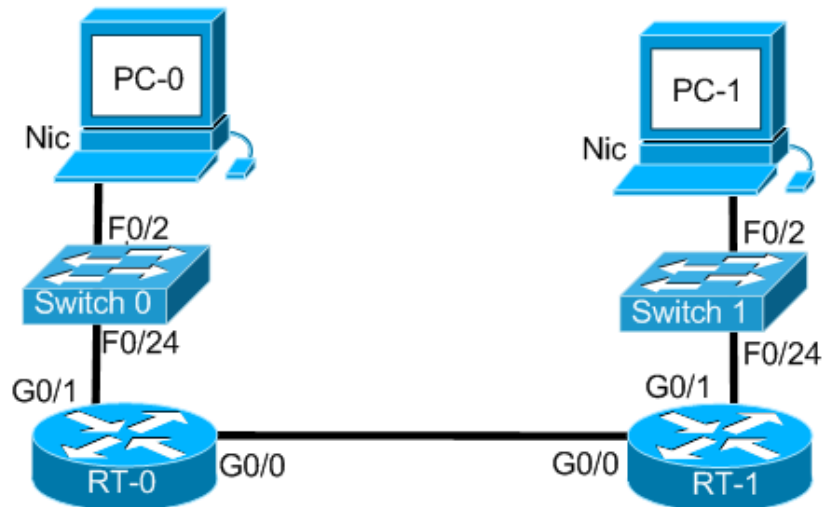


Lab 02 – Basics of Routing

Topology



Note:

- 1) The switches are **2960s** Layer 2
- 2) The routers are **2901s**
- 3) For the In-House students, you will work in pairs. In your groups of 2, decide which of you is PC-A and which is PC-B
- 4) For the On-Line students, you will have to build the lab in Packet Tracer. You can follow along with the lab fairly closely.

IPv4 Addressing Table

Device	Port	IPAddress	Subnet /CIDR	Default Gateway
RT-0	G0/0	10.10.10.2	/30	
RT-0	G0/1	192.168.1.126	/25	
RT-1	G0/0	10.10.10.1	/30	
RT-1	G0/1	192.168.1.254	/25	
SW-0	F0/2	n/a		
SW-0	F0/24	n/a		
SW-1	F0/2	n/a		
SW-1	F0/24	n/a		
PC-0	NIC	192.168.1.1	/25	192.168.1.126
PC-1	NIC	192.168.1.129	/25	192.168.1.254



Objectives

- This lab has been written for both the in-house student (in a lab classroom at Fanshawe College) and for the student taking this course on-line. Please read the sections carefully as you progress through the lab so that you can figure out which part are for you to take to task and complete.
- There will be portions of this lab (Lab-02) that you will be expected to do in later labs with out the explicit instruction detailed in todays lab.
 - For example, todays lab in the [Initial Setup](#) section there are a list of out comes (things to be configured in the switches for today), called the **Basic system config** for today I will go through the detailed steps on how to accomplish this task. BUT next week lab I may not go through the steps in detail, I will just ask you to do the **Basic system config**.
- There will be the following sections for todays lab
 - [Initial Setup](#)
 - [Assigning IPAddresses](#)
 - [Testing](#)
- Throughout the sections and configuration, you may come across a label like: *(PowerPoint – Capture x)*, what are these you might ask? Well, these are points in the process of doing the lab that I want you to stop and answer a question or two or maybe three.
 - When you find one of these (*PowerPoint – Capture x*) please retrieve from FOL the “lab x - Questions.pptx” file, this file contains any question to be answered.
 - Please do these as requested!
 - If you wait to the end of the lab and go back to fill in the questions... you may find you in a situation where you might be asked the same question a few times in a row, each with a slight change to the configuration between the question and you have now missed the changes to the out comes and can not answer the question correctly, (you won't be able to see what changed).

Initial Setup

I would like to see each router and switch with the following:

Basic system config:

- a) The time set on your devices (both the clock and the time zone).
- b) Set the hostname
- c) Set the enable password to "class".
- d) Encrypt all passwords.
- e) Disable domain name lookup.
- f) Setup a banner.
- g) Set the console and vty password to "cisco".
- h) Setup synchronous logging on the console port.
- i) Enable telnet and ssh on the vty ports

You will find over the next few weeks, I will ask much of the same for the basic setup each lab.....

Yes, your right you don't know how to do the steps "a" through "i" above YET! This lab will lead you through this process, and more

Now on with the LAB!

