# Module 2, Lesson 2.1.2c Configuring IPv4 Interfaces on the Router

## Introduction and/or Background

In order for devices to communicate, basic settings must be configured and then tested.

## Objective

In this project/lab the student will:
● Use the Packet Tracer network simulation program to configure basic router and switch settings.
● Verify connectivity of a previously switched network
● Re-address the switched network, and test for connectivity
● Add a router to the LAN and configure basic settings and router interfaces, according to the addressing scheme
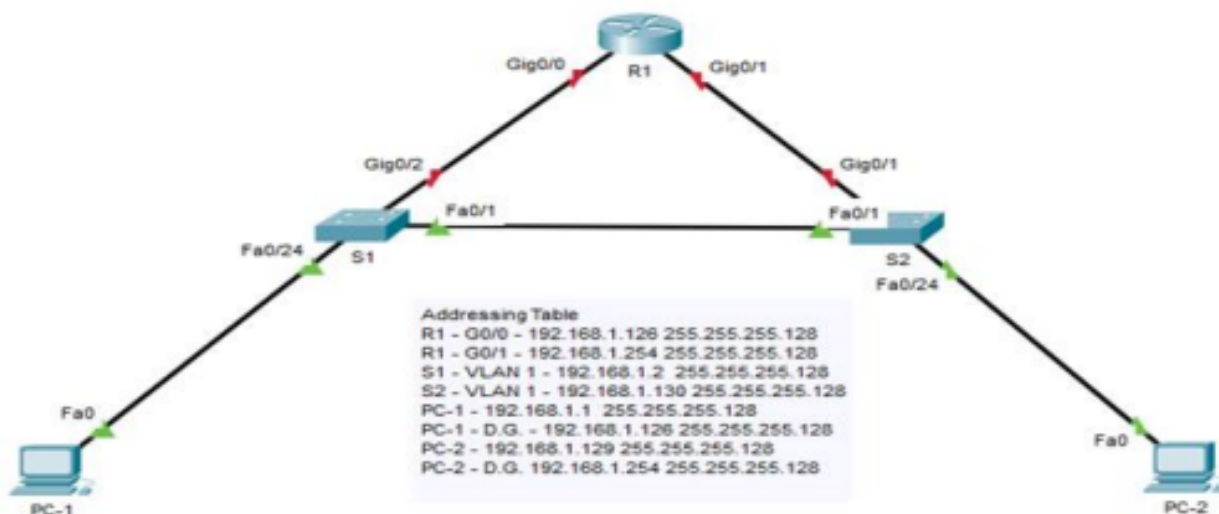
## Assignment

Use the following Packet Tracer file for this assignment: **Connect a Router to the LAN**

## Equipment/Supplies Needed

● Packet Tracer network simulation program
● Computer with Internet connection to upload the completed assignment

**Topology**



Addressing Table
R1 – G0/0 - 192.168.1.126 255.255.255.128
R1 – G0/1 - 192.168.1.254 255.255.255.128
S1 – VLAN 1 - 192.168.1.2  255.255.255.128
S2 – VLAN 1 - 192.168.1.130 255.255.255.128
PC-1 - 192.168.1.1  255.255.255.128
PC-1 – D.G. - 192.168.1.126 255.255.255.128
PC-2 - 192.168.1.129 255.255.255.128
PC-2 – D.G. 192.168.1.254 255.255.255.128

**Addressing Table**

| Device | Interface | IP Address | Subnet Mask | CIDR | Default-Gateway |
|--------|-----------|------------|-------------|------|-----------------|
| R1 | G0/0 | 192.168.1.126 | 255.255.255.128 | /25 | N/A |
| | G0/1 | 192.168.1.254 | 255.255.255.128 | /25 | N/A |
| S1 | Vlan 1 | 192.168.1.2 | 255.255.255.128 | /25 | 192.168.1.126 |
| S2 | Vlan 1 | 192.168.1.130 | 255.255.255.128 | /25 | 192.168.1.254 |
| PC-1 | Nic | 192.168.1.1 | 255.255.255.128 | /25 | 192.168.1.126 |
| PC-2 | Nic | 192.168.1.129 | 255.255.255.128 | /25 | 192.168.1.254 |

