C L I N 2

Network project

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임채연

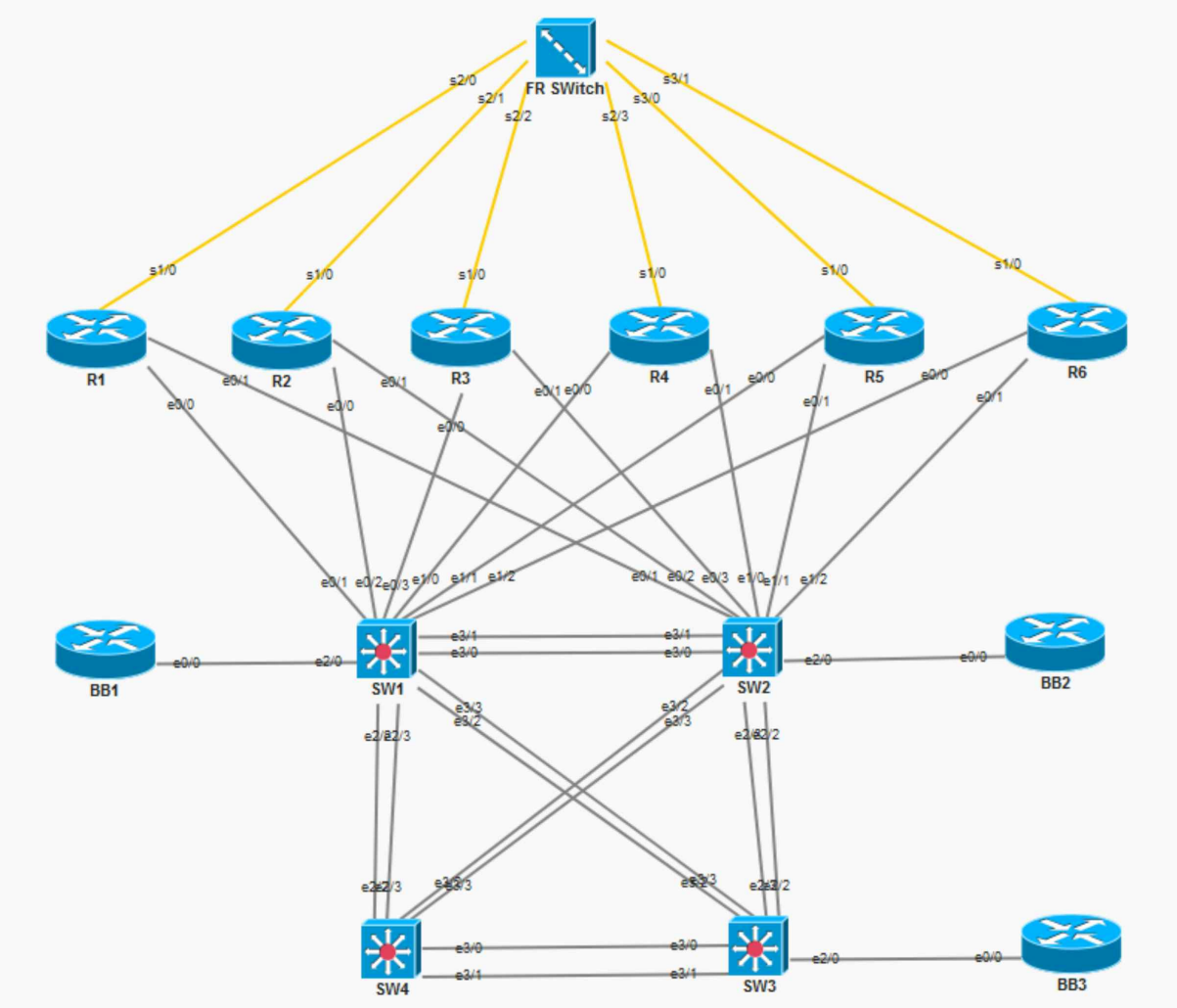
임태현

조성돈

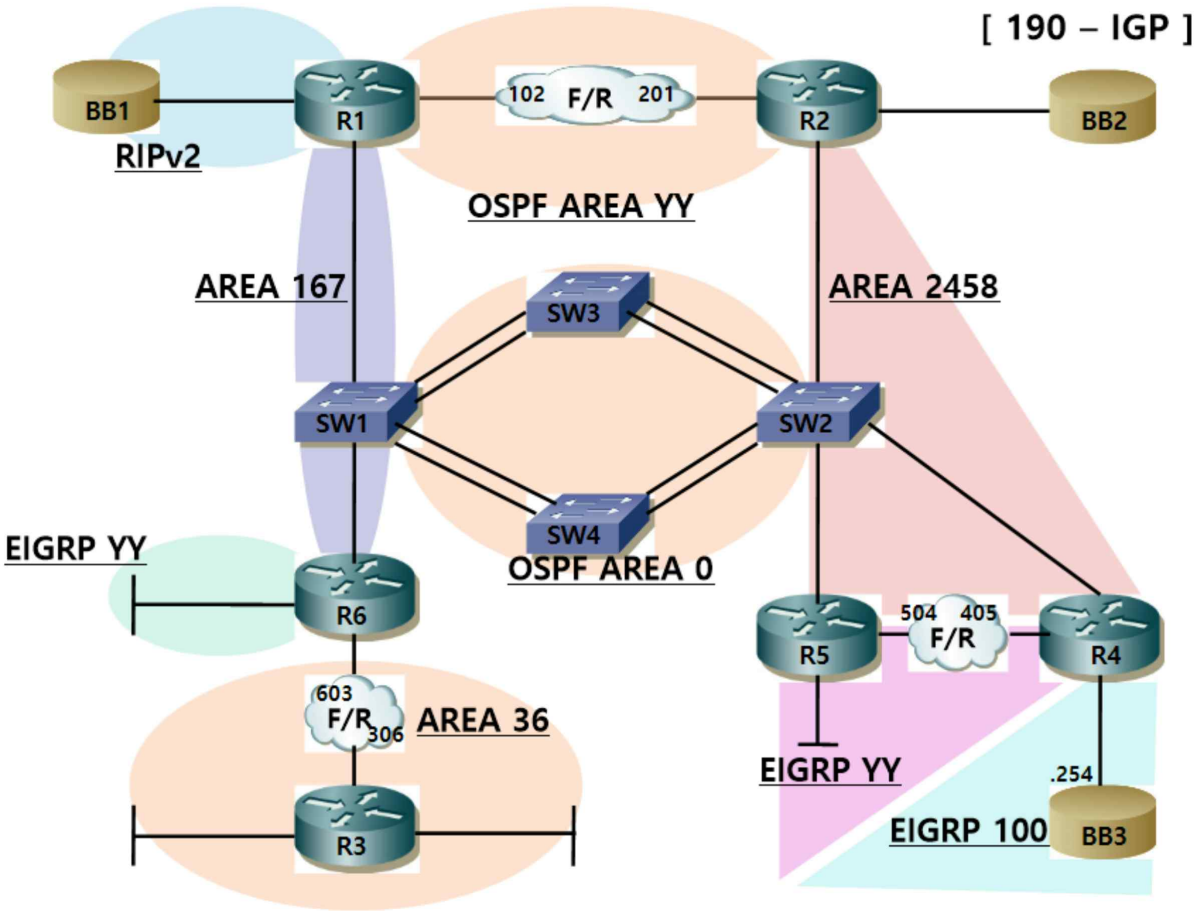
목차

1. 구성도

1.1 물리적 구성도



1.2 논리적 구성도


[190 – IGP]
BB1
R1
102
F/R
201
R2
BB2
RIPv2
OSPF AREA YY
AREA 167
AREA 2458
SW3
SW1
SW2
SW4
OSPF AREA 0
EIGRP YY
R6
504
405
F/R
R5
R4
603
F/R
306
AREA 36
EIGRP YY
.254
EIGRP 100
BB3
R3

