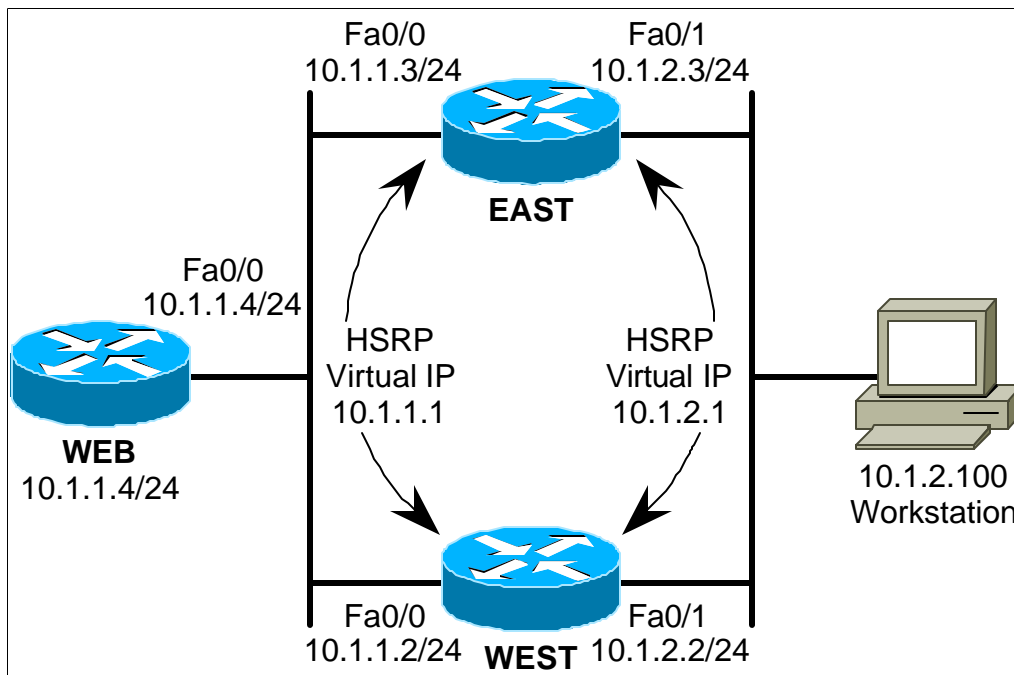


## Lab 8.2.2: HSRP – Hot Standby Routing Protocol



### Objective:

Configure HSRP on a pair of routers to provide redundant router services to a network.

### Scenario:

You have two routers connected to your network. As you will see, having two default gateways does not provide a very reliable path in the event of an outage. Configure your two routers to provide hot standby access to networks. This will allow the web server and workstation to have access to a reliable router in the event of a failure.

### Lab Tasks:

1. Cable the lab as shown in the diagram.
2. Configure the Web router to act as a web server. Configure the router with a username/password and enable http management services.

```
Router(config)#host Web
Web(config)#int fa0/0
Web(config-if)#ip address 10.1.1.4 255.255.255.0
Web(config-if)#no shutdown
Web(config-if)#line vty 0 4
Web(config-line)#login
Web(config-line)#password cisco
Web(config-line)#enable password class
Web(config)#ip http enable
```

3. Next, configure the East and West routers.

```
Router(config)#host West
West(config)#int fa0/0
West(config-if)#ip address 10.1.1.2 255.255.255.0
West(config-if)#no shutdown
West(config-if)#int fa0/1
West(config-if)#ip address 10.1.2.2 255.255.255.0
West(config-if)#no shutdown
West(config-if)#line vty 0 4
West(config-line)#login
West(config-line)#password cisco
West(config-line)#enable password class
```

```
Router(config)#host East
East(config)#int fa0/0
East(config-if)#ip address 10.1.1.3 255.255.255.0
East(config-if)#no shutdown
East(config-if)#int fa0/1
East(config-if)#ip address 10.1.2.3 255.255.255.0
East(config-if)#no shutdown
East(config-if)#line vty 0 4
East(config-line)#login
East(config-line)#password cisco
East(config-line)#enable password class
```

4. There are only two routers involved and they are both connected to the same network. A routing protocol is not needed. Each router has knowledge of all networks in the network. IP Routing will need to be enabled on all routers.

We will now specify the default gateways for both the workstation and the Web server/router so that they know how to connect to their destination network. There are two routers present on each network. We will specify both routers as possible default routers.

On the workstation:

Configure your workstation with the IP address 10.1.2.100 and a netmask of 255.255.255.0. Use the two default gateways: 10.1.2.2 and 10.1.2.3.

On the Web router, configure the default gateways 10.1.1.2 and 10.1.1.3:

```
Web(config)#ip route 0.0.0.0 0.0.0.0 10.1.1.2
Web(config)#ip route 0.0.0.0 0.0.0.0 10.1.1.3
```

5. You should now be able to ping the Web server/router 10.1.1.4 from your workstation.

Are you able to ping successfully?

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If not, troubleshoot your configurations to determine where the problem is and correct it. You may need to reset switches used in previous labs back to factory defaults.

6. Once you are able to successfully ping the Web server/router, unplug both of the Ethernet cables from the East router.

Now try to ping again, what happens?

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Why is this happening?

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Plug your Ethernet cables back into the East router.

