



NETWORK TEAM PROJECT

TEAM : FRONT

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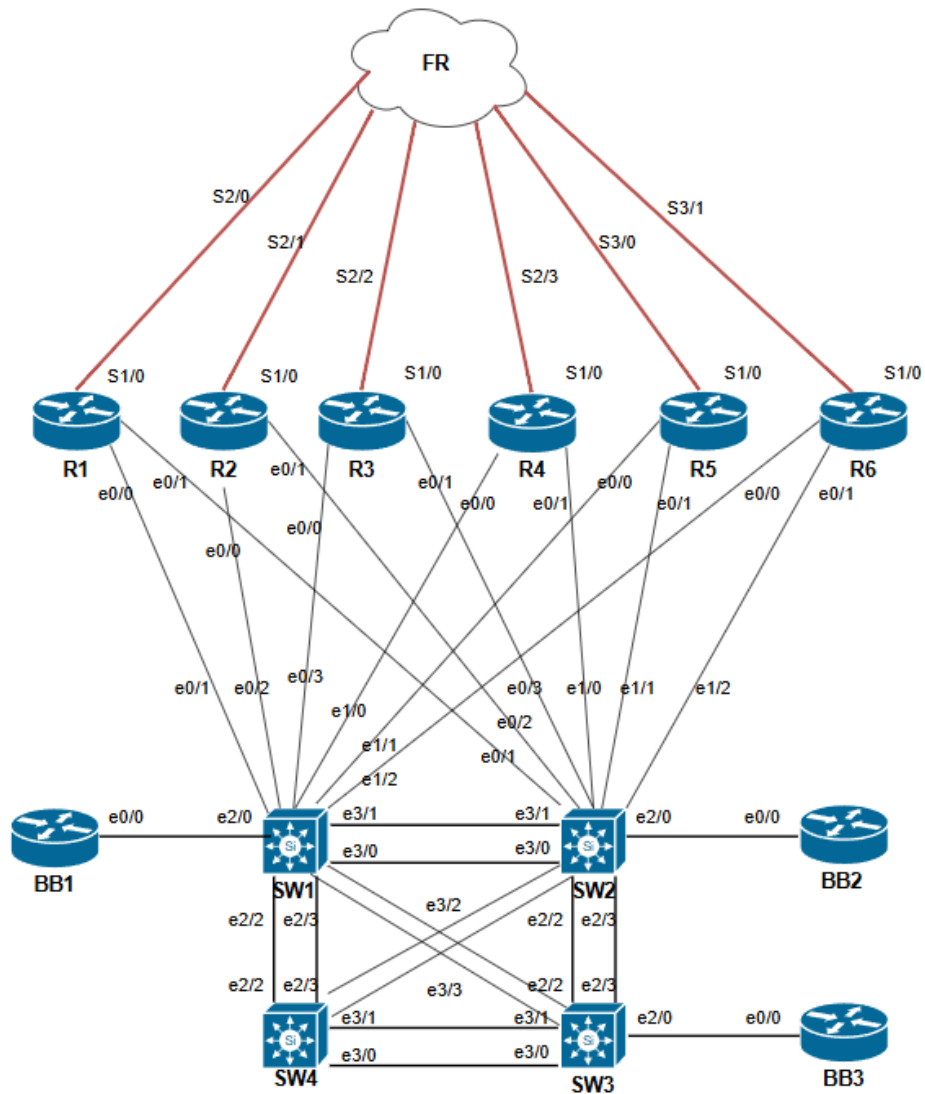
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① 라우팅 테이블 확인

