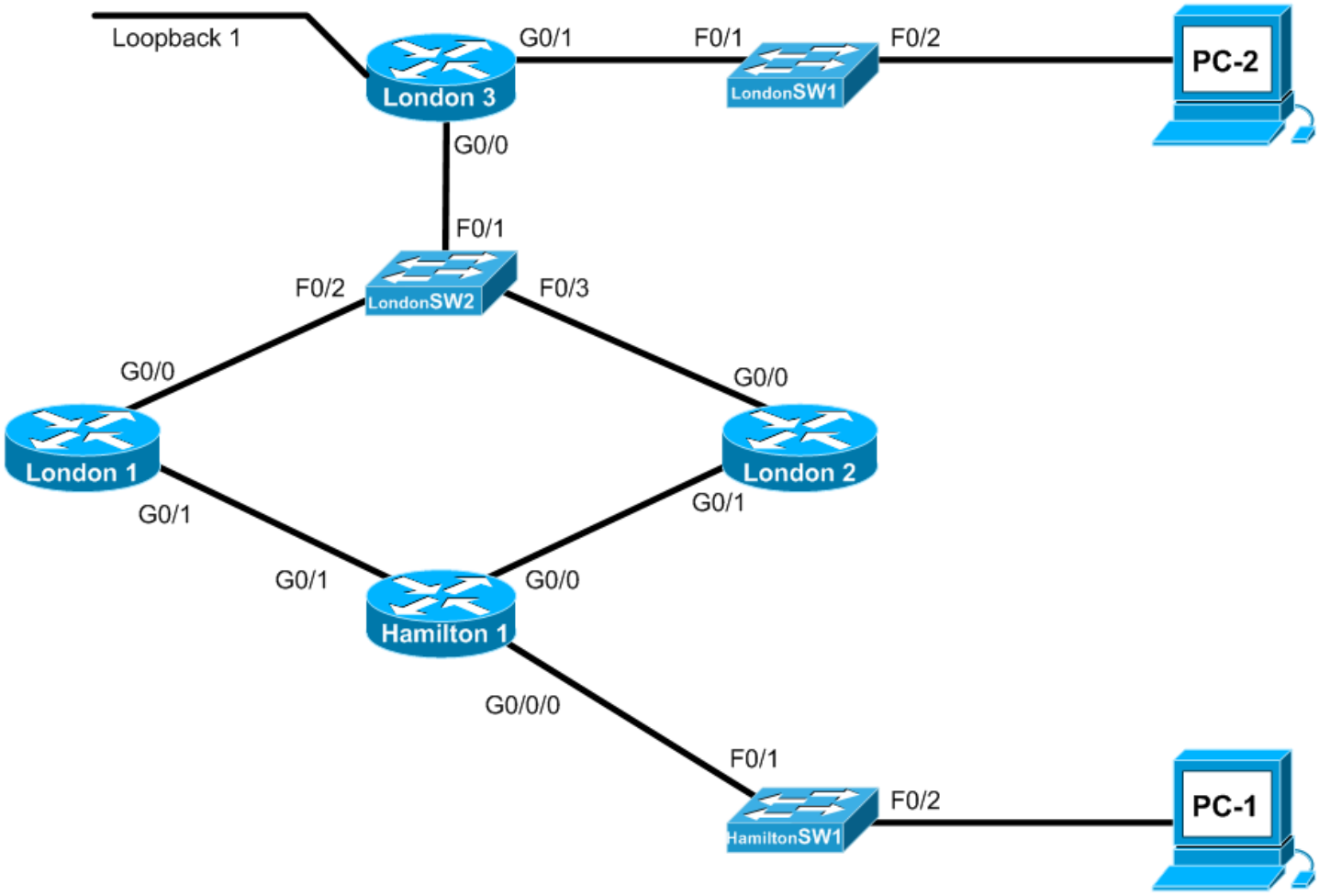
Topology



Note:

1) The routers in the topology above are **2901**s and the switches are **2960**s (Layer 2 switches)
2) **Special NOTE**:
   In-House Students:
   Hamilton 1 router must have the **EHWIC-4ESG** (4 port L2 switch) module installed. (G0/0/0)
   On-lines Students:
   Hamilton 1 router must have the **HWIC-4ESW** (4 port L2 switch) module installed. (F0/0/0)
3) **Special NOTE**: In this Lab, we will modify and configure one of these 4 ports and **make it act like a Layer 3 device**
4) For the In-House students, you will be working in pairs this week.
   a. You will not have enough equipment for everyone to work alone,
   b. you will also not have enough cables to do the lab alone.
5) For the On-Line students, you will have to build the lab in Packet Tracer.
6) You will find in the Lab section of FOL for this week a PowerPoint file. Everything you need to capture today is to be copied into this document.

IPV4 Addressing Table

Device Name	interface	IPV4 Address / mask	Default Gateway	Ports	Vlan
PC-1		172.20.50.2/28	172.20.50.1		
PC-2		172.16.10.2/28	172.16.10.1		
LondonSW1		172.16.10.3/28	172.16.10.1		1
LondonSW2		192.168.2.3/24	192.168.2.4		1
London1	G0/0	192.168.2.5/24			
	G0/1	172.20.30.14/30			
London2	G0/0	192.168.2.6/24			
	G0/1	172.20.40.5/30			
London3	G0/0	192.168.2.4/24			
	G0/1	172.16.10.1/28			
	Lo1	172.16.11.1/24			
Hamilton1	G0/0	172.20.40.6/30			
	G0/1	172.20.30.13/30			
	F0/0/0				10
	Vlan10	172.20.50.1/28			
HamiltonSW1		172.20.50.3/28	172.20.50.1	1-12	10

