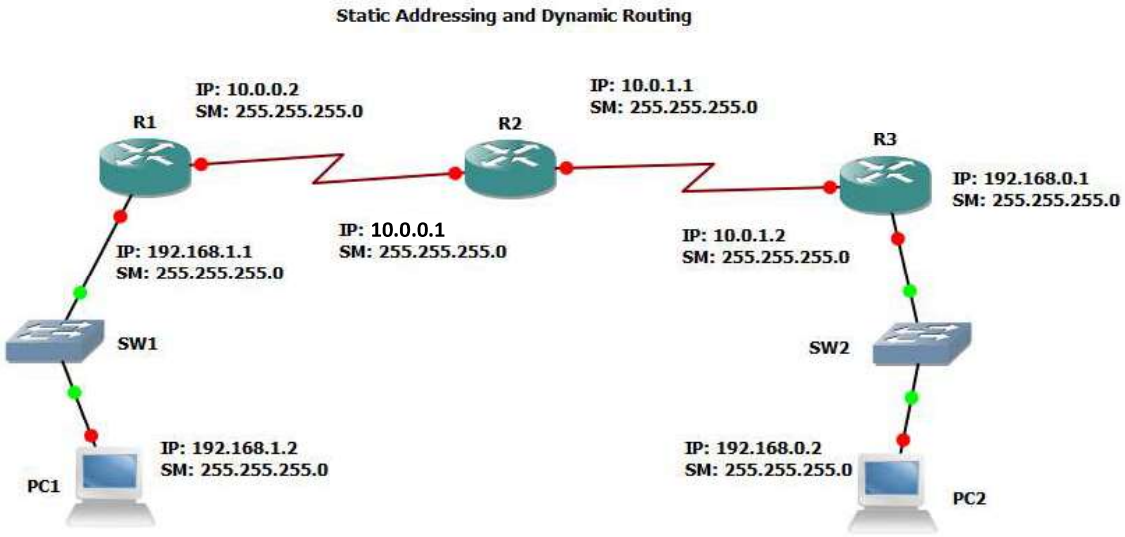
Chapter 7

Lab 6: Design simple 1-hop and 2-hop networks and configure IPv4 addresses and RIP using GNS3

7.1 Objective

Design a simple 1-hop and 2-hop networks to demonstrate static addressing and dynamic routing using GNS3. For dynamic routing we use the simple RIP protocol.



7.2 Procedure

1. Configure the router interfaces as shown in the Section 1.2.4. For serial interface choose the labels as s1/0, s1/1 and so on. Example for R1 given below.

   R1# configure terminal
   R1(config)# interface s1/0
   R1(config-if)# ip address 10.0.0.2 255.255.255.0
   R1(config-if)# no shutdown
   R1(config-if)# exit

   R1(config)# interface f0/0
   R1(config-if)# ip address 192.168.1.1 255.255.255.0
   R1(config-if)# no shutdown
   R1(config-if)# exit

2. For dynamic routing write the sample code based on the subnets directly connected to a router as follows. Example for R2

   R2(config)# router rip
   R2(config-router)# version 2
   R2(config-router)# network 10.0.0.0
   R2(config-router)# network 10.0.1.0

R2(config-router)# end

3. For PC assign IP address as shown in Section 1.2.4. You can add as many switches to SW1 and SW2. You can also add as many PCs as you want. Example for PC1

   PC1> 192.168.1.2/24 192.168.1.1

To make a 1 hop network simply reduce the number of active routers in the network to 1. Make only one router interface connected to the switch active. In this manner, you can vary the number of hops (i.e., routers) that your packet passes through. **The above diagram allows up to 3-hops.**

7.3 Analyses

1. Suppose subnet masks such as 255.255.255.252, 255.255.255.248, 255.255.255.240, 255.255.255.224 or 255.255.255.192 are used in the first subnet. What are the possible range of IP addresses that can be assigned to the Fast Ethernet interface of R1 and PC1? Tabulate your result. Test a few cases.

2. Show the IP addresses of the active interfaces of R1, R2 and R3 in the router's terminal

3. Show the routing tables in R1, R2 and R3 in the router's terminal

4. Run Wireshark on the serial interface of R1 and show the screenshot of packet capture.

5. Show the ping operation by pinging PC2 from PC1. Show packet capture and write port numbers, IP addresses of each Echo request and reply. Explain ping statistics.

6. Show ping operation over TCP by pinging PC2 from PC1. Show packet capture and write port numbers, IP addresses of each Echo request and Echo reply.