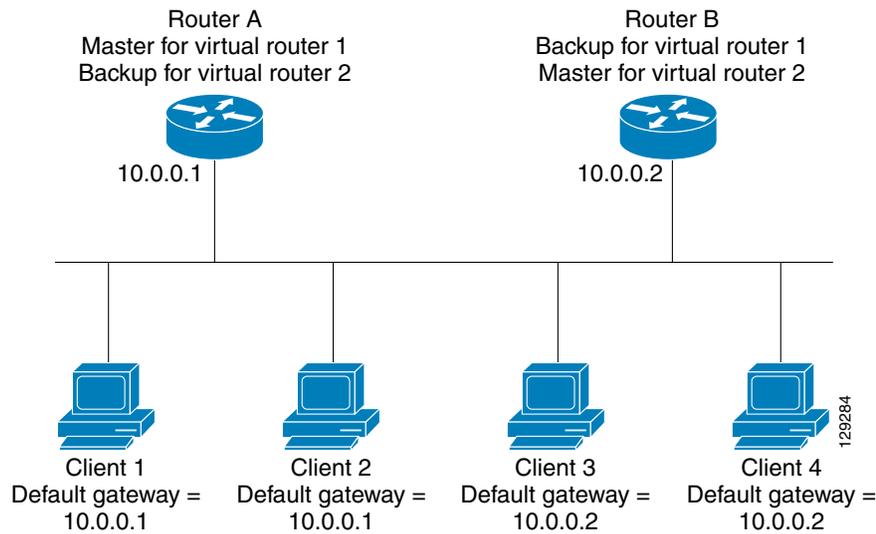
The number of VRRP groups that a router interface can support depends on the following factors:

- Router processing capability
- Router memory capability

In a topology where multiple VRRP groups are configured on a router interface, the interface can act as a master for one VRRP group and as a backup for one or more other VRRP groups.

[Figure 18-2](#) shows a LAN topology in which VRRP is configured so that Routers A and B share the traffic to and from clients 1 through 4. Routers A and B act as backups to each other if either router fails.

**Figure 18-2 Load Sharing and Redundancy VRRP Topology**



This topology contains two virtual IP addresses for two VRRP groups that overlap. For VRRP group 1, Router A is the owner of IP address 10.0.0.1 and is the master. Router B is the backup to Router A. Clients 1 and 2 are configured with the default gateway IP address of 10.0.0.1.

For VRRP group 2, Router B is the owner of IP address 10.0.0.2 and is the master. Router A is the backup to router B. Clients 3 and 4 are configured with the default gateway IP address of 10.0.0.2.

## VRRP Router Priority and Preemption

An important aspect of the VRRP redundancy scheme is the VRRP router priority because the priority determines the role that each VRRP router plays and what happens if the master router fails.

If a VRRP router owns the virtual IP address and the IP address of the physical interface, this router functions as the master. The priority of the master is 255.

The priority also determines if a VRRP router functions as a backup router and the order of ascendancy to becoming a master if the master fails.

For example, if Router A, the master in a LAN topology, fails, VRRP must determine if backups B or C should take over. If you configure Router B with priority 101 and Router C with the default priority of 100, VRRP selects Router B to become the master because it has the higher priority. If you configure Routers B and C with the default priority of 100, VRRP selects the backup with the higher IP address to become the master.

VRRP uses preemption to determine what happens after a VRRP backup router becomes the master. With preemption enabled by default, VRRP switches to a backup if that backup comes online with a priority higher than the new master. For example, if Router A is the master and fails, VRRP selects Router B (next in order of priority). If Router C comes online with a higher priority than Router B, VRRP selects Router C as the new master, even though Router B has not failed.

If you disable preemption, VRRP switches only if the original master recovers or the new master fails.

## vPC and VRRP

VRRP interoperates with virtual port channels (vPCs). vPCs allow links that are physically connected to two different Cisco Nexus 9000 Series devices to appear as a single port channel by a third device. See the *Cisco Nexus 9000 Series NX-OS Layer 2 Switching Configuration Guide* for more information on vPCs.

vPC forwards traffic through both the master VRRP router as well as the backup VRRP router. See the “[Configuring VRRP Priority](#)” section on page 18-9.

