VRRP

Feature history for VRRP

This table provides release and platform support information for the features explained in this module.

These features are available in all the releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature name and description	Supported platform
Cisco IOS XE 17.18.1	VRRP: VRRP is an election protocol that dynamically assigns responsibility for one or more virtual devices to the VRRP devices on a LAN, allowing several devices on a multiaccess link to utilize the same virtual IP address.	Cisco C9350 Series Smart Switches Cisco C9610 Series Smart Switches

Understand VRRP

The Virtual Router Redundancy Protocol (VRRP) is an election protocol that dynamically assigns responsibility for one or more virtual devices to the VRRP devices on a LAN, allowing several devices on a multiaccess link to utilize the same virtual IP address. You configure a VRRP device to run the VRRP protocol with other devices on a LAN. In a VRRP configuration, one device is elected as the virtual primary device. The other devices act as backups if the virtual primary device fails.

VRRP benefits

- Redundancy: Enables you to configure multiple devices as the default gateway device, 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 devices. The traffic load is shared more equitably among available devices.
- Multiple VRRP groups: Supports up to 255 virtual devices (VRRP groups) on a device physical interface, subject to restrictions in scaling. 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 that are configured on an Ethernet interface, you can configure VRRP on each subnet.
- IPv4 and IPv6: VRRPv3 supports IPv4 and IPv6 address families while VRRPv2 only supports IPv4 addresses.
- Preemption: Enables you to preempt a backup device that has taken over for a failing primary with a higher priority backup device 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 devices 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 object tracking: Ensures that the best VRRP device is the primary for the group by altering VRRP priorities based on interface states.
- SSO: VRRPv3 supports Stateful Switchover (SSO). Enable the **fhrp sso** command for VRRPv3 to support SSO. Disable SSO support using the **no fhrp sso** command.

VRRP operation

There are several ways a LAN client can determine which device should be the first hop to a particular remote destination. The client can use a dynamic process or static configuration. Examples of dynamic device discovery are as follows:

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

Dynamic discovery protocols have the drawback of requiring configuration and processing overhead on your LAN client. In addition, in the event of a device failure, the process of switching to another device can be slow.

Statically configuring a default device on the client is an alternative to dynamic discovery protocols. This approach simplifies client configuration and processing, but creates a single point of failure. If the default

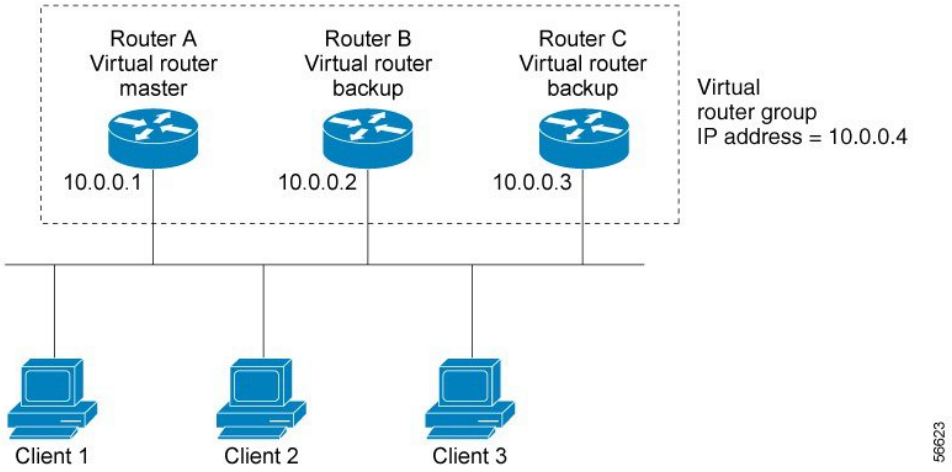
gateway fails, the LAN client is limited to communicating only on the local IP network segment and is cut off from the rest of the network.

VRRP solves the static configuration problem by enabling a group of devices to form a single virtual device. The LAN clients can then be configured with the virtual device as their default gateway. The virtual device, representing a group of devices, is also known as a VRRP group.

