Lab 2

Initial setup:

1. Trunk links and add vlans
    a. on router 1
        i. int fa1/0.2
            1. encapsulation dot1q 2
            2. ip address 192.168.2.1 255.255.255.0
        ii. int fa1/0.3
            1. encapsulation dot1q 3
            2. ip address 192.168.3.1 255.255.255.0
        iii. int fa1/0.4
            1. encapsulation dot1q 4
            2. ip address 192.168.4.1 255.255.255.0
        iv. int fa1/0.5
            1. encapsulation dot1q 5
            2. ip address 192.168.5.1 255.255.255.0
    b. on switch 1
        i. trunk link between sw1 and router
            1. int fa0/9
                a. switchport mode access
                b. switchport trunk encapsulation dot1q
                c. switchport mode trunk

ii. do the same thing for fat0/10 between sw1 and sw2

iii. trunk fa0/1 between sw1 and cisco1800

c. on switch 2

i. trunk int fa0/10

d. on cisco1800 trunk as switch

i. trunk int fa2

2. Set up vtp

a. on switch 2 make client

i. config t

ii. vtp mode client

iii. vtp domain lab2

b. on switch 1 make client

c. on cisco1800

i. vlan database

ii. vtp server

iii. vtp domain lab2

1. Creating a DHCP server and implementing wired LANs

a.

i. in commserver

1. interface loopback 1
2. ip address 172.0.0.1 255.255.255.0
3. ip host SW1 2033 172.0.0.1
4. ip host SW2 2034 172.0.0.1
5. ip host R 2035 172.0.0.1

6. line 33 40
7. transport input all
8. clear line 33
9. clear line 34
10. clear line 35

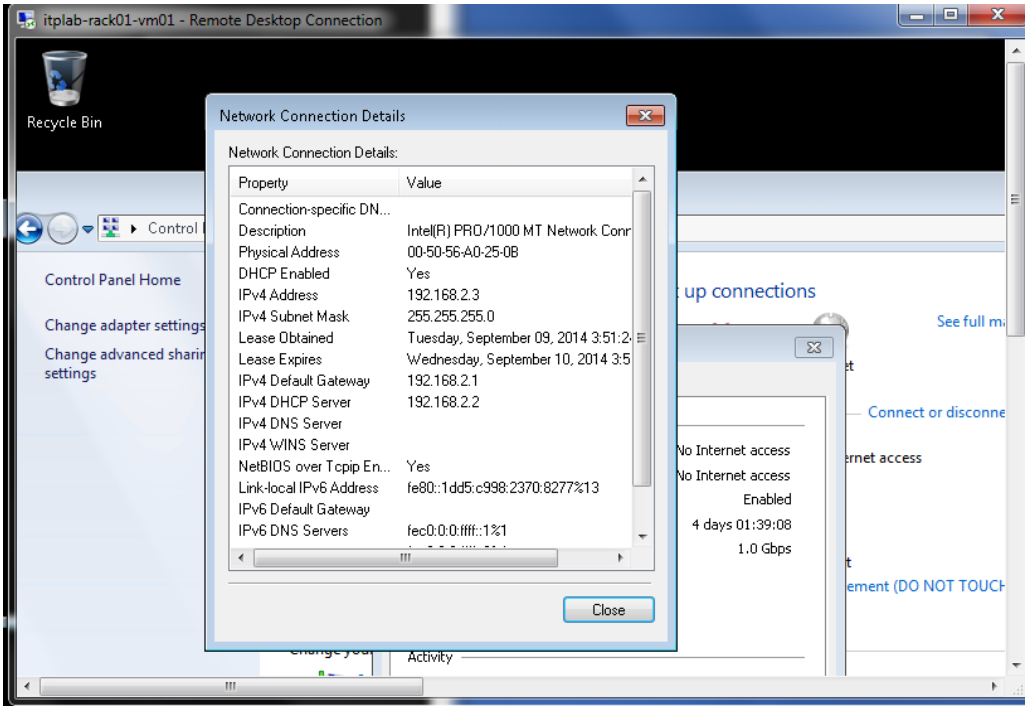
ii. in switch part of cisco1800

1. setting up vlans
    a. vlan database
    b. vlan 2 name wired1
    c. vlan 3 name wired2
    d. apply
    e. exit
2. assign vlans to pc ports on cisco
    a. in fa3 for pc1
        i. switchport mode access
        ii. switchport access vlan 2
    b. in fa 4 for pc 2 same thing