1. Click on PC-1, click Desktop and then Command Prompt. You will testing connectivity by pinging. Use the Addressing Table to determine what IP Address to ping to.
   A. Ping from PC-1 to PC-2 Success Yes or No *yes*
   B. Ping from PC-1 to S1 Success Yes or No *yes*
   C. Ping from PC-1 to S2 Success Yes or No *yes*

2. Click on PC-2, click Desktop and then Command Prompt. You will testing connectivity by pinging. Use the Addressing Table to determine what IP Address to ping to.
   A. Ping from PC-2 to S2 Success Yes or No *yes*
   B. Ping from PC-2 to S1 Success Yes or No *yes*
   C. Ping from PC-2 to PC-1 Success Yes or No *yes*

3. Re-address the switched network and test for connectivity. Currently, all devices have a /24 subnet mask. The next step is changing all devices to have a /25 subnet mask. Follow these steps:
   A. Click **PC-1**, click **Desktop** and then click **IP Configuration**. Type in **192.168.1.1** as the IP Address.Change the subnet mask to **255.255.255.128**. Type in **192.168.1.126** as the Default Gateway.
   B. Click **PC-2**, click **Desktop** and then click **IP Configuration**. Type in **192.168.1.129** as the IP Address. Change the subnet mask to **255.255.255.128.** Type in **192.168.1.254** as the Default Gateway.
   C. Configure switches with the IP address and new subnet mask (255.255.255.128) as shown in the addressing table.
   D. When prompted for password, type in **cyber**
   E. At the **S1>** prompt, type in **enable**
   F. When prompted for a password, type in **class**
      *S1(config)#* **int vlan 1**
      *S1(config-if)#* **ip address 192.168.1.2 255.255.255.128**
   G. Repeat the steps above for S2, using the correct IP Address. Refer to the addressing table as needed.

4. Re-test the connectivity between the network devices by pinging them again:
    Ping from PC-1 to PC-2 Success Yes or No  *NO*
    Ping from PC-1 to S1 Success Yes or No  *yes*
    Ping from PC-1 to S2 Success Yes or No *NO*
    Ping from PC-2 to S2 Success Yes or No *yes*
    Ping from PC-2 to S1 Success Yes or No *NO*
    Ping from PC-2 to PC-1 Success Yes or No *NO*
    Ping from S1 to S2 Success Yes or No *NO*
    Ping from S2 to S1 Success Yes or No *NO*

    After changing the subnet masks to a **/25** why are the pings between some of the devices no longer successful? *The Gateways are different*

    What device can be implemented in the network to get connectivity, using the new addressing scheme? *A Router*

5. Add a router to the LAN and display device information by following these steps:
    A. Click on **R1** and then click **CLI**
        Router>**enable**
        Router#**show version**

        What is the name of the IOS image that is currently running on the router?
            *C1900 (C1900-universalK9-m)*
        How much NVRAM (Non-Volatile) does the router have?
            *255K*

        How much Flash memory does the router have?
            *249856 K*
6. Display the routing table on the router by using the following command:
        R1#**show ip route**

        Are there any entries listed in the routing table?
            *NO*

7. Display a summary list of the interfaces on the router by using the following command:
        R1#**show ip interface brief**

        How many Gigabit Ethernet interfaces are listed?
            *2*
        What is the current status of these interfaces?
            *Administratively down*
8. Click **S1**, then click **CLI**
        At the S1# prompt, type in **show version**

        What is the model number of the switch?
            *WS-C2960-24TT*
        What is the name of the IOS image that is running on the switch?
            *C2960-Lanbase-M*
        How much NVRAM (Non-Volatile) does the switch have?
            *63488K*

