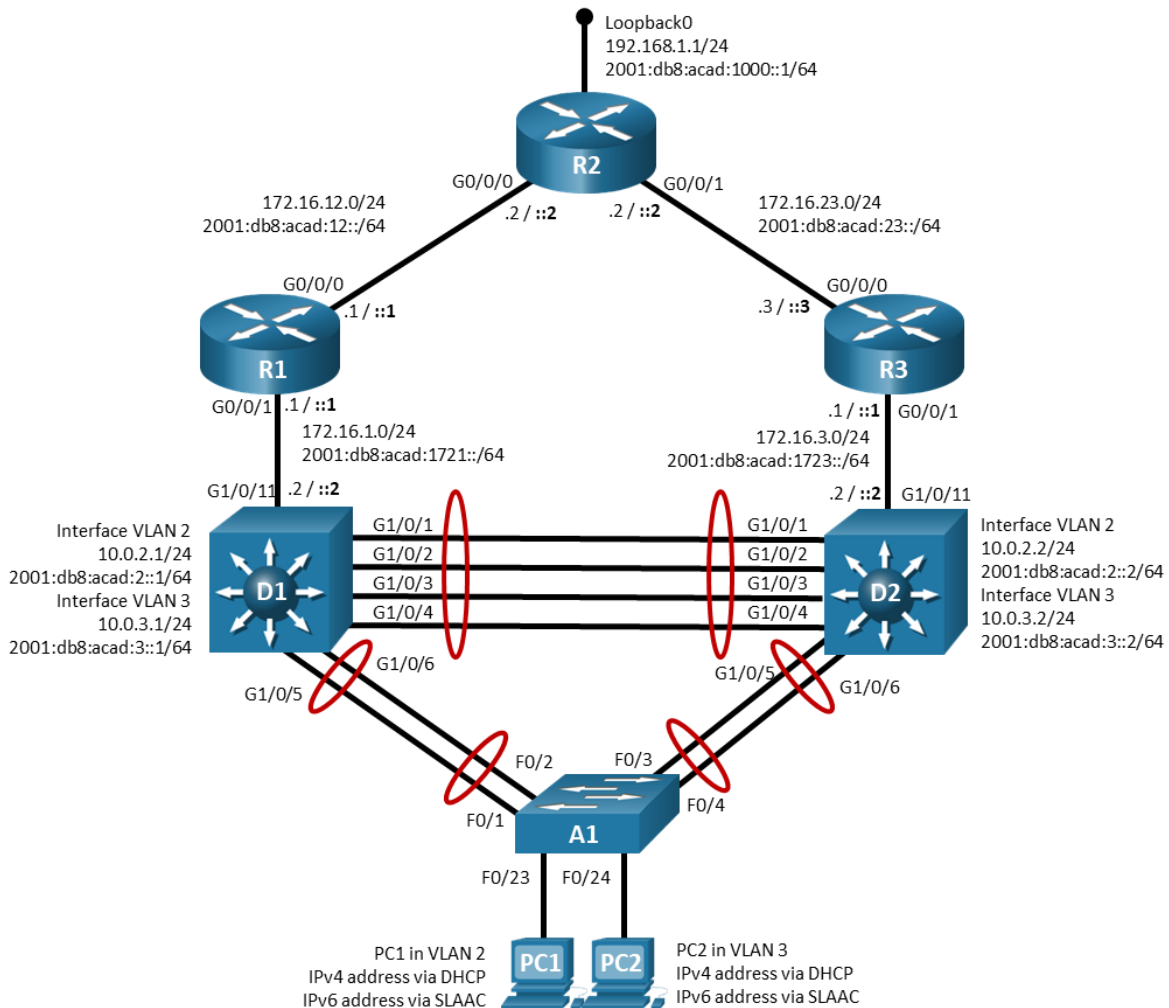


Lab - Implement IP SLA (Instructor Version)

Instructor Note: Red font color or gray highlights indicate text that appears in the instructor copy only.

Answers: [24.1.6 Lab - Implement IP SLA](#)

Topology



Addressing Table

Device	Interface	IPv4 Address/Mask	IPv6 Address/Prefix	IPv6 Link Local
R1	G0/0/0	172.16.12.1/24	2001:db8:acad:12::1/64	fe80::1:1
	G0/0/1	172.16.1.1/24	2001:db8:acad:1721::1/64	fe80::1:2
R2	G0/0/0	172.16.12.2/24	2001:db8:acad:12::2/64	fe80::2:1

Device	Interface	IPv4 Address/Mask	IPv6 Address/Prefix	IPv6 Link Local
	G0/0/1	172.16.24.2/24	2001:db8:acad:23::2/64	fe80::2:2
	Loopback 0	192.168.1.1/24	2001:db8:acad:1000::1/64	fe80::2:3
R3	G0/0/0	172.16.23.3/24	2001:db8:acad:23::3/64	fe80::3:1
	G0/0/1	172.16.3.1/24	2001:db8:acad:1723::1/64	fe80::3:2
D1	G1/0/11	172.16.1.2/24	2001:db8:acad:1721::2/64	fe80::d1:1
	VLAN 2	10.0.2.1/24	2001:db8:acad:2::1/64	fe80::d1:2
	VLAN 3	10.0.3.1/24	2001:db8:acad:3::1/64	fe80::d1:3
D2	G1/0/11	172.16.3.2/24	2001:db8:acad:23::3/64	fe80::d2:1
	VLAN 2	10.0.2.2/24	2001:db8:acad:2::2/64	fe80::d2:2
	VLAN 3	10.0.3.2/24	2001:db8:acad:3::2/64	fe80::d2:3
A1	VLAN 2	10.0.2.3/24	2001:db8:acad:2::3/64	fe80::a1:1
PC 1	NIC	DHCP	SLAAC	EUI-64
PC 2	NIC	DHCP	SLAAC	EUI-64

Objectives

Part 1: Build the Network and Configure Basic Device Settings

Part 2: Configure and Observe IP SLA Operations

Part 3: Configure and Observe HSRP IP SLA Tracking

Background / Scenario

Cisco IP service level agreements (SLAs) allow users to monitor network performance between Cisco devices (switches or routers), or from a Cisco device to a remote IP device. Cisco IP SLAs can be applied to VoIP and video applications as well as monitoring end-to-end IP network performance.

Note: This lab is an exercise in deploying and verifying IP SLAs and does not necessarily reflect networking best practices. The IP SLA itself is an additional task that must be performed by the switch CPU. A large number of intensive SLAs could create a significant burden on the CPU, possibly interfering with other switch functions and having detrimental impact on the overall device performance. Therefore, you should carefully evaluate the benefits of running IP SLAs. The CPU load should be monitored after the SLAs are deployed to verify that they do not stress the device's CPU above safe limits.

