
Chapter 10

Configuring SRP

This chapter describes how to configure the HP 9304M, HP 9308M, and HP 6208M-SX routing switches to use the Standby Router Protocol (SRP), a proprietary protocol that provides redundant paths between two routing switches.

Details for configuring SRP with the CLI and the Web management interface are shown. For detailed summaries of all CLI commands, including the syntax and ranges of parameter values, see the *Command Line Interface Reference*.

For information about the differences between SRP and the Virtual Router Redundancy Protocol (VRRP), see “Differences Between SRP and VRRP” on page 10-7.

Overview of Standby Router Protocol (SRP)

SRP allows alternate paths to be provided to a host. To provide path redundancy between given hosts, a **virtual router** with its own unique IP addresses is created. The virtual router is created by assigning these unique IP addresses to ports on existing routing switches in the network—routing switches that could provide a path between the given hosts.

NOTE: Virtual IP router addresses are in addition to the IP address assigned to each IP interface.

For example, in Figure 10.1, suppose you want to provide continual connectivity between Host 1 and Host 3 with the use of redundant paths. A virtual router is created by assigning the same virtual router IP address to all physical interfaces that will provide redundant paths for that portion of the network. Virtual router IP address 192.53.5.1 is assigned to interfaces A and B, and the virtual router IP address 192.55.4.1 is assigned to interfaces C and D. Notice that in both cases, these virtual addresses are in addition to their physical IP addresses.

The virtual IP address also serves as the default router for the hosts. Hosts 1 and 2 reference the virtual IP router address 192.53.5.1 as their default router and Host 3 references the virtual router IP address, 192.55.4.1.

If Router 1 goes down, then Router 2 provides connectivity between Host 1 and Host 3.

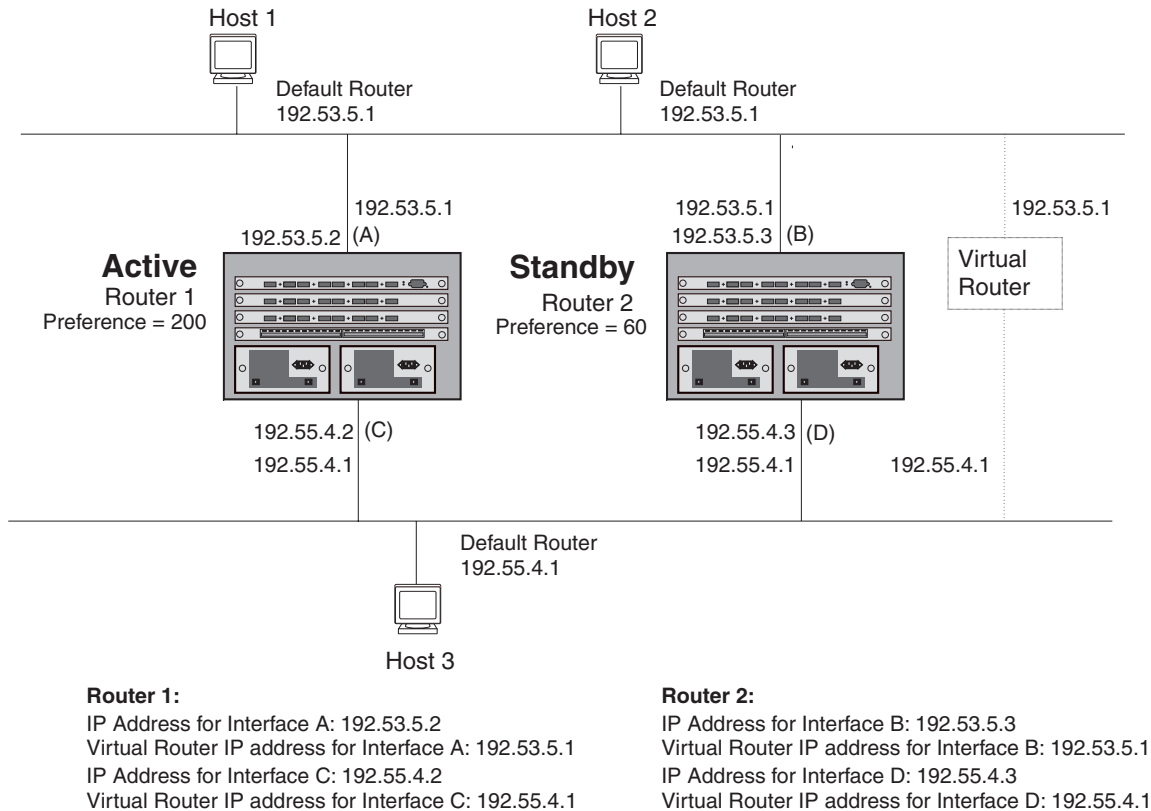


Figure 10.1 SRP operating in an HP 9304M network

SRP Support on Virtual Interfaces

SRP is supported on both physical and virtual interfaces. Support on a virtual interface allows you to assign a single virtual interface to serve as a redundant link for multiple ports within a VLAN. For example, in Figure 10.2, virtual interface 1 represents ports 1, 2, and 3 for Router 1.