**Note**

You should configure VRRP on the primary vPC peer device as active and VRRP on the vPC secondary device as standby.

## VRRP Advertisements

The VRRP master sends VRRP advertisements to other VRRP routers in the same group. The advertisements communicate the priority and state of the master. Cisco NX-OS encapsulates the VRRP advertisements in IP packets and sends them to the IP multicast address assigned to the VRRP group. Cisco NX-OS sends the advertisements once every second by default, but you can configure a different advertisement interval.

## VRRP Authentication

VRRP supports the following authentication functions:

- No authentication
- Plain text authentication

VRRP rejects packets in any of the following cases:

- The authentication schemes differ on the router and in the incoming packet.
- Text authentication strings differ on the router and in the incoming packet.

## VRRP Tracking

VRRP supports the following options for tracking:

- Native interface tracking—Tracks the state of an interface and uses that state to determine the priority of the VRRP router in a VRRP group. The tracked state is down if the interface is down or if the interface does not have a primary IP address.
- Object tracking—Tracks the state of a configured object and uses that state to determine the priority of the VRRP router in a VRRP group. See [Chapter 19, “Configuring Object Tracking”](#) for more information on object tracking.

If the tracked state (interface or object) goes down, VRRP updates the priority based on what you configure the new priority to be for the tracked state. When the tracked state comes up, VRRP restores the original priority for the virtual router group.

For example, you might want to lower the priority of a VRRP group member if its uplink to the network goes down so another group member can take over as master for the VRRP group. See the [“Configuring VRRP Interface State Tracking”](#) section on page 18-15 for more information.

**Note**


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VRRP does not support Layer 2 interface tracking.

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## BFD

This feature supports bidirectional forwarding detection (BFD). BFD is a detection protocol that provides fast-forwarding and path-failure detection times. BFD provides subsecond failure detection between two adjacent devices and can be less CPU-intensive than protocol hello messages because some of the BFD load can be distributed onto the data plane on supported modules. See the *Cisco Nexus 9000 Series NX-OS Interfaces Configuration Guide* for more information.

## High Availability

VRRP supports high availability through stateful restarts and stateful switchovers. A stateful restart occurs when the VRRP process fails and is restarted. A stateful switchover occurs when the active supervisor switches to the standby supervisor. Cisco NX-OS applies the run-time configuration after the switchover.

## Virtualization Support

VRRP supports virtual routing and forwarding (VRF) instances.

## Licensing Requirements for VRRP

The following table shows the licensing requirements for this feature:

Product	License Requirement
Cisco NX-OS	VRRP requires no license. Any feature not included in a license package is bundled with the nx-os image and is provided at no extra charge to you. For a complete explanation of the Cisco NX-OS licensing scheme, see the <i>Cisco NX-OS Licensing Guide</i> .

## Guidelines and Limitations for VRRP

VRRP has the following configuration guidelines and limitations:

- You cannot configure VRRP on the management interface.
- When VRRP is enabled, you should replicate the VRRP configuration across devices in your network.
- We recommend that you do not configure more than one first-hop redundancy protocol on the same interface.
- You must configure an IP address for the interface that you configure VRRP on and enable that interface before VRRP becomes active.
- Cisco NX-OS removes all Layer 3 configurations on an interface when you change the interface VRF membership, port channel membership, or when you change the port mode to Layer 2.
- When you configure VRRP to track a Layer 2 interface, you must shut down the Layer 2 interface and reenble the interface to update the VRRP priority to reflect the state of the Layer 2 interface.
- BFD for VRRP can only be configured between two routers.

## Default Settings

Table 18-1 lists the default settings for VRRP parameters.

