# Chapter 11
# Configuring SRP

This chapter covers configuration of the Standby Router Protocol (SRP), a proprietary protocol that provides redundant paths between two routers.

Details for configuring SRP with the CLI and the Web management interface are shown. Detailed summaries of all CLI commands, noting syntax and range of parameter values, can also be found in **Appendix B**.

## Overview of SRP

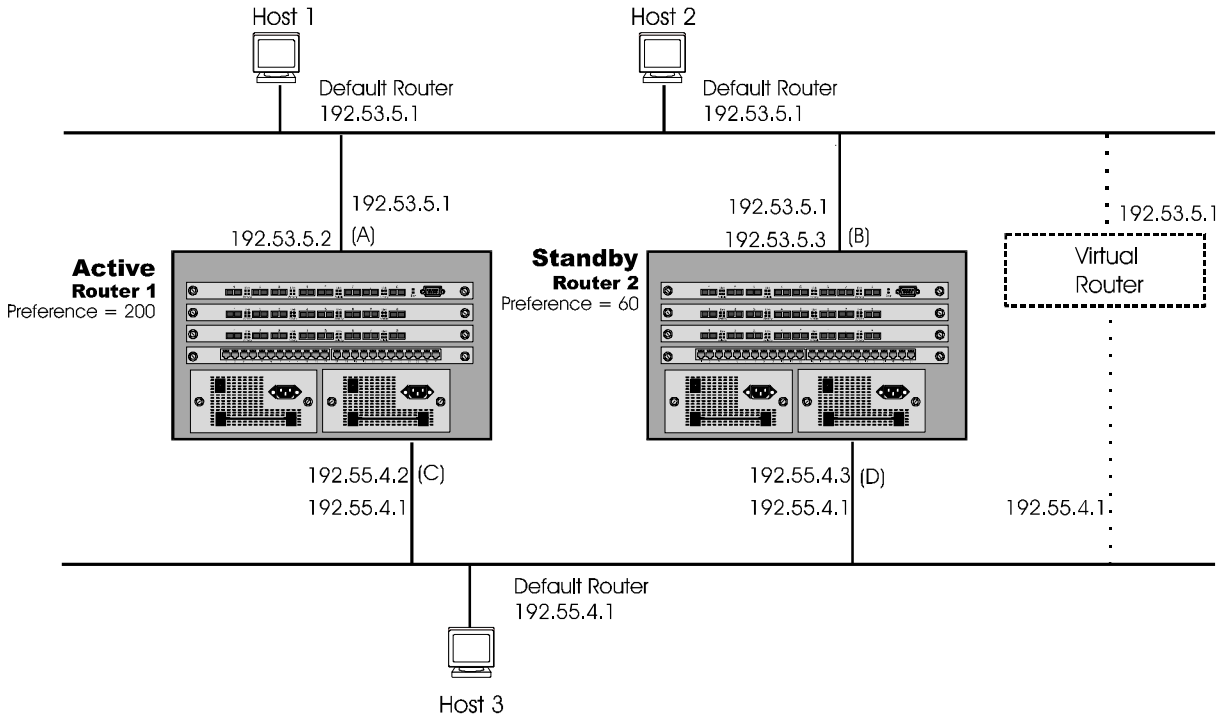
SRP allows alternate paths to be provided to a host. To provide path redundancy between given hosts, a **virtual router** with its own unique IP addresses is created. The virtual router is created by assigning these unique IP addresses to ports on existing routers in the network–routers that could provide 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 11.1**, the user wishes 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 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.




**Router 1:**
IP Address for Interface A: 192.53.5.2
Virtual Router IP address for Interface A: 192.53.5.1
IP Address for Interface C: 192.55.4.2
Virtual Router IP address for Interface C: 192.55.4.1

**Router 2:**
IP Address for Interface B: 192.53.5.3
Virtual Router IP address for Interface B: 192.53.5.1
IP Address for Interface D: 192.55.4.3
Virtual Router IP address for Interface D: 192.55.4.1

**Figure 11.1 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 a user to assign a single virtual interface to serve as a redundant link for multiple ports within a VLAN. For example, in **Figure 11.2**, 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 the user wants the virtual link to go to SRP standby state when a subset of the ports goes down, then he or she should configure track ports as well.