A virtual interface will by default remain active until all underlying links go down. If you want the virtual link to go to SRP standby state when a subset of the ports goes down, you must configure track ports as well.

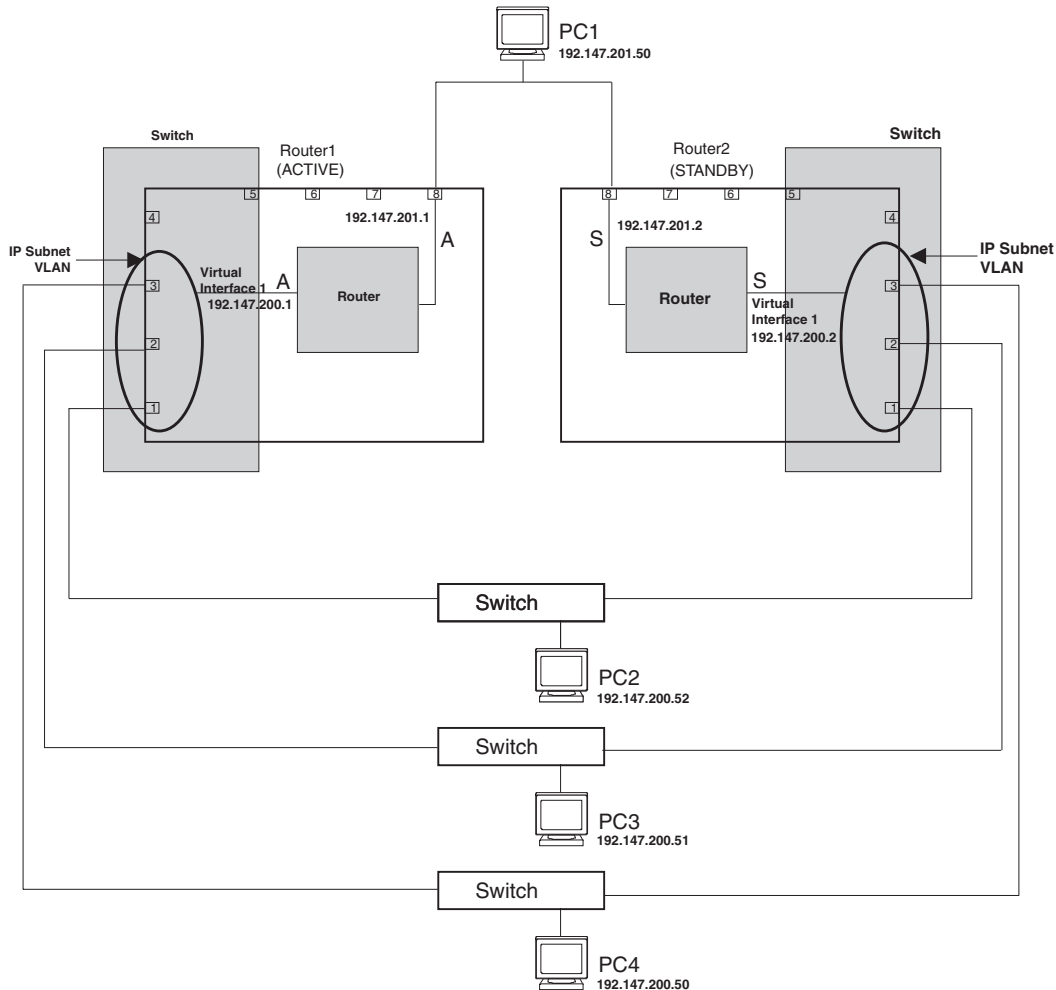


Figure 10.2 Virtual interface as a redundant link

Active and Standby Routers

To establish one routing switch as active, you assign a higher preference to the routing switch. If the preference for two routing switches is equal, the interface with the higher IP address takes precedence as the active router. Link status is monitored using a track port.

Track Ports

A **track port** tracks the status of the ports that are providing redundant paths. You can assign any port to be a track port; however, a port that is providing a redundant path cannot serve as its own track port. A track port should be assigned to track each port that is part of a virtual link. For example, in Figure 10.1, interfaces A, B, C, and D should all be assigned track ports.

If a change in state (up or down) is detected by the track port, the priority of the SRP Group Interface will automatically be increased or decreased.

NOTE: Virtual router interfaces cannot be assigned as track ports.

Multiple Track Port Support

You can assign multiple ports to serve as track ports for SRP redundant links. If an active link fails, all SRP interfaces that serve as track ports for the failed link are placed in standby mode.

This feature allows you to configure a system so that a given routing switch and its defined redundant links will be in either active or standby mode. Multiple track port assignment prevents a mix of active and standby links to exist on a routing switch.

For example, in Figure 10.3, links on Router 1 designated as e1 and e3 have failed and have transferred control to their standby links on Router 2; e4 and e2 remain as active links. This results in Router 1, the routing switch that was originally assigned to serve as the active router, having a mix of active and standby links.