Note: The routers used with CCNP hands-on labs are Cisco 4221 with Cisco IOS XE Release 16.9.4 (universalk9 image). The switches used in the labs are Cisco Catalyst 3650s with Cisco IOS XE Release 16.9.4 (universalk9 image) and Cisco Catalyst 2960s with Cisco IOS Release 15.2(2) (lanbasek9 image). Other routers, switches, and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and the output produced might vary from what is shown in the labs. Refer to the Router Interface Summary Table at the end of the lab for the correct interface identifiers.

Note: Make sure that the switches have been erased and have no startup configurations. If you are unsure, contact your instructor.

Note: The default Switch Database Manager (SDM) template on a Catalyst 2960 does not support IPv6. You must change the default SDM template to the dual-ipv4-and-ipv6 default template using the **sdm prefer dual-ipv4-and-ipv6 default** global configuration command. Changing the template will require a reboot.

Instructor Note: Refer to the Instructor Lab Manual for the procedures to initialize and reload devices

Required Resources

- 2 Routers (Cisco 4221 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 2 Switches (Cisco 3650 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 1 Switch (Cisco 2960 with Cisco IOS Release 15.2(2) lanbasek9 image or comparable)
- 1 PC (Choice of operating system with a terminal emulation program installed)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

Instructions

Part 1: Build the Network and Configure Basic Device Settings and Interface Addressing

In Part 1, you will set up the network topology and configure basic settings and interface addressing.

Step 1: Cable the network as shown in the topology.

Attach the devices as shown in the topology diagram, and cable as necessary.

Step 2: Configure basic settings for each switch.

- a. Console into each switch, enter global configuration mode, and apply the basic settings. The startup configurations for each device are provided below.

Router R1

```
hostname R1
ipv6 unicast-routing
no ip domain lookup
banner motd # R1, Implement IP SLA #
line con 0
  exec-timeout 0 0
  logging synchronous
  exit
line vty 0 4
  privilege level 15
  password cisco123
  exec-timeout 0 0
  logging synchronous
  login
  exit
interface g0/0/0
  ip address 172.16.12.1 255.255.255.0
  ipv6 address fe80::1:1 link-local
  ipv6 address 2001:db8:acad:12::1/64
  no shutdown
```

```
exit
interface g0/0/1
 ip address 172.16.1.1 255.255.255.0
 ipv6 address fe80::1:2 link-local
 ipv6 address 2001:db8:acad:1721::1/64
 no shutdown
exit
router ospf 4
 router-id 1.1.1.4
 network 172.16.0.0 0.0.255.255 area 0
exit
ipv6 router ospf 6
 router-id 1.1.1.6
exit
interface g0/0/0
 ipv6 ospf 6 area 0
exit
interface g0/0/1
 ipv6 ospf 6 area 0
exit
end
```

Router R2

```
hostname R2
ipv6 unicast-routing
no ip domain lookup
banner motd # R2, Implement IP SLA #
line con 0
 exec-timeout 0 0
 logging synchronous
exit
line vty 0 4
 privilege level 15
 password cisco123
 exec-timeout 0 0
 logging synchronous
 login
exit
interface g0/0/1
 ip address 172.16.23.2 255.255.255.0
 ipv6 address fe80::2:1 link-local
 ipv6 address 2001:db8:acad:23::2/64
 no shutdown
exit
interface g0/0/0
 ip address 172.16.12.2 255.255.255.0
```

```
ipv6 address fe80::2:2 link-local
ipv6 address 2001:db8:acad:12::2/64
no shutdown
exit
interface loopback 0
ip address 192.168.1.1 255.255.255.0
ipv6 address fe80::2:3 link-local
ipv6 address 2001:db8:acad:1000::1/64
ip ospf network point-to-point
ipv6 ospf network point-to-point
no shutdown
exit
router ospf 4
router-id 2.2.2.4
network 172.16.0.0 0.0.255.255 area 0
network 192.168.1.0 0.0.0.255 area 0
exit
ipv6 router ospf 6
router-id 2.2.2.6
exit
interface g0/0/0
ipv6 ospf 6 area 0
exit
interface g0/0/1
ipv6 ospf 6 area 0
exit
interface Loopback 0
ipv6 ospf 6 area 0
exit
end
```

Router R3

```
hostname R3
ipv6 unicast-routing
no ip domain lookup
banner motd # R3, Implement IP SLA #
line con 0
exec-timeout 0 0
logging synchronous
exit
line vty 0 4
privilege level 15
password cisco123
exec-timeout 0 0
logging synchronous
login
```

Lab - Implement IP SLA

```
exit
interface g0/0/0
 ip address 172.16.23.3 255.255.255.0
 ipv6 address fe80::3:1 link-local
 ipv6 address 2001:db8:acad:23::3/64
 no shutdown
exit
interface g0/0/1
 ip address 172.16.3.1 255.255.255.0
 ipv6 address fe80::3:2 link-local
 ipv6 address 2001:db8:acad:1723::1/64
 no shutdown
exit
router ospf 4
 router-id 3.3.3.4
 network 172.16.0.0 0.0.255.255 area 0
exit
ipv6 router ospf 6
 router-id 3.3.3.6
exit
interface g0/0/0
 ipv6 ospf 6 area 0
exit
interface g0/0/1
 ipv6 ospf 6 area 0
exit
end
```