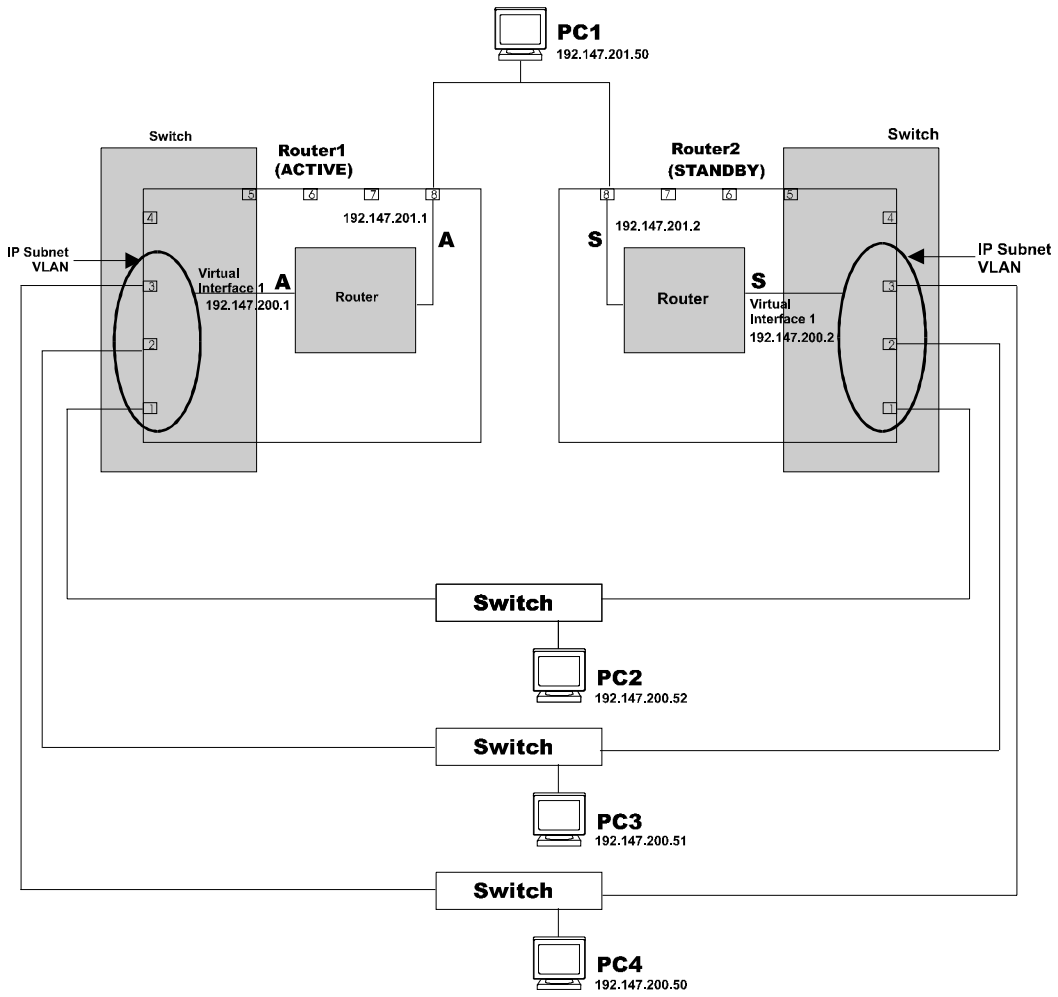



**Figure 11.2 Virtual interface as a redundant link**

## Active and Standby Routers

To establish one router as active, the user assigns it a higher preference. Should preference for the two routers be equal, the interface with the higher IP address will take precedence as the active router. Link status is monitored by assigning a track port.

## Track Ports

A **track port** is used to track the status of those ports that provide redundant paths. Any port can be assigned to act as 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 11.1**, interfaces A, B, C and D should all be assigned track ports.

Should a change in state, up or down, be 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*

Multiple ports can be assigned to serve as track ports for SRP redundant links. When an active link fails, all SRP interfaces that serve as track ports for the failed link will be placed in standby mode.

This feature allows the user to configure a system so that a given router and its defined redundant links will all be in either active or standby mode. Multiple track port assignment prevents a mix of active and standby links to exist on a router as shown in **Figure 11.3**.