To bias all traffic and link traffic to the standby router, assign all other redundant links as track ports for all other interfaces on the routing switch. For example, on Router 1, you would assign interfaces e1, e2, and e3 as track ports for e4. Interfaces e1, e2, and e4 would thus track port e3. Interfaces e2, e3, and, e4 would track port e1. Interfaces e1, e3, and e4 would track port e2. Configured in this manner, a failure on Router 1 links e1 and e3 would make Router 2 the active router for all the links seen in Figure 10.4.

Because one routing switch and all its links are active and the other routing switch and its links are all in standby mode, all traffic will be directed to the active router.

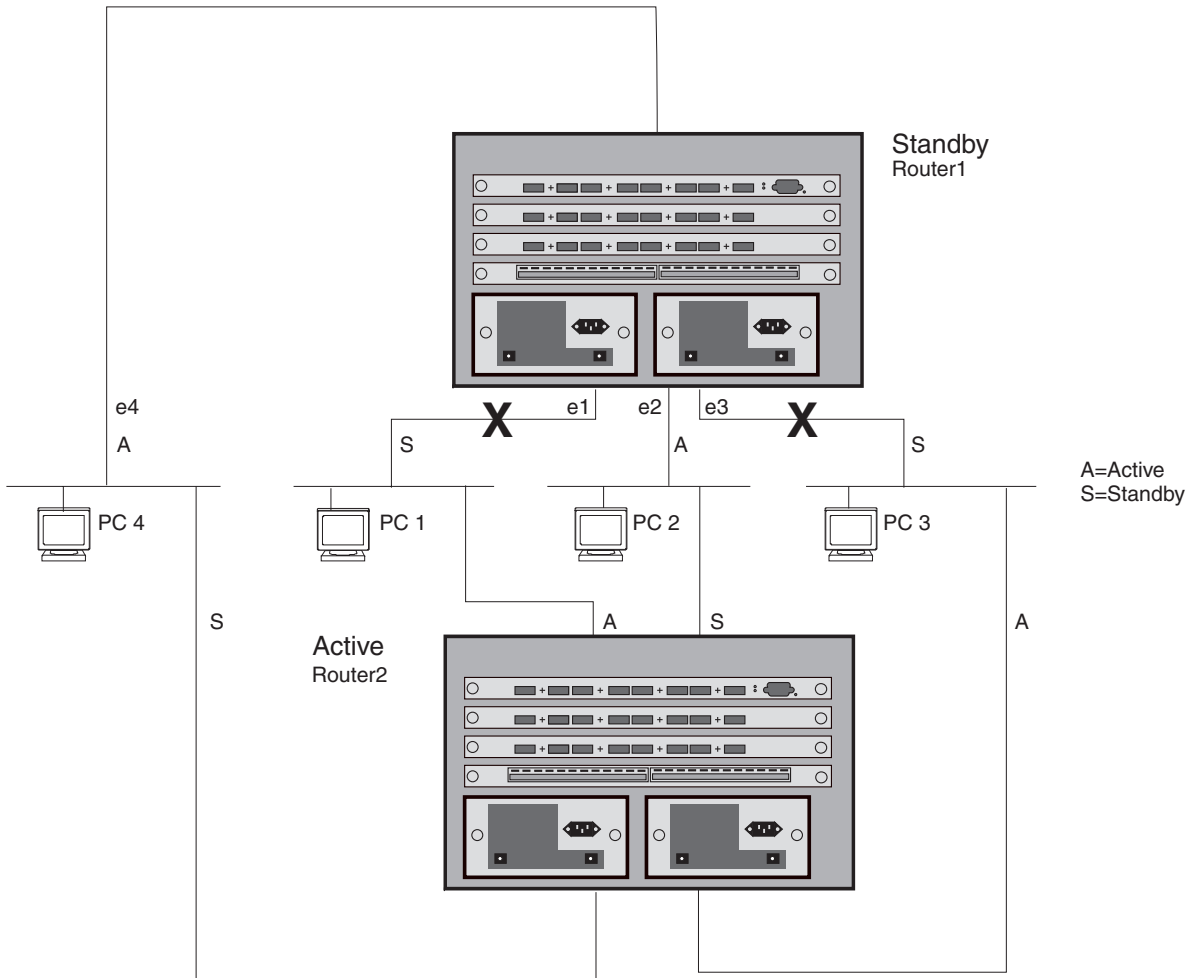


Figure 10.3 Failure of e1 and e3 links results in mixed active and standby links on router1 without the use of multiple track ports