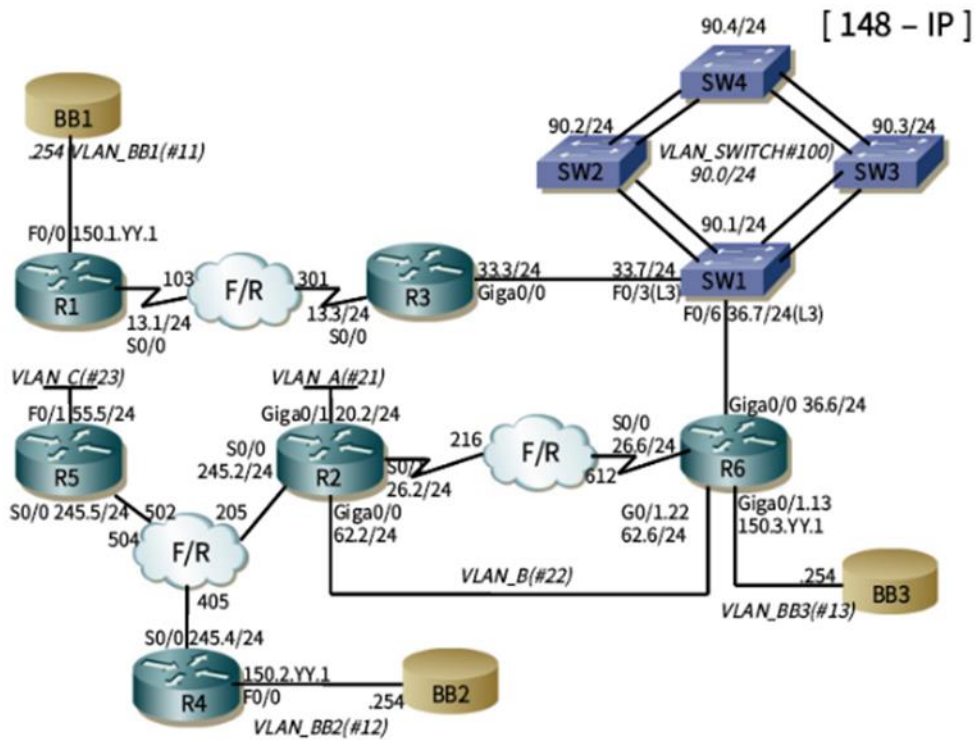
② VTP 정보 확인

VLAN 정보 확인

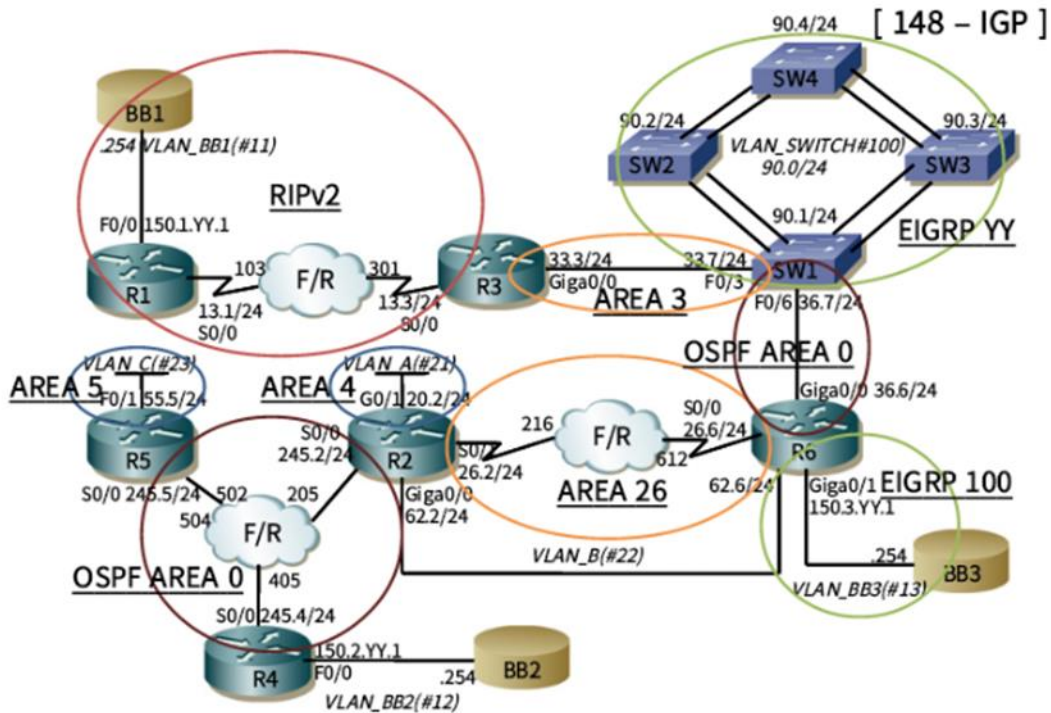
I. 물리적 구성도



II. IP 구성도



III. IGP 구성도



IV. 설정

148-MAP

T/S

Frame-relay 관련 설정 미리 되어 있으며, 별도의 그림이 제공된다.

SW의 VTP mode 는 Transparent mode 로 설정 되어 있다.

SW에 vlan 설정되어 있는 부분은 없다. 문제에서 vlan 설정을 요구함.

EIGRP 구간에 있는 VLAN의 SVI interface 와 Loopback address 는 설정되어 있지 않음. 문제에서 요구 R3의 G0/1 에 사용하지 않는 IP address 가 설정되어 있음(삭제)

R2,R6 serial network 와 R2,R6의 Ethernet network 가 바뀔 수 있음

I. Bridging and Switching

1. Configure IP across your frame relay network

-frame-relay 구성 후 자기 자신의 IP address 로 ping 이 되게 설정하시오.

```
FRONT-R1(config)# int s1/0
FRONT-R1(config)# encapsulation frame-relay
FRONT-R1(config)# no frame-relay inverse-arp
FRONT-R1(config)# no shut
FRONT-R1(config)# ip add 14.14.13.1 255.255.255.0
FRONT-R1(config)# frame map ip 14.14.13.3 103 broad
FRONT-R1(config)# frame map ip 14.14.13.1 103

FRONT-R2(config)# int s1/0
FRONT-R2(config)# encapsulation frame-relay
FRONT-R2(config)# no frame-relay inverse-arp
FRONT-R2(config)# no shut
FRONT-R2(config)# ip add 14.14.245.2 255.255.255.0
FRONT-R2(config)# frame map ip 14.14.245.5 205 broad
FRONT-R2(config)# frame map ip 14.14.245.4 205 broad
FRONT-R2(config)# frame map ip 14.14.245.2 205

FRONT-R3(config)# int s1/0
FRONT-R3(config)# encapsulation frame-relay
FRONT-R3(config)# no frame-relay inverse-arp Rack14R3(config)# no shut
FRONT-R3(config)# ip add 14.14.13.3 255.255.255.0
FRONT-R3(config)# frame map ip 14.14.13.1 301 broad
FRONT-R3(config)# frame map ip 14.14.13.3 301

FRONT-R4(config)# int s1/0
FRONT-R4(config)# encapsulation frame-relay
FRONT-R4(config)# no frame-relay inverse-arp
FRONT-R4(config)# no shut
FRONT-R4(config)# ip add 14.14.245.4 255.255.255.0
FRONT-R4(config)# frame map ip 14.14.245.5 405 broad
FRONT-R4(config)# frame map ip 14.14.245.2 405 broad
FRONT-R4(config)# frame map ip 14.14.245.4 405
```

```

FRONT-R5(config)# int s1/0
FRONT-R5(config)# encapsulation frame-relay
FRONT-R5(config)# no frame-relay inverse-arp
FRONT-R5(config)# no shut
FRONT-R5(config)# ip add 14.14.245.5 255.255.255.0
FRONT-R5(config)# frame map ip 14.14.245.4 504 broad
FRONT-R5(config)# frame map ip 14.14.245.2 502 broad
FRONT-R5(config)# frame map ip 14.14.245.5 502

```

2. Cat3550 Switch Setup

** SW cfg 1. Trunk , etherchannel > 2. VLAN mapping > 3. VTP*

2.1 VTP Configuration

- configure so that sw2, sw3 and sw4 will learn vlan information from sw1. Any new vlans created in domain "front" on sw1 should also be propagated to other switches

```

FRONT-SW1(config)#vtp domain front.com
FRONT-SW1(config)#vtp mode server
FRONT-SW1(config)#vtp version 2
FRONT-SW1(config)#vtp password cisco

SW2~4) vtp mode client / vtp password cisco / vtp domain front.com

