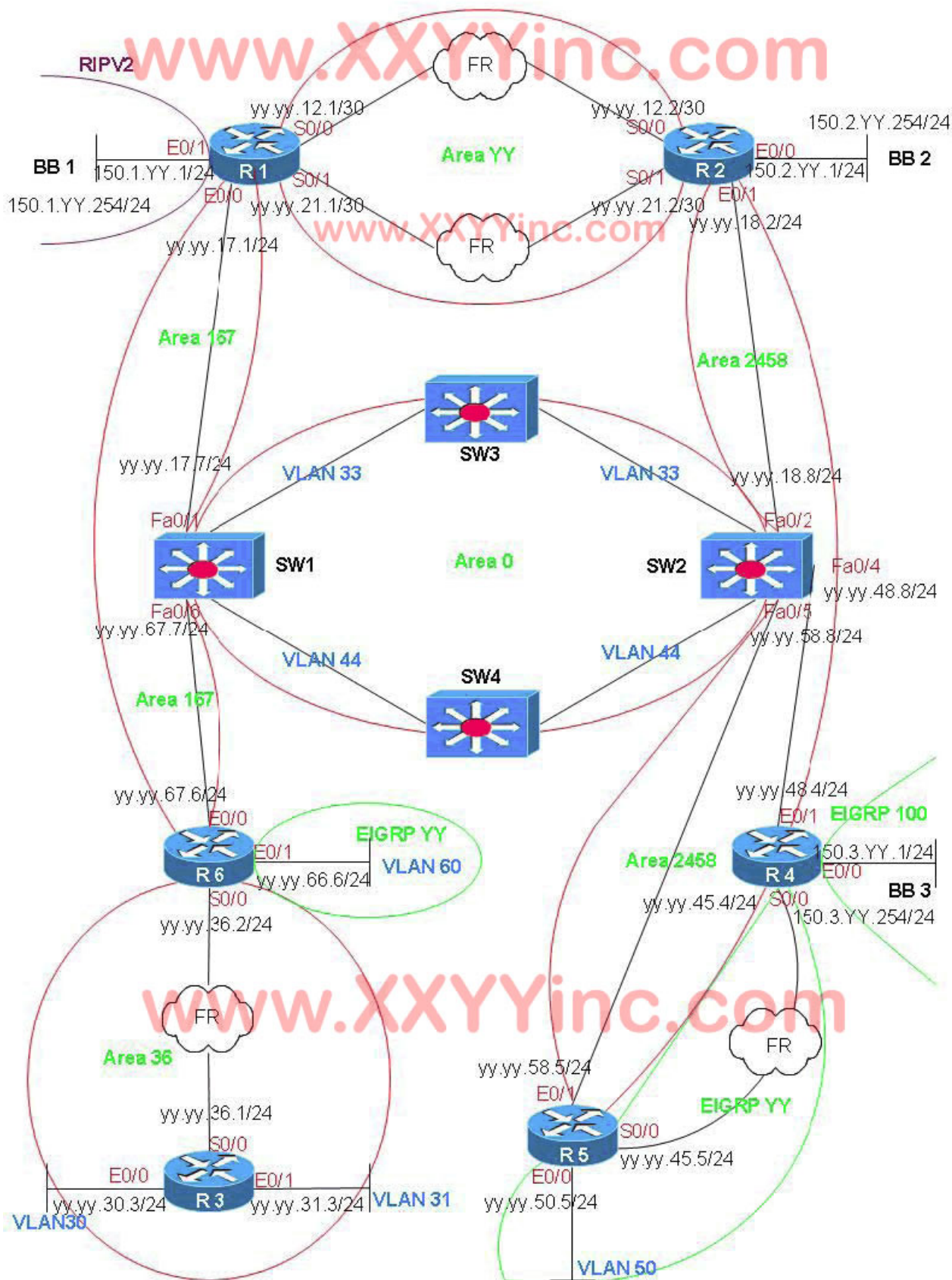


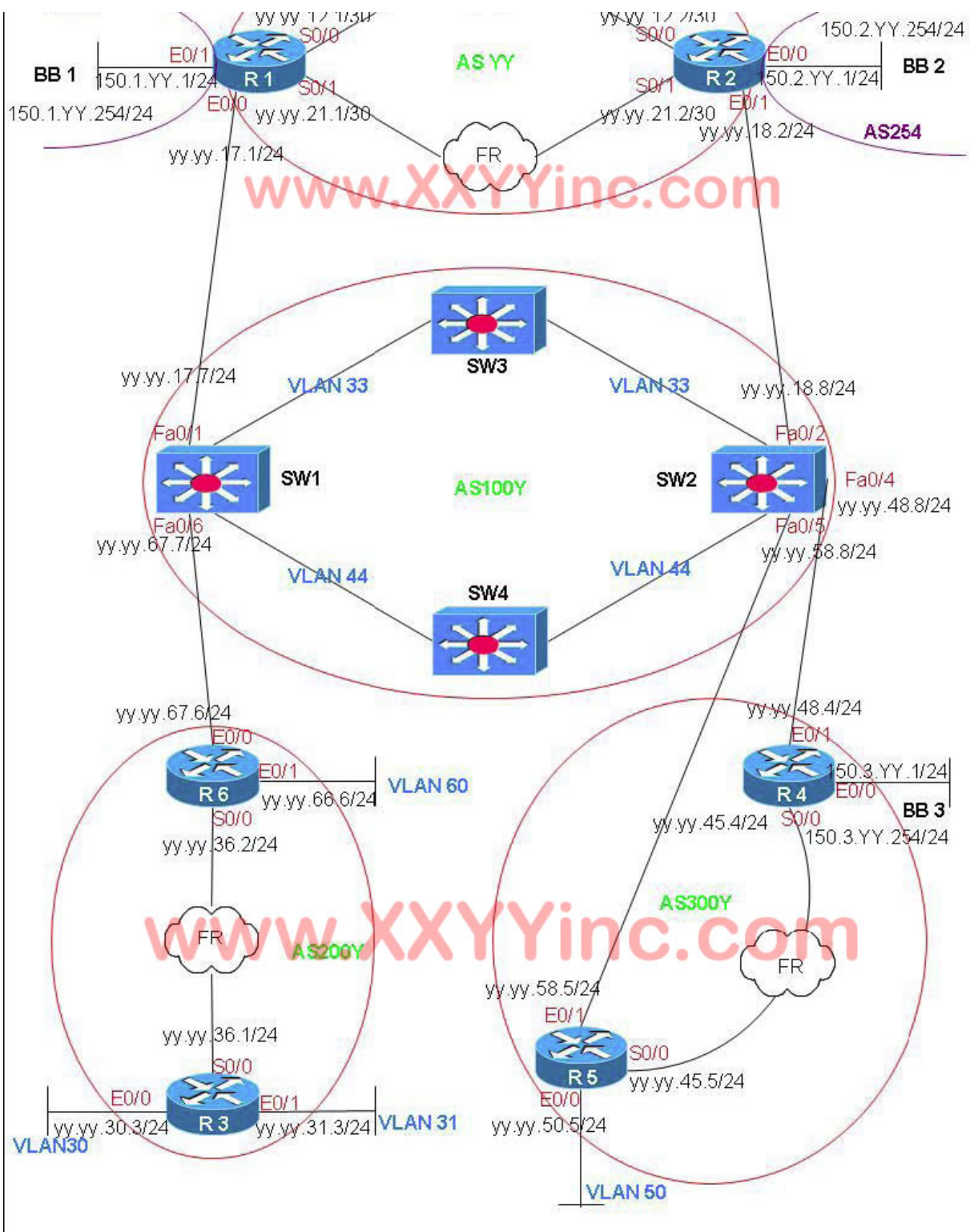
# **CCIE LAB Routing & Switching**

**Ver:N2**

**Update March, 2009**



CCIE LAB Routing & Switching



**note: you have better configure the logging console in every router and switch.so when you enable a protocol,it can create a reporting.**

**at last ,when the man acctack you configuration,you can find and trace it according to the reporting where is changed easily.**

**in the lab topology. cisco have configured the protocol EIGRP ,PIM SM-DM , BGP and vlan in switch expect switch BB.**

**first you must check out the configuration and find that it is where is wrong before you configure.**

**when i take the lab,i didn't find any mistake in original configuration.。**

## 一、 Bridging and Switching

### 1.1 Establishing and dividing VLAN

- **Configure the switch as VTP SERVER.Beacuse the vlans have been configured yet.You must change the vlan'name in demand in the topology.For example: vlan\_30 change to VLAN\_30.**
- **Create the vlan in switch BB.Beacuse the number of vlan is not designated, you can configure vlan's number by yourself.But the vlan's name must be in this style just like VLAN\_BB1.**

**NOTE: now,you can ping 150.1.yy.254 from all of the switch.beacuse the route in BB1 is distributed from RIP.so, when you configure the ACL,you musn't delete this route. you had better record it in you notebook.now,the ports are not configured in switch.**

