

Module 2 Hands-on Project

Title: Design and Implementation of a Network Solution.

Instructions:

This hands-on project will guide you through setting up a network with two routers, servers, switches, a printer, and multiple PCs using Cisco Packet Tracer. You'll also configure RIPv2 for dynamic routing between subnets.

Step 1: Network Design

Device Layout:

1. **Routers:** Place two routers, **Router0** and **Router1**, to interconnect two subnets.
2. **Switches:** Connect **Switch0** to **Router0** and **Switch1** to **Router1**.

3. **Servers:** Place one Web Server and two DNS Servers connected to **Switch0** and **Switch1**.
4. **DHCP Server:** Connect the DHCP server to **Switch0** and another to **Switch1**
5. **PCs:** Distribute multiple PCs across **Switch0** and **Switch1**.
6. **Printer:** Connect the printer to **Switch1**.

Step 2: Addressing Scheme

Assume a base network IP of **192.168.1.0/24**. You'll subnet this network to accommodate the two subnets.

Hint:

For connection between the two routers (Router0 and Router1) use the IP addresses:

Router0 - 192.168.2.1/30 - 255.255.255.252

Router1 - 192.168.2.2/30 - 255.255.255.252

Subnetting:

- **Subnet A (for Router0, Switch0, Servers, and PCs):**
192.168.1.0/25
 - Usable Range: **192.168.1.1** to **192.168.1.126**
 - Assign the Web Server: **192.168.1.2**

- Assign DNS and DHCP Servers: **192.168.1.3** and **192.168.1.4**
- PCs on this subnet: Assign dynamically via DHCP (Reserved range in DHCP: **192.168.1.5** to **192.168.1.100**)
- **Subnet B (for Router1, Switch1, DHCP Server, PCs, and Printer): 192.168.1.128/25 - hint: Subnet mask = 255.255.255.128**
 - Usable Range: **192.168.1.129** to **192.168.1.254**
 - DHCP Server static IP: **192.168.1.131**
 - Printer static IP: **192.168.1.130**
 - PCs on this subnet: Assign dynamically via DHCP
 - (Reserved range in DHCP: **192.168.1.135** to **192.168.1.225**)

Step 3: Configuring Devices

Routers & RIPv2:

1. Configure each router's interface connected to the switches with the appropriate IP address (**Router0 - 192.168.1.1/25, Router1 - 192.168.1.129/25**).
2. Enable RIPv2 on both routers:

Copy code below for router0:

```
router rip
```

```
version 2
```

```
network 192.168.1.0
```

```
network 192.168.2.0
```

```
no auto-summary
```

Copy code below for router1:

```
router rip
```

```
version 2
```

```
network 192.168.1.0
```

```
network 192.168.2.0
```

```
no auto-summary
```

Switches:

Connect PCs, servers, and the printer to the switches as planned.
No IP configuration is needed on the switches for this setup.

Web & DNS Servers:

Configure the web and DNS servers with static IPs (**192.168.1.2**, **192.168.1.3**, **192.168.1.4**) and subnet mask **255.255.255.128**. The default gateway for Subnet A is **192.168.1.1**.

DHCP Server:

1. Configure the DHCP server with a static IP of **192.168.1.131** and subnet mask **255.255.255.128**. The default gateway for Subnet B is **192.168.1.129**.
2. Set up two DHCP pools, one for each subnet, with the respective ranges, subnet masks, and default gateways.

Printer & PCs:

- Assign the printer a static IP of **192.168.1.130**.
- PCs connected to **Switch0** will receive their IP configuration from the DHCP server. Ensure they're set to obtain an IP address automatically.

Step 4: Testing and Verification

1. **Ping Test:** From a PC in Subnet A, ping the Web Server, a DNS Server, and a PC in Subnet B to ensure connectivity.
2. **Web Server Access:** From a PC, attempt to access the web server using its IP address in a web browser.
3. **DHCP Allocation:** Verify that PCs are receiving correct IP addresses from the DHCP server by checking their IP configuration.

Step 5: Documentation

Document the network design, IP addressing scheme, device configurations, and any challenges faced during setup along with troubleshooting steps. This documentation is crucial for network management and future reference.

This project provides a comprehensive practice scenario that encompasses network design, subnetting, device configuration,

and dynamic routing, offering a solid foundation in network setup and management.