For example, in **Figure 11.3**, links on Router1 designated as e1 and e3 have failed and transferred control to their standby links on Router2, and e4 and e2 remain as active links. This results in 9304M1, the router 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, the user would assign all other redundant links as track ports for all other interfaces on the router. For example, on Router1, e1, e2 and e3 would be assigned as track ports for e4; e1, e2 and e4 would be track ports for e3; e2, e3 and e4 would be track ports for e1; and e1, e3 and e4 would be assigned as track ports for e2. When configured in this manner, a failure on Router1 links e1 and e3 would make Router2 the active router for all the links seen in **Figure 11.4**

By ensuring that one router and all its links are active and the other router and its links are all in standby mode, all traffic will be directed to the active router.

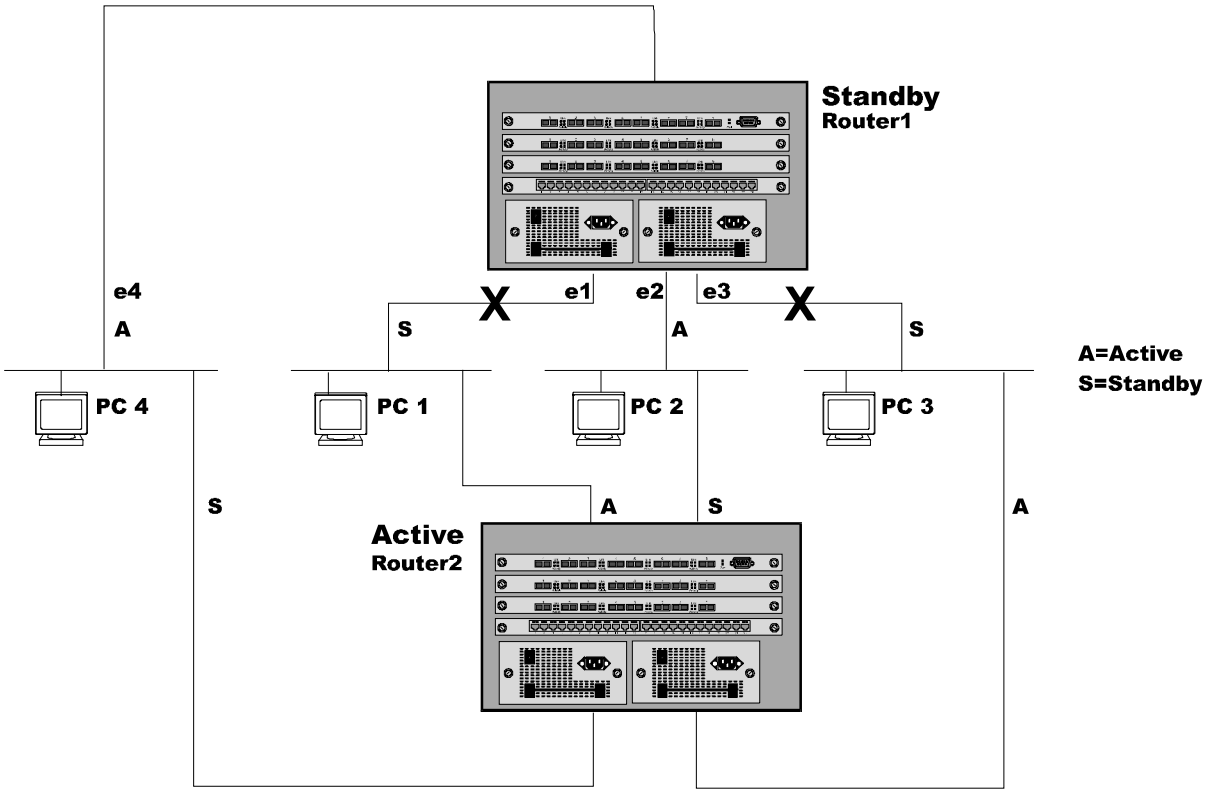



**Figure 11.3 Failure of e1 and e3 links results in mixed active and standby links on router1 without the use of multiple track ports**

