Today's Labs:

There are 2 labs for today Lab **06.1** & **06.2** Both in this one PDF.

Lab 06.1 (Starting at Page 2) should look familiar to the point it is somewhat the same as lab 4, the difference is I'm asking you to program both the switch and router, (without DHCP on the router) and you have to change the IP address on PC-A

Lab 06.2 (Starting at Page 6) is a stripped-down version of the 06.1.
no trunks, no sub-interfaces, only 2 Vlans, no management network

Believe it or not this is the lab I want you to do first, and the one I will be marking.

The second lab, (06.1), is for you to do in spare time so you can see there are several different ways to do things depending on requirements.

Lab 06.2 is router on a stick, sort-of, (but more commonly called legacy), 2 Vlans on the layer 2 switch, each connected to their own leg/interface on the router.

Lab 06.1 is router on a stick as we know it today, with a trunk and sub-interfaces (4 of them) to 4 Vlans on the layer 2 switch.

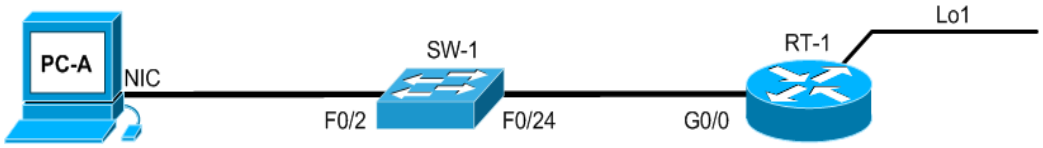
You will also see there is both IPv4 and IPv6, I will be trying to include IPv6 in the labs as we move forward!

Students, do lab 06.2 first, then proceed to try Lab06.1

You will all notice that there is not a PowerPoint section to today's lab. The PDF of the lab has been setup so you can add notes and answer questions….

INFO-6047: Lab 06.1 – Inter Vlan Routing

Topology



Note:

1) The router in the topology above are **2901** and the switch is a **2960** Layer 2
2) For the In-House students, you will be working on your own this week. (You can talk, help and work with each other, BUT you must build your own topology, to be graded.)
3) For the On-Line students, you will have to build the lab in Packet Tracer.

IPV4 Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway	Ports	Vlan name
RT-1	G0/0	no address				
	G0/0.10	192.168.10.254	/24			
		2001:db8:acad:10::254	/64			
	G0/0.20	192.168.20.254	/24			
		2001:db8:acad:20::254	/64			
	G0/0.30	192.168.30.254	/24			
		2001:db8:acad:30::254	/64			
	G0/0.99	192.168.1.254	/24			
		2001:db8:acad:1::254	/64			
	Lo1	10.10.10.10	/32			
		2001:db8:acad:50:10:10:10:10	/128			
SW-1	Vlan 10				1 - 6	Student
	Vlan 20				7 - 12	Faculty
	Vlan 30				13 - 18	Server
	Vlan 99	192.168.1.253	/24	192.168.1.254	19 - 23	Mgmt
	Trunk				24	
PC-A	NIC					

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 and router you will be using,
   PLEASE check that they are clean before you start
b) You have setup Vlans on a switch same as we did in lab 4
   i. Starting with a clean switch
      i. Check the addressing table and build the appropriate Vlans
      ii. Check the addressing table and build the appropriate Trunks
      iii. Check the addressing table and apply the appropriate IPaddresses
      iv. Don't forget to add the default gateway
c) You have setup a router last week in lab 5
   i. Starting with a clean router
   ii. Don't forget to enable IPv6 on your routers today (**ipv6 unicast-routing**)
      i. Check the addressing table and apply the appropriate IPaddresses to the interfaces (Lo1).
         1. **RT-1(config)# inter lo 1**
         2. **RT-1(config)# ip add 10.10.10.10 255.255.255.255**
         3. **RT-1(config)# ipv6 add 2001:db8:acad:50:10:10:10:10/128**
   iii. Inter face G0/0 is not set up normally…..
      i. The physical G0/0 has no IP address applied to it
         1. **RT-1(config)# inter g0/0**
         2. **RT-1(config-if)# no ip address**
         3. **RT-1(config-if)# no shut**
   iv. Now we need to create sub-interfaces one for each Vlan in the trunk connected on G0/0
      i. To create a sub inter face of g0/0
         1. **RT-1(config)# inter g0/0.10**
         2. **RT-1(config-if)# encapsulation dot1q 10**
         3. **RT-1(config-if)# ip add 192.168.10.254 255.255.255.0**
         4. **RT-1(config-if)# ipv6 add 2001:db8:acad:10::254/64**
         5. **RT-1(config-if)# no shut**