Switch D1

```
hostname D1
ip routing
ipv6 unicast-routing
no ip domain lookup
banner motd # D1, Implement IP SLA #
line con 0
 exec-timeout 0 0
 logging synchronous
exit
line vty 0 4
 privilege level 15
 password cisco123
 exec-timeout 0 0
 logging synchronous
 login
exit
interface range g1/0/1-24, g1/1/1-4, g0/0
```

```
shutdown
exit
interface range g1/0/1-6
  switchport mode trunk
  no shutdown
exit
interface range g1/0/1-4
  channel-group 12 mode active
exit
interface range g1/0/5-6
  channel-group 1 mode active
exit
interface g1/0/11
  no switchport
  ip address 172.16.1.2 255.255.255.0
  ipv6 address fe80::d1:1 link-local
  ipv6 address 2001:db8:acad:1721::2/64
  no shutdown
exit
vlan 2
  name SECOND_VLAN
exit
vlan 3
  name THIRD_VLAN
exit
spanning-tree vlan 2 root primary
spanning-tree vlan 3 root secondary
interface vlan 2
  ip address 10.0.2.1 255.255.255.0
  ipv6 address fe80::d1:2 link-local
  ipv6 address 2001:db8:acad:2::1/64
  no shutdown
exit
interface vlan 3
  ip address 10.0.3.1 255.255.255.0
  ipv6 address fe80::d1:3 link-local
  ipv6 address 2001:db8:acad:3::1/64
  no shutdown
exit
interface vlan 2
  standby version 2
  standby 2 ip 10.0.2.254
  standby 2 priority 150
  standby 2 preempt
  standby 26 ipv6 autoconfig
```

```
standby 26 priority 150
standby 26 preempt
exit
interface vlan 3
standby version 2
standby 3 ip 10.0.3.254
standby 3 preempt
standby 36 ipv6 autoconfig
standby 36 preempt
exit
router ospf 4
router-id 0.13.1.4
network 172.16.1.0 0.0.0.255 area 0
network 10.0.0.0 0.0.255.255 area 0
passive-interface vlan 2
passive-interface vlan 3
exit
ipv6 router ospf 6
router-id 0.13.1.6
passive-interface vlan 2
passive-interface vlan 3
exit
interface g1/0/11
ipv6 ospf 6 area 0
exit
interface vlan 2
ipv6 ospf 6 area 0
exit
interface vlan 3
ipv6 ospf 6 area 0
exit
ip dhcp excluded-address 10.0.2.1 10.0.2.5
ip dhcp excluded-address 10.0.2.128 10.0.2.254
ip dhcp pool SECOND_VLAN_DHCP_POOL
network 10.0.2.0 255.255.255.0
default-router 10.0.2.254
exit
ip dhcp excluded-address 10.0.3.1 10.0.3.128
ip dhcp excluded-address 10.0.3.254
ip dhcp pool THIRD_VLAN_DHCP_POOL
network 10.0.3.0 255.255.255.0
default-router 10.0.3.254
exit
end
```

Switch D2

Lab - Implement IP SLA

```
hostname D2
ip routing
ipv6 unicast-routing
no ip domain lookup
banner motd # D2, Implement IP SLA #
line con 0
  exec-timeout 0 0
  logging synchronous
  exit
line vty 0 4
  privilege level 15
  password cisco123
  exec-timeout 0 0
  logging synchronous
  login
  exit
interface range g1/0/1-24, g1/1/1-4, g0/0
  shutdown
  exit
interface range g1/0/1-6
  switchport mode trunk
  no shutdown
  exit
interface range g1/0/1-4
  channel-group 12 mode active
  exit
interface range g1/0/5-6
  channel-group 2 mode active
  exit
interface g1/0/11
  no switchport
  ip address 172.16.3.2 255.255.255.0
  ipv6 address fe80::d2:1 link-local
  ipv6 address 2001:db8:acad:1723::2/64
  no shutdown
  exit
vlan 2
  name SECOND_VLAN
  exit
vlan 3
  name THIRD_VLAN
  exit
spanning-tree vlan 2 root secondary
spanning-tree vlan 3 root primary
interface vlan 2
```

Lab - Implement IP SLA

```
ip address 10.0.2.2 255.255.255.0
ipv6 address fe80::d2:2 link-local
ipv6 address 2001:db8:acad:2::2/64
no shutdown
exit
interface vlan 3
ip address 10.0.3.2 255.255.255.0
ipv6 address fe80::d2:3 link-local
ipv6 address 2001:db8:acad:3::2/64
no shutdown
exit
interface vlan 2
standby version 2
standby 2 ip 10.0.2.254
standby 2 preempt
standby 26 ipv6 autoconfig
standby 26 preempt
exit
interface vlan 3
standby version 2
standby 3 ip 10.0.3.254
standby 3 priority 150
standby 3 preempt
standby 36 ipv6 autoconfig
standby 36 priority 150
standby 36 preempt
exit
router ospf 4
router-id 0.13.2.4
network 172.16.3.0 0.0.0.255 area 0
network 10.0.0.0 0.0.255.255 area 0
passive-interface vlan 2
passive-interface vlan 3
exit
ipv6 router ospf 6
router-id 0.13.2.6
passive-interface vlan 2
passive-interface vlan 3
exit
interface g1/0/11
ipv6 ospf 6 area 0
exit
interface vlan 2
ipv6 ospf 6 area 0
exit
```

Lab - Implement IP SLA

```
interface vlan 3
  ipv6 ospf 6 area 0
  exit
ip dhcp excluded-address 10.0.2.1 10.0.2.128
ip dhcp excluded-address 10.0.2.254
ip dhcp pool SECOND_VLAN_DHCP_POOL
  network 10.0.2.0 255.255.255.0
  default-router 10.0.2.254
  exit
ip dhcp excluded-address 10.0.3.1 10.0.3.5
ip dhcp excluded-address 10.0.3.128 10.0.3.254
ip dhcp pool THIRD_VLAN_DHCP_POOL
  network 10.0.3.0 255.255.255.0
  default-router 10.0.3.254
  exit
end
```

Switch A1

```
hostname A1
no ip domain lookup
banner motd # A1, Implement IP SLA #
line con 0
  exec-timeout 0 0
  logging synchronous
  exit
line vty 0 4
  privilege level 15
  password cisco123
  exec-timeout 0 0
  logging synchronous
  login
  exit
interface range f0/1-24, g0/1-2
  shutdown
  exit
interface range f0/1-4
  switchport mode trunk
  no shutdown
  exit
interface range f0/1-2
  channel-group 1 mode active
  exit
interface range f0/3-4
  channel-group 2 mode active
  exit
vlan 2
```

```
name SECOND_VLAN
exit
vlan 3
name THIRD_VLAN
exit
interface f0/23
switchport mode access
switchport access vlan 2
spanning-tree portfast
no shutdown
exit
interface f0/24
switchport mode access
switchport access vlan 3
spanning-tree portfast
no shutdown
exit
interface vlan 2
ip address 10.0.2.3 255.255.255.0
ipv6 address fe80::a1:1 link-local
ipv6 address 2001:db8:acad:2::3/64
no shutdown
exit
ip default-gateway 10.0.2.254
end
```

- b. Set the clock on each switch to UTC time.
- c. Save the running configuration to startup-config.

Step 3: Configure the PCs for network connectivity.

Configure PC1 and PC2 for DHCP and SLAAC.

Part 2: Configure and Observe IP SLA Operations

In Part 2 you will configure and observe IP SLA operations. The SLA itself is simply a testing mechanism. Our example will test for simple reachability with an ICMP echo, but SLAs can do a lot more with many other protocols.

For now, all you will do is configure and schedule the IP SLAs and then query their status. This way you see the SLA operation separate from any application it might be used for.

Step 1: Create IP SLAs on switch D1.