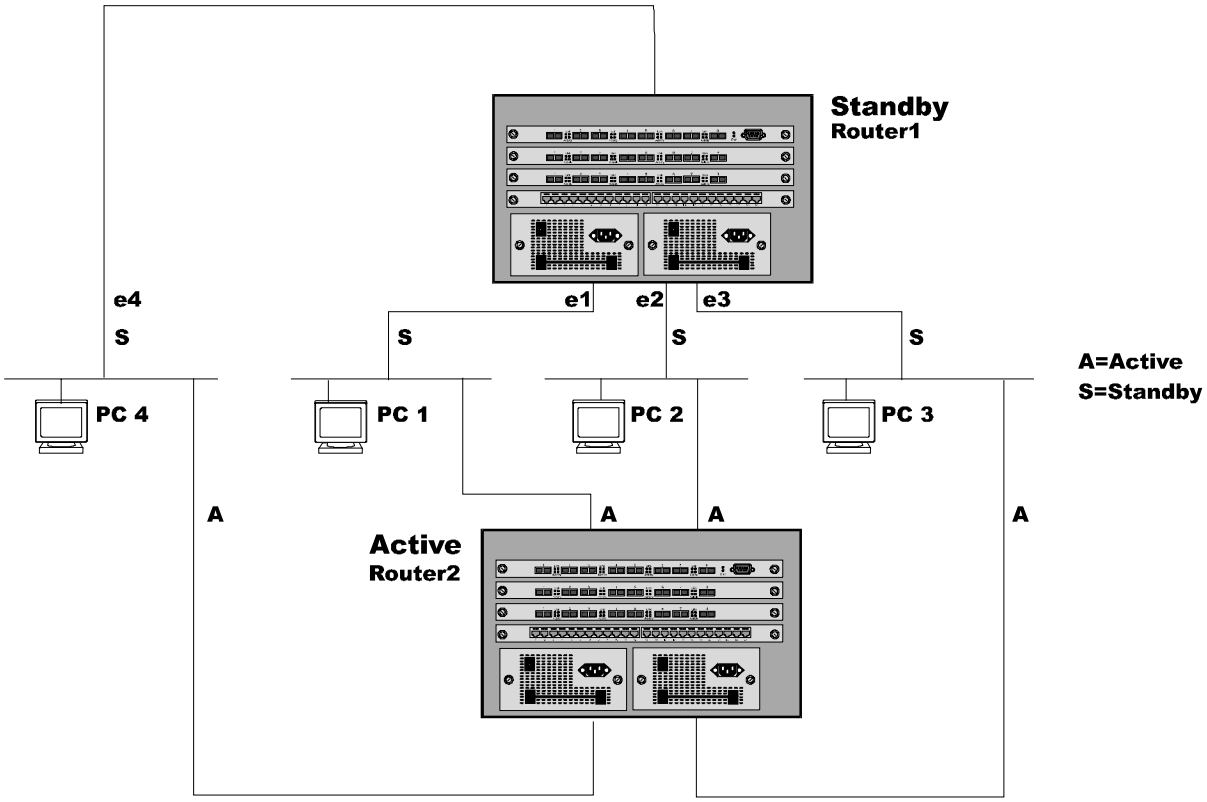



**Figure 11.4 Router2 becomes active router after links e1 and e3 fail with multiple track ports defined**

## Independent Operation of RIP and OSPF

SRP operation is independent of 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.

## Configuring SRP

To begin using SRP on the router, the user should follow the steps below:

1. Enable operation of SRP on the router.
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 router's IP address.
3. Assign track ports, if appropriate.
4. Assign one of the routers 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 routers as required.

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

**NOTE:** SRP is enabled on the System configuration sheet when using the web management interface. 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 routers are connected to the same sub-net.

### Enable SRP on the Router

Before configuring SRP to provide redundancy for a router, the user must enable the feature on the router.

#### USING THE CLI

To enable SRP on a router, the user would enter the following:

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

#### USING THE WEB MANAGEMENT INTERFACE

To enable SRP on a router, the user would enter the following:

1. Select the system link from the main menu.
2. Enable **SRP** on the System configuration sheet.
3. Select the **apply** button to assign the changes.

**NOTE:** All SRP configurations are done on one configuration panel of the Web management interface. Given this, all other configuration steps, other than enabling the feature, will be 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, a user is interested in employing SRP within the network to provide a redundant path between Host 1 and Host 3, should their primary path go down. (**Figure 11.5)**.