VRRP is supported on several interfaces including Ethernet, Fast Ethernet, BVI, and Gigabit Ethernet. It also extends support to MPLS VPNs, VRF-aware MPLS VPNs, and VLANs.

A LAN topology configured with VRRP is illustrated by this figure. In this example, Routers A, B, and C run VRRP and form a virtual device. The IP address of the virtual device matches that configured for Router A's Ethernet interface, 10.0.0.1.

Figure 1: Basic VRRP topology

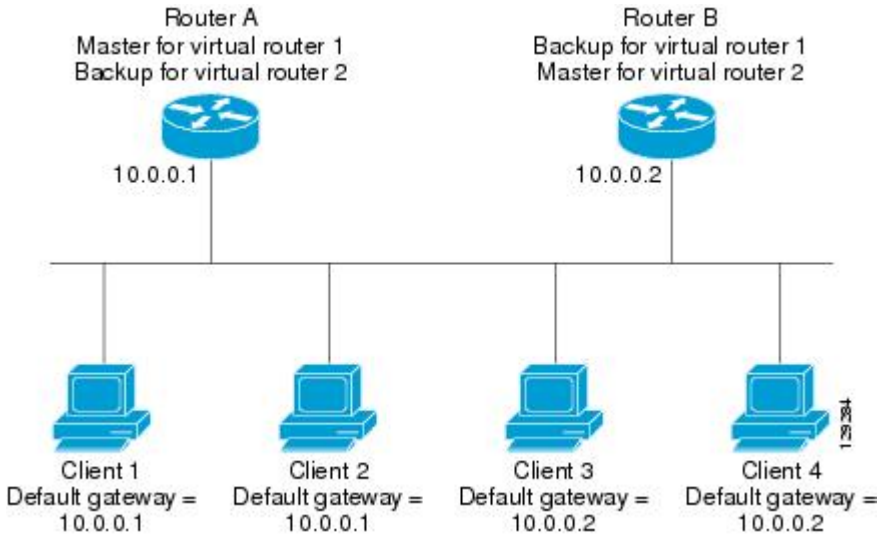


Because the virtual device uses the IP address of the physical Ethernet interface of Router A, Router A assumes the role of the virtual primary device and is also known as the IP address owner. As the virtual primary device, Router A controls the IP address of the virtual device and is responsible for forwarding packets sent to this IP address. Clients 1 to 3 are configured with the default gateway IP address of 10.0.0.1.

Routers B and C serve as backups for the virtual device. If the virtual primary device fails, the device configured with the higher priority will become the virtual primary device and provide uninterrupted service for the LAN hosts. When Router A recovers, it becomes the virtual primary device again. For more detail on the roles of VRRP devices and the process when the virtual primary device fails, see the VRRP device priority and preemption, on page 4 section.

The figure below 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 and that Routers A and B act as virtual device backups to each other if either device fails.

Figure 2: Load sharing and redundancy VRRP topology



In this topology, two virtual devices are configured. For virtual device 1, Router A is the owner of IP address 10.0.0.1 and virtual primary device, and Router B is the virtual device backup to Router A. Clients 1 and 2 are configured with the default gateway IP address of 10.0.0.1.

For virtual device 2, Router B is the owner of IP address 10.0.0.2 and virtual primary device, and Router A is the virtual device backup to Router B. Clients 3 and 4 are configured with the default gateway IP address of 10.0.0.2.

VRRP device priority and preemption

VRRP device priority is an important aspect of the VRRP redundancy scheme. Priority determines each VRRP device's role and the actions if the virtual primary device fails.

If a VRRP device owns the IP address of the virtual device and the IP address of the physical interface, this device will function as a virtual primary device.

Priority also determines if a VRRP device functions as a virtual device backup and the order of ascendancy to becoming virtual primary device if the virtual primary device fails. Configure each virtual device backup's priority from 1 to 254 using the **priority** command (use the **vrrp address-family** command to enter the VRRP configuration mode and access the **priority** option).