- a. Create IP SLA 4 using the command **ip sla 4**. The number 4 is locally significant and could be any number between 1 and 2147483647.

```
D1(config)# ip sla 4
```

- b. Configure IP SLA 4 to send an icmp-echo to the IPv4 address 192.168.1.1 and set the frequency for the ping to be every 15 seconds.

```
D1(config-ip-sla)# icmp-echo 192.168.1.1
```

Lab - Implement IP SLA

```
D1(config-ip-sla-echo)# frequency 15
D1(config-ip-sla-echo)# exit
```

- c. Create IP SLA 6.

```
D1(config)# ip sla 6
```

- d. Configure IP SLA 6 to send an icmp-echo to the IPv4 address 2001:db8:acad:1000::1 and set the frequency for the ping to be every 15 seconds.

```
D1(config-ip-sla)# icmp-echo 2001:db8:acad:1000::1
D1(config-ip-sla-echo)# frequency 15
D1(config-ip-sla-echo)# exit
```

- e. Use the **ip sla schedule** command to configure both SLA 4 and SLA 6 with a life of forever and to start immediately.

```
D1(config)# ip sla schedule 4 life forever start-time now
D1(config)# ip sla schedule 6 life forever start-time now
```

Step 2: Observe IP SLA operation.

- a. Issue the command **show ip sla summary** to see a summarized status of the SLAs now that you have scheduled them.

```
D1# show ip sla summary
IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending
All Stats are in milliseconds. Stats with u are in microseconds
```

ID	Type	Destination	Stats	Return Code	Last Run
*4	icmp-echo	192.168.1.1	RTT=2	OK	12 seconds ago
*6	icmp-echo	2001:DB8:ACAD:1000::1	RTT=1	OK	12 seconds ago

- b. To test and see what response the SLAs give in a failure, issue the **shutdown** command on R1 interface G0/0/0, then issue the **show ip sla summary** command again.

```
D1# show ip sla summary
IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending
All Stats are in milliseconds. Stats with u are in microseconds
```

ID	Type	Destination	Stats	Return Code	Last Run
*4	icmp-echo	192.168.1.1	-	Timeout	8 seconds ago

```
*6          icmp-echo    2001:DB8:ACAD:100 -      Timeout      8 seconds ago
          0::1
```

- c. Issue the command **show ip sla configuration 4** to see details on IP SLA 4.

```
D1# show ip sla configuration 4
IP SLAs Infrastructure Engine-III
Entry number: 4
Owner:
Tag:
Operation timeout (milliseconds): 5000
Type of operation to perform: icmp-echo
Target address/Source address: 192.168.1.1/0.0.0.0
Type Of Service parameter: 0x0
Request size (ARR data portion): 28
Data pattern: 0xABCDABCD
Verify data: No
Vrf Name:
Schedule:
  Operation frequency (seconds): 15 (not considered if randomly scheduled)
  Next Scheduled Start Time: Start Time already passed
  Group Scheduled : FALSE
  Randomly Scheduled : FALSE
  Life (seconds): Forever
  Entry Ageout (seconds): never
  Recurring (Starting Everyday): FALSE
  Status of entry (SNMP RowStatus): Active
Threshold (milliseconds): 5000
Distribution Statistics:
  Number of statistic hours kept: 2
  Number of statistic distribution buckets kept: 1
  Statistic distribution interval (milliseconds): 20
Enhanced History:
History Statistics:
  Number of history Lives kept: 0
  Number of history Buckets kept: 15
  History Filter Type: None
```

- d. Issue the command **show ip sla statistics 4** to examine statistical information on this IP SLA.

```
D1# show ip sla statistics 4
IPSLAs Latest Operation Statistics

IPSLA operation id: 4
  Latest RTT: NoConnection/Busy/Timeout
Latest operation start time: 19:04:46 UTC Fri Feb 7 2020
Latest operation return code: Timeout
Number of successes: 14
Number of failures: 7
Operation time to live: Forever
```

- e. Issue the **no shutdown** command on R1 interface G0/0/0.

- f. Configure the same IP SLAs on Switch D2. Verify them in the same manner, issuing the **shutdown** command on R3 interface G0/0/0. When you have verified that SLA is tracking reachability to R2 interface Loopback 0, issue the **no shutdown** command on R3 interface G0/0/0.

Part 3: Configure and Observe HSRP IP SLA Tracking

In this part, we will put the IP SLAs that you created into use, and you can see how they work. In this case, our network is operational and HSRP is providing first-hop redundancy. HSRP will react to a directly connected interface that is failing or coming online, as you saw in the tracking section of the HSRP lab. But what if there is an indirect link failure that makes the active HSRP router less desirable? The IP SLA will allow us to handle this scenario. For this example, we will treat R2 interface Loopback 0 as a critical entity on the internet, like a DNS server. The organizational policy is that if that DNS server is not reachable from the gateway, the gateway should not be used.

Step 1: Verify HSRPv2 is operational.

- a. Verify that HSRP is active and operating on Switch D1 with the **show standby brief** command.

```
D1# show standby brief
          P indicates configured to preempt.
          |
Interface  Grp  Pri P State  Active           Standby           Virtual IP
V12        2    150 P Active local          10.0.2.2          10.0.2.254
V12        26   150 P Active local          FE80::D2:2       FE80::5:73FF:FEA0:1A
V13        3    100 P Standby 10.0.3.2        local             10.0.3.254
V13        36   100 P Standby FE80::D2:3      local             FE80::5:73FF:FEA0:24
```

As you can see from the output, switch D1 is the active virtual router for VLAN 2 and the standby for VLAN 3 for both IPv4 and IPv6.

- b. From PC1, start a continuous ping to 192.168.1.1.
- c. On D1, issue the **shutdown** command on interface VLAN 2. You should see that HSRP fails over to D2 as the Active Virtual Router for VLAN 2, and the pings continue to succeed. When verified, issue the **no shutdown** command on switch D1 interface VLAN 2.
- d. From PC2, start a continuous ping to 192.168.1.1.
- e. On D2, issue the **shutdown** command on interface VLAN 3. You should see that HSRP fails over to D1 as the Active Virtual Router for VLAN 3, and the pings continue to succeed. When verified, issue the **no shutdown** command on switch D2 interface VLAN 3.
- f. Now issue the **shutdown** command on R1 interface G0/0/0 and R3 interface G0/0/0. Note that there is no impact on either D1 or D2 regarding HSRP, and the pings start failing. Stop the continuous pings on PC1 and PC2 and issue the **no shutdown** command on R1 interface G0/0/0 and R3 interface G0/0/0.

Step 2: Reconfigure HSRP to use the IP SLA.

