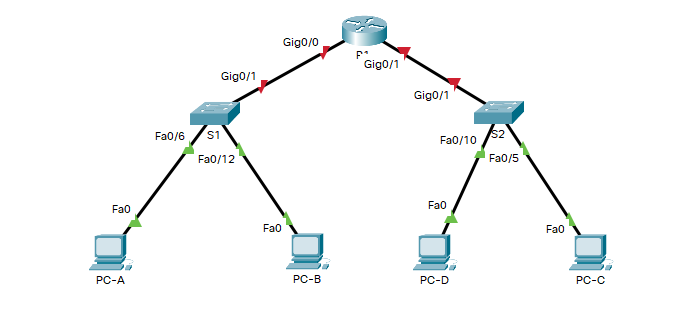
Lab – Building a Network

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# Topology



# Objectives

Part 1: Design a subnetting scheme for the network

Part 2: Properly deploy and wire the network according to a set of specifications

Part 3: Use the commands learned from the semester to program the switches and router so that the network can communicate.

Part 4: Make sure you have full connectivity for all devices by using the PING command.

# Background / Scenario

# Required Resources

For this lab, you will need to use Packet Tracer to build your network. In Packet Tracer you will need to use the following equipment:

4 ea. 2960 Switches

1 ea. 1941 Router

6 ea. Straight through cables

# Instructions

## Design a Subnetting Scheme

### Design a subnet

* + - 1. You are given the address of 192.168.10.0 255.255.255.0, you need to design a subnetting scheme that has at least 7 subnets with at least 25 host addresses in each subnet. Remember, you can have more of each, but not less. Remember the two basic formulas 2n for subnets and 2n-2 for hosts.

What is your new subnet mask: 255.255.255.224

Fill in the chart below with your answer

|  |  |  |  |
| --- | --- | --- | --- |
| Subnet Address | Host Range | Broadcast Address |  |
| 192.168.10.0 | 192.168.10.1 – 192.168.10.30 | 192.168.10.31 |  |
| **192.168.10.32** | **192.168.10.33 – 192.168.10.62** | 192.168.10.63 |  |
| **192.168.10.64** | 192.168.10.65 – 192.168.10.94 | 192.168.10.95 |  |
| **192.168.10.96** | 192.168.10.97 – 192.168.10.126 | 192.168.10.127 |  |
| **192.168.10.128** | 192.168.10.129 – 192.168.10.158 | 192.168.10.159 |  |
| **192.168.10.160** | 192.168.10.161 – 192.168.10.190 | 192.168.10.191 |  |
| **192.168.10.192** | 192.168.10.193 – 192.168.10.222 | 192.168.10.223 |  |
| **192.168.10.224** | 192.168.10.225 – 192.168.10.254 | 192.168.10.255 |  |

**\*\* The 8th row is the final subnet (8 subnets, 30 host addresses each) \*\***

### Fill In the Subnet Chart

* + - 1. Now take your subnets and fill in the following chart. Use the first two subnets for your two LANs. Give the router interface the first subnet address. Give the switch the second subnet address and the third and fourth to the two computers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device | Subnet Address | Subnet Mask | Default Gateway |  |
| R1 | 192.168.10.0 | 255.255.255.224 | N/A |  |
| S1 | 192.168.10.32 | 255.255.255.224 | 192.168.10.0 |  |
| PC-A | 192.168.10.64 | 255.255.255.224 | 192.168.10.32 |  |
| PC-B | 192.168.10.96 | 255.255.255.224 | 192.168.10.32 |  |
| S2 | 192.168.10.128 | 255.255.255.224 | 192.168.10.0 |  |
| PC-D | 192.168.10.160 | 255.255.255.224 | 192.168.10.128 |  |
| PC-C | 192.168.10.192 | 255.255.255.224 | 192.168.10.128 |  |

## Properly deploy and wire the network according to a set of specifications

In this section, you will set up your network and cable it according to the following chart. Use only straight through cables for all your connections.

|  |  |  |
| --- | --- | --- |
| Device | Connect to | Interface |
| PC-A | S1 | Fa 0/6 |
| PC-B | S1 | Fa 0/12 |
| S1 | R1 | Gig 0/1 to Gig 0/0 |
| PC-D | S2 | Fa 0/10 |
| PC-C | S2 | Fa 0/5 |
| S2 | R1 | Gig 0/1 to Gig 0/1 |

Close Configuration Window

## Use the commands learned from the semester to program the switches and router so that the network can communicate.

### List all the commands for a switch. (Note: enable and configuration terminal are givens throughout this.)

* + - 1. Command to change the name of a switch: hostname S1/S2 
         1. For the LAN on your left name the switch S1.
         2. For the LAN on your right name the switch S2.
      2. Command to configure switch password access for secret enable mode: enable secret cisco 
         1. Use cisco for the password
      3. Command to prevent unwanted DNS lookups: no ip command prompt
      4. Command to configure a login message of the day banner: banner motd “message” 
         1. For the Banner of the day use ***Unauthorized access is strictly prohibited.***
      5. What are the three commands to restrict console access?

* + - * 1. line console 0
        2. password class
        3. login
      1. What are the three commands to restrict access to the virtual terminal (VTY) lines?
         1. line vty 0 15
         2. password letmein
         3. exit
         4. How many VTY lines are on the switch? 16 ( 0 – 15 )
      2. Command to encrypt all plain text passwords. service password-encryption
      3. What are the three commands to create SVI IP address to allow remote switch management?
         1. interface vlan1
         2. ip address (address) (subnet mask)
         3. no shutdown
      4. What is the command to assign a default gateway to the switch?
         1. Ip default-gateway
         2. Remember the default gateway is the interface on the router the switch is connected to.

### List all the commands for the router.

* + - 1. Command to change the name of a router: hostname R1 
         1. For the router, name it R1.
      2. Command to configure the router password access for secret enable mode: enable secret cisco 
         1. Use cisco for the password
      3. Command to prevent unwanted DNS lookups: no ip command prompt
      4. Command to configure a login message of the day banner: banner motd “message” 
         1. For the Banner of the day use ***Unauthorized access is strictly prohibited.***
      5. What are the three commands to restrict console access?
         1. line console 0
         2. password class
         3. login
      6. What are the three commands to restrict access to the virtual terminal (VTY) lines?
         1. line vty 0 15
         2. password letmein
         3. exit
         4. How many VTY lines are on the router? 16 ( 0 – 15 )
      7. Command to encrypt all plain text passwords. service password-encryption
      8. What are the four commands needed to assign an IPv4 address to a gigabit ethernet interface?
         1. config t
         2. interface gigabitethernet 0/0
         3. ip address (address) (subnet mask)
         4. no shutdown

For the router interface description use Connected to LAN S1/S2 depending on which LAN it is connected to.

### Once you have your commands down, enter them into the switches and router.

* + - 1. Make sure you name your switch on the left S1 and the switch on the right S2.
      2. Give the SVI in each switch the address entered into your chart.
      3. Give each router interface the address entered into the above chart.
      4. Give each router interface the above description making sure that the interface connected to S1 says connected to S1. For the interface connected to S2 note that making sure it states it is connected to S2.
      5. When you are done make sure you do a **copy run start** to save your configurations on all networking devices.
      6. Assign IP addresses and default gateways to your PCs following your addressing scheme.
      7. Using the **Ping** command, test connectivity across your network. If all the devices cannot talk to each other take whatever troubleshooting steps necessary to correct the problem.

# Step 4: Save both your Word Document and your Packet Tracer file to the Netacad site.