BB connect:

SW1: Fa0/10----BB1

SW2: Fa0/10----BB2

SW3: Fa0/10----BB3

**NOTE: the step of checking the result. first, checking the vlan of BB1,BB2 and BB3 connect to interface fa0/10 is correct.then check the valn is correct.from interface fa0/1 to interface fa0/6.don't miss the any port.**

### 1.2 VTP mode

- **Congfigure the switch mode is transport mode,and all the port in switch is in access mode**
- **Configure RackYYSw1 to be the VTP Server for domain VTP+YY, For examples, Rack07 would be VTP07, Rack 15 would be VTP15 and so on;**
- **Be sure that RackYYSw2 and Sw3 and Sw4 can see vlan configuration from Sw1;**
- **Configure the vtp vesion 2 and authentication .the password is cisco**  
**//note:you had better configure the EtherChannel, so it ansure the trunk is on,after it ,the information can be distribute between vlans**

**SW2/SW3/SW4:**

**vtp domain VTPYY**

```
vtp mode client
vtp password cisco
```

=====

SW1:

```
vtp domain VTPYY
vtp mode server
vtp version 2
vtp password cisco
```

check: **show vtp status ;show vlan b**

### 1.3 Trunk and EtherChannel

- Because the user find that the speed of network is slow and ask you to increase the bandwidth to 200M.that imply you must configure the layer 2 Etherchannel and the Etherchannel's number is confiured by yourself decision
- Configure the TRUNK in four switches.Which negotiate mode you will choose in trunk depend on the the cisco examination's demand. it is PAgP or LACP.

//NOTE: first,you had better to do shutdown the interface of Etherchannel in every switch.after finishing it,you can configure the interface.then ,you can enable the interface with no shutdown. if you meet the interface's state of Etherchannel is down ,the other side's state is Err-disable. you can use the command "shutdown" and " no shutdown" in bothe side interface.

SW1/SW2/SW3/SW4:

```
int r f0/19-24
shut
```

SW1:

```
interface range fa0/19-20
switchport trunk encapsulation isl
switchport mode trunk
channel-group 13 mode desirable
no shutdown
```

```
interface range fa0/21-20
switchport trunk encapsulation isl
switchport mode trunk
channel-group 14 mode desirable
no shutdown
```

=====

SW2:

```
interface range fa0/19-20
switchport trunk encapsulation isl
switchport mode trunk
channel-group 24 mode desirable
no shutdown
```

```
interface range fa0/21 – 22
```

```
switchport trunk encapsulation isl
switchport mode trunk
channel-group 23 mode desirable
no shutdown
```

=====

SW3:

```
interface range fa0/19 – 20
    switchport trunk encapsulation isl
    switchport mode trunk
    channel-group 13 mode desirable
    no shutdown
```

```
interface range fa0/21 – 22
    switchport trunk encapsulation isl
    switchport mode trunk
    channel-group 23 mode desirable
    no shutdown
```

=====

SW4:

```
interface range fa0/19 – 20
    switchport trunk encapsulation isl
    switchport mode trunk
    channel-group 24 mode desirable
    no shutdown
```

```
interface range fa0/21 – 22
    switchport trunk encapsulation isl
    switchport mode trunk
    channel-group 14 mode desirable
    no shutdown
```

check : `show etherchannel summary` ; `show run int port XX`

#### 1.4 EtherChannel Load balancing

Configure the EtherChannel load balancing base on the srouce,destination or MAC address. if the switch is not supported that features.You can confiugre the Balancing with srouce-mac address.

**NOTE:you will find the Switch 1 in 3550 serial.every switch must be configure.**

SW1:

**Port-channel load-balancing src-mac**

//**3550** is not support **src-dst-mac**, so you must use **src-mac** features, only in **SW1** 是 **3550**,the other switchs area **3560** serial

SW2/SW3/SW4 :

Port-channel load-balancing src-dst-mac //

check: **show etherchannel load-balance**

### 1.5 802.1x

Creat the vlan 999 and name GUEST in SWITCH 1. The ports from interface fa0/11 to fa0/18 are configured in Port Authentication.

Configure the vlan belong to GUEST VLAN if the vlan is not supported the protocol 802.1x. the ip address of RADIUS-SERVER is 150.1.1.254 and KEY is cisco.