iii. on pc assign ip address and default gateway to test

iv. on switch 2 set up dhcp for vlan 2

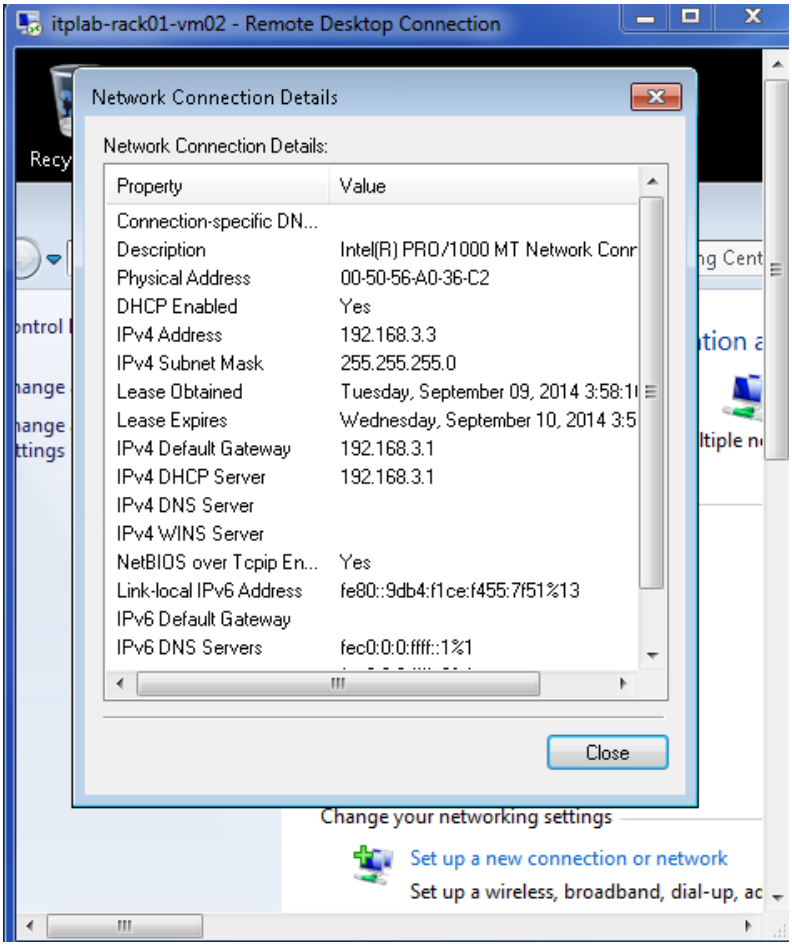
1. config t
2. ip dhcp pool vlan 2
3. network 192.168.2.0 255.255.255.0
4. default 192.168.2.1
5. ip dhcp excluded-address 192.168.2.1 192.168.2.2

6. service dhcp
7. on sw2 assign ip address to vlan2
    a. vlan2
        i. config t
        ii. interface vlan2
        iii. ip address 192.168.2.2 255.255.255.0
        iv. no shut
8.
```
SW2#show ip dhcp binding
Bindings from all pools not associated with VRF:
IP address          Client-ID/              Lease expiration        Type
                    Hardware address/
                    User name
192.168.2.3         0100.5056.a025.0b       Mar 02 1993 02:54 AM    Automatic
SW2#
```
9. 

v. on router 1 set up dhcp for vlan 3
    1. config t
    2. ip dhcp pool vlan 2

3. network 192.168.3.0 255.255.255.0
4. default 192.168.3.1
5. ip dhcp excluded-address 192.168.3.1 192.168.3.2
6. exit
7. service dhcp
8.

```
R1#show ip dhcp binding
Bindings from all pools not associated with VRF:
IP address          Client-ID/              Lease expiration        Type
                    Hardware address/
                    User name
192.168.3.3         0100.5056.a036.c2       Sep 10 2014 10:07 PM    Automatic
R1#
```

9. 