2. Bridging and Switching

2.1 VTP Mode 설정

cnSW1 : VTP Server Mode　　cnSW2,3,4 : VTP Client Mode

VTP Version : 2

VTP Password : cisco

cnSW1

```
cnSW1#sh vtp status
VTP Version capable             : 1 to 3
VTP version running             : 2
VTP Domain Name                 : cisco.com
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
Device ID                       : aabb.cc00.0700
Configuration last modified by 0.0.0.0 at 11-27-24 12:14:18
Local updater ID is 0.0.0.0 (no valid interface found)

Feature VLAN:
--------------
VTP Operating Mode              : Server
Maximum VLANs supported locally : 1005
Number of existing VLANs        : 5
Configuration Revision          : 62
MD5 digest                      : 0x24 0xB3 0x2A 0x36 0x5D 0x4E 0x33 0x09
                                  0x2E 0x41 0x4F 0x33 0xD6 0xF2 0xF9 0x4F
```

cnSW2,3,4

```
SW2#sh vtp status
VTP Version capable             : 1 to 3
VTP version running             : 2
VTP Domain Name                 : cisco.com
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
Device ID                       : aabb.cc00.0800
Configuration last modified by 0.0.0.0 at 11-27-24 12:14:18

Feature VLAN:
--------------
VTP Operating Mode              : Client
Maximum VLANs supported locally : 1005
Number of existing VLANs        : 5
Configuration Revision          : 62
MD5 digest                      : 0x24 0xB3 0x2A 0x36 0x5D 0x4E 0x33 0x09
                                  0x2E 0x41 0x4F 0x33 0xD6 0xF2 0xF9 0x4F
```

VTP Password 설정

```
cnSW1#sh vtp password
VTP Password: cisco
```

2.2 Switch Trunk 설정

Multi Vlan 통신을 위한 Trunk 설정

```
cnSW1#show interfaces trunk

Port        Mode             Encapsulation  Status        Native vlan
Et2/2       on               802.1q         trunking      1
Et2/3       on               802.1q         trunking      1
Et3/2       on               802.1q         trunking      1
Et3/3       on               802.1q         trunking      1

Port        Vlans allowed on trunk
Et2/2       1-4094
Et2/3       1-4094
Et3/2       1-4094
Et3/3       1-4094

Port        Vlans allowed and active in management domain
Et2/2       1
Et2/3       1
Et3/2       1
Et3/3       1

Port        Vlans in spanning tree forwarding state and not pruned
Et2/2       1
Et2/3       1
Et3/2       1

Port        Vlans in spanning tree forwarding state and not pruned
Et3/3       1
```

2.3 Vlan 생성 및 이름 설정, Vlan 할당

Vlan 이름 설정

```
cnSW1(config)#vlan 15
cnSW1(config-vlan)#name VLAN_BB1
cnSW1(config-vlan)#vlan 16
cnSW1(config-vlan)#name VLAN_BB2
cnSW1(config-vlan)#vlan 17
cnSW1(config-vlan)#name VLAN_BB3
cnSW1(config-vlan)#vlan 30
cnSW1(config-vlan)#name VLAN_30
cnSW1(config-vlan)#vlan 31
cnSW1(config-vlan)#name VLAN_31
cnSW1(config-vlan)#vlan 33
cnSW1(config-vlan)#name VLAN_33
cnSW1(config-vlan)#vlan 44
cnSW1(config-vlan)#name VLAN_44
cnSW1(config-vlan)#vlan 50
cnSW1(config-vlan)#name VLAN_50
cnSW1(config-vlan)#vlan 60
cnSW1(config-vlan)#name VLAN_60
```

show vlan brief 명령을 사용하여 구성한 Vlan 확인

```
cnSW1#sh vlan brief

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, Et3/0, Et3/1
15   VLAN_BB1                         active
16   VLAN_BB2                         active
17   VLAN_BB3                         active
30   VLAN_30                          active
31   VLAN_31                          active
33   VLAN_33                          active
44   VLAN_44                          active
50   VLAN_50                          active
60   VLAN_60                          active
1002 fddi-default                     act/unsup
1003 trcrf-default                    act/unsup
1004 fddinet-default                  act/unsup
1005 trbrf-default                    act/unsup
```

switchport mode access

switchport access vlan [vlan 번호]

