



FHRP

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The ability of a network to dynamically recover from the failure of a device acting as a default gateway is known as **first-hop redundancy**

HSRP

HSRP version 1 = IPv4 (group numbers 0-255)

HSRP version 2 = IPv4 + IPv6 (group numbers 0-4095)

HSRP active router failing:

1. Standby router stops seeing hello messages from the forwarding router
2. Standby router assumes the role of the forwarding router
3. Standby router takes the IPv4 and MAC address and is now the active router

The function of the HSRP standby router is to monitor the operational status of the HSRP group and to quickly assume packet-forwarding responsibility if the active router fails.

HSRP States

HSRP State	Description
Initial	This state is entered through a configuration change or when an interface first becomes available.
Learn	The router has not determined the virtual IP address and has not yet seen a hello message from the active router. In this state, the router waits to hear from the active router.
Listen	The router knows the virtual IP address, but the router is neither the active router nor the standby router. It listens for hello messages from those routers.
Speak	The router sends periodic hello messages and actively participates in the election of the active and/or standby router.
Standby	The router is a candidate to become the next active router and sends periodic hello messages.
Active	The router won the election.

HSRP election

priority

- Default the router with the highest IPv4 address is elected as the active router (can be overridden by priority)
- The default HSRP priority is 100, and can range from 0-255
- The highest priority = active router
- set the priority with `standby priority interface`

Preemption

- Preemption is the ability to trigger the re-election process
- Preemption must be enabled using `standby preempt interface`
- When a router on that interface comes online with a higher priority it will automatically be active router

Timers

- The active and standby routers send **every 3 seconds a hello message** to the multicast address. If the active router does **not send any hello message over 10**

seconds there will be an re-election. So in short the active router can miss 3 hello messages before it is declared as 'down'.

HSRP configuration example

1. Configure HSRP version 2
2. Configure the virtual IP for the group
3. Configure the priority for the active router to be greater than 100
4. Configure the active router to preempt the standby router in cases where the active router comes online after the standby router

```
Router(config)# interface FastEthernet0/1
Router(config-if)# standby version 2
Router(config-if)# standby 1 192.168.1.1 255.255.255.0
Router(config-if)# standby 1 priority 150
Router(config-if)# standby 1 preempt
```

Verifying configuration

The configuration can be verified using the following commands:

```
show standby
```

```
show standby brief
```

You can debug HSRP using the following command:

```
debug standby packets
```

VRRP

VRRP is the multi-vendor FHRP alternative of HSRP and operates the same

VRRP version 2 = IPv4

VRRP version 3 = IPv4 + IPv6

GLBP

Gateway Load Balancing Protocol is a Cisco proprietary protocol that supports **Load balancing between a group of redundant routers.**