

Packet Tracer – Router and Switch Redundancy

Addressing Table

| Device | IP Address | Subnet Mask | Default Gateway | Site |
|---------------------|----------------|---------------|-----------------|--------------------------|
| External Web Server | 209.165.201.10 | 255.255.255.0 | N/A | Internet |
| R1 | 10.44.1.2 | 255.255.255.0 | N/A | Metropolis Bank HQ |
| R2 | 10.44.1.3 | 255.255.255.0 | N/A | Metropolis Bank HQ |
| Phil's computer | 10.44.1.12 | 255.255.255.0 | 10.44.1.1 | Metropolis Bank HQ |
| Tim's computer | 10.44.2.11 | 255.255.255.0 | 10.44.2.1 | Gotham Healthcare Branch |

Objectives

Part 1: Observe a Network Failover with Redundant Routers.

Part 2: Observe a Network Failover with Redundant Switches.

Background

In this activity, you will observe the successful failover of the Metropolis network utilizing multiple routers to provide default gateway redundancy. Afterwards across the world, you will observe the successful network failover of the Gotham network utilizing multiple switches to provide redundant network pathways. The IP addressing, network configuration, and service configurations are already complete. You will use the client devices in the differing geographic regions to test the pathways before and after successful network failover.

Part 1: Observe a Network Failover with Redundant Routers.

Step 1: Access the command prompt on Phil's computer.

- Click the **Metropolis Bank HQ** site and then click the laptop **Phil**.
- Click the **Desktop** tab and then click **Command Prompt**.

Step 2: Trace the pathway to the External Web server.

- Ping the **External Web** server on the **Internet** by entering **ping 209.165.201.10** in the command prompt.
- Trace the pathway to the **External Web** server on the **Internet** by entering **tracert 209.165.201.10** in the command prompt.
- Each IP address shown in the output of the **tracert** command is a network device that network traffic is crossing.

What are the IP addresses of the devices that the traffic from Phil's laptop is crossing to reach the External Web server?

The first address of the **tracert** output is the default gateway (exit point) of the network.

- Comparing the output of the **tracert** command to the Addressing Table at the beginning of this lab, which router is operating as the current default gateway?

Step 3: Cause a network failover.

- Within the **Metropolis Bank HQ** site, click the switch **HQ_S1**.
- Click the **CLI** tab.
- Disable the uplink port Gig0/2 using the following commands:

```
enable
configure terminal
interface GigabitEthernet0/2
shutdown
```

Step 4: Trace the pathway to the External Web server again.

- Within the **Metropolis Bank HQ** site, click the laptop **Phil**.
- Click the **Desktop** tab and then click **Command Prompt**.
- Ping the **External Web** server on the **Internet** by entering **ping 209.165.201.10** in the command prompt.
- Trace the pathway to the **External Web** server on the **Internet** by entering **tracert 209.165.201.10** in the command prompt.

Each IP address shown in the output of the **tracert** command is a network device that network traffic is crossing.

What are the IP addresses of the devices that the traffic from Phil's laptop is crossing to reach the External Web server?

- The first address of the **tracert** output is the default gateway (exit point) of the network.
Which router is now operating as the current default gateway?
- In the **Command Prompt** enter the command **ipconfig**. The default gateway is listed as 10.44.1.1 which is neither 10.44.1.2 from the first time the **tracert** command was given, nor 10.44.1.3 from the second time the **tracert** command was given. This shows that the default gateway of 10.44.1.1 is actually routed through redundant routers with different IP addresses, router R1 at 10.44.1.2 or router R2 at 10.44.1.3 if R1 is not available.

Part 2: Observe a Network Failover with Redundant Switches

Step 1: Access the command prompt on Tim's computer.

- Click the **Gotham Healthcare Branch** site and then click the computer **Tim**.
- Click the **Desktop** tab and then click **Command Prompt**.

Step 2: Trace the pathway to the External Web server.

- Ping the **External Web** server on the **Internet** by entering **ping 209.165.201.10** in the command prompt.
- In order to observe the network failover, a constant ping can be used.

Ping the **External Web** server with a constant ping by entering **ping -t 209.165.201.10** in the command prompt.

Minimize the Tim computer window.

Step 3: Cause a network failover.

- a. Within the **Gotham Healthcare Branch** site, click the switch **S3**.
- b. Click on the **CLI** tab.
- c. Disable the uplink port Gig0/2 using the following commands:

```
enable
configure terminal
interface GigabitEthernet0/2
shutdown
```

Step 4: Trace the pathway to the External Web server again.

- a. Within the **Gotham Healthcare Branch** site, maximize the Tim computer window.
- b. Wait about 30-60 seconds. You can also watch the switchport link lights in the Gotham Healthcare Branch network.
- c. The output on Tim’s computer should be similar to the following:

```
PC> ping -t 209.165.201.10
Pinging 209.165.201.10 with 32 bytes of data:

Reply from 209.165.201.10: bytes=32 time=47ms TTL=126
Reply from 209.165.201.10: bytes=32 time=42ms TTL=126
Reply from 209.165.201.10: bytes=32 time=42ms TTL=126
Reply from 209.165.201.10: bytes=32 time=43ms TTL=126
Request timed out.
Reply from 209.165.201.10: bytes=32 time=41ms TTL=126
Reply from 209.165.201.10: bytes=32 time=42ms TTL=126
Reply from 209.165.201.10: bytes=32 time=42ms TTL=126
```

- d. Close the window.
Which cable was the data crossing during the successful ping replies **before** the “Request timed out” messaged occurred?

Which cable was the data crossing during the successful ping replies **after** the “Request timed out” messaged occurred?

- e. What does this scenario prove about switch failover redundancy when a Gigabit Ethernet port is shutdown all of a sudden?

Suggested Scoring Rubric

| Activity Section | Question Location | Possible Points | Earned Points |
|--|-------------------|-----------------|---------------|
| Part 1: Observe a network failover with redundant routers | Step 2 | 10 | |
| | Step 2 | 10 | |
| | Step 4 | 10 | |
| | Step 4 | 10 | |
| Part 2: Observe a network failover with redundant switches | Step 4 | 5 | |
| | Step 4 | 5 | |
| | Step 4 | 10 | |
| Questions | | 60 | |
| Packet Tracer Score | | 40 | |
| Total Score | | 100 | |