creates sub interface 10
connects this sub interface to Vlan 10

   v. Now repeat the step above, creating a sub-interface on the router for each of the Vlans on the switch connected through the trunk to the router. (Hint 3 more times, for Vlan 20, 30, & 99)

d) Plugging in the cables as shown in the topology.

e) Starting place for the PC-A in the topology is in port f0/2 of the switch this is Vlan 10

i. This is the starting point for PC-A and it should be configured with:

i. IP address of → 192.168.10.**10**
ii. Default Gateway of → 192.168.10.254
iii. Subnet mask of → 255.255.255.0
iv. IPv6 address of → 2001:db8:acad:10::**10**
v. IPv6 Default Gateway → 2001:db8:acad:10::254
vi. IPv6 Subnet/Prefix → /64

Please note the PC-A's address will be "**10**" in all cases for IPv4 and IPv6

f) Please fill in this table with the appropriate IPaddress for IPv4 & IPv6 for the 20, 30, and 99 vlans

	Address	Default Gateway	Mask	
IPv4	**192.168.20.10**	**192.168.20.254**	**24**	Vlan 20
IPv6	**2001:db8:acad:20::10**	**2001:db8:acad:20::254**	**64**	
IPv4	**192.168.30.10**	**192.168.30.254**	**24**	Vlan 30
IPv6	**2001:db8:acad:30::10**	**2001:db8:acad:30::254**	**64**	
IPv4	**192.168.1.10**	**192.168.1.254**	**24**	Vlan 99
IPv6	**2001:db8:acad:1::10**	**2001:db8:acad:1::254**	**64**	

g) Testing

i. For each Vlan, adjust your PC-A to have the appropriate address, mask, and default gateway
ii. Plug you PC-A into a port on the switch for the each of the vlans
iii. Can you ping 10.10.10.10 and 2001:db8:acad:50:10:10:10:10

i. From Vlan 10 **Yes**
ii. From Vlan 20 **No**
iii. From Vlan 30 **No**
iv. From Vlan 99 **No**

h) Now for both the router and the switch, log into each and do a show running command copy only the running config and paste it into the appropriate area below.

Router

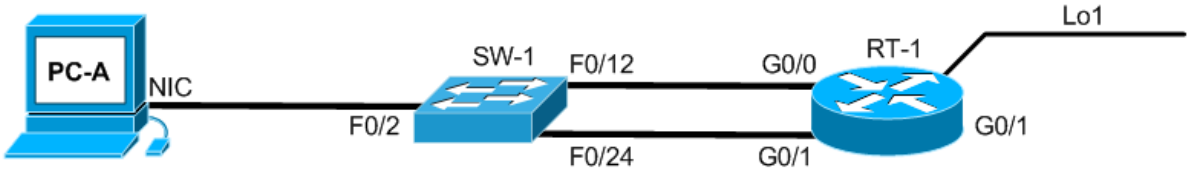
```
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname RT-1
!
!
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
clock timezone EST -5
!
!
!
!
no ip cef
ipv6 unicast-routing
!
no ipv6 cef
!
!
!
!
license udi pid CISCO2901/K9 sn FTX1524SJ0K
!
!
!
!
!
!
!
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface Loopback1
 ip address 10.10.10.10 255.255.255.255
 ipv6 address 2001:DB8:ACAD:50:10:10:10:10/128
!
```

