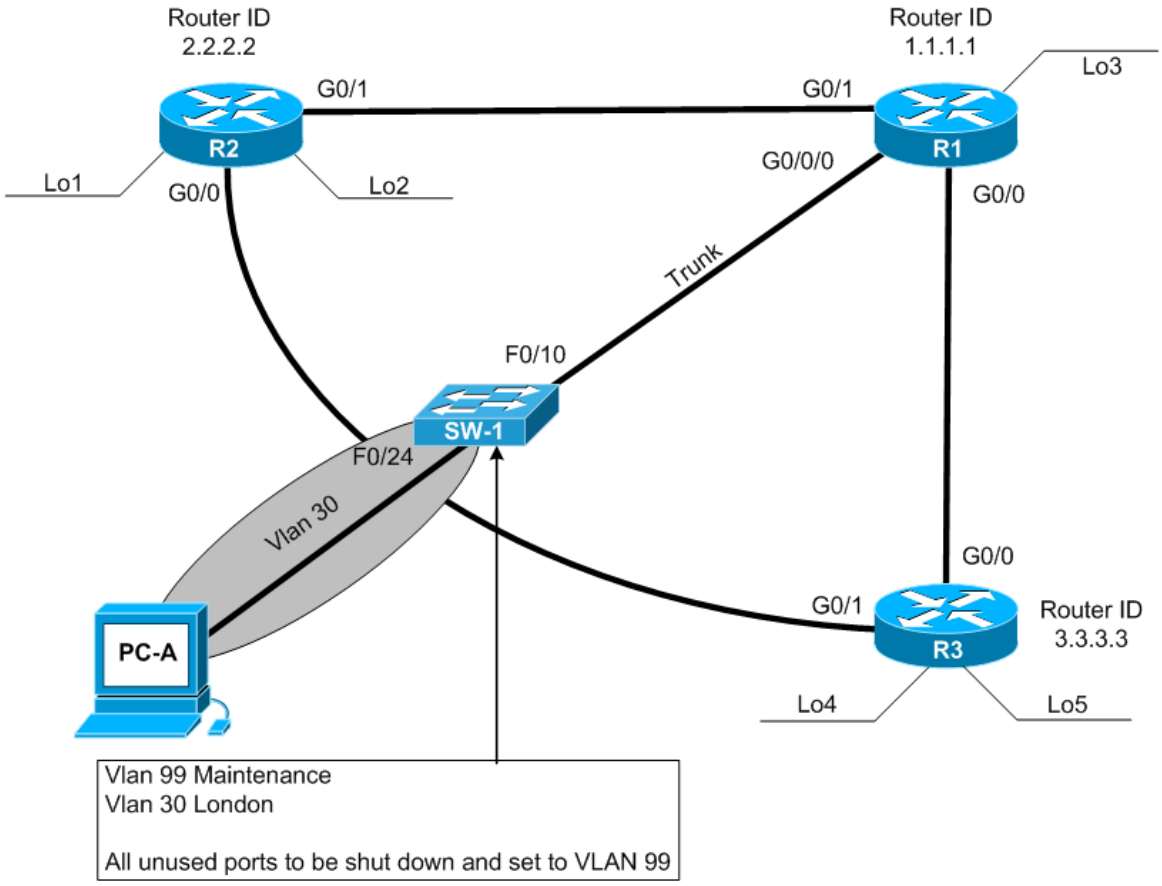
Topology



Notes:

1) The routers in the topology above are **2901**s and the switch is **2960** (Layer 2 switch)
2) **Special NOTE**:
   In-House Students:
   R1 router must have the E**HWIC-4ESG** (4 port L2 switch) module installed. (G0/0/0)
   On-lines Students:
   R1 router must have the **HWIC-4ESW** (4 port L2 switch) module installed. (F0/0/0)
3) For the In-House students, you will be working in no more than pairs this week. (this lab can be done by yourself)
   a. You will not have enough equipment for everyone to work alone, (there are only 6 routers in a pod) there is enough equipment in a pod for 2 groups working per pod, (that would be a max of 4 students 2 per group of 3 routers).
4) For the On-Line students, you will have to build the lab in Packet Tracer.
5) You will find in the Lab section of FOL for this week a PowerPoint file. Please download this file, I have placed markers in the lab where you should do each capture. Make the screen captures and save them in the PowerPoint file according to the questions asked.