```

2.2 Trunk Port

- R6-SW2 사이를 Trunk port 로 만들고, 필요한 VLAN 정보만 흘려 다니도록 설정하라.

```

FRONT-R6(config)# int e0/1
FRONT-R6(config-if)# no shut

FRONT-R6(config)# int e0/1.22
FRONT-R6(config-if)# encapsulation dot1q 22
FRONT-R6(config-if)# ip add 14.14.62.6 255.255.255.0
FRONT-R6(config)# int e0/1.13
FRONT-R6(config-if)# encapsulation dot1q 13
FRONT-R6(config-if)# ip add 150.3.14.1 255.255.255.0

FRONT-SW2(config)# int e1/2
FRONT-SW2(config-if)# switch trunk encapsulation dot1q
FRONT-SW2(config-if)# switch mode trunk
FRONT-SW2(config-if)# switch trunk allowed vlan 13,22

```

2.3 SW1,SW2,SW3,SW4

- PAGP 나 LACP 와 같은 이더채널 네고 프로토콜 사용하지 말고 이더채널 설정하시오.(SW1~SW4 구간)
- SW1~SW4에서 Trunk protocol 은 ISL(or dot1q) 로 설정하고, 이중화된 Link들의 Utilizatin 을 극대화하라
- SW1-SW4(f0/21,22 – shutdown) , SW2-SW3(f0/21,22-shutdown)

```

FRONT-SW1(config)# int range e2/2 - 3
FRONT-SW1(config)# shut
FRONT-SW1(config)# int range e3/0 - 1
FRONT-SW1(config-if-range)# switchport trunk encapsulation dot
FRONT-SW1(config-if-range)# switchport mode trunk
FRONT-SW1(config-if-range)# channel-group 12 mode on
FRONT-SW1(config)# int range e3/2 - 3
FRONT-SW1(config-if-range)# switchport trunk encapsulation dot
FRONT-SW1(config-if-range)# switchport mode trunk
FRONT-SW1(config-if-range)# channel-group 13 mode on

FRONT-SW2(config)# int range e2/2 - 3
FRONT-SW2(config)# shut
FRONT-SW2(config)# int range e3/0 - 1
FRONT-SW2(config-if-range)# switchport trunk encapsulation dot
FRONT-SW2(config-if-range)# switchport mode trunk
FRONT-SW2(config-if-range)# channel-group 21 mode on
FRONT-SW2(config)# int range e3/2 - 3
FRONT-SW2(config-if-range)# switchport trunk encapsulation dot
FRONT-SW2(config-if-range)# switchport mode trunk
FRONT-SW2(config-if-range)# channel-group 24 mode on

FRONT-SW3(config)# int range e2/2 - 3
FRONT-SW3(config)# shut
FRONT-SW3(config)# int range e3/0 - 1
FRONT-SW3(config-if-range)# switchport trunk encapsulation dot
FRONT-SW3(config-if-range)# switchport mode trunk
FRONT-SW3(config-if-range)# channel-group 34 mode on
FRONT-SW3(config)# int range e3/2 - 3
FRONT-SW3(config-if-range)# switchport trunk encapsulation dot
FRONT-SW3(config-if-range)# switchport mode trunk
FRONT-SW3(config-if-range)# channel-group 31 mode on

FRONT-SW4(config)# int range e2/2 - 3
FRONT-SW4(config)# shut
FRONT-SW4(config)# int range e3/0 - 1
FRONT-SW4(config-if-range)# switchport trunk encapsulation dot
FRONT-SW4(config-if-range)# switchport mode trunk
FRONT-SW4(config-if-range)# channel-group 43 mode on
FRONT-SW4(config)# int range e3/2 - 3
FRONT-SW4(config-if-range)# switchport trunk encapsulation dot
FRONT-SW4(config-if-range)# switchport mode trunk
FRONT-SW4(config-if-range)# channel-group 42 mode on

```

2.4 Etherchannel Loadbalancing

- SW1,SW2 사이에서 Etherchannel 에 loadbalancing 설정하라.(## 변형 SW1,SW2에 설정

```

SW1 ~ SW4
FRONT-SW1(config)#port-channel load-balance src-dst-ip
FRONT-SW2(config)#port-channel load-balance src-dst-ip
FRONT-SW3(config)#port-channel load-balance src-dst-ip
FRONT-SW4(config)#port-channel load-balance src-dst-ip

```

2.5 VLAN configuration

- SW3의 fa0/11 port에 BPDU를 수신했을 때 해당 포트를 자동으로 shutdown 하시오.

```
FRONT-SW1(config)#vlan 11
FRONT-SW1(config)#name VLAN_BB1
FRONT-SW1(config)#vlan 12
FRONT-SW1(config)#name VLAN_BB2
FRONT-SW1(config)#vlan 13
FRONT-SW1(config)#name VLAN_BB3
FRONT-SW1(config)#vlan 21
FRONT-SW1(config)#name VLAN_A
FRONT-SW1(config)#vlan 22
FRONT-SW1(config)#name VLAN_B
FRONT-SW1(config)#vlan 23
FRONT-SW1(config)#name VLAN_C
FRONT-SW1(config)#vlan 100
FRONT-SW1(config)#name SWITCH
FRONT-SW1(config)#int vlan 100
FRONT-SW1(config)#no sh
FRONT-SW1(config)#ip add 14.14.90.1 255.255.255.0
FRONT-SW1(config)#int e0/1
FRONT-SW1(config)#sw mo acc
FRONT-SW1(config)#sw acc vlan 11
FRONT-SW1(config)#int e2/0
FRONT-SW1(config)#sw mo acc
FRONT-SW1(config)#sw acc vlan 11
FRONT-SW1(config)#int e1/0
FRONT-SW1(config)#sw mo acc
FRONT-SW1(config)#sw acc vlan 12
FRONT-SW1(config)#int e0/2
FRONT-SW1(config)#sw mo acc
FRONT-SW1(config)#sw acc vlan 22

FRONT-SW2(config)#int e0/2
FRONT-SW2(config)#sw mo acc
FRONT-SW2(config)#sw acc vlan 21
FRONT-SW2(config)#int e1/1
FRONT-SW2(config)#sw mo acc
FRONT-SW2(config)#sw acc vlan 23
FRONT-SW2(config)#int e2/0
FRONT-SW2(config)#sw mo acc
FRONT-SW2(config)#sw acc vlan 12

FRONT-SW3(config)#int e2/0
FRONT-SW3(config)#sw mo acc
FRONT-SW3(config)#sw acc vlan 13
FRONT-SW3(config)#int e1/2
FRONT-SW3(config)#sw mo acc
FRONT-SW3(config)#sw acc vlan 13
```


