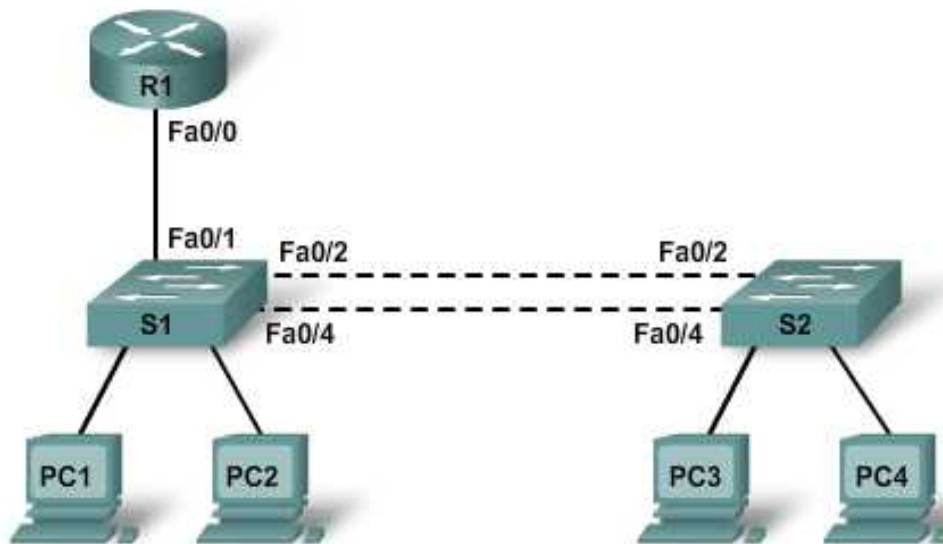


Lab 7.3.3 Configuring and Testing the Rapid Spanning Tree Prototype

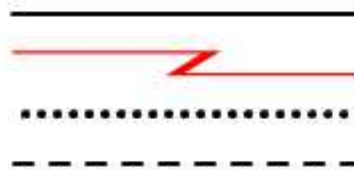


Straight-through cable

Serial cable

Console (Rollover)

Crossover cable



| Device Designation | Device Name | IP Address | Subnet Mask | Default Gateway |
|--------------------|--------------|---|---|-----------------|
| R1 | BR4 | Fa0/0.1 10.0.0.1 Fa0/0.10 10.10.10.254 Fa0/0.20 10.10.20.254 | 255.255.255.0 255.255.255.0 255.255.255.0 | |
| S1 | FC-ASW-1 | VLAN1: 10.0.0.2 | 255.255.255.0 | 10.0.0.1 |
| S2 | ProductionSW | VLAN1: 10.0.0.3 | 255.255.255.0 | 10.0.0.1 |
| H1 | H1 | 10.10.10.10 | 255.255.255.0 | 10.10.10.254 |
| H2 | H2 | 10.10.20.10 | 255.255.255.0 | 10.10.20.254 |
| H3 | H3 | 10.10.10.11 | 255.255.255.0 | 10.10.10.254 |
| H4 | H4 | 10.10.20.11 | 255.255.255.0 | 10.10.20.254 |

Objectives

- Configure trunking on trunk ports to provide access to a router on the network.
- Configure separate VLANs for separate logical networks for production users and the server farm.
- Verify inter-VLAN connectivity.
- Enable RSTP and configure the root switch and backup root switch.
- Verify that the network can converge after inducing link and switch failures.

640-802 CCNA Exam Objectives

This lab contains skills that relate to the following CCNA exam objectives:

- Describe enhanced switching technologies, including: VTP, RSTP, VLAN, PVSTP, 802.1q.
- Verify network status and switch operation using basic utilities (including: ping, traceroute, Telnet, SSH, arp, ipconfig), and **show** and **debug** commands.
- Configure, verify, and troubleshoot RSTP operation.

Expected Results and Success Criteria

Before starting this lab, read through the tasks that you are expected to perform. What do you expect the result of performing these tasks will be?

How will the tests performed in the lab illustrate the purpose of the Rapid Spanning Tree Protocol?