2. Configuring wireless for ipv4 vlans

a. on cisco1800

i. en

ii. vlan database

1. vlan 4 name wireless1
2. vlan 5 name wireless2
3. apply
4. exit

b. dhcp pool on cisco

i. ip dhcp pool vlan4

ii. network 192.168.4.0 255.255.255.0

iii. default 192.168.4.1

iv. ip dhcp excluded-address 192.168.4.1 192.168.4.2

v. service dhcp

vi. same thing for vlan 5

c. root radio station

i. interface dot11radio 0

ii. ssid wireless1ssid

iii. vlan 4

iv. authentication open

v. exit

vi. ssid wireless2ssid

vii. vlan 5

viii. authentication open

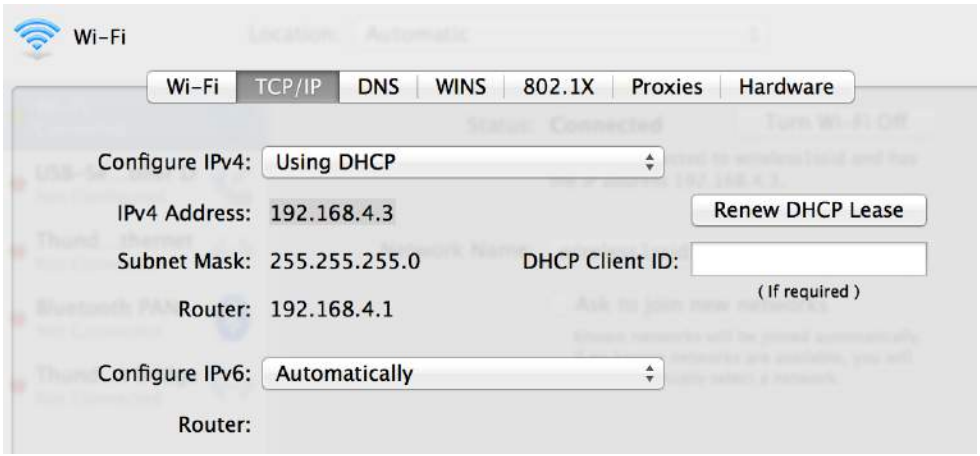
ix. exit

x. station-role root

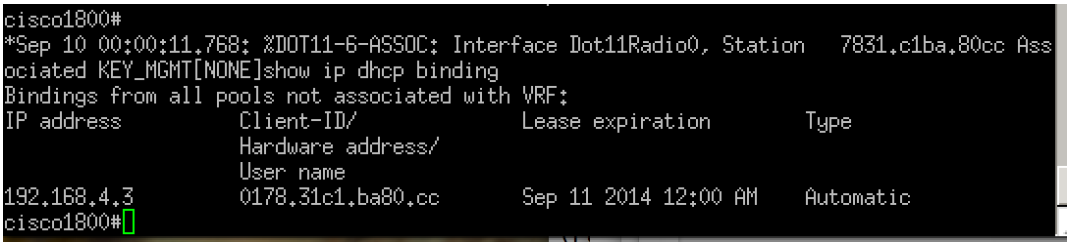
xi. channel 2412

d. configuring bridging on vlans
    i. bridge irb
    ii. interface vlan 4
    iii. bridge-group 1
    iv. exit
    v. int bvi 1
    vi. ip address 192.168.4.1 255.255.255.0
    vii. same for vlan 5
    viii. for both bridge groups
        1. bridge 1 protocol ieee
        2. bridge 1 route ip
e. configuring radio station subinterfaces
    i. vlan 4
        1. interface dot11radio0.4
        2. encapsulation dot1q 4
        3. no cdp enable
        4. bridge-group 1
    ii. vlan 5 same thing
    iii. turn on interfaces
f. configuring clients

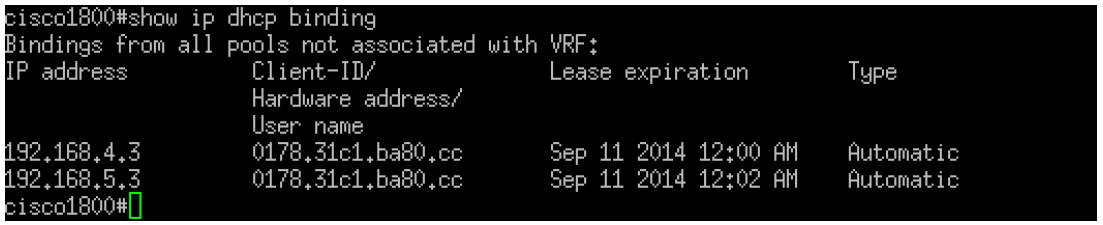
i.