2.6 STP shared vlan

- shared vlan / 11,12 one common SPT / 100 another SPT / all other vlan default instance
- vlan 11,21은 SW1 이 root-sw 가 되어야 하고, vlan 100 은 번호가 높은 스위치(SW4)가 root가 된다.
- *VLAN_BB2을 instance 3 으로 설정하여 SW2가 root가 되도록 하라.(뒤에 별도의 문제로 나옴)*

```
(SW1~SW4)
FRONT-SW1(config)#spanning-tree mode mst
FRONT-SW1(config)#spanning-tree mst configuration
FRONT-SW1(config)#name FRONT
FRONT-SW1(config)#revision 1
FRONT-SW1(config)#instance 1 vlan 11,21
FRONT-SW1(config)#instance 2 vlan 100
FRONT-SW1(config)#instance 3 vlan 12

FRONT-SW1(config)#spanning-tree mst 1 root primary
FRONT-SW4(config)#spanning-tree mst 2 root primary
```

2.7 Mac Address Database

- SW3 에서 BB3의 MAC 주소 정보를 500초 동안 보여지게 하라.

```
FRONT-SW3(config)#mac address-table aging-time 500 vlan
```

2.8 Root Switch

- VLAN_BB2 에 대해서 SW2를 root switch 가 되게 하라.

```
(SW1-SW4)
FRONT-SW4(config)# spanning-tree mst configuration
FRONT-SW4(config-mst)# instance 3 vlan 12

FRONT-SW2(config)# spanning-tree mst 3 root primary
```

2.9 Create the interfaces VLAN below VLAN 100 (VLAN_SWITCHES)

- SW1 : YY.YY.90.1
- SW2 : YY.YY.90.2
- SW3 : YY.YY.90.3
- SW4 : YY.YY.90.4

```
FRONT-SW1(config)#int vlan 100
FRONT-SW1(config)#no sh
FRONT-SW1(config)#ip add 14.14.90.1 255.255.255.0

FRONT-SW2(config)#int vlan 100
FRONT-SW2(config)#no sh
FRONT-SW2(config)#ip add 14.14.90.2 255.255.255.0

FRONT-SW3(config)#int vlan 100
FRONT-SW3(config)#no sh
FRONT-SW3(config)#ip add 14.14.90.3 255.255.255.0

FRONT-SW4(config)#int vlan 100
FRONT-SW4(config)#no sh
FRONT-SW4(config)#ip add 14.14.90.3 255.255.255.0
```

II. IP IGP Protocols

(## 문제를 다 풀고 나서 BB1,BB3,YY.YY.0.0 network 로 통신이 되어야 한다. Router 의 MTU값을 조정 할 수 없다.)

(## sw f0/3, f0/6 에서 ip mtu 사용 불능)

(## IGP 구성시 router-id 를 사용하지 마시오. OSPF process number 은 rack number 로 설정하시오.)

1.1 RIPv2 Configuration

- Configure RIP between R1,R3 and BB1 / RIP update 주소로 Multicast, Broadcast 를 사용하지 말 것
- Diagram 에 RIP 과 관련이 없는 인터페이스로는 update 를 보내지 말 것.

```
FRONT-R1(config)#router rip
FRONT-R1(config)#ver 2
FRONT-R1(config)#no au
FRONT-R1(config)#net 14.0.0.0
FRONT-R1(config)#net 150.1.0.0
FRONT-R1(config)#passive-interface default
FRONT-R1(config)#nei 150.1.14.254
FRONT-R1(config)#nei 14.14.13.3
FRONT-R1(config)#int s1/0
FRONT-R1(config)#ip split-horizon

FRONT-R3(config)#router rip
FRONT-R3(config)#ver 2
FRONT-R3(config)#no au
FRONT-R3(config)#net 14.0.0.0
FRONT-R3(config)#passive-interface default
FRONT-R3(config)#nei 14.14.13.1
FRONT-R3(config)#int s1/0
FRONT-R3(config)#ip split-horizon
```

2. EIGRP

2.1 EIGRP YY Configuration

- SW1~SW4 에 EIGRP YY 를 설정하고 Loopback0(SW1제외) 과 SVI 인터페이스를 포함시킨다
- Summary를 허용 안 한다.

```
FRONT-SW1(config)#router eigrp 14
FRONT-SW1(config-router)#no auto-summary
FRONT-SW1(config-router)#net 14.14.90.1 0.0.0.0
```

```
FRONT-SW2(config)#router eigrp 14
FRONT-SW2(config-router)#no auto-summary
FRONT-SW2(config-router)#net 14.14.8.8 0.0.0.0
FRONT-SW2(config-router)#net 14.14.90.2 0.0.0.0
```

```
FRONT-SW3(config)#router eigrp 14
FRONT-SW3(config-router)#no auto-summary
FRONT-SW3(config-router)#net 14.14.9.9 0.0.0.0
FRONT-SW3(config-router)#net 14.14.90.3 0.0.0.0
```

```
FRONT-SW4(config)#router eigrp 14
FRONT-SW4(config-router)#no auto-summary
FRONT-SW4(config-router)#net 14.14.10.10 0.0.0.0
FRONT-SW4(config-router)#net 14.14.90.4 0.0.0.0
```

2.2 EIGRP 100 configuration

- Configure EIGRP AS 100 as the routing protocol between R6 and the BB3
- Backbone router BB3 never send queries to R6 / • summary 허용 안한다

```
FRONT-R6(config)#router eigrp 100
FRONT-R6(config)#no auto-summary
FRONT-R6(config)#net 150.3.14.1 0.0.0.0
FRONT-R6(config)#eigrp stub redistribute
(## sh ip eigrp neighbor detail)
```