- a. Create a track object using the command **track [number] ip sla [sla number]**.

```
D1(config)# track 4 ip sla 4
```

- b. Set the delay timers. These are used to help manage changes on flapping links. In this case, R2 interface Loopback 0 is known to D1 and D2 via OSPF, so the delay needs to take OSPF timers into account. The command is setting the SLA up so that it will wait a period of time after the first failed SLA to make sure it is actually down, and it will wait a period of time after it appears to be returned to operation to be sure it is actually operating.

```
D1(config-track)# delay down 45 up 20
D1(config-track)# exit
```

- c. Configure track 6 to pay attention to IP SLA 6 with the same delay values.

```
D1(config)# track 6 ip sla 6
D1(config-track)# delay down 45 up 20
D1(config-track)# exit
```

- d. Now that the IP SLAs are being tracked, we must associate the status of the track with the HSRP group. This is done on the VLAN interface using the **standby [group] track [track number]** command. As a part of that command, add a decrement value, which will drop the interface's HSRP priority should the IP SLA fail.

```
D1(config)# interface vlan 2
D1(config-if)# standby 2 track 4 decrement 60
D1(config-if)# standby 26 track 4 decrement 60
D1(config-if)# exit
D1(config)# interface vlan 3
D1(config-if)# standby 3 track 4 decrement 60
D1(config-if)# standby 36 track 4 decrement 60
D1(config-if)# exit
```

- e. Repeat the same commands on D2 so that HSRP is tracking IP SLAs there as well.

```
D2(config)# track 4 ip sla 4
D2(config-track)# delay down 45 up 20
D2(config-track)# exit
D2(config)# track 6 ip sla 6
D2(config-track)# delay down 45 up 20
D2(config-track)# exit
D2(config)# interface vlan 2
D2(config-if)# standby 2 track 4 decrement 60
D2(config-if)# standby 26 track 4 decrement 60
D2(config-if)# exit
D2(config)# interface vlan 3
D2(config-if)# standby 3 track 4 decrement 60
D2(config-if)# standby 36 track 4 decrement 60
D2(config-if)# exit
```

Step 3: Observe and validate HSRPv2 operation with IP SLAs.

- On PC1, start a continuous ping to 192.168.1.1.
- On R1, shutdown interface G0/0/0.
- After about 45 seconds, you should see that HSRP fails over for VLAN 2 from switch D1 to switch D2, and pings from PC1 work again.
- Issue the **no shutdown** command on R1 interface G0/0/0.
- Switch D1 takes over again as the Active Virtual Router for VLAN 2, and the host is still able to ping 192.168.1.1.
- Stop the continuous ping running on PC1.

Router Interface Summary Table

Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
1800	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
1900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2801	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
2811	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
4221	Gigabit Ethernet 0/0/0 (G0/0/0)	Gigabit Ethernet 0/0/1 (G0/0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
4300	Gigabit Ethernet 0/0/0 (G0/0/0)	Gigabit Ethernet 0/0/1 (G0/0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)

Note: To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface.

Device Configs - Final

Router R1

```
R1# show run
```

```
Building configuration...
```

```
Current configuration : 1592 bytes
```

```
!
version 16.9
service timestamps debug datetime msec
service timestamps log datetime msec
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname R1
!
boot-start-marker
boot-end-marker
!
no aaa new-model
!
```

Lab - Implement IP SLA

```
no ip domain lookup
!
login on-success log
!
subscriber templating
!
ipv6 unicast-routing
multilink bundle-name authenticated
!
spanning-tree extend system-id
!
redundancy
mode none
!
interface GigabitEthernet0/0/0
 ip address 172.16.12.1 255.255.255.0
 negotiation auto
 ipv6 address FE80::1:1 link-local
 ipv6 address 2001:DB8:ACAD:12::1/64
 ipv6 ospf 6 area 0
!
interface GigabitEthernet0/0/1
 ip address 172.16.1.1 255.255.255.0
 negotiation auto
 ipv6 address FE80::1:2 link-local
 ipv6 address 2001:DB8:ACAD:1721::1/64
 ipv6 ospf 6 area 0
!
interface Serial0/1/0
 no ip address
!
interface Serial0/1/1
 no ip address
!
router ospf 4
 router-id 1.1.1.4
 network 172.16.0.0 0.0.255.255 area 0
!
ip forward-protocol nd
no ip http server
ip http secure-server
!
ipv6 router ospf 6
 router-id 1.1.1.6
!
control-plane
!
banner motd ^C R1, Implement IP SLA ^C
!
line con 0
```

Lab - Implement IP SLA

```
exec-timeout 0 0
logging synchronous
transport input none
stopbits 1
line aux 0
  stopbits 1
line vty 0 4
  exec-timeout 0 0
  privilege level 15
  password cisco123
  logging synchronous
  login
!
```

Router R2

```
R2# show run
Building configuration...
```

```
Current configuration : 1771 bytes
!
version 16.9
service timestamps debug datetime msec
service timestamps log datetime msec
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname R2
!
boot-start-marker
boot-end-marker
!
no aaa new-model
!
no ip domain lookup
!
login on-success log
!
subscriber templating
!
ipv6 unicast-routing
multilink bundle-name authenticated
!
spanning-tree extend system-id
!
redundancy
  mode none
!
```

Lab - Implement IP SLA

```
interface Loopback0
 ip address 192.168.1.1 255.255.255.0
 ip ospf network point-to-point
 ipv6 address FE80::2:3 link-local
 ipv6 address 2001:DB8:ACAD:1000::1/64
 ipv6 ospf 6 area 0
 ipv6 ospf network point-to-point
!
interface GigabitEthernet0/0/0
 ip address 172.16.12.2 255.255.255.0
 negotiation auto
 ipv6 address FE80::2:2 link-local
 ipv6 address 2001:DB8:ACAD:12::2/64
 ipv6 ospf 6 area 0
!
interface GigabitEthernet0/0/1
 ip address 172.16.23.2 255.255.255.0
 negotiation auto
 ipv6 address FE80::2:1 link-local
 ipv6 address 2001:DB8:ACAD:23::2/64
 ipv6 ospf 6 area 0
!
router ospf 4
 router-id 2.2.2.4
 network 172.16.0.0 0.0.255.255 area 0
 network 192.168.1.0 0.0.0.255 area 0
!
ip forward-protocol nd
no ip http server
ip http secure-server
!
ipv6 router ospf 6
 router-id 2.2.2.6
!
control-plane
!
banner motd ^C R2, Implement IP SLA ^C
!
line con 0
 exec-timeout 0 0
 logging synchronous
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 exec-timeout 0 0
 privilege level 15
 password cisco123
 logging synchronous
```

```
login
!  
end
```