SW1:

Vlan 999

Name VLAN\_GUEST

---

---

SW3:

aaa new-model

aaa authentication dot1x default group radius

**//aaa authentication login LOCAL line enable local none**

dot1x system-auth-control

dot1x guest-vlan supplicant

radius-server host 150.1.1.254 (auth-port 1812 acct-port 1813) key cisco

//radius-server retransmit 3

interface range fa0/11-18

no switchport access vlan 999

**//this configuration has been configurated,you must delete this configuration**

sw mo acc

dot1x port-control auto

dot1x guest-vlan 999

dot1x host-mode multi-host

**//line con 0**

login authentication LOCAL

**//line vty 0 15**

login authentication LOCAL

check: **show dot1x all**

### 1.6 MST

Configure the MST in every switch. Creat the instance in every BB.VLAN 100 in instance 10. VLAN 200 in instance 20. VLAN 300 in instance 30.the other vlan in instacn 40

SW1/SW2/SW3/SW4:

spanning-tree mode mst

spanning-tree mst configuration

name cisco

```
revision 1
instance 10 vlan 100
instance 20 vlan 200
instance 30 vlan 300
instance 40 vlan 30,31,33,44,50,60,500,999
```

check: **show spanning-tree mst ; show spanning-tree mst configuration**

### 1.7 MST tuning

Configure the switch that is belong to VLAN BB as a root,and ansure the root.

SW1:

```
spanning-tree mst 10 root primary diameter 4
```

SW2:

```
spanning-tree mst 20 root primary diameter 4
```

SW3:

```
spanning-tree mst 30 root primary diameter 4
```

Verification: **show spanning-tree mst; sh spanning-tree mst *instance-id***

### 1.8 Traffic Monitor

Configure the Remote-VLAN 500 as VLAN\_RSPAN.in switch 1,VLAN\_500 is renamed to VLAN\_RSPAN.Montor the traffic from BB1 and BB2 in interface fa0/18 of SWITCH 4

SW1:

```
vlan 500
```

```
remote-span
```

```
name VLAN_RSPAN
```

```
no monitor session all
```

```
monitor session 1 source interface fa0/10 rx //MAYBE it is TX.
```

```
monitor session 1 destination remote vlan 500 reflector-port fa0/16
```

SW2:

```
no monitor session all
```

```
monitor session 1 source interface fa0/10 rx
```

```
monitor session 1 destination remote vlan 500 =====
```

SW4:

```
no monitor session all
```

```
monitor session 1 source remote vlan 500
```

```
monitor session 1 destination interface fa0/18
```

check: **show monitor session all Or show monitor session 1 detail**

### 1.9 Frame-Relay

Configure the Frame-Relay in topology. After configurting, every equimet must be ping itself and when you use th command "show frame-relay map", 0.0.0.0 don't come out

Note :when I configure the R1,R2. they have 0.0.0.0

Step: first you must disable the dynamic map and check the interface serial.then ping itself and opposite site.after it ,you check the connection between the routers. Anuser the physical lay is ok.then you can check the IGP.write down the type of LMI and encapsulation in all of the interface which enable the Frame-relay.

**R1:**

```
interface s0/0
  ip add YY.YY.12.1 255.255.255.0
  en fram
  no arp frame-relay
  no frame-relay inv
  frame-relay map ip YY.YY.12.2 102 b
  frame-relay map ip YY.YY.12.1 102 b
interface s0/1
  ip add YY.YY.21.1 255.255.255.0
  en fram
  no arp frame-relay
  no frame-relay inv
  frame-relay map ip YY.YY.21.2 112 b
  frame-relay map ip YY.YY.21.1 112 b
```

---

**R2:**

```
interface s0/0
  ip add YY.YY.12.2 255.255.255.0
  en fram
  no arp frame-relay
  no frame-relay inv
  frame-relay map ip YY.YY.12.1 201 b
  frame-relay map ip YY.YY.12.2 201 b
interface s0/1
  ip add YY.YY.21.2 255.255.255.0
  en fram
  no arp frame-relay
  no frame-relay inv
  frame-relay map ip YY.YY.21.1 211 b
  frame-relay map ip YY.YY.21.1 211 b
```

---

**R3:**

```
interface s0/0
  ip add YY.YY.36.1 255.255.255.0
  en fram
  no arp frame-relay
  no frame-relay inv
  frame-relay map ip YY.YY.36.2 306 b
  frame-relay map ip YY.YY.36.1 306 b
```

=====  
**R6:**

```
interface s0/0/0
  ip add YY.YY.36.2 255.255.255.0
  en fram
  no arp frame-relay
  no frame-relay inv
  frame-relay map ip YY.YY.36.1 603 b
  frame-relay map ip YY.YY.36.2 603 b
```