3. OSPF

3.1 AREA 0

- Configure OSPF on routers R2,R4,R5,SW1 as indicated in Diagram.
- area 0 을 설정하고, R5가 DR이 되어야 한다.
- Do not use the " ip ospf network " -> AREA 0 구간만 해당.
- Ensure all OSPF interfaces are visible on all routers.
- 라우터 ID 사용하지 마시오.

```
FRONT-R5(config)#router ospf 1
FRONT-R5(config-router)#network 14.14.5.5 0.0.0.0 area 0
FRONT-R5(config-router)#network 14.14.245.5 0.0.0.0 area 0
FRONT-R5(config-router)#neighbor 14.14.245.2
FRONT-R5(config-router)#neighbor 14.14.245.4
FRONT-R5(config-router)#area 5 stub

FRONT-R4(config)#router ospf 1
FRONT-R4(config-router)#network 14.14.4.4 0.0.0.0 area 0
FRONT-R4(config-router)#network 14.14.245.4 0.0.0.0 area 0
FRONT-R4(config)#int s1/0
FRONT-R4(config-if)#ip ospf priority 0

FRONT-R6(config)#router ospf 1
FRONT-R6(config-router)#network 14.14.36.6 0.0.0.0 area 0
FRONT-R6(config)#int e0/0
FRONT-R6(config-if)#ip ospf mtu-ignore

FRONT-SW1(config)#router ospf 1
FRONT-SW1(config-router)#network 14.14.36.7 0.0.0.0 area 0
```

3.2 AREA 26 (virtual-link)

- Configure OSPF on routers R2,R6, VLAN_B as indicated in Diagram.(Shorten time neighbor , Avoid election DR)

```
FRONT-R2(config)#router ospf 1
FRONT-R2(config-router)#network 14.14.62.2 0.0.0.0 area 26
FRONT-R2(config-router)#area 26 virtual-link 14.14.6.6
FRONT-R2(config)#int e0/0
FRONT-R2(config-if)#ip ospf network point-to-point
FRONT-R2(config)#int s1/0
FRONT-R2(config-if)#ip ospf priority 0

FRONT-R6(config)#router ospf 1
FRONT-R6(config-router)#network 14.14.36.6 0.0.0.0 area 0
FRONT-R6(config-router)#network 14.14.62.6 0.0.0.0 area 26
FRONT-R6(config-router)#network 14.14.6.6 0.0.0.0 area 26
FRONT-R6(config-router)#area 26 virtual-link 14.14.2.2
FRONT-R6(config)#int e0/0
FRONT-R6(config-if)#ip ospf network point-to-point
FRONT-R6(config)#int e0/1.22
FRONT-R6(config-if)#ip ospf network point-to-point
```

3.3 AREA 3

- Configure OSPF on routers R3, SW1 as indicated in Diagram

```
FRONT-R3(config)#router ospf 1
FRONT-R3(config-router)#network 14.14.3.3 0.0.0.0 area 3
FRONT-R3(config-router)#network 14.14.33.3 0.0.0.0 area 3
FRONT-R6(config)#int e0/0
FRONT-R6(config-if)#ip ospf mtu-ignore  (## MTU size 가 달라도 네이버 맺기)

FRONT-SW1(config)#router ospf 1
FRONT-SW1(config-router)#network 14.14.33.7 0.0.0.0 area 3
FRONT-SW1(config-router)#network 14.14.7.7 0.0.0.0 area 3
```

3.4 AREA 4

- Configure OSPF on router R2 as indicated in Diagram.
- R2에서 설정 VLAN_A 로 default 경로만 전달.
- AREA 4 에서는 VLAN_A로 intra정보와 default 경로를 가지며 다른 external 경로를 전파하지 않도록 하라.

```
FRONT-R2(config)#router ospf 1
FRONT-R2(config-router)#network 14.14.20.2 0.0.0.0 area 4
FRONT-R2(config-router)#network 14.14.2.2 0.0.0.0 area 4
FRONT-R2(config-router)#area 4 stub no-summary
```

3.5 AREA 5

- Configure OSPF on router R5 as indicated in Diagram.
- R5에 설정 VLAN_C로 intra 정보(O)와 inter 정보(O IA) 정보가 보여야 하며 extra(O E1 E2) 는 전파 안된다.

```
FRONT-R5(config)#router ospf 1
FRONT-R5(config-router)#network 14.14.55.5 0.0.0.0 area 5
FRONT-R5(config-router)#network 14.14.5.5 0.0.0.0 area 5
FRONT-R5(config-router)#area 5 stub
```

4. Redistribution (재분배는 모두 mutual 하게 하라)

4.1 RIP - OSPF null 0제거할것

```
FRONT-R3(config)#router rip
FRONT-R3(config-router)#redistribute ospf 1 metric 3

FRONT-R3(config)#router ospf 1
FRONT-R3(config-router)#redistribute rip subnet
```

4.2 OSPF – EIGRP YY

```
FRONT-SW2(config)#router eigrp 14
FRONT-SW1(config-router)#redistribute ospf 1 metric 1 1 1 1 1

FRONT-SW1(config)#router ospf 1
FRONT-SW1(config-router)#redistribute eigrp 14 subnet
```

III. IOS Feature

1. DHCP

- Configure R6 to provide the following parameters for DHCP clients on VLAN_B:
- Make sure all IP addresses that are not used yet in the subnet are available.
- Allow the subnet as 24bit mask / • DNS servers are 150.100.1.50 and 150.100.1.51
- Domain name is cisco.com / 할당된 정보는 영구히 사용할 수 있게 하라.
- For the Default gateway, ensure that if R6 is down. R2 will be the Default Gateway for hosts.

```
FRONTR6(config)#ip dhcp excluded-address 14.14.62.6
FRONTR6(config)#ip dhcp excluded-address 14.14.62.2
FRONTR6(config)#ip dhcp pool DHCP
FRONTR6(dhcp-config)#network 14.14.62.0 255.255.255.0
FRONTR6(dhcp-config)#dns -server 150.100.1.50 150.100.1.51
FRONTR6(dhcp-config)#domain-name cisco.com
FRONTR6(dhcp-config)#lease infinity
FRONTR6(dhcp-config)#default-router 14.14.62.6 14.14.62.2
```