For example, if Device A, the virtual primary device in a LAN topology, fails, an election process takes place to determine if virtual device backups B or C should take over. If Devices B and C are configured with the priorities of 101 and 100, respectively, Device B is elected to become virtual primary device because it has the higher priority. If Devices B and C are configured with a priority of 100, the backup device with the higher IP address becomes the virtual primary device.

By default, a preemptive scheme allows a higher-priority backup device to take over when available, replacing the device that initially became the primary. You can disable this preemptive scheme using the **no preempt** command (use the **vrrp address-family** command to enter the VRRP configuration mode, and enter the **no preempt** command). If preemption is disabled, the virtual device backup that is elected to become virtual primary device remains as the primary until the original virtual primary device recovers and becomes the primary again.

VRRP advertisements

The primary virtual device sends VRRP advertisements to other VRRP devices in the same group. The advertisements communicate the priority and state of the primary virtual device. The VRRP advertisements are encapsulated into either IPv4 or IPv6 packets (based on the VRRP group configuration) and sent to the appropriate multicast address assigned to the VRRP group. For IPv4, the multicast address is 224.0.0.18. For IPv6, the multicast address is FF02:0:0:0:0:0:0:12. The advertisements are sent every second by default and the interval is configurable.

Cisco devices allow you to configure millisecond timers, representing a change from VRRPv2. You need to manually configure the millisecond timer values on both the primary and the backup devices. The **show vrrp** command output on backup devices displays the primary advertisement value as 1 second; packets do not accept millisecond values.

Use millisecond timers only when necessary, with careful consideration and testing. Millisecond values function correctly under specific conditions. The millisecond timer values are compatible with other vendor equipment, as long as it supports VRRPv3. You can specify a timer value between 100 milliseconds and 40000 milliseconds.

VRRP object tracking

Object tracking is an independent process used to create, monitor, and remove tracked objects, such as the state of the line protocol of an interface. Clients such as the Hot Standby Router Protocol (HSRP), Gateway Load Balancing Protocol (GLBP), and VRRP register their interests with specific tracked objects and act when the states of objects change.

Each tracked object is identified by a unique number that is specified on the tracking CLI. Client processes such as VRRP use this number to track a specific object.

The tracking process periodically polls tracked objects and notes changes. The changes in the tracked object are communicated to interested client processes, either immediately or after a specified delay. The object values are reported as either up or down.

VRRP object tracking gives VRRP access to all the objects available through the tracking process. The tracking process allows you to track individual objects, such as the state of an interface line protocol, the state of an IP route, or the reachability of a route.

VRRP provides an interface to the tracking process. Each VRRP group can track multiple objects that may affect the priority of the VRRP device. You specify the object number to be tracked and VRRP is notified of any change to the object. VRRP increments (or decrements) the priority of the virtual device based on the state of the object being tracked.

How VRRP object tracking affects the priority of a device

The priority of a device can change dynamically with object tracking when the tracked object goes down. The tracking process periodically polls tracked objects and notes changes. The changes in the tracked object are communicated to VRRP, either immediately or after a specified delay. The object values are reported as either up or down.

You can track objects like the line protocol state of an interface or the reachability of an IP route. If the specified object goes down, the VRRP priority is reduced. A VRRP device with a higher priority can become the virtual primary device if you configure the **vrrp preempt** command.

VRRP In Service Software Upgrade

VRRP supports In Service Software Upgrade (ISSU), enabling a high-availability (HA) system to operate in stateful switchover (SSO) mode, even when different versions of Cisco IOS XE software run on the active and standby Route Processors (RPs) or line cards.

With ISSU, you can upgrade or downgrade between supported Cisco IOS XE releases without interrupting packet forwarding or sessions, thus reducing planned downtime. This is achieved by temporarily running different software versions on the active and standby RPs to maintain state information. This feature allows the system to continue forwarding packets without losing sessions and with minimal or no packet loss by switching to secondary RPs running upgraded (or downgraded) software. This feature is enabled by default.

VRRP Stateful Switchover

With the introduction of the VRRP Support for Stateful Switchover feature, VRRP is SSO aware. VRRP can detect when a device is failing over to the secondary RP and continue in its current group state.