=====

**R4:**

```
interface s0/0
  ip add YY.YY.45.1 255.255.255.0
  en fram
  no arp frame-relay
  no frame-relay inv
  frame-relay map ip YY.YY.45.2 405 b
  frame-relay map ip YY.YY.45.1 405 b
```

=====

**R5:**

```
interface s0/0/0
  ip add YY.YY.45.2 255.255.255.0
  en fram
  no arp frame-relay
  no frame-relay inv
  frame-relay map ip YY.YY.45.1 504 b
  frame-relay map ip YY.YY.45.2 504 b
```

**note:every interface use this command:**

**Shutdown**

**clear frame-relay inarp//disable dynamic mapping**

**interface xxx**

**no shutdown**

**二、 IGP**

**In the topology is configured EIGRPYY, you must transit the EIGRP to ospf smoothly.**

**every equipment configure EIGPR:**

```
router eigrp YY
  auto-summary
  network YY.0.0.0
```

default, there are 25 routes in every router.it is yy.0.0.0/24

### **2.1 OSPF**

- OSPF process is YY , router-id is the address of loopback0.

- Configure the ospf area 0 according the given topology in swch.(note:enable interface loopback0 in area 0)
- Configure area 167 and 2458 according the topology.then you can ping all of the interface
- Configure the NBMA in OSPF, and designated the type of network as point-to-point and area simple authentication.
- Designate the SW1 and SW2 as DR in AS 167 and AS 2458.the other switch is not DR.

**NOTE:**

The frist of transit :

**EIGRP YY mustn't use Passive mode.**

**Initialize the protocol EIGRP,so every router has 25 routes** (contains 15 network and 10 the addresses of interface loopback0)

**// configure the interface loopbak 0 network-type to point-to-point.then the interface enabled NBMA will be configured POINT-TO-POINT. Configure the area authentication ,check the the number of neighbor.**

**SW1:**

**ip routing**

**interface loopback0**

**ip ospf network point-to-point**

**interface Vlan33**

**ip address YY.YY.33.7 255.255.255.0**

**interface Vlan44**

**ip address YY.YY.44.7 255.255.255.0**

**router ospf YY**

**router-id YY.YY.7.7**

**area 167 virtual-link YY.YY.1.1**

**area 167 virtual-link YY.YY.6.6**

**network YY.YY.7.7 0.0.0.0 area 0**

**network YY.YY.17.7 0.0.0.0 area 167**

**network YY.YY.33.7 0.0.0.0 area 0**

**network YY.YY.44.7 0.0.0.0 area 0**

**network YY.YY.67.7 0.0.0.0 area 167**

**interface fa0/1**

**ip ospf priority 255**

**interface fa0/6**

**ip ospf priority 255**

=====  
**SW2:**

**ip routing**

**interface loopback0**

**ip ospf network point-to-point**

**interface Vlan33**

**ip address YY.YY.33.8 255.255.255.0**

**interface Vlan44**

```
ip address YY.YY.44.8 255.255.255.0
router ospf YY
  router-id YY.YY.8.8
  area 2458 virtual-link YY.YY.2.2
  network YY.YY.8.8 0.0.0.0 area 0
  network YY.YY.28.8 0.0.0.0 area 2458
  network YY.YY.33.8 0.0.0.0 area 0
  network YY.YY.44.8 0.0.0.0 area 0
  network YY.YY.48.8 0.0.0.0 area 2458
  network YY.YY.58.8 0.0.0.0 area 2458
interface fa0/2
  ip ospf priority 255
interface fa0/4
  ip ospf priority 255
interface fa0/5
  ip ospf priority 255
```

=====

**SW3:**

```
ip routing
interface loopback0
  ip ospf network point-to-point
interface Vlan33
  ip address YY.YY.33.9 255.255.255.0
router ospf YY
  router-id YY.YY.9.9
  network YY.YY.9.9 0.0.0.0 area 0
  network YY.YY.33.9 0.0.0.0 area 0
```

=====

**SW4:**

```
ip routing
interface loopback0
  ip ospf network point-to-point
interface Vlan44
  ip address YY.YY.44.10 255.255.255.0
router ospf YY
  router-id YY.YY.10.10
  network YY.YY.10.10 0.0.0.0 area 0
  network YY.YY.44.10 0.0.0.0 area 0
```

=====

**R1:**

```
interface loopback0
  ip ospf network point-to-point
interface s0/0
  ip os net point-to-point
interface s0/1
  ip os net point-to-point
```