2. UDP Broadcast Management

- BB2 에 BOOTP server 가 있고, BB3 에 client 가 있다.
- Configure on R6 to forward bootp broadcast to 150.2.YY.244 on Backbone 2

```
FRONTR6(config)#ip forward-protocol udp bootpc
FRONTR6(config)#int e0/1.13
FRONTR6(config-if)#ip helper-address 150.2.13.254
```

V. Security

1. OSPF Authentication

- Area 0 에 가장 강력한 인증을 적용하여라.(text 말고 md5 / area 0 인증)

```
FRONTR5(config)#router ospf 1
FRONTR5(config-router)#area 0 authentication message-digest
FRONTR5(config)#int s1/0
FRONTR5(config-if)#ip ospf message-digest-key 1 md5 cisco

FRONTR2(config)#router ospf 1
FRONTR2(config-router)#area 0 authentication message-digest
FRONTR2(config-router)#area 26 virtual-link 14.14.6.6 message-digest-key 1 md5 cisco
FRONTR2(config)#int s1/0
FRONTR2(config-if)#ip ospf message-digest-key 1 md5 cisco

FRONTR4(config)#router ospf 1
FRONTR4(config-router)#area 0 authentication message-digest
FRONTR4(config)#int s1/0
FRONTR4(config-if)#ip ospf message-digest-key 1 md5 cisco
FRONTR4(config)#int lo0
FRONTR4(config-if)#ip ospf message-digest-key 1 md5 cisco

FRONTR6(config)#router ospf 1
FRONTR6(config-router)#area 0 authentication message-digest
FRONTR6(config-router)#area 26 virtual-link 14.14.2.2 message-digest-key 1 md5 cisco
FRONTR6(config)#int e0/0
FRONTR6(config-if)#ip ospf message-digest-key 1 md5 cisco

FRONTSW1(config)#router ospf 1
FRONTSW1(config-router)#area 0 authentication message-digest
FRONTSW1(config)#int e1/2
FRONTSW1(config-if)#ip ospf message-digest-key 1 md5 cisco
```

2. Configure Access Levels

- Without change the default user access levels. Create a level 5 user access level on R3 using password cisco5 and make sure that this user can:
 - Turn off any debugs that might be running /
 - Run extended Pings
 - Save the configure file on nvram /
 - Remove and add ip address

```
FRONTR3(config)#enable secret level 5 cisco5
FRONTR3(config)#privilege exec level 5 undebug all
FRONTR3(config)#privilege exec level 5 ping
FRONTR3(config)#privilege exec level 5 configure terminal
FRONTR3(config)#privilege exec level 5 write memory
FRONTR3(config)#privilege exec level 5 copy run start
FRONTR3(config)#privilege configure level 5 interface
FRONTR3(config)#privilege interface level 5 ip address
```

3. IP Security

- Your ISP has advised you that a hacker is flooding your Backbone 1 segment with a barrage of requests of connection to a server with the IP address 150.1.YY.254. The attacks are based on TCP SYN flooding and are coming from within your network.
- Protect your server from these attacks on R1.
- Ensure that if the attacks continue, the connection time, even for legitimate users, will be 2 1/2 minutes

```
FRONTR1(config)#access-list 150 permit tcp any host 150.1.13.254
FRONTR1(config)#ip tcp intercept list 150
FRONTR1(config)#ip tcp intercept mode intercept
FRONTR1(config)#ip tcp intercept connection-timeout 150
```


V. 결과

① 라우팅 테이블 확인

■Switch 1

□ Switch 1 재분배 전

```
FRONT-SW1#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

    14.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
O       14.14.3.3/32 [110/11] via 14.14.33.3, 00:09:30, Ethernet0/3
O IA    14.14.6.6/32 [110/11] via 14.14.36.6, 00:07:22, Ethernet1/2
C       14.14.7.0/24 is directly connected, Loopback0
L       14.14.7.7/32 is directly connected, Loopback0
D       14.14.8.0/24 [90/130816] via 14.14.90.2, 00:12:35, Vlan100
D       14.14.9.0/24 [90/130816] via 14.14.90.3, 00:12:11, Vlan100
D       14.14.10.0/24 [90/130816] via 14.14.90.4, 00:11:57, Vlan100
C       14.14.33.0/24 is directly connected, Ethernet0/3
L       14.14.33.7/32 is directly connected, Ethernet0/3
C       14.14.36.0/24 is directly connected, Ethernet1/2
L       14.14.36.7/32 is directly connected, Ethernet1/2
O IA    14.14.62.0/24 [110/20] via 14.14.36.6, 00:07:22, Ethernet1/2
C       14.14.90.0/24 is directly connected, Vlan100
L       14.14.90.1/32 is directly connected, Vlan100
```

□ Switch 1 재분배 후

```
    14.0.0.0/8 is variably subnetted, 16 subnets, 2 masks
O E2    14.14.1.0/24 [110/20] via 14.14.33.3, 00:02:54, Ethernet0/3
O       14.14.3.3/32 [110/11] via 14.14.33.3, 00:09:10, Ethernet0/3
O IA    14.14.6.6/32 [110/11] via 14.14.36.6, 00:08:04, Ethernet1/2
C       14.14.7.0/24 is directly connected, Loopback0
L       14.14.7.7/32 is directly connected, Loopback0
D       14.14.8.0/24 [90/130816] via 14.14.90.2, 00:10:40, Vlan100
D       14.14.9.0/24 [90/130816] via 14.14.90.3, 00:10:40, Vlan100
D       14.14.10.0/24 [90/130816] via 14.14.90.4, 00:10:40, Vlan100
O E2    14.14.13.0/24 [110/20] via 14.14.33.3, 00:02:54, Ethernet0/3
C       14.14.33.0/24 is directly connected, Ethernet0/3
L       14.14.33.7/32 is directly connected, Ethernet0/3
C       14.14.36.0/24 is directly connected, Ethernet1/2
L       14.14.36.7/32 is directly connected, Ethernet1/2
O IA    14.14.62.0/24 [110/20] via 14.14.36.6, 00:08:04, Ethernet1/2
C       14.14.90.0/24 is directly connected, Vlan100
L       14.14.90.1/32 is directly connected, Vlan100
    150.1.0.0/24 is subnetted, 1 subnets
O E2    150.1.13.0 [110/20] via 14.14.33.3, 00:02:54, Ethernet0/3
```