SSO works in networking devices that usually serve as edge devices and support dual Route Processors (RPs). SSO provides RP redundancy by establishing one RP as active while the other remains in standby mode. SSO synchronizes critical state information between the RPs, ensuring the dynamic maintenance of network state information.

Before VRRP became SSO aware, deploying VRRP on a device with redundant RPs would cause the device to stop its VRRP group activities and rejoin the group as if it were reloaded when a switchover occurred. VRRP continues its activities as a group member during a switchover with the SSO-VRRP feature. VRRP state information is maintained between redundant RPs so that the standby RP can continue the device's activities within the VRRP during and after a switchover.

This feature is enabled by default. Disable this feature using the **no vrrp sso** command in global configuration mode.

Restrictions for VRRP

- On Cisco C9610 Series Smart Switches, VRRP is not supported on subinterfaces.
- VRRP or VRRPv3 is designed for use over Ethernet LANs that are capable of multiaccess, multicast, or broadcast, and are not intended as a replacement for existing dynamic protocols.
- Do not configure the VRRP/VRRPv3 advertise timer to be less than the forwarding delay on the BVI interface. If you configure the VRRP/VRRPv3 advertise timer to a value equal to or greater than the forwarding delay on the BVI interface, the setting stops a VRRP/VRRPv3 device on a newly initialized BVI interface from taking over the primary role unconditionally.

  Use the **bridge forward-time** command to set the forwarding delay on the BVI interface. Use the **vrrp timers advertise** command to set the VRRP/VRRPv3 advertisement timer.
- VRRPv3 does not support Stateful Switchover (SSO).
- Full network redundancy can only be achieved if VRRP operates over the same network path as the VRRS Pathway redundant interfaces. For full redundancy, these restrictions apply:
  - VRRS pathways should neither share a different physical interface as the parent VRRP group, nor be configured on a sub-interface having a different physical interface as the parent VRRP group.

- VRRS pathways should not be configured on SVIs unless the associated VLANs share the same trunk as the VLAN for the parent VRRP group.

- The interface link-local IP address and the VRRP group virtual link-local IP address should be different for VRRP features to function properly.

Configure VRRP

This section provides information about the various tasks to configure VRRP.

Customize VRRP

Customizing the behavior of VRRP is optional. Be aware that enabling a VRRP group means the group is immediately operational. If you enable a VRRP group before customizing VRRP, the device might take control of the group and become the virtual primary device before customization is completed. Therefore, if you plan to customize VRRP, it is a good idea to do so before enabling VRRP.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** `Device(config)# GigabitEthernet 0/0/0`	Enters interface configuration mode.
Step 4	**ip address** *ip-address mask* **Example:** `Device(config-if)# ip address 172.16.6.5 255.255.255.0`	Configures an IP address for an interface.
Step 5	**vrrp** *group* **description** *text* **Example:** `Device(config-if)# vrrp 10 description working-group`	Assigns a text description to the VRRP group.

	Command or Action	Purpose
Step 6	**vrrp** *group* **priority** *level* **Example:** `Device(config-if)# vrrp 10 priority 110`	Sets the priority level of the device within a VRRP group. • The default priority is 100.
Step 7	**vrrp** *group* **preempt** [**delay minimum** *seconds*] **Example:** `Device(config-if)# vrrp 10 preempt delay minimum 380`	Configures the device to take over as virtual primary device for a VRRP group if it has a higher priority than the current virtual primary device. • The default delay period is 0 seconds.
Step 8	**vrrp** *group* **timers advertise** [**sec**] *interval* **Example:** `Device(config-if)# vrrp 10 timers advertise 110`	Configures the interval between successive advertisements by the virtual primary device in a VRRP group. • The unit of the interval is in seconds unless the **sec** keyword is specified. The default *interval* value is 1 second. **Note** All devices in a VRRP group must use the same timer values. If the same timer values are not set, the devices in the VRRP group will not communicate with each other and any misconfigured device will change its state to primary.
Step 9	**vrrp** *group* **timers learn** **Example:** `Device(config-if)# vrrp 10 timers learn`	Configures the device, when it is acting as virtual device backup for a VRRP group, to learn the advertisement interval used by the virtual primary device.
Step 10	**exit** **Example:** `Device(config-if)# exit`	Exits interface configuration mode.