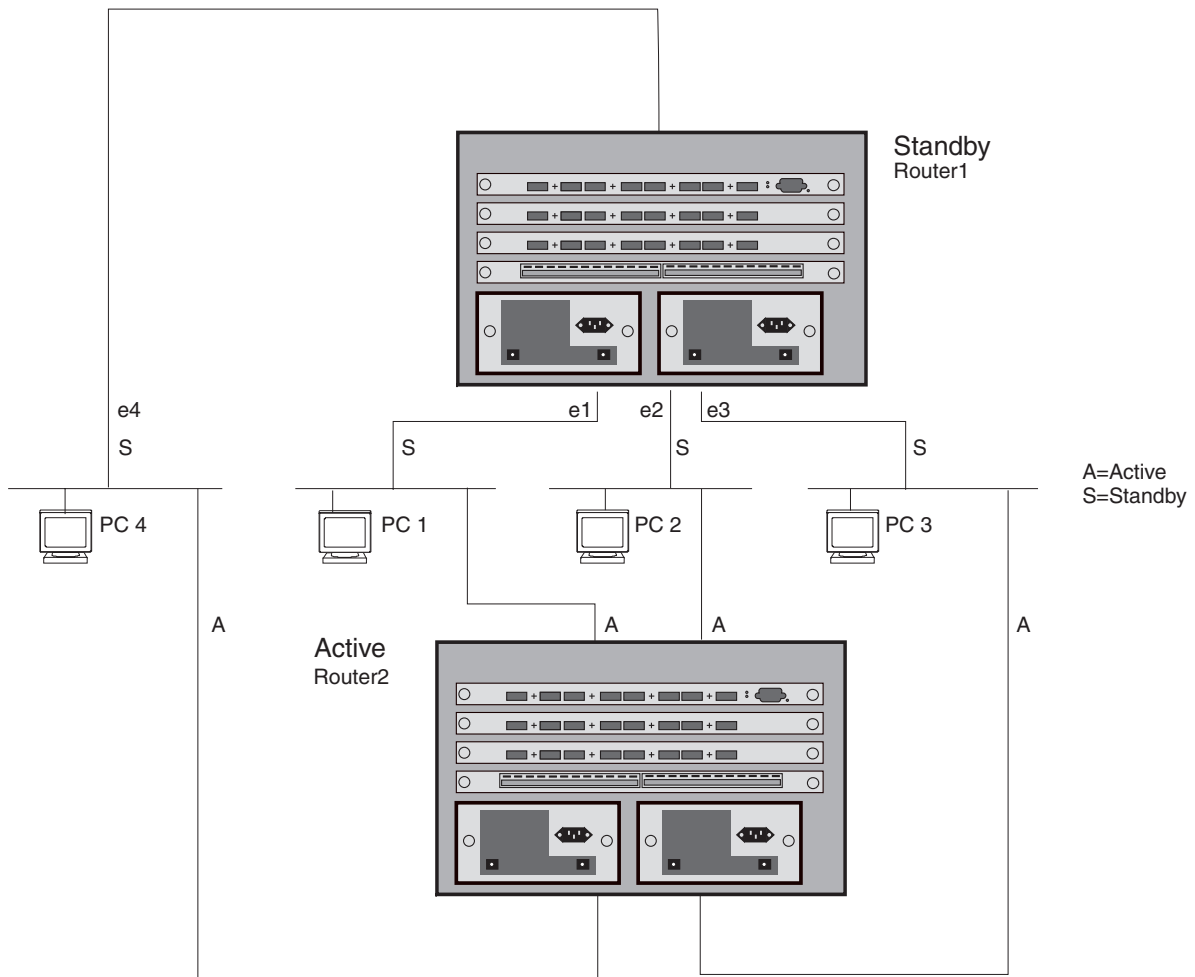


Figure 10.4 Router2 becomes active router after links e1 and e3 fail with multiple track ports defined

Independent Operation of RIP and OSPF

SRP operation is independent of the RIP and OSPF protocols. RIP and OSPF operation will be unaffected when SRP is enabled on its interfaces.

Dynamic SRP Configuration

All SRP global and interface parameters are dynamically activated. You do not need to reset the system to place SRP configuration parameters into effect.

Differences Between SRP and VRRP

The Virtual Router Redundancy Protocol (VRRP) is a standards-based protocol that provides redundancy to routers within a LAN. VRRP is described in RFC 2338. The implementation of VRRP on the HP 9304M, HP 9308M, and HP 6208M-SX routing switches provides many of the same features as SRP. In addition, VRRP enables you to configure third-party devices that adhere to RFC 2338 along with the HP 9304M, HP 9308M, and HP 6208M-SX routing switches as virtual routers. SRP requires that the third-party devices support SRP or HSRP.

If you are configuring the HP 9304M, HP 9308M, and HP 6208M-SX routing switches for redundancy, you can use either protocol. The features provided by the two protocols are similar, yet the protocols do differ in the following ways:

- VRRP uses an IP multicast address for VRRP management traffic, while SRP uses pre-defined unicast addresses.
- VRRP uses real IP addresses assigned to an interface and does not use virtual IP addresses, whereas SRP must use one pre-defined virtual IP address for each virtual router. You can associate a VRRP virtual router with an IP address or with a virtual interface (a named set of physical interfaces).
- Each VRRP virtual router (denoted by a unique Virtual Router ID [VRID]) can have one Master router and one or more Backup routers. In contrast, each SRP router can have one Primary Router and only one Standby Router. Most VRRP and SRP configurations consist of two routers—one active router (Master or Primary) and one standby router (Backup or Standby).
- The implementation of VRRP on the HP 9304M, HP 9308M, and HP 6208M-SX routing switches supports authentication using simple clear text passwords. SRP does not support authentication.