■Router 1

□ Router 1 재분배 전

```
FRONT-R1#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, + - replicated route

Gateway of last resort is not set

    14.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C       14.14.1.0/24 is directly connected, Loopback0
L       14.14.1.1/32 is directly connected, Loopback0
R       14.14.3.0/24 [120/1] via 14.14.13.3, 00:00:15, Serial1/0
C       14.14.13.0/24 is directly connected, Serial1/0
L       14.14.13.1/32 is directly connected, Serial1/0
R       14.14.33.0/24 [120/1] via 14.14.13.3, 00:00:15, Serial1/0
    150.1.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       150.1.13.0/24 is directly connected, Ethernet0/0
L       150.1.13.1/32 is directly connected, Ethernet0/0
```

□ Router 1 재분배 후

```
    14.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
C       14.14.1.0/24 is directly connected, Loopback0
L       14.14.1.1/32 is directly connected, Loopback0
R       14.14.3.0/24 [120/1] via 14.14.13.3, 00:00:21, Serial1/0
R       14.14.6.6/32 [120/3] via 14.14.13.3, 00:00:21, Serial1/0
R       14.14.7.7/32 [120/3] via 14.14.13.3, 00:00:21, Serial1/0
R       14.14.8.0/24 [120/3] via 14.14.13.3, 00:00:21, Serial1/0
R       14.14.9.0/24 [120/3] via 14.14.13.3, 00:00:21, Serial1/0
R       14.14.10.0/24 [120/3] via 14.14.13.3, 00:00:21, Serial1/0
C       14.14.13.0/24 is directly connected, Serial1/0
L       14.14.13.1/32 is directly connected, Serial1/0
R       14.14.33.0/24 [120/1] via 14.14.13.3, 00:00:21, Serial1/0
R       14.14.36.0/24 [120/3] via 14.14.13.3, 00:00:21, Serial1/0
R       14.14.62.0/24 [120/3] via 14.14.13.3, 00:00:22, Serial1/0
R       14.14.90.0/24 [120/3] via 14.14.13.3, 00:00:22, Serial1/0
    150.1.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       150.1.13.0/24 is directly connected, Ethernet0/0
L       150.1.13.1/32 is directly connected, Ethernet0/0
FRONT-R1#
```

■Router 6

□ Router 6 재분배 전

```
FRONT-R6#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, + - replicated route

Gateway of last resort is not set

    14.0.0.0/8 is variably subnetted, 9 subnets, 2 masks
O IA   14.14.3.3/32 [110/21] via 14.14.36.7, 00:02:11, Ethernet0/0
C       14.14.6.0/24 is directly connected, Loopback0
L       14.14.6.6/32 is directly connected, Loopback0
O IA   14.14.7.7/32 [110/11] via 14.14.36.7, 00:02:11, Ethernet0/0
O IA   14.14.33.0/24 [110/20] via 14.14.36.7, 00:02:11, Ethernet0/0
C       14.14.36.0/24 is directly connected, Ethernet0/0
L       14.14.36.6/32 is directly connected, Ethernet0/0
C       14.14.62.0/24 is directly connected, Ethernet0/1.22
L       14.14.62.6/32 is directly connected, Ethernet0/1.22
    150.3.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       150.3.13.0/24 is directly connected, Ethernet0/1.13
L       150.3.13.1/32 is directly connected, Ethernet0/1.13
```

□ Router 6 재분배 후

```
    14.0.0.0/8 is variably subnetted, 15 subnets, 2 masks
O E2   14.14.1.0/24 [110/20] via 14.14.36.7, 00:13:09, Ethernet0/0
O IA   14.14.3.3/32 [110/21] via 14.14.36.7, 00:18:24, Ethernet0/0
C       14.14.6.0/24 is directly connected, Loopback0
L       14.14.6.6/32 is directly connected, Loopback0
O IA   14.14.7.7/32 [110/11] via 14.14.36.7, 00:18:24, Ethernet0/0
O E2   14.14.8.0/24 [110/20] via 14.14.36.7, 00:13:59, Ethernet0/0
O E2   14.14.9.0/24 [110/20] via 14.14.36.7, 00:13:59, Ethernet0/0
O E2   14.14.10.0/24 [110/20] via 14.14.36.7, 00:13:59, Ethernet0/0
O E2   14.14.13.0/24 [110/20] via 14.14.36.7, 00:13:09, Ethernet0/0
O IA   14.14.33.0/24 [110/20] via 14.14.36.7, 00:18:24, Ethernet0/0
C       14.14.36.0/24 is directly connected, Ethernet0/0
L       14.14.36.6/32 is directly connected, Ethernet0/0
C       14.14.62.0/24 is directly connected, Ethernet0/1.22
L       14.14.62.6/32 is directly connected, Ethernet0/1.22
O E2   14.14.90.0/24 [110/20] via 14.14.36.7, 00:14:00, Ethernet0/0
    150.1.0.0/24 is subnetted, 1 subnets
O E2   150.1.13.0 [110/20] via 14.14.36.7, 00:13:10, Ethernet0/0
    150.3.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       150.3.13.0/24 is directly connected, Ethernet0/1.13
L       150.3.13.1/32 is directly connected, Ethernet0/1.13
FRONT-R6#
```