Router R3

```
R3# show run
```

```
Building configuration...
```

```
Current configuration : 1592 bytes
!  
version 16.9  
service timestamps debug datetime msec  
service timestamps log datetime msec  
platform qfp utilization monitor load 80  
no platform punt-keepalive disable-kernel-core  
!  
hostname R3  
!  
boot-start-marker  
boot-end-marker  
!  
no aaa new-model  
!  
no ip domain lookup  
!  
login on-success log  
!  
subscriber templating  
!  
ipv6 unicast-routing  
multilink bundle-name authenticated  
!  
spanning-tree extend system-id  
!  
redundancy  
mode none  
!  
interface GigabitEthernet0/0/0  
 ip address 172.16.23.3 255.255.255.0  
 negotiation auto  
 ipv6 address FE80::3:1 link-local  
 ipv6 address 2001:DB8:ACAD:23::3/64  
 ipv6 ospf 6 area 0  
!  
interface GigabitEthernet0/0/1  
 ip address 172.16.3.1 255.255.255.0  
 negotiation auto  
 ipv6 address FE80::3:2 link-local
```

Lab - Implement IP SLA

```
ipv6 address 2001:DB8:ACAD:1723::1/64
ipv6 ospf 6 area 0
!
interface Serial0/1/0
no ip address
!
interface Serial0/1/1
no ip address
!
router ospf 4
router-id 3.3.3.4
network 172.16.0.0 0.0.255.255 area 0
!
ip forward-protocol nd
no ip http server
ip http secure-server
!
ipv6 router ospf 6
router-id 3.3.3.6
!
control-plane
!
banner motd ^C R3, Implement IP SLA ^C
!
line con 0
exec-timeout 0 0
logging synchronous
transport input none
stopbits 1
line aux 0
stopbits 1
line vty 0 4
exec-timeout 0 0
privilege level 15
password cisco123
logging synchronous
login
!
end
```

Switch D1

```
D1# show run
Building configuration...

Current configuration : 8360 bytes
!
version 16.9
no service pad
service timestamps debug datetime msec
```

Lab - Implement IP SLA

```
service timestamps log datetime msec
! Call-home is enabled by Smart-Licensing.
service call-home
no platform punt-keepalive disable-kernel-core
!
hostname D1
!
vrf definition Mgmt-vrf
!
  address-family ipv4
  exit-address-family
!
  address-family ipv6
  exit-address-family
!
no aaa new-model
switch 1 provision ws-c3650-24ps
!
ip routing
!
no ip domain lookup
ip dhcp excluded-address 10.0.2.1 10.0.2.5
ip dhcp excluded-address 10.0.2.128 10.0.2.254
ip dhcp excluded-address 10.0.3.1 10.0.3.128
ip dhcp excluded-address 10.0.3.254
!
ip dhcp pool SECOND_VLAN_DHCP_POOL
  network 10.0.2.0 255.255.255.0
  default-router 10.0.2.254
!
ip dhcp pool THIRD_VLAN_DHCP_POOL
  network 10.0.3.0 255.255.255.0
  default-router 10.0.3.254
!
login on-success log
ipv6 unicast-routing
!
license boot level ipservicesk9
!
diagnostic bootup level minimal
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
spanning-tree vlan 2 priority 24576
spanning-tree vlan 3 priority 28672
!
redundancy
  mode sso
!
transceiver type all
```

Lab - Implement IP SLA

```
monitoring
!
track 4 ip sla 4
  delay down 45 up 20
!
track 6 ip sla 6
  delay down 45 up 20
!
class-map match-any system-cpp-police-topology-control
  description Topology control
class-map match-any system-cpp-police-sw-forward
  description Sw forwarding, L2 LVX data, LOGGING
class-map match-any system-cpp-default
  description Inter FED, EWLC control, EWLC data
class-map match-any system-cpp-police-sys-data
  description Learning cache ovfl, High Rate App, Exception, EGR Exception,
NFLSAMPLED DATA, RPF Failed
class-map match-any system-cpp-police-punt-webauth
  description Punt Webauth
class-map match-any system-cpp-police-l2lvx-control
  description L2 LVX control packets
class-map match-any system-cpp-police-forus
  description Forus Address resolution and Forus traffic
class-map match-any system-cpp-police-multicast-end-station
  description MCAST END STATION
class-map match-any system-cpp-police-multicast
  description Transit Traffic and MCAST Data
class-map match-any system-cpp-police-l2-control
  description L2 control
class-map match-any system-cpp-police-dot1x-auth
  description DOT1X Auth
class-map match-any system-cpp-police-data
  description ICMP redirect, ICMP_GEN and BROADCAST
class-map match-any system-cpp-police-stackwise-virt-control
  description Stackwise Virtual
class-map match-any non-client-nrt-class
class-map match-any system-cpp-police-routing-control
  description Routing control and Low Latency
class-map match-any system-cpp-police-protocol-snooping
  description Protocol snooping
class-map match-any system-cpp-police-dhcp-snooping
  description DHCP snooping
class-map match-any system-cpp-police-system-critical
  description System Critical and Gold Pkt
!
policy-map system-cpp-policy
!
interface Port-channell
  switchport mode trunk
!
```


Lab - Implement IP SLA

```
interface Port-channel12
  switchport mode trunk
!
interface GigabitEthernet0/0
  vrf forwarding Mgmt-vrf
  no ip address
  shutdown
  negotiation auto
!
interface GigabitEthernet1/0/1
  switchport mode trunk
  channel-group 12 mode active
!
interface GigabitEthernet1/0/2
  switchport mode trunk
  channel-group 12 mode active
!
interface GigabitEthernet1/0/3
  switchport mode trunk
  channel-group 12 mode active
!
interface GigabitEthernet1/0/4
  switchport mode trunk
  channel-group 12 mode active
!
interface GigabitEthernet1/0/5
  switchport mode trunk
  channel-group 1 mode active
!
interface GigabitEthernet1/0/6
  switchport mode trunk
  channel-group 1 mode active
!
interface GigabitEthernet1/0/7
  shutdown
!
interface GigabitEthernet1/0/8
  shutdown
!
interface GigabitEthernet1/0/9
  shutdown
!
interface GigabitEthernet1/0/10
  shutdown
!
interface GigabitEthernet1/0/11
  no switchport
  ip address 172.16.1.2 255.255.255.0
  ipv6 address FE80::D1:1 link-local
  ipv6 address 2001:DB8:ACAD:1721::2/64
```

Lab - Implement IP SLA

```
ipv6 ospf 6 area 0
!
interface GigabitEthernet1/0/12
shutdown
!
interface GigabitEthernet1/0/13
shutdown
!
interface GigabitEthernet1/0/14
shutdown
!
interface GigabitEthernet1/0/15
shutdown
!
interface GigabitEthernet1/0/16
shutdown
!
interface GigabitEthernet1/0/17
shutdown
!
interface GigabitEthernet1/0/18
shutdown
!
interface GigabitEthernet1/0/19
shutdown
!
interface GigabitEthernet1/0/20
shutdown
!
interface GigabitEthernet1/0/21
shutdown
!
interface GigabitEthernet1/0/22
shutdown
!
interface GigabitEthernet1/0/23
shutdown
!
interface GigabitEthernet1/0/24
shutdown
!
interface GigabitEthernet1/1/1
shutdown
!
interface GigabitEthernet1/1/2
shutdown
!
interface GigabitEthernet1/1/3
shutdown
!
```