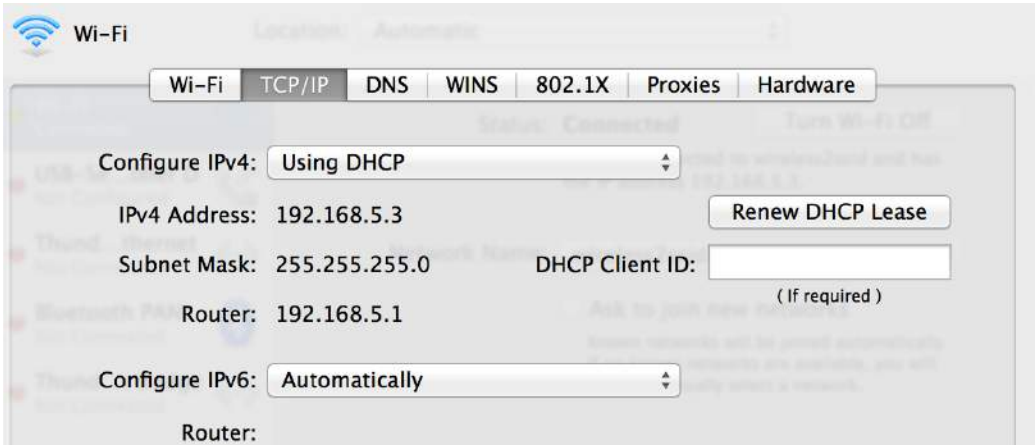
ii.



iii.



iv.



3. Securing WLANs

a. max-associations

i. conf t

ii. int dot11radio0

iii. ssid wireless1ssid

iv. max-associations 1

v.
```
no ip address
!
ssid wireless1ssid
   vlan 4
   max-associations 1
   authentication open
!
```

b. wep128

i. int dot11radio0

ii. vlan 5 key 1 size 128bit 0 00000000000000000000000000

iii.
```
interface Dot11Radio0
no ip address
!
encryption vlan 5 key 1 size 128bit 0 00000000000000000000000000 transmit-key
!
ssid wireless1ssid
   vlan 4
   max-associations 1
   authentication open
```

c. wpa

i. int dot11radio

ii. encryption vlan 3 mode ciphers tkip

iii. ssid _____

1. authentication open
2. authentication key-management wpa
3. wpa-psk ascii 0 batmobile

iv.

```
encryption vlan 3 mode ciphers tkip
!
ssid wireless1ssid
   vlan 4
   max-associations 1
   authentication open
!
ssid wireless2ssid
   vlan 5
   authentication open
!
ssid wireless3
   vlan 3
   authentication open
   authentication key-management wpa
   wpa-psk ascii 0 batmobile
```

4. Vlan wired host

a.

```
!
interface Vlan4
 no ip address
 bridge-group 1
```

b. no completed???