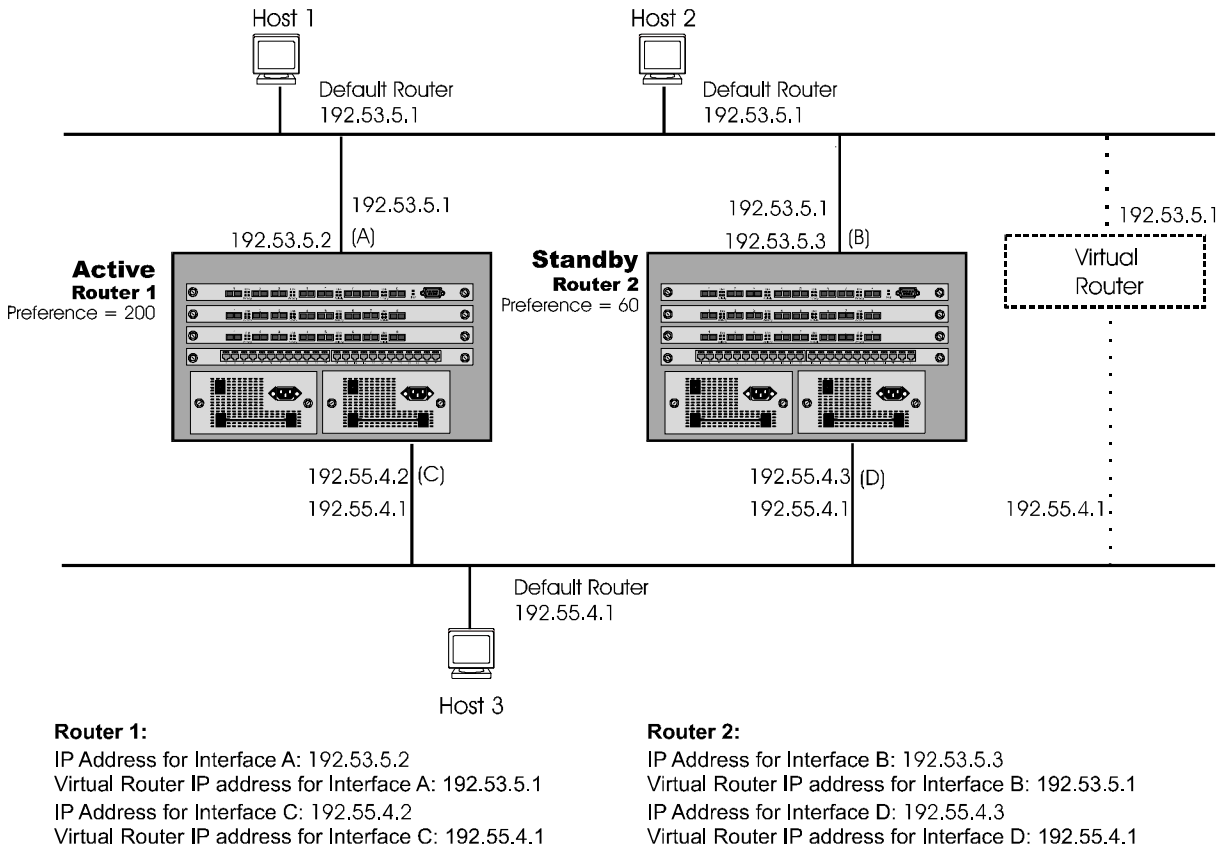



**Figure 11.5 SRP operating in an HP 9304M network**

**USING THE CLI**

EXAMPLE: To define and assign the virtual router IP addresses for **Router 1**, shown in **Figure 11.5**, the user 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 17, and interface C corresponds to physical interface 20.

**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 17, the user would enter the commands shown below:

```
Router1(config)# inter e 2/17
```

```
Router1(config-if-2/17)# ip srp address 192.53.5.2 vir-rtr-ip 192.53.5.1 other-rtr-ip 192.53.5.3
```

Notice that the user is also defining the other router 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 20, the user would enter the following commands:

```
Router1(config)# inter e 2/20

Router1(config-if-2/20)# ip srp address 192.55.4.2 vir-rtr-ip 192.55.4.1 other-rtr-
ip 192.55.4.3
```

Notice that the user also defines the other router 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, the user 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 17, and interface D corresponds to physical interface 22.