Enable VRRP

To enable VRRP, perform this task.

Procedure

	Command or Action	Purpose
Step 1	**enable**	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: `Device> enable`	Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** `Device(config)# interface GigabitEthernet 0/0/0`	Enters interface configuration mode.
Step 4	**ip address** *ip-address mask* **Example:** `Device(config-if)# ip address 172.16.6.5 255.255.255.0`	Configures an IP address for an interface.
Step 5	**vrrp** *group* **ip** *ip-address* [**secondary**] **Example:** `Device(config-if)# vrrp 10 ip 172.16.6.1`	Enables VRRP on an interface. • Identify a primary IP address, and use the **vrrp ip** command with the **secondary** keyword to add additional IP addresses to the group. **Note** All devices in the VRRP group must be configured with the same primary address and a matching list of secondary addresses for the virtual device. Devices in the VRRP group will not communicate if different primary or secondary addresses are set, and any misconfigured device will change its state to primary.
Step 6	**end** **Example:** `Device(config-if)# end`	Returns to privileged EXEC mode.

Configure VRRP object tracking

Note The priority of a VRRP group, when it is the IP address owner, is set to a fixed value of 255, which object tracking cannot reduce.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**track** *object-number* **interface** *type number* {**line-protocol** | **ip routing**} **Example:** `Device(config)# track 2 interface serial 6 line-protocol`	Configures an interface to be tracked where changes in the state of the interface affect the priority of a VRRP group. • This command configures the interface and corresponding object number to be used with the **vrrp track** command. • The **line-protocol** keyword tracks whether the interface is up. The **ip routing** keyword also checks that IP routing is enabled and active on the interface. • You can also use the **track ip route** command to track the reachability of an IP route or a metric type object.
Step 4	**interface** *type number* **Example:** `Device(config)# interface Ethernet 2`	Enters interface configuration mode.
Step 5	**vrrp** *group* **ip** *ip-address* **Example:** `Device(config-if)# vrrp 1 ip 10.0.1.20`	Enables VRRP on an interface and identifies the IP address of the virtual device.
Step 6	**vrrp** *group* **priority** *level* **Example:** `Device(config-if)# vrrp 1 priority 120`	Sets the priority level of the device within a VRRP group.
Step 7	**vrrp** *group* **track** *object-number* [**decrement** *priority*] **Example:**	Configures VRRP to track an object.

	Command or Action	Purpose
	`Device(config-if)# vrrp 1 track 2 decrement 15`	
Step 8	**end** **Example:** `Device(config-if)# end`	Returns to privileged EXEC mode.
Step 9	**show track** [*object-number*] **Example:** `Device# show track 1`	Displays tracking information.

Configure VRRP text authentication

Before you begin

The system does not enable interoperability with vendors who may have implemented the RFC 2338 method.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**terminal interface** *type number* **Example:** `Device(config)# interfaceGigabitEthernet 0/0/0`	Configures an interface type and enters interface configuration mode.
Step 4	**ip address** *ip-address mask* [**secondary**] **Example:** `Device(config-if)# ip address 10.0.0.1 255.255.255.0`	Specifies a primary or secondary IP address for an interface.
Step 5	**vrrp** *group* **authentication text** *text-string* **Example:**	Authenticates VRRP packets received from other devices in the group. • If you configure authentication, all devices within the VRRP group must use the same

	Command or Action	Purpose
	`Device(config-if)# vrrp 1 authentication text textstring1`	authentication string, which by default is 'cisco'. **Note** All devices within the VRRP group must be configured with the same authentication string. If inconsistent authentication strings are used, devices will fail to communicate, and any misconfigured device will change its state to primary.
Step 6	**vrrp** *group* **ip** *ip-address* **Example:** `Device(config-if)# vrrp 1 ip 10.0.1.20`	Enables VRRP on an interface and identifies the IP address of the virtual device.
Step 7	**end** **Example:** `Device(config-if)# end`	Returns to privileged EXEC mode.