5. HSRP redundancy

a. set up Commserver with loopback1 and add all 6 hosts the usual way

b. give ip addresses to each interface on routers

   i. int fa2/0

   ii. ip address 192.168.1.4 255.255.255.0

   iii. no shut

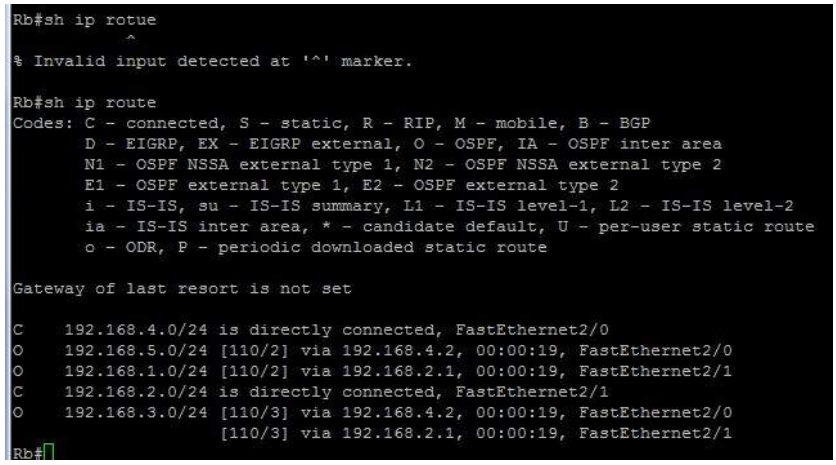
c. Set up ospf on all the routers

   i. conf t

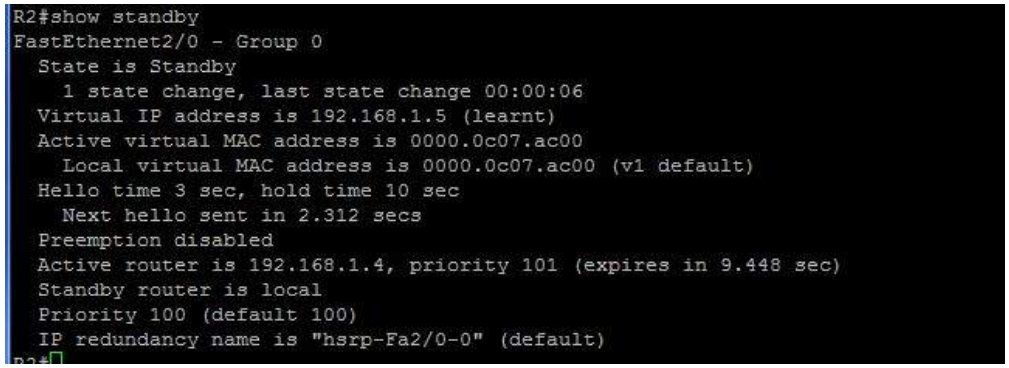
   ii. router ospf 2

      1. network 192.168.0.0 255.255.0.0 area 0

   iii. do sh ip route to see if config works or not

1. 

iv. ping interface from terminal to double check connectivity

1. 

v. set up loopback like commserver and ping

d. Configure HSRP on interfaces between the routers

i. configure R1 int fa2/0

1. standby ip 192.168.1.5 (V-IP)
2. standby priority 101
3. sh standby to verify it's state

4.
```
R1#show standby
FastEthernet2/0 - Group 0
  State is Active
    2 state changes, last state change 00:04:43
  Virtual IP address is 192.168.1.5
  Active virtual MAC address is 0000.0c07.ac00
    Local virtual MAC address is 0000.0c07.ac00 (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 1.836 secs
  Preemption disabled
  Active router is local
  Standby router is 192.168.1.3, priority 100 (expires in 8.616 sec)
  Priority 101 (configured 101)
  IP redundancy name is "hsrp-Fa2/0-0" (default)
```

ii. configure R2 int fa2/0

1. standby ip
2. the virtual ip address is learned

iii. set default gateway on terminal to virtual ip address

iv. pull cable

1.
```
R2#
*Sep 14 00:31:29.341: %HSRP-5-STATECHANGE: FastEthernet2/0 Grp 0 state Standby -
> Activeshow standby
FastEthernet2/0 - Group 0
  State is Active
    5 state changes, last state change 00:00:08
  Virtual IP address is 192.168.1.5 (learnt)
  Active virtual MAC address is 0000.0c07.ac00
    Local virtual MAC address is 0000.0c07.ac00 (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.952 secs
  Preemption disabled
  Active router is local
  Standby router is unknown
  Priority 100 (default 100)
  IP redundancy name is "hsrp-Fa2/0-0" (default)
R2#
*Sep 14 00:31:55.341: %OSPF-5-ADJCHG: Process 2, Nbr 192.168.3.1 on FastEthernet
2/0 from FULL to DOWN, Neighbor Down: Dead timer expired
R2#
R2#
R2#sh standby
FastEthernet2/0 - Group 0
  State is Active
```

6. Questions from 2b
    a. A router will terminate the Vlan and Mac layers at the interface if it is configured for routing in layer 3. Bridging interfaces allow the Vlan and Mac header to be maintained on a frame.
    b. Bridge x protocol ieee enables bridging on the router. Bridge x route ip enables routing for ip protocol.

c. When you use irb you have the ability to route between and bridged domain and a routed domain.

d. The BVI is a virtual interface that acts like a normal routed interface.

7. Study Questions

a. They would be good for situations where a centralized network isn't possible for instance during a disaster.

b. You would use an infrastructure network in situations where you need to communicate with servers or the Internet.

c. A layer 2 switch uses Mac addresses to pass packets while a layer 3 switch uses Ip addresses. Yes, they can be substituted for a router in a network.

d. DHCP is a protocol that assigns ip addresses to devices and also sends them default gateways. You would use it in a wireless network to do just that.

e. WEP is a way to secure a wireless network that provides authentication and encryption. It is insecure because they key values are too short and the keys needed to be shared statically. You can break WEP by eavesdropping packets and decrypting them. Other security options for 802.11 networks are WPA and WPA2.

f. IRB is a way to bridge and route a protocol on the same interface. VLAN and Mac headers are replaced when entering a router. With IRB, the VLAN header is maintained when it is forwarded.

g. The difference between WPA and WPA2 is that WPA2 now includes aes as encryption.

h. Enable 'guest-mode' on one ssid.