위 2줄을 이용하여 Vlan을 각 포트에 할당

Vlan 할당 후 show vlan brief 명령을 활용하여 확인

```
cnSW1#sh vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Et0/0, Et1/1, Et1/3, Et2/1
                                                Et3/0, Et3/1
15   VLAN_BB1                         active    Et2/0
16   VLAN_BB2                         active    Et0/2
17   VLAN_BB3                         active    Et1/0
30   VLAN_30                          active    Et0/3
31   VLAN_31                          active
33   VLAN_33                          active
44   VLAN_44                          active
50   VLAN_50                          active
60   VLAN_60                          active
1002 fddi-default                     act/unsup
1003 trcrf-default                    act/unsup
1004 fddinet-default                  act/unsup
1005 trbrf-default                    act/unsup
```

Trunk Port에 Vlan을 할당한 후 show interface trunk 명령을 사용하여 확인

```
cnSW1#show interfaces trunk

Port        Mode             Encapsulation  Status        Native vlan
Et2/2       on               802.1q         trunking      1
Et2/3       on               802.1q         trunking      1
Et3/2       on               802.1q         trunking      1
Et3/3       on               802.1q         trunking      1

Port        Vlans allowed on trunk
Et2/2       1-4094
Et2/3       1-4094
Et3/2       1-4094
Et3/3       1-4094

Port        Vlans allowed and active in management domain
Et2/2       1,10,15-17,20,30-31,33,40,44,50,60,90
Et2/3       1,10,15-17,20,30-31,33,40,44,50,60,90
Et3/2       1,10,15-17,20,30-31,33,40,44,50,60,90
Et3/3       1,10,15-17,20,30-31,33,40,44,50,60,90

Port        Vlans in spanning tree forwarding state and not pruned
Et2/2       1,10,15-17,20,30-31,33,40,44,50,60,90
Et2/3       1,10,15-17,20,30-31,33,40,44,50,60,90
Et3/2       1,10,15-17,20,30-31,33,40,44,50,60,90

Port        Vlans in spanning tree forwarding state and not pruned
Et3/3       1,10,15-17,20,30-31,33,40,44,50,60,90
```

2.4 cnSW1 SVI, Loopback 주소 설정

```
cnSW1#sh ip interface brief | exclude um
Loopback0              7.7.7.7         YES manual up                    up
Vlan33                 1.1.33.7        YES manual up                    up
Vlan44                 1.1.44.7        YES manual up                    up
```

2.5 MST

각 스위치들의 Spanning-tree 모드를 MST로 설정

```
cnSW1(config)#spanning-tree mode mst
```

```
cnSW1(config)#spanning-tree mode mst
cnSW1(config)#spanning-tree mst 1 priority 0
cnSW1(config)#spanning-tree mst config
cnSW1(config-mst)#name clin2
cnSW1(config-mst)#revision 1
cnSW1(config-mst)#instance 1 vlan 15
cnSW1(config-mst)#instance 2 vlan 16
cnSW1(config-mst)#instance 3 vlan 17
cnSW1(config-mst)#instance 4 vlan 30,31,33,44,50,60
```

```
cnSW2(config)#spanning-tree mode mst
```

```
cnSW2(config)#spanning-tree mode mst
cnSW2(config)#spanning-tree mst 2 priority 0
cnSW2(config)#spanning-tree mst config
cnSW2(config-mst)#name clin2
cnSW2(config-mst)#revision 1
cnSW2(config-mst)#instance 1 vlan 15
cnSW2(config-mst)#instance 2 vlan 16
cnSW2(config-mst)#instance 3 vlan 17
cnSW2(config-mst)#instance 4 vlan 30,31,33,44,50,60
```

```
cnSW3(config)#spanning-tree mode mst
```

```
cnSW3(config)#spanning-tree mode mst
cnSW3(config)#spanning-tree mst 3 priority 0
cnSW3(config)#spanning-tree mst config
cnSW3(config-mst)#name clin2
cnSW3(config-mst)#revision 1
cnSW3(config-mst)#instance 1 vlan 15
cnSW3(config-mst)#instance 2 vlan 16
cnSW3(config-mst)#instance 3 vlan 17
cnSW3(config-mst)#instance 4 vlan 30,31,33,44,50,60
```

```
cnSW4(config)#spanning-tree mode mst
```

```
cnSW4(config)#spanning-tree mode mst
cnSW4(config)#spanning-tree mst 4 priority 0
cnSW4(config)#spanning-tree mst config
cnSW4(config-mst)#name clin2
cnSW4(config-mst)#revision 1
cnSW4(config-mst)#instance 1 vlan 15
cnSW4(config-mst)#instance 2 vlan 16
cnSW4(config-mst)#instance 3 vlan 17
cnSW4(config-mst)#instance 4 vlan 30,31,33,44,50,60
```