9. Display a summary list of the interfaces on the switch by using the following command:
    S1#**show ip int brief**

    How many FastEthernet interfaces are on the switch?
    *24*

    How many Gigabit Ethernet interfaces are on the switch?
    *2*

    How many interfaces show an UP and UP status?
    *3*

10. Configure the router by using the following parameters (*Hint: If you have forgotten how to configure something, please refer back to the Unit 2.2 lab*):
    A. Enter **Privileged EXEC** mode from **User Exec** Mode
    B. Enter into **Global Config** Mode
    C. Assign the **Hostname** of **R1** to the router
    D. **Disable the DNS lookup** to prevent the router from attempting to translate incorrectly entered commands
    E. Assign the **enable password as class**
    F. Create a **Message of the Day Banner** that warns anyone accessing the device that **unauthorized access is prohibited**
    G. Assign **cyber** as the **Console** password and enable **login**
    H. Assign **cyber** as the **VTY** password and enable **login**
    I. **Encrypt** all clear-text passwords

11. Configure the Gigabit Ethernet interfaces on R1 by using the following commands:
    *R1(config)#* **interface gigabitethernet 0/0**
    *R1(config-if)#* **ip address 192.168.1.126 255.255.255.128**
    *R1(config-if)#* **no shutdown**

**Note:** It is good practice to configure a description for each interface to help document the network information. Configure an interface description indicating to which device it is connected.

    *R1(config-if)#* **description LAN connection to S1**
    *R1(config-if)#* **end**
    *R1#* **ping 192.168.1.1**

    *R1(config)#* **interface gigabitethernet 0/1**
    *R1(config-if)#* **ip address 192.168.1.254 255.255.255.128**
    *R1(config-if)#* **no shutdown**
    *R1(config-if)#* **description LAN connection to S2**
    *R1(config-if)#* **end**
    *R1#* **ping 192.168.1.129**

12. Verify interface configurations and connectivity on R1 by typing in the following:
    R1#**show ip interface brief**

    How many Serial interfaces are on R1?
    *2*

    How many Ethernet (any type) interfaces are on R1?
    *3*

How many interfaces are configured with IP Addresses, and are in an UP and UP state on R1?

*2*

13. View the routing table on R1 by typing in the following:

R1#**show ip route**

How many connected routes (uses the "C" code) are on R1?

*2*

14. Use the **show interface G0/0** command to view statistics about the interface: R1#**show interface G0/0**

How is the subnet mask listed in the output?

*1/255*

How is the bandwidth listed for the G0/0 interface?

*1000000 Kbit*

What is the MAC Address for the G0/0 interface?

*00d0.ff6b.e901*

15. Test the end-to-end connectivity across the network by pinging all of the devices again: Ping from PC-1 to S1     Success Yes or No *yes*
    Ping from PC-1 to R1, G0/0     Success Yes or No *yes*
    Ping from PC-1 to S2          Success Yes or No *No*
    Ping from PC-1 to R1, G0/1     Success Yes or No *yes*

16. Configuring Default Gateways on the switches will allow for full end-to-end connectivity for the switches to all devices. Click on the switches and put in the passwords used in Step 10 and then follow these steps:

    S1#**config t**
    S1(config)#**ip default-gateway 192.168.1.126**

    S2#**config t**
    S2(config)#**ip default-gateway 192.168.1.254**

17. Re-ping one last time to verify end-to-end connectivity. All pings should be successful.
    Ping from PC-1 to S1          Success Yes or No *yes*
    Ping from PC-1 to R1, G0/0  Success Yes or No *yes*
    Ping from PC-1 to S2          Success Yes or No *yes*
    Ping from PC-1 to R1, G0/1  Success Yes or No *yes,*

**Once the assignment is complete, upload BOTH the document and Packet Tracer file for grading.**

**Grading Rubric**

| | |
|---|---|
| Basic Configuration of Routers and Switches entered correctly | 10 Points |
| IP Addresses and Subnet Masks for Router and Switch interfaces entered correctly | 10 Points |
| IP Addresses, Subnet Masks and Default Gateways for the PCs entered correctly | 10 Points |
| All devices able to successfully Ping | 50 Points |

| Questions in Lab answered correctly | 20 Point |