Create and customize a VRRPv3 group

To create a VRRP group, perform this task. Steps 6 to 14 denote customizing options for the group, and they are optional:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**fhrp version vrrp v3** **Example:** `Device(config)# fhrp version vrrp v3`	Enables the ability to configure VRRPv3 and VRRS.
Step 4	**interface** *type number* **Example:**	Enters interface configuration mode.

	Command or Action	Purpose
	`Device(config)# interface GigabitEthernet 0/0/0`	
Step 5	**vrrp** *group-id* **address-family** {**ipv4** | **ipv6**} **Example:** `Device(config-if)# vrrp 3 address-family ipv4`	Creates a VRRP group and enters VRRP configuration mode.
Step 6	**address** *ip-address* [**primary** | **secondary**] **Example:** `Device(config-if-vrrp)# address 100.0.1.10 primary`	Specifies a primary or secondary address for the VRRP group. **Note** VRRPv3 for IPv6 requires that a primary virtual link-local IPv6 address is configured to allow the group to operate. After the primary link-local IPv6 address is established on the group, you can add the secondary global addresses.
Step 7	**description** *group-description* **Example:** `Device(config-if-vrrp)# description group 3`	(Optional) Specifies a description for the VRRP group.
Step 8	**match-address** **Example:** `Device(config-if-vrrp)# match-address`	(Optional) Matches secondary address in the advertisement packet against the configured address. **Note** Secondary address matching is enabled by default.
Step 9	**preempt delay minimum** *seconds* **Example:** `Device(config-if-vrrp)# preempt delay minimum 30`	(Optional) Enables preemption of lower priority primary device with an optional delay. **Note** Preemption is enabled by default.
Step 10	**priority** *priority-level* **Example:** `Device(config-if-vrrp)# priority 3`	(Optional) Specifies the priority value of the VRRP group. The priority of a VRRP group is 100 by default.
Step 11	**timers advertise** *interval* **Example:** `Device(config-if-vrrp)# timers advertise 1000`	(Optional) Sets the advertisement timer in milliseconds. The advertisement timer is set to 1000 milliseconds by default.

	Command or Action	Purpose
Step 12	**vrrpv2** **Example:** `Device(config-if-vrrp)# vrrpv2`	(Optional) Enables support for VRRPv2 configured devices in compatibility mode.
Step 13	**vrrs leader** *vrrs-leader-name* **Example:** `Device(config-if-vrrp)# vrrs leader leader-1`	(Optional) Specifies a leader's name to be registered with VRRS and to be used by followers. **Note** A registered VRRS name is unavailable by default.
Step 14	**shutdown** **Example:** `Device(config-if-vrrp)# shutdown`	(Optional) Disables VRRP configuration for the VRRP group. **Note** VRRP configuration is enabled for a VRRP group by default.
Step 15	**end** **Example:** `Device(config)# end`	Returns to privileged EXEC mode.

Configure the delay period before FHRP client initialization

To configure the delay period before the initialization of all FHRP clients on an interface, perform this task:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**fhrp version vrrp v3** **Example:** `Device(config)# fhrp version vrrp v3`	Enables the ability to configure VRRPv3 and VRRS.

	Command or Action	Purpose
Step 4	**interface** *type number* **Example:** `Device(config)# interface GigabitEthernet 0/0/0`	Enters interface configuration mode.
Step 5	**fhrp delay** {[**minimum**] [**reload**] *seconds*} **Example:** `Device(config-if)# fhrp delay minimum 5`	Specifies the delay period for the initialization of FHRP clients after an interface comes up. The range is 0-3600 seconds.
Step 6	**end** **Example:** `Device(config)# end`	Returns to privileged EXEC mode.