- a) You should have two PC's, two 2906 layer 2 switches, and 2 2901 routers on to the PT work space or have the equipment setup in the classroom lab with you and your partner having your laptops for the PCs in the topology, a 2960 switch, and a 2901 router.
- b) You should have connected the devices as in the [Topology](#) view at the beginning of this document, (mind the ports being used, not so important in this lab but will be in the future).
 - a. Use regular ethernet cables between the PC's and the switches
 - b. Use a cross-over cable between the two switches and or routers
 - c. Finally, from the PC to the switch lets use a console cable and a terminal session to do the initial configuration. (Yes, in PT there is an easier way, the CLI tab of the interface for the device)
 - i. Pressing enter on the keyboard you should see a **Switch>** or **Router>**
Prompt
If you see the following question after the IOS has been loaded:
**"Would you like to enter the initial configuration dialog?
[yes/no]:"**
"no" (always answer no) If you answer yes you will enter setup mode,
If you do get into setup mode, you should be able to press Ctrl-C at any time to terminate the process, if Ctrl-C does not work you may have to reset the switch manually.
 - d. Follow the steps below "c)" through "o)" to configure and then start testing your first connections/configurations



The following will lead you through the **Basic System Config**: of the switch/router:

NOTE:

- in the following: **Black is description**, **Blue is the prompt**, **Red is the command**
- watch the prompts as you work through this lab see how it changes
- if the prompt at this point in time says anything other than **"Switch > or Router>"** please follow the instructions in **"Appendix A"** to clean out your devices

a) The prompt should look like the following:

Switch> or Router> (Please keep in mind all the following commands steps "b" through "m" may say **Switch** for the prompt, but will say **Router** if you're working on a router, and of course the prompt will change when the hostname is changed.... This set of **commands** are the same for both routers and switches.)

b) To enter Privileged (enable) mode type

Switch> enable

Notice the prompt changed

Switch# ←

Note:

The prompt change

c) "a" part 1 of **Basic system config**:

To set the time and date

Switch# clock set 12:10:00 12 Jan 2021 (Adjust this to fit your date and time)

d) To configure the switch must enter configuration mode (global config)

Switch# configure terminal (or **conf t** for short)

Notice the prompt change

Switch(config)# ←

Note:

The prompt change

e) "a" part 2 of **Basic system config**:

There are 2 commands to get the date and time set correctly, this is the second part.

Switch(config)# clock timezone EST -5

f) "b" of **Basic system config**:

Set the hostname for this device remember this could be **SW-2** if you're the second switch and PC-B...

Switch(config)# hostname SW-1

Notice the prompt

g) "c" of **Basic system config**:

Set the enable password to "class"

SW-1(config)# enable secret class

h) "d" of **Basic system config**:

To encrypt all passwords

SW-1(config)# service password-encryption



i) "e" of **Basic system config**:
To disable domain name lookups
SW-1(config)# no ip domain-lookup

j) "f" of **Basic system config**:
Setup the banner

SW-1(config)# banner motd #
Unauthorized access is strictly prohibited. #

You must do a "Enter" on
you keyboard ... this
command spans 2 or more
lines.

k) "g & h" of **Basic system config**:
Set the console password to cisco

SW-1(config)# line con 0
SW-1 (config-line)# password cisco
SW-1 (config-line)# logging synchronous
SW-1 (config-line)# login
SW-1 (config-line)# exit

Note:
The prompt change

l) "g & i" of **Basic system config**:
Set the telnet passwords to cisco
SW-1 (config)# line vty 0 15
SW-1 (config-line)# password cisco
SW-1 (config-line)# login
SW-1(config-line)# transport input all
SW-1 (config-line)# exit

m) Exit the session
SW-1(config)# exit
SW-1#exit

Note:
The prompt changes

At this point the **Basic system config**, is complete, hear is a neat trick....

- Each week I will be asking you to use the same basic configuration on each device
- Can we save this some how so we don't have to type this in each week multiple times?
- **Yes We Can!**
- Save all the little **red** bits starting back at sections "c" each on there own line in a text file
- Save that text file as "Basic config.txt"
- Now next week you just have to open the file and copy it, then paste it in to the device.
- Preferably copy the Basic config.txt to a new file name representing the device for this week (one file for each the devices in this week's lab), then open the new files tweak a few things such as hostname, time, and date.... Then copy the information into the new device for this week.



Assigning IPAddresses

Now we need to give the switch its IP address so that we can communicate with it through telnet.