Lab - Implement IP SLA

```
interface GigabitEthernet1/1/4
shutdown
!
interface Vlan1
no ip address
!
interface Vlan2
ip address 10.0.2.1 255.255.255.0
standby version 2
standby 2 ip 10.0.2.254
standby 2 priority 150
standby 2 preempt
standby 2 track 4 decrement 60
standby 26 ipv6 autoconfig
standby 26 priority 150
standby 26 preempt
standby 26 track 4 decrement 60
ipv6 address FE80::D1:2 link-local
ipv6 address 2001:DB8:ACAD:2::1/64
ipv6 ospf 6 area 0
!
interface Vlan3
ip address 10.0.3.1 255.255.255.0
standby version 2
standby 3 ip 10.0.3.254
standby 3 preempt
standby 3 track 4 decrement 60
standby 36 ipv6 autoconfig
standby 36 preempt
standby 36 track 4 decrement 60
ipv6 address FE80::D1:3 link-local
ipv6 address 2001:DB8:ACAD:3::1/64
ipv6 ospf 6 area 0
!
router ospf 4
router-id 0.13.1.4
passive-interface Vlan2
passive-interface Vlan3
network 10.0.0.0 0.0.255.255 area 0
network 172.16.1.0 0.0.0.255 area 0
!
ip forward-protocol nd
ip http server
ip http secure-server
!
ip sla 4
icmp-echo 192.168.1.1
frequency 15
ip sla schedule 4 life forever start-time now
ip sla 6
```

Lab - Implement IP SLA

```
icmp-echo 2001:DB8:ACAD:1000::1
frequency 15
ip sla schedule 6 life forever start-time now
ipv6 router ospf 6
router-id 0.13.1.6
passive-interface Vlan2
passive-interface Vlan3
!
control-plane
service-policy input system-cpp-policy
!
banner motd ^C D1, Implement IP SLA ^C
!
line con 0
exec-timeout 0 0
logging synchronous
stopbits 1
line aux 0
stopbits 1
line vty 0 4
exec-timeout 0 0
privilege level 15
password cisco123
logging synchronous
login
line vty 5 15
login
!
end
```

Switch D2

```
D2# show run
Building configuration...

Current configuration : 8360 bytes
!
version 16.9
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
! Call-home is enabled by Smart-Licensing.
service call-home
no platform punt-keepalive disable-kernel-core
!
hostname D2
!
vrf definition Mgmt-vrf
!
address-family ipv4
```

Lab - Implement IP SLA

```
exit-address-family
!  
address-family ipv6  
exit-address-family
!  
no aaa new-model  
switch 1 provision ws-c3650-24ps
!  
ip routing
!  
no ip domain lookup  
ip dhcp excluded-address 10.0.2.1 10.0.2.128  
ip dhcp excluded-address 10.0.2.254  
ip dhcp excluded-address 10.0.3.1 10.0.3.5  
ip dhcp excluded-address 10.0.3.128 10.0.3.254
!  
ip dhcp pool SECOND_VLAN_DHCP_POOL  
network 10.0.2.0 255.255.255.0  
default-router 10.0.2.254
!  
ip dhcp pool THIRD_VLAN_DHCP_POOL  
network 10.0.3.0 255.255.255.0  
default-router 10.0.3.254
!  
login on-success log  
ipv6 unicast-routing
!  
license boot level ipservicesk9
!  
diagnostic bootup level minimal
!  
spanning-tree mode rapid-pvst  
spanning-tree extend system-id  
spanning-tree vlan 2 priority 28672  
spanning-tree vlan 3 priority 24576
!  
redundancy  
mode sso
!  
transceiver type all  
monitoring
!  
track 4 ip sla 4  
delay down 45 up 20
!  
track 6 ip sla 6  
delay down 45 up 20
!  
class-map match-any system-cpp-police-topology-control  
description Topology control
```

Lab - Implement IP SLA

```
class-map match-any system-cpp-police-sw-forward
  description Sw forwarding, L2 LVX data, LOGGING
class-map match-any system-cpp-default
  description Inter FED, EWLC control, EWLC data
class-map match-any system-cpp-police-sys-data
  description Learning cache ovfl, High Rate App, Exception, EGR Exception,
NFLSAMPLED DATA, RPF Failed
class-map match-any system-cpp-police-punt-webauth
  description Punt Webauth
class-map match-any system-cpp-police-l2lvx-control
  description L2 LVX control packets
class-map match-any system-cpp-police-forus
  description Forus Address resolution and Forus traffic
class-map match-any system-cpp-police-multicast-end-station
  description MCAST END STATION
class-map match-any system-cpp-police-multicast
  description Transit Traffic and MCAST Data
class-map match-any system-cpp-police-l2-control
  description L2 control
class-map match-any system-cpp-police-dot1x-auth
  description DOT1X Auth
class-map match-any system-cpp-police-data
  description ICMP redirect, ICMP_GEN and BROADCAST
class-map match-any system-cpp-police-stackwise-virt-control
  description Stackwise Virtual
class-map match-any non-client-nrt-class
class-map match-any system-cpp-police-routing-control
  description Routing control and Low Latency
class-map match-any system-cpp-police-protocol-snooping
  description Protocol snooping
class-map match-any system-cpp-police-dhcp-snooping
  description DHCP snooping
class-map match-any system-cpp-police-system-critical
  description System Critical and Gold Pkt
!
policy-map system-cpp-policy
!
interface Port-channel2
  switchport mode trunk
!
interface Port-channel12
  switchport mode trunk
!
interface GigabitEthernet0/0
  vrf forwarding Mgmt-vrf
  no ip address
  shutdown
  negotiation auto
!
interface GigabitEthernet1/0/1
```

Lab - Implement IP SLA

```
switchport mode trunk
channel-group 12 mode active
!
interface GigabitEthernet1/0/2
switchport mode trunk
channel-group 12 mode active
!
interface GigabitEthernet1/0/3
switchport mode trunk
channel-group 12 mode active
!
interface GigabitEthernet1/0/4
switchport mode trunk
channel-group 12 mode active
!
interface GigabitEthernet1/0/5
switchport mode trunk
channel-group 2 mode active
!
interface GigabitEthernet1/0/6
switchport mode trunk
channel-group 2 mode active
!
interface GigabitEthernet1/0/7
shutdown
!
interface GigabitEthernet1/0/8
shutdown
!
interface GigabitEthernet1/0/9
shutdown
!
interface GigabitEthernet1/0/10
shutdown
!
interface GigabitEthernet1/0/11
no switchport
ip address 172.16.3.2 255.255.255.0
ipv6 address FE80::D2:1 link-local
ipv6 address 2001:DB8:ACAD:1723::2/64
ipv6 ospf 6 area 0
!
interface GigabitEthernet1/0/12
shutdown
!
interface GigabitEthernet1/0/13
shutdown
!
interface GigabitEthernet1/0/14
shutdown
```

