

Internetworking using Routers (Static & Default Routing)

1. Objectives

- To learn how to connect and configure more than one Router
- Using **static and default routes**
- To build and configure an **internetwork** using **Packet Tracer**

2a. Background: Static and Default Routes

In this activity, you will configure static and default routes. A static route is a route that is entered manually by the network administrator to create a reliable and safe route.

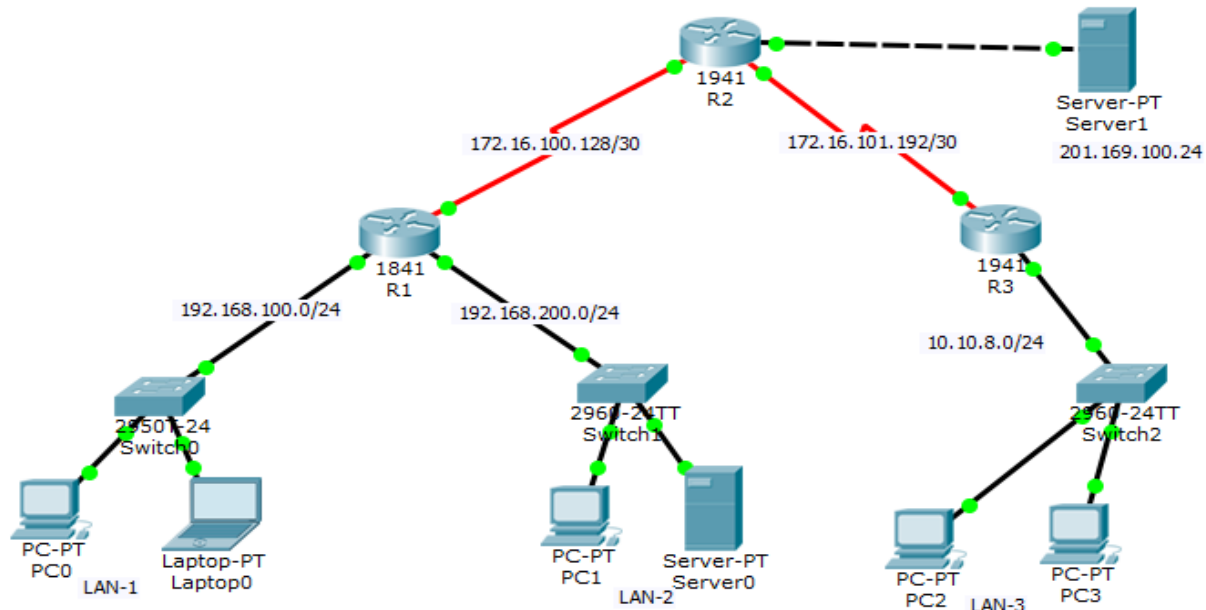
A **recursive static route** relies on the next hop router in order for packets to be sent to its destination. A **recursive static route** requires two routing table lookups. A **directly attached static route** relies on its exit interface in order for packets to be sent to its destination, while a recursive static route uses the IP address of the next hop router.

A **default route**, also known as **the gateway of last resort**, is the network route used by a router when no other known route exists for a destination network. A static route is used to route traffic to a specific network.

3a. Instructions: Static and Default Routes

Step 1: Physical Connections

Create a topology as shown in the following figure. (Given .pkt file)



Step 2: IP Addressing Table

Configure IP addresses of PCs (already configured).

Step 3: Host Name

Set hostnames for routers (R1, R2, and R3) as shown in the topology. (`R1 (config) # hostname R1`)

Step 4: Adding IP Addresses

Add IP addresses to both an Ethernet (i.e., G0/0) and serial interface (i.e., S0/0/1). For serial interface with the **DCE cable** you will need to also add the clocking with the **clock rate** command. **Get the IP addresses from the diagram.**

Step 5: Configure Serial interfaces

Configure **DTE serial interface**: Set IP address, Subnet mask and make interface active (no shutdown).

Configure **DCE serial interface**: Set IP address, Subnet mask and make interface active (no shutdown).

Configure **clock rate**: `Router (config-if) # clock rate 250000`

Step 6: Configure Static & Default Routes

Configure a **recursive static route**:

Syntax: `ip route Dest_Net_Address Net_Mask Next_Hop_IP_Address`

Example: `ip route 172.31.0.0 255.255.255.0 172.31.1.193`

Configure a **directly attached static route**:

Syntax: ip route **Dest_Net_Address** **Net_Mask** **Exit_Interface**

Example: ip route 172.31.1.0 255.255.255.128 Serial0/0/0

Configure a **default route**:

Syntax: ip route **0.0.0.0** **0.0.0.0** **Next_Hop_IP_Address**

Example: ip route 0.0.0.0 0.0.0.0 Serial0/0/1

Commands for STATIC route in R1 & R3 and DEFAULT route in R3 :

```
R1(config)#ip route 201.169.100.0 255.255.255.0 172.16.100.130
R1(config)#ip route 172.16.101.192 255.255.255.252 172.16.100.130
R1(config)#ip route 10.10.8.0 255.255.255.0 172.16.100.130
```

```
R2(config)#ip route 10.10.8.0 255.255.255.0 172.16.101.194
R2(config)#ip route 192.168.100.0 255.255.255.0 172.16.100.129
R2(config)#ip route 192.168.200.0 255.255.255.0 172.16.100.129
```

```
R3(config)#ip route 0.0.0.0 0.0.0.0 172.16.101.193
```

Step 7: Verify Routing table and Test the network (ping host in one network to other networks)

Use the **show ip route** command to verify that each router has all of the networks in the topology entered in the routing table.

When you are finished with the routing configuration, return to **privileged EXEC mode** and save the current configuration to NVRAM.

```
R1(config-router)#end
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

```
R1#copy run start
```

Exercise

Complete following topology using **static** and **default** routing protocols where appropriate.

Test the connectivity and show to the instructor in the next lab.