NOTE: If your routing switches already are using SRP and you do not need redundancy with devices that cannot use SRP, you do not need to reconfigure your routing switches to use VRRP.

HP recommends that you do not use VRRP and SRP on the same device.

Configuring SRP

To begin using SRP on the routing switch:

1. Enable operation of SRP on the routing switch.
2. Configure SRP parameters on physical or virtual interfaces for those IP sub-nets for which a redundant path is desired. Configure the virtual router IP address and the other routing switch's IP address.
3. Assign track ports, if appropriate.
4. Assign one of the routing switches to serve as the active router using the preference parameter, as appropriate.
5. Modify interface parameters, keep-alive-time, and router-dead-interval on both routing switches as required.

NOTE: You initially enable SRP at the global CONFIG level of the CLI using the **router srp** command. All other parameters are assigned or modified at the interface level of the CLI using **ip srp address <ip-addr> [<parameter>]** commands.

NOTE: If you are using the Web Management interface, you enable SRP on the System configuration sheet. All other parameters (interface) are configured on the SRP configuration sheet.

Configuration Rules for SRP

- Virtual interfaces cannot be assigned as track ports.
- The keep-alive-time value must be set to the same value on both the active and standby router when both routers are connected to the same sub-net.
- The router-dead-time parameter must be set to the same value on both the active and standby routers when both routing switches are connected to the same sub-net.

Enable SRP on the Routing Switch

Before configuring SRP to provide redundancy for a routing switch, you must enable the feature on the routing switch.

USING THE CLI

To enable SRP on a routing switch, enter the following command:

```
HP9300(config)# router srp
```

USING THE WEB MANAGEMENT INTERFACE

To enable SRP on a routing switch:

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Select the Enable radio button next to SRP.
3. Click the Apply button to apply the change to the device's running-config file.
4. Select the Save link at the bottom of the dialog. Select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

NOTE: All SRP configurations are implemented using a single configuration panel of the Web management interface. Given this, all other configuration steps, other than enabling the feature, are shown in a separate section at the end of this chapter rather than interspersed with CLI examples.

Assign Virtual Router IP Addresses

In the examples in this section, SRP is used to provide a redundant path between Host 1 and Host 3 to ensure against failure of the primary path. See Figure 10.5.

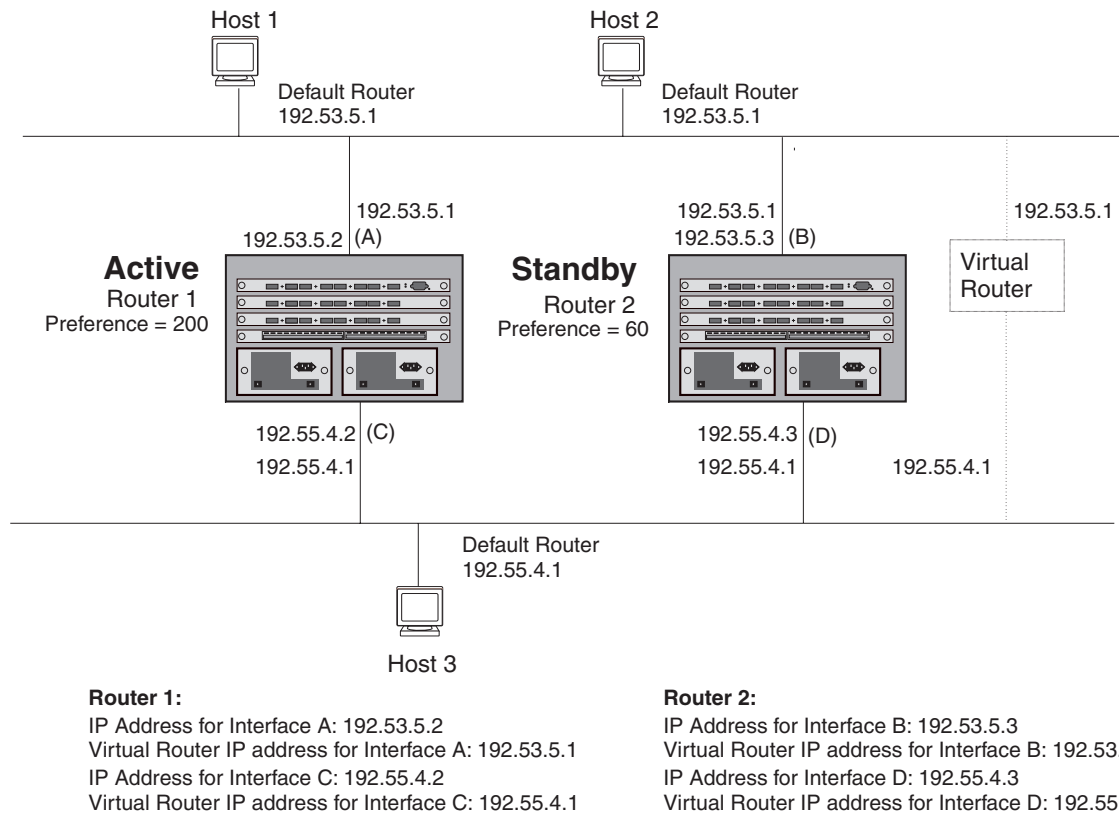


Figure 10.5 SRP operating in an HP 9304M network

USING THE CLI

EXAMPLE:

To define and assign the virtual router IP addresses for Router 1, shown in Figure 10.5, you would need to define two separate virtual IP addresses for interfaces A and C and link those addresses to the IP addresses of the physical interfaces for A and C.