■Router 2

□ Router 2 재분배 후

```
14.0.0.0/8 is variably subnetted, 12 subnets, 2 masks
C      14.14.2.0/24 is directly connected, Loopback0
L      14.14.2.2/32 is directly connected, Loopback0
O      14.14.4.4/32 [110/65] via 14.14.245.4, 00:11:23, Serial1/0
O IA   14.14.5.5/32 [110/65] via 14.14.245.5, 00:11:33, Serial1/0
O      14.14.6.6/32 [110/11] via 14.14.62.6, 00:13:25, Ethernet0/0
C      14.14.20.0/24 is directly connected, Ethernet0/1
L      14.14.20.2/32 is directly connected, Ethernet0/1
O IA   14.14.55.0/24 [110/74] via 14.14.245.5, 00:11:33, Serial1/0
C      14.14.62.0/24 is directly connected, Ethernet0/0
L      14.14.62.2/32 is directly connected, Ethernet0/0
C      14.14.245.0/24 is directly connected, Serial1/0
L      14.14.245.2/32 is directly connected, Serial1/0
FRONT-R2#
14.0.0.0/8 is variably subnetted, 20 subnets, 2 masks
D EX   14.14.1.0/24 [170/2560000512] via 14.14.90.1, 00:50:42, Vlan100
D EX   14.14.2.2/32 [170/2560000512] via 14.14.90.1, 00:07:50, Vlan100
D EX   14.14.3.3/32 [170/2560000512] via 14.14.90.1, 00:51:32, Vlan100
D EX   14.14.4.4/32 [170/2560000512] via 14.14.90.1, 00:04:16, Vlan100
D EX   14.14.5.5/32 [170/2560000512] via 14.14.90.1, 00:04:16, Vlan100
D EX   14.14.6.6/32 [170/2560000512] via 14.14.90.1, 00:07:50, Vlan100
D EX   14.14.7.0/24 [170/2560000512] via 14.14.90.1, 00:51:32, Vlan100
C      14.14.8.0/24 is directly connected, Loopback0
L      14.14.8.8/32 is directly connected, Loopback0
D      14.14.9.0/24 [90/130816] via 14.14.90.3, 00:58:28, Vlan100
D      14.14.10.0/24 [90/130816] via 14.14.90.4, 00:58:28, Vlan100
D EX   14.14.13.0/24 [170/2560000512] via 14.14.90.1, 00:50:42, Vlan100
D EX   14.14.20.0/24 [170/2560000512] via 14.14.90.1, 00:07:50, Vlan100
D EX   14.14.33.0/24 [170/2560000512] via 14.14.90.1, 00:51:32, Vlan100
D EX   14.14.36.0/24 [170/2560000512] via 14.14.90.1, 00:51:32, Vlan100
D EX   14.14.55.0/24 [170/2560000512] via 14.14.90.1, 00:04:16, Vlan100
D EX   14.14.62.0/24 [170/2560000512] via 14.14.90.1, 00:07:50, Vlan100
C      14.14.90.0/24 is directly connected, Vlan100
L      14.14.90.2/32 is directly connected, Vlan100
D EX   14.14.245.0/24 [170/2560000512] via 14.14.90.1, 00:04:16, Vlan100
150.1.0.0/24 is subnetted, 1 subnets
D EX   150.1.13.0 [170/2560000512] via 14.14.90.1, 00:50:42, Vlan100
FRONT-SW2#
```


③ VTP 정보확인

■ Switch 1

```
FRONT-SW1#sh vtp sta
VTP Version capable      : 1 to 3
VTP version running      : 2
VTP Domain Name          : front.com
VTP Pruning Mode         : Disabled
VTP Traps Generation     : Disabled
Device ID                : aabb.cc00.0700
Configuration last modified by 0.0.0.0 at 11-29-24 07:41:43
Local updater ID is 14.14.90.1 on interface V100 (lowest numbered VLAN interface found)

Feature VLAN:
-----
VTP Operating Mode       : Server
Maximum VLANs supported locally : 1005
Number of existing VLANs : 12
Configuration Revision    : 7
MD5 digest               : 0x23 0x24 0x9B 0x9B 0x76 0xA6 0xD6 0xF4
                        : 0x7B 0x7D 0x0A 0x89 0x80 0x8F 0x1E 0xB6
```

■ Switch 2

```
FRONT-SW2#sh vtp sta
*Dec 3 11:32:10.515: %SYS-5-CONFIG_I: Configured from console by console
FRONT-SW2#sh vtp sta
VTP Version capable      : 1 to 3
VTP version running      : 2
VTP Domain Name          : front.com
VTP Pruning Mode         : Disabled
VTP Traps Generation     : Disabled
Device ID                : aabb.cc00.0800
Configuration last modified by 0.0.0.0 at 11-29-24 07:41:43

Feature VLAN:
-----
VTP Operating Mode       : Client
Maximum VLANs supported locally : 1005
Number of existing VLANs : 12
Configuration Revision    : 7
MD5 digest               : 0x23 0x24 0x9B 0x9B 0x76 0xA6 0xD6 0xF4
                        : 0x7B 0x7D 0x0A 0x89 0x80 0x8F 0x1E 0xB6
```

④ VLAN 정보 확인

■Switch 1

```
FRONT-SW1#sh vlan b
```

VLAN Name	Status	Ports
1 default	active	Et0/0, Et1/1, Et1/3, Et2/1 Et2/2, Et2/3
11 VLAN_BB1	active	Et0/1, Et2/0
12 VLAN_BB2	active	Et1/0
13 VLAN_BB3	active	
21 VLAN_A	active	
22 VLAN_B	active	Et0/2
23 VLAN_C	active	
100 SWITCH	active	

■Switch 2

```
FRONT-SW2#sh vlan b
```

VLAN Name	Status	Ports
1 default	active	Et0/0, Et0/1, Et0/3, Et1/0 Et1/3, Et2/1, Et2/2, Et2/3
11 VLAN_BB1	active	
12 VLAN_BB2	active	Et2/0
13 VLAN_BB3	active	
21 VLAN_A	active	Et0/2
22 VLAN_B	active	
23 VLAN_C	active	Et1/1
100 SWITCH	active	

■Switch 4

```
FRONT-SW4#sh vlan b
```

VLAN	Name	Status	Ports
1	default	active	Et0/0, Et0/1, Et0/2, Et0/3 Et1/0, Et1/1, Et1/2, Et1/3 Et2/0, Et2/1, Et2/2, Et2/3
11	VLAN_BB1	active	
12	VLAN_BB2	active	
13	VLAN_BB3	active	
21	VLAN_A	active	
22	VLAN_B	active	
23	VLAN_C	active	
100	SWITCH	active	