Using the console ports or the CLI interface in PT, press the enter key a few times

(PowerPoint – Capture 1)

Now that we are in “Global config mode”, we need to set address on the routers interfaces.

- n) Set one of the router IPaddress

```
RT-1(config)# interface g0/0
```

Notice the prompt change

```
RT-1(config-if)# ip address 10.10.10.1 255.255.255.252
```

```
RT-1(config-if)# no shut
```

```
RT-1(config-if)# exit
```

Remember you have just configured one out of 4 interfaces.

Check the masks for the addresses too.

Note: above, is the configuration for 1 of the 4 interfaces on the 2 routers. Check the topology and addressing tables to figure out the information that you will have to change for the other 3 interfaces. Also don't forget the CIDR/Masks are different for 2 of the 4 interfaces.

- o) Now for some routing... I will give you the information for this lab. We are not ready for you to figure out setting up routing yet (you will be in later labs).

In global config mode enter the following command on the appropriate router

```
RT-1(config)# ip route 0.0.0.0 0.0.0.0 10.10.10.2
```

```
RT-0(config)# ip route 0.0.0.0 0.0.0.0 10.10.10.1
```

These commands above will set the default routes so that PC-0 and PC-1 will properly communicate with each other.

Still connected by the console cable or the CLI interface:

(PowerPoint – Capture 2)

(PowerPoint – Capture 3)

Testing

If all is well you should be able to ping your partners PC, and the addresses of the routers.

If you can't ping the other PC or router....

- Make sure your partner is as far as you in the lab and ready for this
- Make sure all the cabling is correct
- On your router run one of my favorite commands



- **show cdp neighbors**
- this command on RT-1 & RT-0 should show an out put similar to:

```
RT-1#sh cdp nei
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID        Local Intrfce   Holdtme    Capability   Platform   Port ID
SW-1             Gig 0/1         179        S            2960       Fas 0/24
RT-0             Gig 0/0         179        R            C2900      Gig 0/0
```

```
RT-0#sh cdp nei
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID        Local Intrfce   Holdtme    Capability   Platform   Port ID
RT-1             Gig 0/0         130        R            C2900      Gig 0/0
SW-0             Gig 0/1         130        S            2960       Fas 0/24
```

- check you cabling
- check the laptops for firewalls being enabled
- check the laptops for anti-virus being enabled

Both firewalls and some Anti-Virus software can stop the ping protocol **(on-line students)**

If you can ping and see all the devices:

Then there are 5 more Power point captures to be done....

(PowerPoint – Capture 4)

(PowerPoint – Capture 5)

(PowerPoint – Capture 6)

(PowerPoint – Capture 7)

(PowerPoint – Capture 8)

This is and introductory... you will be doing much the same next week so if you don't get this working that is OK, but keep trying! You will be doing this most every week of this term.

Once you do get things working... here are a few other commands you can use on the switches and routers to check your work.

show inter trunk
show inter vlan 1

show flash
show running

show clock
show hosts

show ip inter brief
sh cdp neighbors



That's it for today.

- If you were in class please Clean out the configurations on the switches and routers you used this week.
- If you are working in PT please save your file to an appropriate place for later use.
- Don't forget to collect your cables.
- Then cleanup your workstations
- Finally do the quiz for this week it is worth 3% of your final grade.in most cases it is due Saturday at 23:59 EST

follow the instruction
in "[Appendix A](#)"

Appendix A: Erase & Reload a Router or a Switch

For the labs it is necessary to start switches and routers with no configuration, so at the end of every lab the configuration will be cleared and the switches and routers reloaded.

To erase the current configuration

SW-1# erase startup-config

The response from the switch will be

Erasing the nvram file system will remove all files! Continue [confirm]

Press enter to confirm

SW-1# delete vlan.dat

Delete filename [vlan.dat]?

Delete flash:/vlan.dat? [confirm]

Press the enter key for both the prompts above

You may get an error message if there was no vlan.dat file found, this is OK

SW-1# reload

If the response says: "System configuration has been modified. Save?[yes/no]:"

Enter "no"

This is just telling you that the configuration has changed since that last time it was saved. It is making sure that you really want to delete the current configuration. If you enter "yes", the configuration file will be saved and will be back when your reload of the switch or router is finished.

The switch or router will respond with: Proceed with reload? [confirm]

Press enter to confirm

Once this process starts you can move on to the next device if there are more than one device in your configuration.