This example assumes that interface A corresponds to physical interface 1/7, and interface C corresponds to physical interface 2/1.

Configuring Router 1

To establish the virtual IP address 192.53.5.1 for interface A defined by IP address 192.53.5.2 and Ethernet port 1/7, enter the following commands:

```
Router1(config)# inter e 1/7
Router1(config-if-1/7)# ip srp address 192.53.5.2 vir-rtr-ip 192.53.5.1
other-rtr-ip 192.53.5.3
```

Notice that the latter command also defines the other routing switch used in this configuration by entering the IP address for Interface B on Router 2 (**other-rtr-ip 192.53.5.3**).

To establish the virtual IP address 192.55.4.1 for interface C defined by IP address 192.55.4.2 and Ethernet port 2/1, enter the following commands:

```
Router1(config)# inter e 2/1
Router1(config-if-2/1)# ip srp address 192.55.4.2 vir-rtr-ip 192.55.4.1
other-rtr-ip 192.55.4.3
```

Notice that the latter command also defines the other routing switch used in this configuration by entering the IP address for Interface D on Router 2 (**other-rtr-ip 192.55.4.3**).

Configuring Router 2

To define and assign the virtual router IP address for Router 2, you would need to define two separate virtual IP addresses for interfaces B and D as well as linking those address to the IP addresses of the physical interfaces for A and C.

This example assumes that interface B corresponds to physical interface 1/7, and interface D corresponds to physical interface 2/2.

To establish the virtual IP address 192.53.5.1 for interface B defined by IP address 192.53.5.3 and Ethernet port 1/7, you would enter the following commands. Note that you also are defining the other routing switch used in this configuration by entering the IP address for interface A on Router 1 (**other-rtr-ip 192.53.5.2**).

```
Router2(config)# inter e 1/7
Router2(config-if-1/7)# ip srp address 192.53.5.3 vir-rtr-ip 192.53.5.1
other-rtr-ip 192.53.5.2
```

NOTE: The steps outlined in examples 1 and 2 also should be followed when creating and assigning the virtual router IP address 192.55.4.1 for interfaces C (192.55.4.2) and D (192.55.4.3).

Assign the Track Port(s)

Track ports monitor the relationship between the active and standby routers.

EXAMPLE:

To assign interface 1 to act as the track port for interface A (e1/7) on Router 1, enter the following commands:

```
Router1(config)# inter e 1/7
Router1(config-if-1/7)# ip srp address 192.53.5.2 track 1
```

NOTE: The IP address referenced in the track port assignment command is the IP address of the physical interface.

NOTE: The track port can also be assigned when assigning the virtual router IP address, as an extension to that command.

Assigning the Active Router

To establish one routing switch as active, assign it a higher **preference level**. If the preference level for the two routing switches is equal, the interface with the higher IP address takes precedence as the active router.

EXAMPLE:

To make Router 1 the active router, assign a preference value to interfaces A and C that is higher than the preference value of interfaces B and D on Router 2.

To assign a preference value of 200 to interfaces A and C, you would enter the following commands:

```
Router1(config)# int e 1/7
Router1(config-if-1/7)# ip srp address 192.53.5.2 preference 200
Router1(config-if-1/7)# int e 2/1
Router1(config-if-2/1)# ip srp address 192.55.4.2 preference 200
```

Modify Port Parameters (optional)

The user can also modify two port parameters for SRP: the keep-alive-time and the router-dead-interval.

Keep Alive Time

The **keep-alive-time** parameter allows you to modify how often the SRP hello message is sent on the interface on which the keep-alive-time is configured.

EXAMPLE:

To modify the keep-alive-time parameter for interfaces A and C on Router 1 to 15 seconds from the default of 3 seconds, enter the following:

```
Router1(config)# int e 1/7
Router1(config-if-1/7)# ip srp 192.53.5.2 keep-alive-time 15
Router1(config-if-1/7)# int e 2/1
Router1(config-if-2/1)# ip srp 192.55.4.2 keep-alive-time 15
```

NOTE: The keep-alive-time value must be set to the same value on both the active and standby routers when both routers are connected to the same sub-net.

Router Dead Time

The **router-dead-time** parameter allows you to define the period of time (hold time) that the standby router waits before determining that the active router is unavailable (dead). If the configured period of time expires, the standby router becomes active.

NOTE: The router-dead-time parameter must be set to the same value on both the active and standby router when both routing switches are connected to the same sub-net.