Initial Setup

I would like to see each device 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

Setup the Network

a) Once you have decided which switch's and router's you will be using,
   PLEASE check that they are clean before you start
b) Routers: (2901s)
   i. To make the **F0/0/0** port on the Hamilton1 router to be routable.
      i. Create a Vlan on the router (yes there is a 4-port switch in the router so you can create Vlans for the L2 switch)
      ii. Assign the IPaddress to the Vlan
      iii. Assign the Vlan to the appropriate gig ethernet port on the 4-port switch
   ii. Shutdown the other 3 ports on the 4-port switch module
   iii. Assign the appropriate addresses to the interfaces, (see the topology and the addressing table) when setting the network masks, **watch the masks you use!** (there is a combination of /24 /28 & /30 networks)
   iv. When hooking up cables remember you can use X-over cable between routers
c) Switches: (2960s L2)
   i. Assign the appropriate addresses on the appropriate Vlans.
   ii. Make sure you assign the default gateway for the switches.
   iii. Shutdown all un-used ports f0/13-24 and g0/1-2
d) Set all your cables in place
e) Time to check things before starting to implement Dynamic routing:

F0/0/0 this port number may change depending on the slot your 4-port L2 Switch is plugged into on the router…. If you do a "show running" on the Hamilton1 router you will see the port names for the 4-port switch, the first port will end with a "0" the four ports are numbered 0 through 3, the center digit G0/**1**/0 is the slot number the 4-port switch is plugged into, again the slots are numbered 0 through 3 in the 2901 routers, (slot 0 is closest to the console port).

(PowerPoint – Capture 1)

Please do not proceed to the next section until you can ping from each device to its neighbour as requested in the *PowerPoint – Capture 1*. If you can not answer "yes" to these 13 questions, you WILL have problems moving on in the lab.

Dynamic Routing - Summarised

a) For each of the 4 routers we need to record the current connections. Connect to the router and copy the information from the "**sh ip route**" command. No need to gather the information from the top of the output… all we need is the connection information, (**see the instructions in the PowerPoint slides**).

(PowerPoint – Capture 2.0, 2.1, 2.2)

What we should see in the PowerPoint Captures are the connected interfaces only up and running **NO ROUTING** information yet.

b) Setting up RIP:
   a. For each of the 4 routers log into the router and starting in "Global configuration mode"
      i. Run the command "**router rip**"
      ii. Then the command "**auto-summary**"
      iii. And for each of the **networks attached to that router**
         1. **network <IPaddress>**

This **<IPaddress>** is the "Network Number" or also called "Subnet-ID" of the network you are working with, for example if you have an interface with and address of 192.168.30.38/30, the network address for this network is 192.168.30.36 this is the address you should be using in the rip network statement.

This lab there are 3 different CIDRs, you need to figure out what the correct network number is to be used in the Rip network statements.

Here is a hint…. The commands you are entering in section "b)" above, you will be tweaking and entering in to each router again. So, it would be a good idea to put the commands into a text file, this way you only need to do the tweaks and then copy and paste the commands in to the routers in the "Dynamic Routing – Not Summarised section a)" below here.

c) What has changed:
Connect to each router and copy the information from the "**sh ip route**" command. No need to gather the information from the top of the output… all we need is the connection information in the bottom part of the output from the command. (**Please follow the instructions in PowerPoint capture #3**).

(PowerPoint – Capture 3.0, 3.1, 3.2)

d) Try a traceroute from PC-1 to PC-2 and of course a traceroute from PC-2 to PC-1, Don't forget that your firewall and some anti-virus software will not let ICMP (used by traceroute) into your PC/Laptop, hence this command may fail. You may have to disable these tools for this command to work.
(Do the appropriate screen captures, and paste the information requested into PowerPoint capture #4)

(PowerPoint – Capture 4)

Dynamic Routing – Not Summarised

a) As stated in section "Dynamic Routing – Summarised, section b)" above, we will be re-entering the router rip commands again with a few tweaks, hear are the tweaks!
   a. The list of commands should be:
      i. **router rip**
      ii. **version 2**
      iii. **no auto-summary**
      iv. **network <ipaddress>**

      one network line for each **network attached to this device**
   b. This need to be done for each of the routers
   c. Once you have tweaked your files, copy them into the appropriate router

b) Let's see what has changed, for each router, run the command "**sh ip route**", copy the routing information into the provided spaces below in capture #5.

(PowerPoint – Capture 5.5, 5.1, 5.2)

c) As we did for the summarized rip routing
Try a traceroute from PC-1 to PC-2 and of course a traceroute from PC-2 to PC-1, Don't forget that your firewall and some anti-virus software will not let ICMP (used by traceroute) into your PC/Laptop, hence this command may fail. You may have to disable these tools for this command to work.
(Do the appropriate screen captures, and past the information requested into PowerPoint capture #6)

(PowerPoint – Capture 6)

d) Compare the information that you have copied from the routers and see if you can see the differences between the summarized and not summarized RIP configurations, see if you can see the changes in the routing table that allow things to work or not work….

That's it for today.
Well it is as far as IPv4 goes.

There is a second PDF in the lab folder for today… it is the same network/topology but it is RIP routing for IPv6, it is there for all students to try and see if you can get it working ether in Packet Tracer, or on the real equipment in the classroom.

This IPv6 lab requires, that all the IPv4 configuration that you have done in this lab be done and working before you start adding the IPv6 to the configuration.

In-house students please clean out the configurations on the switches and routers you used this week.
Don't forget to collect your cables.
Then cleanup your workstations