Background / Preparation

The network designer has developed a test plan for the proposed FilmCompany server farm. The tests depend on the ability of the technicians to configure the switches to use STP, because the server farm test topology implements redundant switched links. In this lab, you will review the basic functionality Cisco Rapid PVST.

Task 1: Configure all devices

Step 1: Configure S1 and S2

Configure the host name, access, and command mode passwords on each switch.

Step 2: Configure interface VLAN 1

Configure the VLAN1 IP address and default gateway on each switch.

Step 3: Configure FC-ASW-1 for server and end user VLANs

| VLAN Number | VLAN Name |
|-------------|-----------|
| 10 | Servers |
| 20 | Users |

Step 4: Configure ProductionSW for server and end user VLANs

| VLAN Number | VLAN Name |
|-------------|-----------|
| 10 | Servers |
| 20 | Users |

Step 5: Assign ports to VLANs on FC-ASW-1

```
FC-ASW-1#configure terminal
FC-ASW-1(config)#interface Fa0/5
FC-ASW-1(config-if)#switchport mode access
FC-ASW-1(config-if)#switchport access VLAN10
FC-ASW-1(config-if)#interface Fa0/6
FC-ASW-1(config-if)#switchport mode access
FC-ASW-1(config-if)#switchport access VLAN20
```

Step 6: Assign ports to VLANs on ProductionSW

```
ProductionSW#configure terminal
ProductionSW(config)#interface Fa0/5
ProductionSW(config-if)#switchport mode access
ProductionSW(config-if)#switchport access VLAN10
ProductionSW(config-if)#interface Fa0/6
ProductionSW(config-if)#switchport mode access
ProductionSW(config-if)#switchport access VLAN20
```

Step 7: Configure trunk ports on FC-ASW-1 to the router and ProductionSW

```
FC-ASW-1(config)#interface Fa0/1
FC-ASW-1(config-if)#switchport mode trunk
FC-ASW-1(config-if)#interface Fa0/2
FC-ASW-1(config-if)#switchport mode trunk
FC-ASW-1(config-if)#interface Fa0/4
FC-ASW-1(config-if)#switchport mode trunk
```

Step 8: Configure trunk ports on ProductionSW to FC-ASW-1

```
ProductionSW(config)#interface Fa0/2
ProductionSW(config-if)#switchport mode trunk
ProductionSW(config-if)#interface Fa0/4
ProductionSW(config-if)#switchport mode trunk
```

Step 9: Configure VTP on both switches

```
FC-ASW-1#vlan database
FC-ASW-1(vlan)#vtp server
```

Step 10: Configure ProductionSW to be a VTP client

```
ProductionSW#vlan database
ProductionSW(vlan)#vtp client
ProductionSW(vlan)#vtp domain ServerFarm
```

Step 11: Configure Rapid Spanning Tree Protocol

On each switch, configure Per-VLAN Rapid Spanning Tree Protocol.

```
FC-ASW-1(config)#spanning-tree mode rapid-pvst
ProductionSW(config)#spanning-tree mode rapid-pvst
```

Step 12: Perform basic router configuration

Configure hostname, passwords, and line access on R1.

Step 13: Configure Subinterface Fa0/0

```
BR4#configure terminal
BR4(config)#interface Fa0/0
BR4(config-if)#no shut
BR4(config-if)#interface Fa0/0.1
BR4(config-subif)#description VLAN1
BR4(config-subif)#encapsulation dot1q 1
BR4(config-subif)#ip address 10.0.0.1 255.255.255.0
BR4(config-subif)#interface Fa0/0.10
BR4(config-subif)#description VLAN10
BR4(config-subif)#encapsulation dot1q 10.
BR4(config-subif)#ip address 10.10.10.254 255.255.255.0
BR4(config-subif)#interface Fa0/0.20
BR4(config-subif)#description VLAN20
BR4(config-subif)#encapsulation dot1q20
BR4(config-subif)#ip address 10.10.20.254 255.255.255.0
BR4(config-subif)#end
BR4#
```

Step 14: Configure two hosts for server VLAN, and two hosts for end user VLAN

- H1 and H3 should be given IP addresses in the Servers VLAN, with a default gateway of 10.10.10.254.
- H2 and H4 should be given IP addresses in the Users VLAN, with a default gateway of 10.10.20.254.