EXAMPLE:

To modify the router-dead-time parameter for interfaces A and C on Router 1 to 30 seconds from the default of 9 seconds, you would enter the following:

```
Router1(config)# int e 1/7
Router1(config-if-1/7)# ip srp 192.53.5.2 router-dead-interval 30
Router1(config-if-1/7)# int e 2/1
Router1(config-if-2/1)# ip srp 192.55.4.2 router-dead-interval 30
```

USING THE WEB MANAGEMENT INTERFACE

EXAMPLE:

To define and assign the virtual router IP addresses for Router 1, shown in Figure 10.5, you would need to define two separate virtual IP addresses for interfaces A and C as well as linking those address to the IP addresses of the physical interfaces for A and C.

For purposes of this example we are assuming that interface A corresponds to physical interface 1/7 and interface C corresponds to physical interface 2/1.

To enable SRP on an interface:

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the SRP link.
 - If the device does not have an SRP configuration, the SRP configuration panel is displayed.
 - If SRP is already configured but you are adding a new SRP configuration, click on the [Add Interface](#) link to display the SRP configuration panel.
 - If you are modifying an existing SRP configuration, click on the Modify button to the right of the row describing the configuration to display the SRP configuration panel.
4. Select the IP address to be configured from the IP Address field's pull down menu. For example, if you are initially assigning SRP to interface A (Router 1) as shown in Figure 10.5, select IP address 192.53.5.2.
5. Assign a virtual IP address for the virtual router. A virtual router IP address needs to be configured on at least one router in the SRP group. For interface A, you would assign 192.53.5.1, as shown in the network configuration of Figure 10.5.

NOTE: The default IP address for a virtual router is 0.0.0.0.

6. Enter the other router IP address. This is the physical IP address of the partner router's interface in the active-standby router relationship. Notice that in the case of the example (Figure 10.5), interface B on router 2 is designated as the standby router interface so IP address 192.53.5.3 is entered.
7. To establish a router as the active router in the redundancy configuration, a higher value should be entered for its preference level. In this case, because router 1 is the desired active router and the router currently being configured, a value of 200 is entered.
8. Modify the keep alive time parameter if a value other than the default value of 3 seconds is desired. For this configuration, modify the value to 15.

NOTE: The keep alive time parameter allows the user to modify how often the SRP hello message is sent on an interface. Possible values are 1 – 120 seconds. The default is 3 seconds.

NOTE: The keep alive time parameter must be set to the same value on both the active and standby routers when both routers are connected to the same sub-net.

9. Modify the dead time parameter if a value other than the default value of 9 seconds is desired. For this configuration you would modify the value to 30.

NOTE: The dead time parameter allows you to define the period of time (hold time) that the standby router will wait before determining that the active router is unavailable (dead). When the configured period of time expires, the standby router will become active. Possible values are 3 – 255. The default value is 9 seconds.

NOTE: The dead time parameter must be set to the same value on both the active and standby routers when both routers are connected to the same sub-net.

10. Select the track port by selecting a box next to the desired interface. For purposes of this example, you would select interface 1 as the track port for interface A on router 1.

NOTE: The track port is a physical port that is used to track the status of ports that provide redundant paths. If the software detects a change in state (up or down), the software increases or decreases the priority of the SRP Group Interface accordingly.

NOTE: If you are configuring a Chassis device, the track port options are listed in a slot/port combination (for example, 1/1, which indicates <slot>/<port>), indicating that the port is resident on a module in slot 1 of the HP 9304M or HP 9308M.

11. Repeat the steps above for each interface that is to be a redundant link. In this example, you would also need to configure interface B for router 1 and interfaces C and D for router 2.
12. Click the Add button to apply the changes to the device's running-config file.
13. Select the [Save](#) link at the bottom of the dialog, then select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

Configuring SRP on Virtual Interfaces

A virtual interface will by default remain active until all underlying links go down. If you want the virtual link to go to SRP standby state when a subset of the ports goes down, you need to configure track ports.