Switch

```
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname SW-1
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
clock timezone EST -5
!
no ip domain-lookup
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/2
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/3
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/4
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/5
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/6
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/7
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/8
 switchport access vlan 20
```

6047: Lab 06.2 – Inter Vlan Routing

Topology



Note:

4) The router in the topology above are **2901** and the switch is a **2960** Layer 2
5) For the In-House students, you will be working on your own this week. (You can talk, help and work with each other, BUT you must build your own topology, to be graded.)
6) For the On-Line students, you will have to build the lab in Packet Tracer.

IPV4 Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway	Ports	Vlan name
RT-1	G0/0	192.168.10.254	/24			
		2001:db8:acad:10:: 254	/64			
	G0/1	192.168.20.254	/24			
		2001:db8:acad:20:: 254	/64			
	Lo1	10.10.10.10	/32			
		2001:db8:acad:50:10:10:10:10	/128			
SW-1	Vlan 10	192.168.10.253	/24	192.168.10.254	1 - 12	Student
	Vlan 20				13 -24	Faculty
PC-A	NIC					

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 and router you will be using,
   PLEASE check that they are clean before you start
b) You have setup Vlans on a switch back in lab 4
   i. Starting with a clean switch
      i. Check the addressing table and build the appropriate Vlans
      ii. Check the addressing table and apply the appropriate IPaddresses
      iii. Don't forget to add the default gateway
c) You have setup a router last week in lab 5
   i. Starting with a clean router
   ii. Don't forget to enable IPv6 on your routers today (**ipv6 unicast-routing**)
      i. Check the addressing table and apply the appropriate IPaddresses to the interfaces (Lo1, G0/0, G0/1).
         1. **RT-1(config)# inter lo 1**
         2. **RT-1(config)# ip add 10.10.10.10 255.255.255.255**
         3. **RT-1(config)# ipv6 add 2001:db8:acad:50:10:10:10:10/128**
d) Plugging in the cables as shown in the topology.
e) Starting place for the PC-A in the topology is in port f0/2 of the switch this is Vlan 10
   i. This is the starting point for PC-A and it should be configured with:
      i. IP address of → 192.168.10.**10**
      ii. Default Gateway of → 192.168.10.254
      iii. Subnet mask of → 255.255.255.0
      iv. IPv6 address of → 2001:db8:acad:10::**10**
      v. IPv6 Default Gateway → 2001:db8:acad:10::254
      vi. IPv6 Subnet/Prefix → /64

Please note the PC-A's address will be "**10**" in all cases for IPv4 and IPv6

f) Please fill in this table with the appropriate IPaddress for IPv4 & IPv6 for vlan 20

	Address	Default Gateway	Mask	
IPv4	192.168.20.10	192.168.20.254		Vlan 20
IPv6	2001:db8:acad:20::10	2001:db8:acad:20::254		

g) Testing

i. For each Vlan, adjust your PC-A to have the appropriate address, mask, and default gateway

ii. Plug you PC-A into a port on the switch for the each of the vlans

iii. Can you ping 10.10.10.10 and 2001:db8:acad:50:10:10:10:10

i. From Vlan 10 **Yes**

ii. From Vlan 20 **No**

h) Now for both the router and the switch, log into each and do a show running command copy only the running config and paste it into the appropriate area below.

Router

```
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname RT-1
!
!
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
clock timezone EST -5
!
!
!
!
no ip cef
ipv6 unicast-routing
!
no ipv6 cef
!
!
!
!
license udi pid CISCO2901/K9 sn FTX15246X6A
!
!
!
!
!
!
!
!
```

Switch

```
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname SW-1
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
clock timezone EST -5
!
no ip domain-lookup
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/2
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/3
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/4
 switchport access vlan 10
 switchport mode access
!
```

That's it for today.

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

Don't forget to complete the quiz for todays lab