Task 2: Perform basic connectivity tests

Step 1: Test intra-VLAN connectivity

- Ping from H1 to H3.

Is the ping successful? _____

If the ping fails, troubleshoot the configuration on the hosts and the VLAN configuration on the switches.

- Ping from H2 to H4.

Is the ping successful? _____

If the ping fails, troubleshoot the configuration on the hosts and the VLAN configuration on the switches.

Step 2: Test inter-VLAN connectivity

Ping from a host on the Servers VLAN to a host on the Users VLAN.

Is the ping successful? _____

If the ping fails, troubleshoot the router and switch configurations.

Task 3: Introduce link and device failures into the network, and observe results

Step 1: Determine the port status of the spanning tree on the server switch

```
FC-ASW-1#show span
```

```
VLAN0010
```

```
Spanning tree enabled protocol ieee
```

```
Root ID      Priority      32778
```

```
Address      0030.F2C9.90A0
```

```
Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
```

```
Bridge ID    Priority      32778 (priority 32768 sys-id-ext 10)
```

```
Address      0090.21AC.0C10
```

```
Aging Time   300
```

| Interface | Role | Sts | Cost | Prio.Nbr | Type |
|-----------|------|-----|------|----------|------|
|-----------|------|-----|------|----------|------|

| | | | | | |
|-------|------|-----|----|-------|-----|
| Fa0/1 | Desg | FWD | 19 | 128.3 | Shr |
|-------|------|-----|----|-------|-----|

| | | | | | |
|-------|------|-----|----|-------|-----|
| Fa0/2 | Root | FWD | 19 | 128.3 | Shr |
|-------|------|-----|----|-------|-----|

| | | | | | |
|-------|------|-----|----|-------|-----|
| Fa0/4 | Altn | BLK | 19 | 128.3 | Shr |
|-------|------|-----|----|-------|-----|

| | | | | | |
|-------|------|-----|----|-------|-----|
| Fa0/5 | Desg | FWD | 19 | 128.3 | Shr |
|-------|------|-----|----|-------|-----|

```
VLAN0020
```

```
Spanning tree enabled protocol ieee
```

```
Root ID      Priority      32788
```

```
Address      0030.F2C9.90A0
```

```
Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
```

```
Bridge ID    Priority      32788 (priority 32768 sys-id-ext 20)
```

```
Address      0090.21AC.0C10
```

```
Aging Time   300
```

| Interface | Role | Sts | Cost | Prio.Nbr | Type |
|-----------|------|-----|------|----------|------|
|-----------|------|-----|------|----------|------|

| | | | | | |
|-------|------|-----|----|-------|-----|
| Fa0/1 | Desg | FWD | 19 | 128.3 | Shr |
|-------|------|-----|----|-------|-----|

| | | | | | |
|-------|------|-----|----|-------|-----|
| Fa0/2 | Root | FWD | 19 | 128.3 | Shr |
|-------|------|-----|----|-------|-----|

| | | | | | |
|-------|------|-----|----|-------|-----|
| Fa0/4 | Altn | BLK | 19 | 128.3 | Shr |
|-------|------|-----|----|-------|-----|

| | | | | | |
|-------|------|-----|----|-------|-----|
| Fa0/6 | Desg | FWD | 19 | 128.3 | Shr |
|-------|------|-----|----|-------|-----|

Which port is not currently participating in forwarding data? _____

Step 2: Induce a link failure on the server switch

Remove the cable from one of the forwarding ports on FC-ASW-1.

Step 3: View the adjustment to the spanning-tree

Re-issue the **show span** command.

How long did it take the switches to determine and utilize a backup link? _____

Step 4: Induce a device failure on the network

Turn off the ProductionSW switch.

Ping from H1 to H2.

Was the ping successful? _____

Step 5: Reflect on the test results

In a network with multiple branch offices, why is the use of Rapid Spanning Tree Protocol important?

Why is it important when implementing a server farm?