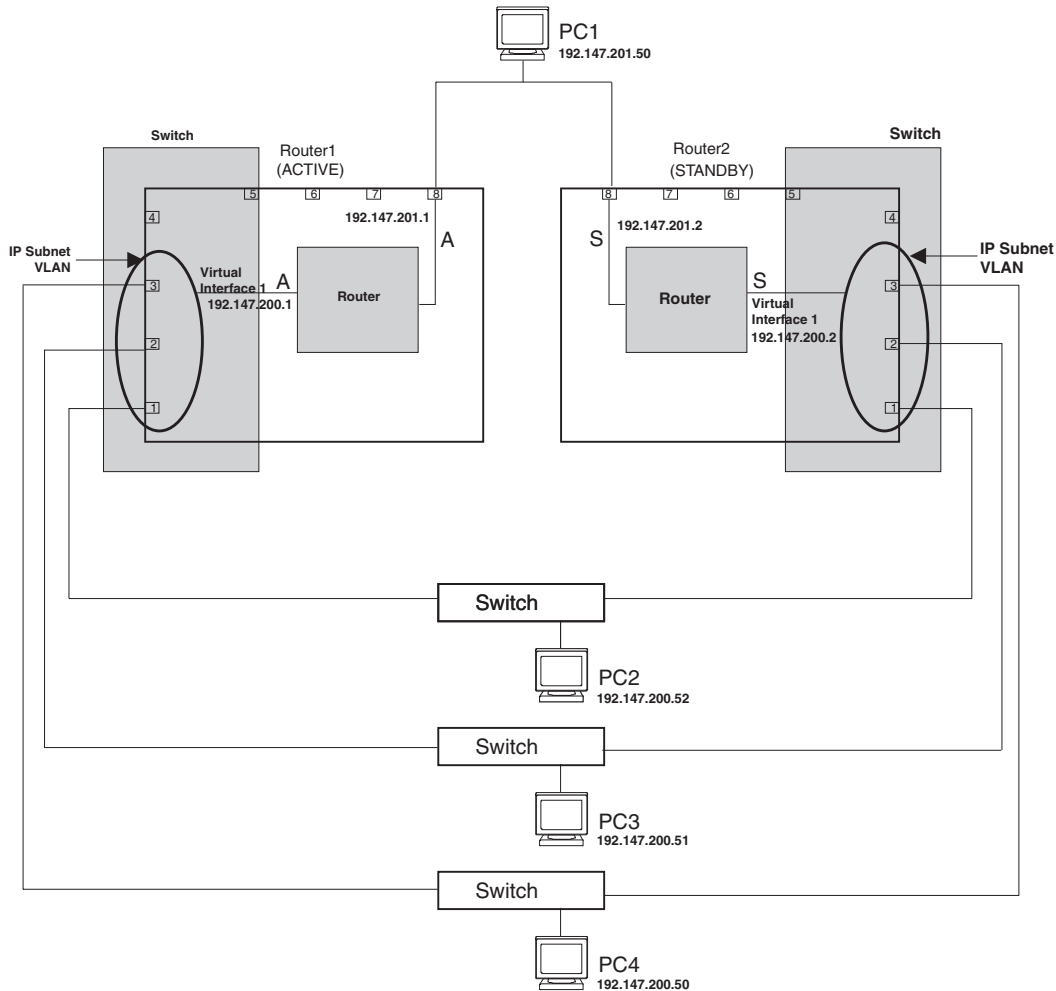


Figure 10.6 Configuring SRP on virtual interfaces

Configuring Multiple Track Ports for Virtual Interfaces

In Figure 10.6, Router 1 is the active router and Router 2 the standby router for all active SRP interfaces. Suppose you want Router 1 to go into the SRP standby state and establish Router 2 as the active router in case ports 1, 2, 3, or 8 on Router 1 go down. To do so, you would configure track ports for ports 1, 2, 3, and 8 on Router 1.

In preparation for track port configuration on Router 1, you would do the following:

1. Configure an IP sub-net VLAN with port membership of 1, 2, and 3 on Router 1.
2. Enable SRP on virtual interface 1.
3. Assign an IP address to virtual interface 1.
4. Assign ports 1, 2, 3, and 8 as track ports for virtual interface 1.
5. Assign an IP address to interface 8.
6. Assign ports 1, 2, and 3 as track ports for interface 8.

USING THE CLI

To configure the IP sub-net VLAN with port membership of 1, 2, and 3, you would enter the following commands:

```
HP9300(config)# vlan 1
HP9300(config-vlan-1)# ip-subnet 192.147.200.0 255.255.255.0
HP9300(config-vlan-ip-subnet)# static e1 to 3
HP9300(config-vlan-ip-subnet)# router-int ve1
```

To enable SRP on virtual interface 1 and to configure ports 1, 2, 3, and 8 as its track ports, you would enter the following commands:

```
HP9300(config)# int ve1
HP9300(config-vif-1)# ip address 192.147.200.1 255.255.255.0
HP9300(config-vif-1)# ip srp address 192.147.200.1 vir-rtr 192.147.200.100
other-rtr 192.147.200.2
HP9300(config-vif-1)# ip srp addr 192.147.200.1 track port 1 2 3 8
```

To enable SRP on physical interface 8 and to configure ports 1, 2, and 3 as its track ports, you would enter the following commands:

```
HP9300(config)# int e8
HP9300(config-if-8)# ip address 192.147.201.1 255.255.255.0
HP9300(config-if-8)# ip srp address 192.147.201.1 vir-rtr 192.147.201.100
other-rtr 192.147.200.2
HP9300(config-if-8)# ip srp addr 192.147.201.1 track port 1 2 3
HP9300(config-if-8)# end
HP9300# write memory
```

NOTE: After configuring track ports for Router 1, configure Router 2 similarly. This reciprocal configuration ensures that if Router 2 becomes the active router, it has track ports that support transfer to a SRP standby state.

NOTE: Virtual interfaces cannot be assigned as track ports.

USING THE WEB MANAGEMENT INTERFACE

You can select multiple track ports for SRP on the SRP configuration sheet.