Wait a few seconds – it may take some time for the Ethernet ports to complete the spanning tree process if you do not have port fast configured on them.

Try your ping again. Does it work now?

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7. This is where HSRP (Hot Standby Routing Protocol) would be a perfect solution.

We currently have two IP addresses on each network used by the routers – one IP address for each router. We will create a third virtual IP address that will “float” between the routers in the event one of the routers fail. We will use the 10.1.x.1 address on each of the networks for the HSRP address.

We turn on HSRP using the **standby ip** command at the interface level.

Turn on HSRP on the 10.1.1.0 network.

```
West(config)#int fa0/0  
West(config)#standby ip 10.1.1.1
```

```
East(config)#int fa0/0  
East(config)#standby ip 10.1.1.1
```

Turn on HSRP on the 10.1.2.0 network.

```
West(config)#int fa0/1  
West(config)#standby ip 10.1.2.1
```

```
East(config)#int fa0/1  
East(config)#standby ip 10.1.2.1
```

8. Now reconfigure your workstation and Web router to remove the current default routes/gateways and install just a single default route/gateway for the HSRP addresses.

On the Web router:

```
Web(config)#no ip route 0.0.0.0 0.0.0.0 10.1.1.2
Web(config)#no ip route 0.0.0.0 0.0.0.0 10.1.1.3
```

```
Web(config)#ip route 0.0.0.0 0.0.0.0 10.1.1.1
```

On your workstation, remove 10.1.2.2 and 10.1.2.3 default gateways and replace them with 10.1.2.1.

9. Now try to ping the Web router at 10.1.1.4.

Can you ping?

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If you can't ping, you should go back and troubleshoot your configuration.

10. From the workstation connect to the console port of your current Standby HSRP router so you can watch the state changes from standby to active as the Active router is disconnected. Do an extended ping on the Web router (10.1.1.4) from the workstation with the following DOS command: `Ping -n 100 10.1.1.4`  
After the pings begin, remove the Ethernet cables from the Active router and observe results. Compare the Active/Standby changes on the hyperterminal screen with the ping results as you disconnect and reconnect the East and West routers.

What do you observe?

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11. Now do a **show standby** command:

```
West#sh standby
FastEthernet0/0 - Group 0
  Local state is Active, priority 100
  Hellotime 3 holdtime 10
  Next hello sent in 00:00:00.630
  Hot standby IP address is 10.1.1.1 configured
  Active router is local
  Standby router is 10.1.1.3 expires in 00:00:09
  Standby virtual mac address is 0000.0c07.ac00
FastEthernet0/1 - Group 0
  Local state is Standby, priority 100
  Hellotime 3 holdtime 10
  Next hello sent in 00:00:01.542
  Hot standby IP address is 10.1.2.1 configured
  Active router is 10.1.2.3 expires in 00:00:08
  Standby router is local
  Standby virtual mac address is 0000.0c07.ac00
```

Notice that HSRP creates a standby virtual mac address that is the same for all interfaces. Why does it need to do this?

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The mac addresses are the same on all interfaces of the router, how can that be? We can't have duplicate mac addresses.

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12. Now set up the West router to become the dominant HSRP router by configuring a higher priority on the West than the East router (remember the default priority is 100) and by also configuring the preempt command:

```
West(config)#int fa0/0
West(config-if)#standby priority 150 preempt
```

```
West(config)#int fa0/1
West(config-if)#standby priority 150 preempt
```

13. Do a **show standby** and a **show standby brief** command on the West router to verify that it is the dominant HSRP router.

```
West#show standby brief
```

**P** indicates configured to preempt.

Interface	Grp	Prio	P	State	Active addr	Standby addr	Group addr
Fa0/0	0	150	P	Active	local	10.1.1.3	10.1.1.1
Fa0/1	0	150	P	Active	local	10.1.2.3	10.1.2.1

```
West#show standby
```

```
FastEthernet0/0 - Group 0
  Local state is Active, priority 150, may preempt
  Hello time 3 hold time 10
  Next hello sent in 00:00:01.944
  Hot standby IP address is 10.1.1.1 configured
  Active router is local
    Standby router is 10.1.1.3 expires in 00:00:08
    Standby virtual mac address is 0000.0c07.ac00
FastEthernet0/1 - Group 0
  Local state is Active, priority 150, may preempt
  Hello time 3 hold time 10
  Next hello sent in 00:00:02.052
  Hot standby IP address is 10.1.2.1 configured
  Active router is local
    Standby router is 10.1.2.3 expires in 00:00:09
```

Standby virtual mac address is 0000.0c07.ac00

14. Connect to the console port of the West router so you can watch the state changes as it is disconnected and reconnected to the network.

**Disconnect West router:**

```
09:26:26:%STANDBY-6-STATECHANGE: Standby: 0: FastEthernet0/0 state Active-> Init
09:26:26:%STANDBY-6-STATECHANGE: Standby: 0: FastEthernet0/1 state Active-> Init
```

**Reconnect West router:**

```
09:26:57: %STANDBY-6-STATECHANGE: Standby: 0: FastEthernet0/0 state Listen->
Active
09:26:57: %STANDBY-6-STATECHANGE: Standby: 0: FastEthernet0/1 state Listen->
Active
```

Does it become the active HSRP router as soon as it is reconnected?

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What do the Priority and Preempt commands allow a Network Administrator to do?

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