To establish the virtual IP address 192.53.5.1 for interface B defined by IP address 192.53.5.3 and Ethernet port 17, the user would enter the following commands. Note that the user is also defining the other router 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 2/17

Router2(config-if-2/17)# ip srp address 192.53.5.3 vir-rtr-ip 192.53.5.1 other-rtr-
ip 192.53.5.2
```

**NOTE:** The same steps outlined in examples 1 and 2 should be followed in 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)

To monitor the relationship between the active and standby routers, track ports are assigned.

EXAMPLE: To assign interface 1 (slot 2) to act as the track port for interface A (e17) on Router 1, the user would enter the following command:

```
Router1(config)# inter e 2/17

Router1(config-if-2/17)# ip srp address 192.53.5.2 track e 2/1
```

**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 router as active, assign it a higher **preference level**. Should the preference level for the two routers be equal, the interface with the higher IP address will take precedence as the active router.

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

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

```
Router1(config)# int e 2/17

Router1(config-if-2/7)# ip srp address 192.53.5.2 preference 200

Router1(config-if-2/17)# int e 2/20

Router1(config-if-2/20)# 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 ***router-dead-interval***.

**Keep Alive Time**

The ***keep-alive-time*** parameter allows the user 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, the user would enter the following:

```
Router1 (config)# int e 2/17
Router1 (config-if-2/17)# ip srp 192.53.5.2 keep-alive-time 15
Router1 (config-if-2/17)# int e 2/20
Router1 (config-if-2/20)# 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 the user 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.

**NOTE:** The ***router-dead-time*** parameter must be set to the same value on both the active and standby router when both routers 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, the user would enter the following:

```
Router1 (config)# int e 2/17
Router1 (config-if-2/17)# ip srp 192.53.5.2 router-dead-interval 30
Router1 (config-if-2/17)# int e 2/20
Router1 (config-if-2/20)# ip srp 192.55.4.2 router-dead-interval 30
```

**USING THE WEB MANAGEMENT INTERFACE**

EXAMPLE 1: To define and assign the virtual router IP addresses for **Router 1**, shown in **Figure 11.5**, the user 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 17 and interface C corresponds to physical interface 20.

To enable SRP on an interface, the user would do the following:

1. Verify that SRP is enabled on a router via the System configuration sheet. Once done, the user then assigns SRP on an interface basis.
2. Select the SRP link from the main menu and the SRP configuration sheet shown in **Figure 11.6** will appear.
3. Select the **IP address** to be configured from the pull down menu. Assuming that the user is initially assigning SRP to interface A (Router 1) as shown in **Figure 11.5**, the user selects IP address 192.53.5.2.
4. 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, the user assigns 192.53.5.1, as shown in the network configuration of **Figure 11.5**.

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

5. 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 11.5**), interface B on router 2 is designated as the standby router interface so IP address 192.53.5.3 is entered.
6. 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.
7. Modify the **keep alive time** parameter if a value other than the default value of 3 seconds is desired. For this configuration the user modifies the value to 15.

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**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 to 120 seconds. The default is 3 seconds.

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**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.

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8. Modify the **dead time** parameter if a value other than the default value of 9 seconds is desired. For this configuration the user modifies the value to 30.

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**NOTE:** The dead time parameter allows the user 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 to 255. The default value is 9 seconds.

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**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.

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9. Select the **track port** by selecting a box next to the desired interface. For purposes of this example, the user has selected interface 1 as the track port for interface A on router 1.

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**NOTE:** The **track port** is a physical port that is used to track the status of ports that provide redundant paths. Should a change in state—up or down, be detected, the priority of the SRP Group Interface will be increased or decreased.

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**NOTE:** If the user is configuring a chassis system, the track port options would be listed in a slot/port combination, e.g. 1/1 (slot/port), indicating that the port is resident on a module in slot 1 of the chassis.

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10. Repeat steps 2-9 for each interface that is to be a redundant link. In this example, the user would also need to configure interface B for router 1 and interfaces C and D for router 2.


**Figure 11.6 SRP configuration sheet**

## Configuring SRP on Virtual Interfaces

A virtual interface will by default remain active until all underlying links go down. If the user wants the virtual link to go to SRP standby state when a subset of the ports goes down, then he or she should configure track ports.

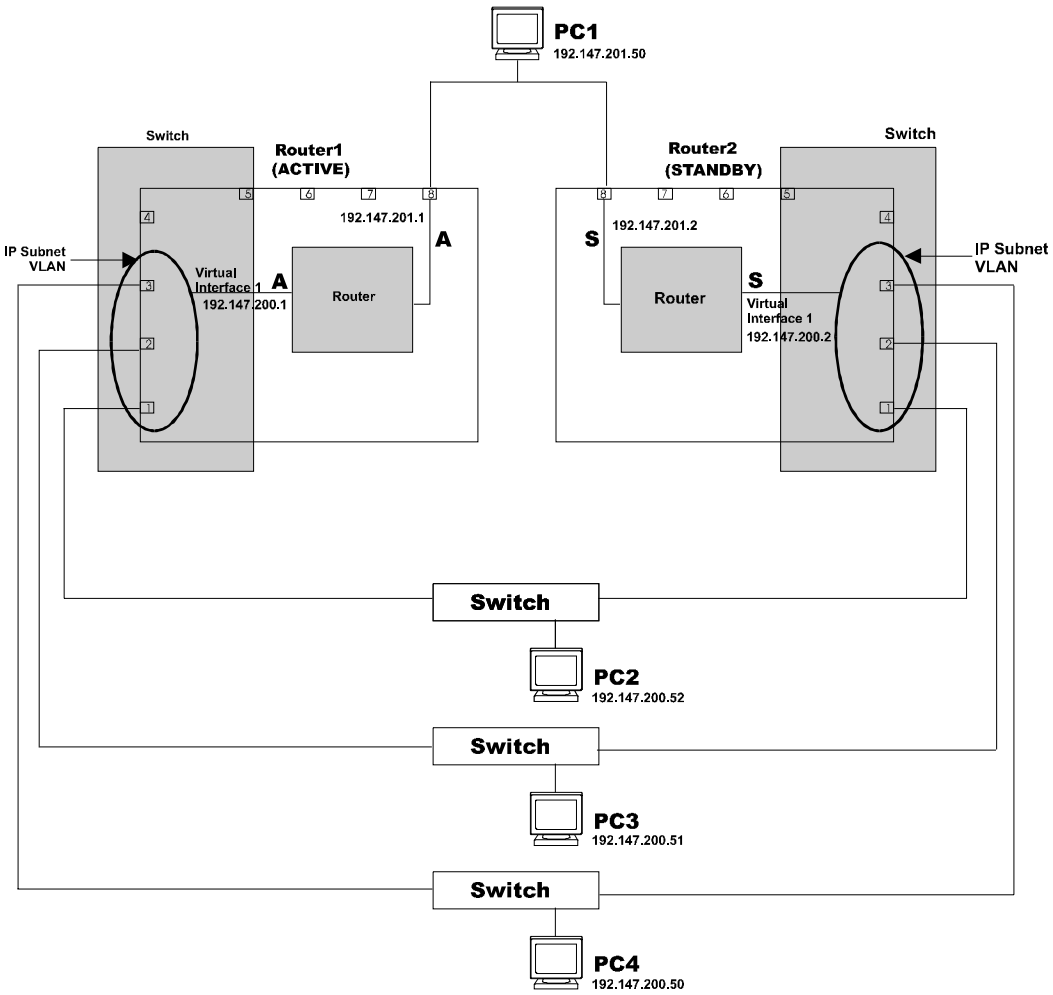


**Figure 11.7 Configuring SRP on virtual interfaces**

### *Configuring Multiple Track Ports for Virtual Interfaces*

In **Figure 11.7**, Router 1 is the active router and Router2 the standby router for all active SRP interfaces. A user wants Router1 to go into the SRP standby state and establish Router2 as the active router, should ports 1, 2, 3 or 8 on Router1 go down. To do so, the user must configure track ports for ports 1, 2, 3 and 8 on Router1.

In preparation for track port configuration on Router1, the user would do the following:

1. Configure an IP sub-net VLAN with port membership of 1, 2 and 3 on Router1
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 (slot 2) routing switches, the user 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 e 2/1 to 2/3
HP9300(config-vlan-ip-subnet)# router-int ve 1
```

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

```
HP9300(config)# int ve 1
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 2/1 2/2 2/3 2/8
```

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

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

**NOTE:** After the user configures track ports for Router1, he or she should configure HP 9304M2 similarly. This will ensure that if Router2 becomes the active router, it will have assigned track ports that support transfer to a SRP standby state.

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

**USING THE WEB MANAGEMENT INTERFACE**

The user selects multiple track ports for SRP on the SRP configuration sheet.