Lab - Implement IP SLA

```
!  
interface GigabitEthernet1/0/15  
 shutdown  
!  
interface GigabitEthernet1/0/16  
 shutdown  
!  
interface GigabitEthernet1/0/17  
 shutdown  
!  
interface GigabitEthernet1/0/18  
 shutdown  
!  
interface GigabitEthernet1/0/19  
 shutdown  
!  
interface GigabitEthernet1/0/20  
 shutdown  
!  
interface GigabitEthernet1/0/21  
 shutdown  
!  
interface GigabitEthernet1/0/22  
 shutdown  
!  
interface GigabitEthernet1/0/23  
 shutdown  
!  
interface GigabitEthernet1/0/24  
 shutdown  
!  
interface GigabitEthernet1/1/1  
 shutdown  
!  
interface GigabitEthernet1/1/2  
 shutdown  
!  
interface GigabitEthernet1/1/3  
 shutdown  
!  
interface GigabitEthernet1/1/4  
 shutdown  
!  
interface Vlan1  
 no ip address  
!  
interface Vlan2  
 ip address 10.0.2.2 255.255.255.0  
 standby version 2  
 standby 2 ip 10.0.2.254
```


Lab - Implement IP SLA

```
standby 2 preempt
standby 2 track 4 decrement 60
standby 26 ipv6 autoconfig
standby 26 preempt
standby 26 track 4 decrement 60
ipv6 address FE80::D2:2 link-local
ipv6 address 2001:DB8:ACAD:2::2/64
ipv6 ospf 6 area 0
!
interface Vlan3
 ip address 10.0.3.2 255.255.255.0
 standby version 2
 standby 3 ip 10.0.3.254
 standby 3 priority 150
 standby 3 preempt
 standby 3 track 4 decrement 60
 standby 36 ipv6 autoconfig
 standby 36 priority 150
 standby 36 preempt
 standby 36 track 4 decrement 60
 ipv6 address FE80::D2:3 link-local
 ipv6 address 2001:DB8:ACAD:3::2/64
 ipv6 ospf 6 area 0
!
router ospf 4
 router-id 0.13.2.4
 passive-interface Vlan2
 passive-interface Vlan3
 network 10.0.0.0 0.0.255.255 area 0
 network 172.16.3.0 0.0.0.255 area 0
!
ip forward-protocol nd
ip http server
ip http secure-server
!
ip sla 4
 icmp-echo 192.168.1.1
 frequency 15
ip sla schedule 4 life forever start-time now
ip sla 6
 icmp-echo 2001:DB8:ACAD:1000::1
 frequency 15
ip sla schedule 6 life forever start-time now
ipv6 router ospf 6
 router-id 0.13.2.6
 passive-interface Vlan2
 passive-interface Vlan3
!
control-plane
 service-policy input system-cpp-policy
```

Lab - Implement IP SLA

```
!  
banner motd ^C D2, Implement IP SLA ^C  
!  
line con 0  
  exec-timeout 0 0  
  logging synchronous  
  stopbits 1  
line aux 0  
  stopbits 1  
line vty 0 4  
  exec-timeout 0 0  
  privilege level 15  
  password cisco123  
  logging synchronous  
  login  
line vty 5 15  
  login  
!  
end
```

Switch A1

```
A1# show run  
Building configuration...  
  
Current configuration : 3917 bytes  
!  
version 15.2  
no service pad  
service timestamps debug datetime msec  
service timestamps log datetime msec  
no service password-encryption  
!  
hostname A1  
!  
boot-start-marker  
boot-end-marker  
!  
no aaa new-model  
system mtu routing 1500  
!  
no ip domain-lookup  
!  
spanning-tree mode rapid-pvst  
spanning-tree extend system-id  
!  
vlan internal allocation policy ascending  
!  
interface Port-channel1  
  switchport mode trunk
```

Lab - Implement IP SLA

```
!  
interface Port-channel2  
  switchport mode trunk  
!  
interface FastEthernet0/1  
  switchport mode trunk  
  channel-group 1 mode active  
!  
interface FastEthernet0/2  
  switchport mode trunk  
  channel-group 1 mode active  
!  
interface FastEthernet0/3  
  switchport mode trunk  
  channel-group 2 mode active  
!  
interface FastEthernet0/4  
  switchport mode trunk  
  channel-group 2 mode active  
!  
interface FastEthernet0/5  
  shutdown  
!  
interface FastEthernet0/6  
  shutdown  
!  
interface FastEthernet0/7  
  shutdown  
!  
interface FastEthernet0/8  
  shutdown  
!  
interface FastEthernet0/9  
  shutdown  
!  
interface FastEthernet0/10  
  shutdown  
!  
interface FastEthernet0/11  
  shutdown  
!  
interface FastEthernet0/12  
  shutdown  
!  
interface FastEthernet0/13  
  shutdown  
!  
interface FastEthernet0/14  
  shutdown  
!
```

Lab - Implement IP SLA

```
interface FastEthernet0/15
shutdown
!
interface FastEthernet0/16
shutdown
!
interface FastEthernet0/17
shutdown
!
interface FastEthernet0/18
shutdown
!
interface FastEthernet0/19
shutdown
!
interface FastEthernet0/20
shutdown
!
interface FastEthernet0/21
shutdown
!
interface FastEthernet0/22
shutdown
!
interface FastEthernet0/23
switchport access vlan 2
switchport mode access
spanning-tree portfast edge
!
interface FastEthernet0/24
switchport access vlan 3
switchport mode access
spanning-tree portfast edge
!
interface GigabitEthernet0/1
shutdown
!
interface GigabitEthernet0/2
shutdown
!
interface Vlan1
no ip address
shutdown
!
interface Vlan2
ip address 10.0.2.3 255.255.255.0
ipv6 address FE80::A1:1 link-local
ipv6 address 2001:DB8:ACAD:2::3/64
!
ip default-gateway 10.0.2.254
```

Lab - Implement IP SLA

```
ip http server
ip http secure-server
!
banner motd ^C A1, Implement IP SLA ^C
!
line con 0
  exec-timeout 0 0
  logging synchronous
line vty 0 4
  exec-timeout 0 0
  privilege level 15
  password cisco123
  logging synchronous
  login
line vty 5 15
  login
!
end
```