IPV4 Addressing Table

Device Name	Interface	IPV4 Address / Mask	Default Gateway
R1	G0/0	192.168.1.5/30	
	G0/1	192.168.1.1/30	
	G0/0/0	Trunk	
	Lo3	10.1.1.1/23	
	VLAN 30	192.168.30.254/24	
	VLAN 99	192.168.99.254/24	
R2	G0/0	192.168.1.9/30	
	G0/1	192.168.1.2/30	
	Lo1	172.16.1.1/23	
	Lo2	172.16.10.1/24	
R3	G0/0	192.168.1.6/30	
	G0/1	192.168.1.10/30	
	Lo4	11.11.11.11/24	
	Lo5	192.168.1.65/26	
SW-1	F0/10	Trunk	
	F0/24	Vlan 30	
	VLAN 30		
	VLAN 99	192.168.99.1/24	192.168.99.254
PC-A		192.168.30.10/24	192.168.30.254

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) Setup the IP addressing on the ports of the devices according to the "Addressing Table".
c) Setup the VlANs on the devices according to the "Addressing Table".
d) Setup the Trunk ports on the devices according to the "Addressing Table".
   If you have setup the vlans and the trunks correctly the use of the "**show interface trunk**" should show you something like:

```
SW-1#sh inter trunk
Port        Mode         Encapsulation  Status        Native vlan
Fa0/10      on           802.1q         trunking      1

Port        Vlans allowed on trunk
Fa0/10      1-1005

Port        Vlans allowed and active in management domain
Fa0/10      1,30,99

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/10      1,30,99

SW-1#
```

Note: **On both the switch and router with trunks attached**. The highlighted lines show that the port is 802.1q trunking and that vlans 1, 30, and 99 are attached to the trunk ports.

Note: **On-line students,** don't forget note 1 above, you will have to put the **HWIC-4ESW** module into the R1 router, and you port numbers may be different (F/0/0/0….).
Note: **In-house students** your 4-port switch should be a Gigabit device hence the port number should be G0/0/0. You may have to run the "**show running**" command to see the correct interface names for your 4-port switch model on your router (R1), as you found last week the name and numbering schema may not match this document.

At this point in the configuration, you should be able to ping the default gateway of PC-A. you should be able to telnet to the default gateway of the PC (R1), from R1 you should be able to ping R2 and R3. On R1 you can use the "**sh cdp neighbors**" command. Don't forget to test the connection between R2 and R3.

```
R1#sh cdp neighbors
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
SW1           Gig 0/0/0         122             S         2960         Fas 0/10
R2            Gig 0/1           126             R         C2900        Gig 0/1
R3            Gig 0/0           126             R         C2900        Gig 0/0
```


If you have manually set everything up to the point and gotten it to work "**Good Work",** but it also means you did not **read the entire lab before you started** to do any work….. or you would have read this part where I tell you there are text files available for you to use for the basis configurations. Look for a ZIP file called "**Scripts for Students**"

All you need to do is tweak the clock settings and copy the appropriate file in to the device your working on and hook up the cables to get to this point in the lab.

Note: if you're an online student you will also have to tweak, the value of G0/0/0 to F0/0/0 in R1, for the files mentioned above to work on Packet Tracer

(PowerPoint – Capture 1)

Setting up OSPF

Login to each of the routers and:

a) Start the routing of OSPF with and AS of 100 for each router.
   a. **R1(config)# router ospf 100**
b) Assign the router ID's according to the Topology, for each router.
   a. **R1(config-router)# router-id 1.1.1.1**
c) **For each interface on each router** add the correct network command using the **area number of 51**
   a. **R1(config-router)# network 192.168.1.0 0.0.0.3 area 51**

Note: You will need at least two routers partly configured to be able to check with the "**show ip rout**" command, to see routes beginning with the letter "O" in the routing table.

(PowerPoint – Capture 2)

(PowerPoint – Capture 3)

Please look at the routing table in R1 and check the route for 172.16.1.1, it should currently look something like:

```
172.16.1.1/32 [110/66] via 192.168.1.2, 02:58:32, GigabitEthernet0/1
```

d) Now please add the following entries into each router:

a.

Router 1 (R1)	Router 2 (R2)	Router3 (R3)
interface g0/1	**interface g0/1**	**interface g0/1**
ip ospf cost 128	**ip ospf cost 128**	**ip ospf cost 64**
exit	**interface g0/0**	**exit**
	ip ospf cost 64	
	exit	

b. This will simulate, slow connections between the routers.
Now check the routing table on R1, do you see the difference.
If not, you may need to run the command "**clear ip ospf process**" this will cause an immediate rebuild of the OSPF database. (connections don't normally change "cost" so OSPF may take awhile to see the change, the "**clear ip ospf process**" will force a rebuild of the database).
Now do you see any differences?

(PowerPoint – Capture 4)

(PowerPoint – Capture 5)

Check out some of the other commands:

Show ip ospf neighbor
Show ip ospf database
Show ip ospf database router
Show ip ospf database network

How do they differ from router to router?

That's it for today.
Well it is as far as what will be graded.

There is a second PDF in the lab folder for today… it is the same network/topology but it is OSPF 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.

Clean out the configurations on the switches and routers you used this week.
Don't forget to collect your cables.
Then cleanup your workstations