Track an IPv6 object using VRRPv3

To track an IPv6 object using VRRPv3, perform this task.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**fhrp version vrrp v3** **Example:** `Device(config)# fhrp version vrrp v3`	Enables you to configure VRRPv3 and Virtual Router Redundancy Service (VRRS) on a device. **Note** When VRRPv3 is in use, VRRPv2 is unavailable.
Step 4	**interface** *type number* **Example:** `Device(config)# interface GigabitEthernet 0/0/0`	Specifies an interface and enters interface configuration mode.

	Command or Action	Purpose
Step 5	**vrrp** *group-id* **address-family ipv6** **Example:** `Device(config-if)# vrrp 1 address-family ipv6`	Creates a VRRP group for IPv6 and enters VRRP configuration mode.
Step 6	**track** *object-number* **decrement** *number* **Example:** `Device(config-if-vrrp)# track 1 decrement 20`	Configures the tracking process to track the state of the IPv6 object used by the VRRPv3 group. VRRP on the interface then registers with the tracking process to be informed of any changes to the IPv6 object on the VRRPv3 group. If the tracked IPv6 object state configured on the interface goes down, the priority of the VRRP group is reduced by 20.
Step 7	**end** **Example:** `Device(config-if-vrrp)# end`	Returns to privileged EXEC mode.

Monitor VRRP

The commands in this section can be used to monitor VRRP.

Example: Monitor VRRP status, configuration, and statistics details

This is a sample output of the status, configuration, and statistics details for a VRRP group:

```
Device# show vrrp detail

 GigabitEthernet1/0/1 - Group 3 - Address-Family IPv4
  Description is "group 3"
  State is MASTER
  State duration 53.901 secs
  Virtual IP address is 100.0.1.10
  Virtual MAC address is 0000.5E00.0103
  Advertisement interval is 1000 msec
  Preemption enabled, delay min 30 secs (0 msec remaining)
  Priority is 100
  Master Router is 10.21.0.1 (local), priority is 100
  Master Advertisement interval is 1000 msec (expires in 832 msec)
  Master Down interval is unknown
  VRRPv3 Advertisements: sent 61 (errors 0) - rcvd 0
  VRRPv2 Advertisements: sent 0 (errors 0) - rcvd 0
  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: 0
    Init to backup: 1 (Last change Sun Mar 13 19:52:56.874)
    Backup to master: 1 (Last change Sun Mar 13 19:53:00.484)
    Master to backup: 0
    Master to init: 0
    Backup to init: 0
```

Example: Monitor VRRP IPv6 object tracking

These examples show how to verify the VRRP IPv6 object tracking process configuration:

```
Device# show vrrp

GigabitEthernet0/0/0 - Group 1 - Address-Family IPv4
  State is BACKUP
  State duration 1 mins 41.856 secs
  Virtual IP address is 172.24.1.253
  Virtual MAC address is 0000.5E00.0101
  Advertisement interval is 1000 msec
  Preemption enabled
  Priority is 80 (configured 100)
    Track object 1 state Down decrement 20
  Master Router is 172.24.1.2, priority is 100
  Master Advertisement interval is 1000 msec (learned)
  Master Down interval is 3609 msec (expires in 3297 msec)

Device# show track ipv6 route brief

Track Type        Instance                  Parameter        State Last Change
601   ipv6 route  3172::1/32               metric threshold Down  00:08:55
602   ipv6 route  3192:ABCD::1/64           metric threshold Down  00:08:55
603   ipv6 route  3108:ABCD::CDEF:1/96      metric threshold Down  00:08:55
604   ipv6 route  3162::EF01/16             metric threshold Down  00:08:55
605   ipv6 route  3289::2/64                metric threshold Down  00:08:55
606   ipv6 route  3888::1200/64             metric threshold Down  00:08:55
607   ipv6 route  7001::AAAA/64             metric threshold Down  00:08:55
608   ipv6 route  9999::BBBB/64             metric threshold Down  00:08:55
611   ipv6 route  1111::1111/64             reachability     Down  00:08:55
612   ipv6 route  2222:3333::4444/64        reachability     Down  00:08:55
613   ipv6 route  5555::5555/64             reachability     Down  00:08:55
614   ipv6 route  3192::1/128               reachability     Down  00:08:55
```