**Table 18-1** Default VRRP Parameters

Parameters	Default
VRRP	Disabled
Advertisement interval	1 seconds
Authentication	No authentication
Preemption	Enabled
Priority	100

## Configuring VRRP

This section includes the following topics:

- [Enabling the VRRP Feature, page 18-8](#)
- [Configuring VRRP Groups, page 18-8](#)
- [Configuring VRRP Priority, page 18-9](#)
- [Configuring VRRP Authentication, page 18-11](#)
- [Configuring Time Intervals for Advertisement Packets, page 18-12](#)
- [Disabling Preemption, page 18-14](#)
- [Configuring VRRP Interface State Tracking, page 18-15](#)

**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.

## Enabling the VRRP Feature

You must globally enable the VRRP feature before you can configure and enable any VRRP groups. To enable the VRRP feature, use the following command in global configuration mode:

Command	Purpose
<code>feature vrrp</code>	Enables VRRP.
<b>Example:</b> <code>switch(config)# feature vrrp</code>	

To disable the VRRP feature and remove all associated configurations, use the following command in global configuration mode:

Command	Purpose
<code>no feature vrrp</code>	Disables the VRRP feature.
<b>Example:</b> <code>switch(config)# no feature vrrp</code>	

## Configuring VRRP Groups

You can create a VRRP group, assign the virtual IP address, and enable the group.

You can configure one virtual IPv4 address for a VRRP group. By default, the master VRRP router drops the packets addressed directly to the virtual IP address because the VRRP master is only intended as a next-hop router to forward packets. Some applications require that Cisco NX-OS accept packets addressed to the virtual router IP. Use the secondary option to the virtual IP address to accept these packets when the local router is the VRRP master.

Once you have configured the VRRP group, you must explicitly enable the group before it becomes active.

### BEFORE YOU BEGIN

Ensure that you configure an IP address on the interface (see the [“Configuring IPv4 Addressing”](#) section on page 2-8).

### SUMMARY STEPS

1. `configure terminal`
2. `interface interface-type slot/port`
3. `vrrp number`
4. `address ip-address [secondary]`

5. **no shutdown**
6. (Optional) **show vrrp**
7. (Optional) **copy running-config startup-config**

## DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	<b>interface</b> <i>interface-type slot/port</i>  <b>Example:</b> switch(config)# interface ethernet 2/1 switch(config-if)#	Enters interface configuration mode.
Step 3	<b>vrrp</b> <i>number</i>  <b>Example:</b> switch(config-if)# vrrp 250 switch(config-if-vrrp)#	Creates a virtual router group. The range is from 1 to 255.
Step 4	<b>address</b> <i>ip-address</i> [ <b>secondary</b> ]  <b>Example:</b> switch(config-if-vrrp)# address 192.0.2.8	Configures the virtual IPv4 address for the specified VRRP group. This address should be in the same subnet as the IPv4 address of the interface.  Use the <b>secondary</b> option only if applications require that VRRP routers accept the packets sent to the virtual router's IP address and deliver to applications.
Step 5	<b>no shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# no shutdown switch(config-if-vrrp)#	Enables the VRRP group. Disabled by default.
Step 6	<b>show vrrp</b>  <b>Example:</b> switch(config-if-vrrp)# show vrrp	(Optional) Displays VRRP information.
Step 7	<b>copy running-config startup-config</b>  <b>Example:</b> switch(config-if-vrrp)# copy running-config startup-config	(Optional) Saves this configuration change.

## Configuring VRRP Priority

The valid priority range for a virtual router is from 1 to 254 (1 is the lowest priority and 254 is the highest). The default priority value for backups is 100. For devices whose interface IP address is the same as the primary virtual IP address (the master), the default value is 255.

If you configure VRRP on a vPC-enabled interface, you can optionally configure the upper and lower threshold values to control when to fail over to the vPC trunk. If the backup router priority falls below the lower threshold, VRRP sends all backup router traffic across the vPC trunk to forward through the master VRRP router. VRRP maintains this scenario until the backup VRRP router priority increases above the upper threshold.

## BEFORE YOU BEGIN

You must enable VRRP (see the “Configuring VRRP” section on page 18-7).

Ensure that you have configured an IP address on the interface (see the “Configuring IPv4 Addressing” section on page 2-8).

## SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-type slot/port*
3. **vrrp** *number*
4. **shutdown**
5. **priority** *level* [**forwarding-threshold** **lower** *lower-value* **upper** *upper-value*]
6. **no shutdown**
7. (Optional) **show vrrp**
8. (Optional) **copy running-config startup-config**

## DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	<b>interface</b> <i>interface-type slot/port</i>  <b>Example:</b> switch(config)# interface ethernet 2/1 switch(config-if)#	Enters interface configuration mode.
Step 3	<b>vrrp</b> <i>number</i>  <b>Example:</b> switch(config-if)# vrrp 250 switch(config-if-vrrp)#	Creates a virtual router group.
Step 4	<b>shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# shutdown switch(config-if-vrrp)#	Disables the VRRP group. Disabled by default.

	Command	Purpose
Step 5	<p><b>priority</b> <i>level</i> [<b>forwarding-threshold</b> <b>lower</b> <i>lower-value</i> <b>upper</b> <i>upper-value</i>]</p> <p><b>Example:</b>  switch(config-if-vrrp)# priority 60  forwarding-threshold lower 40 upper 50</p>	<p>Sets the priority level used to select the active router in an VRRP group. The <i>level</i> range is from 1 to 254. The default is 100 for backups and 255 for a master that has an interface IP address equal to the virtual IP address.</p> <p>Optionally, sets the upper and lower threshold values used by vPC to determine when to fail over to the vPC trunk. The <i>lower-value</i> range is from 1 to 255. The default is 1. The <i>upper-value</i> range is from 1 to 255. The default is 255.</p>
Step 6	<p><b>no shutdown</b></p> <p><b>Example:</b>  switch(config-if-vrrp)# no shutdown  switch(config-if-vrrp)#</p>	<p>Enables the VRRP group. Disabled by default.</p>
Step 7	<p><b>show vrrp</b></p> <p><b>Example:</b>  switch(config-if-vrrp)# show vrrp</p>	<p>(Optional) Displays a summary of VRRP information.</p>
Step 8	<p><b>copy running-config startup-config</b></p> <p><b>Example:</b>  switch(config-if-vrrp)# copy running-config startup-config</p>	<p>(Optional) Saves this configuration change.</p>

## Configuring VRRP Authentication

You can configure simple text authentication for a VRRP group.

### BEFORE YOU BEGIN

Ensure that the authentication configuration is identical for all VRRP devices in the network.

Ensure that you have enabled VRRP (see the “Configuring VRRP” section on page 18-7).

Ensure that you have configured an IP address on the interface (see the “Configuring IPv4 Addressing” section on page 2-8).

### SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-type slot/port*
3. **vrrp** *number*
4. **shutdown**
5. **authentication text** *password*
6. **no shutdown**
7. (Optional) **show vrrp**
8. (Optional) **copy running-config startup-config**

## DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	<b>interface</b> <i>interface-type slot/port</i>  <b>Example:</b> switch(config)# interface ethernet 2/1 switch(config-if)#	Enters interface configuration mode.
Step 3	<b>vrrp</b> <i>number</i>  <b>Example:</b> switch(config-if)# vrrp 250 switch(config-if-vrrp)#	Creates a virtual router group.
Step 4	<b>shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# shutdown switch(config-if-vrrp)#	Disables the VRRP group. Disabled by default.
Step 5	<b>authentication text</b> <i>password</i>  <b>Example:</b> switch(config-if-vrrp)# authentication text aPassword	Assigns the simple text authentication option and specifies the keyname password. The keyname range is from 1 to 255 characters. We recommend that you use at least 16 characters. The text password is up to eight alphanumeric characters.
Step 6	<b>no shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# no shutdown switch(config-if-vrrp)#	Enables the VRRP group. Disabled by default.
Step 7	<b>show vrrp</b>  <b>Example:</b> switch(config-if-vrrp)# show vrrp	(Optional) Displays a summary of VRRP information.
Step 8	<b>copy running-config startup-config</b>  <b>Example:</b> switch(config-if-vrrp)# copy running-config startup-config	(Optional) Saves this configuration change.

## Configuring Time Intervals for Advertisement Packets

You can configure the time intervals for advertisement packets.

### BEFORE YOU BEGIN

You must enable VRRP (see the [“Configuring VRRP”](#) section on page 18-7).

Ensure that you have configured an IP address on the interface (see the [“Configuring IPv4 Addressing”](#) section on page 2-8).

## SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-type slot/port*
3. **vrrp number**
4. **shutdown**
5. **advertisement-interval** *seconds*
6. **no shutdown**
7. (Optional) **show vrrp**
8. (Optional) **copy running-config startup-config**

## DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	<b>interface</b> <i>interface-type slot/port</i>  <b>Example:</b> switch(config)# interface ethernet 2/1 switch(config-if)#	Enters interface configuration mode.
Step 3	<b>vrrp number</b>  <b>Example:</b> switch(config-if)# vrrp 250 switch(config-if-vrrp)#	Creates a virtual router group.
Step 4	<b>shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# shutdown switch(config-if-vrrp)#	Disables the VRRP group. Disabled by default.
Step 5	<b>advertisement-interval</b> <i>seconds</i>  <b>Example:</b> switch(config-if-vrrp)# advertisement-interval 15	Sets the interval time in seconds between sending advertisement frames. The range is from 1 to 255. The default is 1 second.
Step 6	<b>no shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# no shutdown switch(config-if-vrrp)#	Enables the VRRP group. Disabled by default.
Step 7	<b>show vrrp</b>  <b>Example:</b> switch(config-if-vrrp)# show vrrp	(Optional) Displays a summary of VRRP information.
Step 8	<b>copy running-config startup-config</b>  <b>Example:</b> switch(config-if-vrrp)# copy running-config startup-config	(Optional) Saves this configuration change.

## Disabling Preemption

You can disable preemption for a VRRP group member. If you disable preemption, a higher-priority backup router does not take over for a lower-priority master router. Preemption is enabled by default.

### BEFORE YOU BEGIN

You must enable VRRP (see the “[Configuring VRRP](#)” section on page 18-7).

Ensure that you have configured an IP address on the interface (see the “[Configuring IPv4 Addressing](#)” section on page 2-8).

### SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-type slot/port*
3. **vrrp** *number*
4. **shutdown**
5. **no preempt**
6. **no shutdown**
7. (Optional) **show vrrp**
8. (Optional) **copy running-config startup-config**

### DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	<b>interface</b> <i>interface-type slot/port</i>  <b>Example:</b> switch(config)# interface ethernet 2/1 switch(config-if)#	Enters interface configuration mode.
Step 3	<b>vrrp</b> <i>number</i>  <b>Example:</b> switch(config-if)# vrrp 250 switch(config-if-vrrp)#	Creates a virtual router group.
Step 4	<b>no shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# no shutdown	Enables the VRRP group. Disabled by default.
Step 5	<b>no preempt</b>  <b>Example:</b> switch(config-if-vrrp)# no preempt	Disables the preempt option and allows the master to remain when a higher-priority backup appears.

	Command	Purpose
Step 6	<b>no shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# no shutdown	Enables the VRRP group. Disabled by default.
Step 7	<b>show vrrp</b>  <b>Example:</b> switch(config-if-vrrp)# show vrrp	(Optional) Displays a summary of VRRP information.
Step 8	<b>copy running-config startup-config</b>  <b>Example:</b> switch(config-if-vrrp)# copy running-config startup-config	(Optional) Saves this configuration change.

## Configuring VRRP Interface State Tracking

Interface state tracking changes the priority of the virtual router based on the state of another interface in the device. When the tracked interface goes down or the IP address is removed, Cisco NX-OS assigns the tracking priority value to the virtual router. When the tracked interface comes up and an IP address is configured on this interface, Cisco NX-OS restores the configured priority to the virtual router (see the “[Configuring VRRP Priority](#)” section on page 18-9).



**Note** For interface state tracking to function, you must enable preemption on the interface.



**Note** VRRP does not support Layer 2 interface tracking.

### BEFORE YOU BEGIN

You must enable VRRP (see the “[Configuring VRRP](#)” section on page 18-7).

Ensure that you have configured an IP address on the interface (see the “[Configuring IPv4 Addressing](#)” section on page 2-8).

Ensure that you have enabled the virtual router (see the “[Configuring VRRP Groups](#)” section on page 18-8).

### SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-type slot/port*
3. **vrrp** *number*
4. **shutdown**
5. **track interface** *type number priority value*
6. **no shutdown**
7. (Optional) **show vrrp**
8. (Optional) **copy running-config startup-config**

## DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	<b>interface</b> <i>interface-type slot/port</i>  <b>Example:</b> switch(config)# interface ethernet 2/1 switch(config-if)#	Enters interface configuration mode.
Step 3	<b>vrrp</b> <i>number</i>  <b>Example:</b> switch(config-if)# vrrp 250 switch(config-if-vrrp)#	Creates a virtual router group.
Step 4	<b>shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# shutdown switch(config-if-vrrp)#	Disables the VRRP group. Disabled by default.
Step 5	<b>track interface</b> <i>type number priority value</i>  <b>Example:</b> switch(config-if-vrrp)# track interface ethernet 2/10 priority 254	Enables interface priority tracking for a VRRP group. The priority range is from 1 to 254.
Step 6	<b>no shutdown</b>  <b>Example:</b> switch(config-if-vrrp)# no shutdown switch(config-if-vrrp)#	Enables the VRRP group. Disabled by default.
Step 7	<b>show vrrp</b>  <b>Example:</b> switch(config-if-vrrp)# show vrrp	(Optional) Displays a summary of VRRP information.
Step 8	<b>copy running-config startup-config</b>  <b>Example:</b> switch(config-if-vrrp)# copy running-config startup-config	(Optional) Saves this configuration change.

## Verifying the VRRP Configuration

To display VRRP configuration information, perform one of the following tasks:

Command	Purpose
<b>show vrrp</b>	Displays the VRRP status for all groups.
<b>show fhrp</b> [ <i>interface-type interface-number</i> ] [ <b>verbose</b> ]	Displays First Hop Redundancy Protocol (FHRP) information.
<b>show interface</b> <i>interface-type</i>	Displays the virtual router configuration for an interface.

## Monitoring VRRP Statistics

To display VRRP statistics, use the following commands:

Command	Purpose
<code>show vrrp statistics</code>	Displays the VRRP statistics.

Use the `clear vrrp statistics` command to clear all the VRRP statistics for all interfaces in the device.

Use the `clear vrrp vr` command to clear the IPv4 VRRP statistics for a specified interface.

Use the `clear vrrp ipv4` command to clear all the statistics for the specified IPv4 virtual router.

## Configuration Examples for VRRP

In this example, Router A and Router B each belong to three VRRP groups. In the configuration, each group has the following properties:

- Group 1:
  - Virtual IP address is 10.1.0.10.
  - Router A will become the master for this group with priority 120.
  - Advertising interval is 3 seconds.
  - Preemption is enabled.
- Group 5:
  - Router B will become the master for this group with priority 200.
  - Advertising interval is 30 seconds.
  - Preemption is enabled.
- Group 100:
  - Router A will become the master for this group first because it has a higher IP address (10.1.0.2).
  - Advertising interval is the default of 1 second.
  - Preemption is disabled.

### Router A

```
interface ethernet 1/0
 ip address 10.1.0.2/16
 no shutdown
 vrrp 1
  priority 120
  authentication text cisco
  advertisement-interval 3
  address 10.1.0.10
  no shutdown
 vrrp 5
  priority 100
  advertisement-interval 30
  address 10.1.0.50
  no shutdown
 vrrp 100
```

```

no preempt
address 10.1.0.100
no shutdown

```

**Router B**

```

interface ethernet 1/0
ip address 10.2.0.1/2
no shutdown
vrrp 1
priority 100
authentication text cisco
advertisement-interval 3
address 10.2.0.10
no shutdown

vrrp 5
priority 200
advertisement-interval 30
address 10.2.0.50
no shutdown
vrrp 100
no preempt
address 10.2.0.100
no shutdown

```

## Additional References

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

- [Related Documents, page 18-18](#)

## Related Documents

Related Topic	Document Title
Configuring the hot standby routing protocol	<a href="#">Chapter 17, “Configuring HSRP”</a>
Configuring high availability	<i>Cisco Nexus 9000 Series NX-OS High Availability and Redundancy Guide</i>