2.6 Load Balancing

한 쪽 서버에 트래픽이 집중되는 현상을 막기 위해 cnSW1~4 사이에 설정한 Trunking 포트에 MAC주소를 기반으로한 Load Balancing을 진행

```
cnSW1(config-mst)#port-channel load-balance src-dst-mac
cnSW1(config)#int range e3/2 - 3
cnSW1(config-if-range)#switchport trunk encapsulation dot1q
cnSW1(config-if-range)#switchport mode trunk
cnSW1(config-if-range)#channel-group 13 mode desirable
Creating a port-channel interface Port-channel 13

cnSW1(config-if-range)#int range e2/2 - 3
cnSW1(config-if-range)#switchport trunk encapsulation dot1q
cnSW1(config-if-range)#switchport mode trunk
cnSW1(config-if-range)#channel-group 14 mode desirable
Creating a port-channel interface Port-channel 14
```

```
cnSW3(config-mst)#port-channel load-balance src-dst-mac
cnSW3(config)#int range e3/2 - 3
cnSW3(config-if-range)#switchport trunk encapsulation dot1q
cnSW3(config-if-range)#switchport mode trunk
cnSW3(config-if-range)#channel-group 13 mode desirable
Creating a port-channel interface Port-channel 13

cnSW3(config-if-range)#int range e2/2 - 3
cnSW3(config-if-range)#switchport trunk encapsulation dot1q
cnSW3(config-if-range)#switchport mode trunk
cnSW3(config-if-range)#channel-group 23 mode desirable
Creating a port-channel interface Port-channel 23
```

```
cnSW4(config-mst)#port-channel load-balance src-dst-mac
cnSW4(config)#int range e3/2 - 3
cnSW4(config-if-range)#switchport trunk encapsulation dot1q
cnSW4(config-if-range)#switchport mode trunk
cnSW4(config-if-range)#channel-group 24 mode desirable
Creating a port-channel interface Port-channel 24

cnSW4(config-if-range)#int range e2/2 - 3
cnSW4(config-if-range)#switchport trunk encapsulation dot1q
cnSW4(config-if-range)#switchport mode trunk
cnSW4(config-if-range)#channel-group 14 mode desirable
Creating a port-channel interface Port-channel 14
```

2.7 Fram-Relay 설정

가상의 회선을 구성함으로써 실제 사용하는 회선의 수를 줄이고, 상대적으로 더 빠른 속도로 전송하기 위해 cnR1~6 사이에 Fram-Relay를 구성

```
cnR1(config-if)#int s1/0
cnR1(config-if)#ip add 11.11.12.1 255.255.255.252
cnR1(config-if)#encapsulation frame-relay
cnR1(config-if)#no frame inverse-arp
cnR1(config-if)#fram map ip 11.11.12.2 102 b
cnR1(config-if)#no shutdown
```

```
cnR2(config-if)#int s1/0
cnR2(config-if)#ip add 11.11.12.2 255.255.255.252
cnR2(config-if)#encapsulation frame-relay
cnR2(config-if)#no frame inverse-arp
cnR2(config-if)#fram map ip 11.11.12.1 201 b
cnR2(config-if)#no shutdown
```

```
cnR3(config-if)#int s1/0
cnR3(config-if)#ip add 11.11.36.1 255.255.255.252
cnR3(config-if)#encapsulation frame-relay
cnR3(config-if)#no frame inverse-arp
cnR3(config-if)#fram map ip 11.11.36.2 306 b
cnR3(config-if)#no shutdown
```

```
cnR4(config-if)#int s1/0
cnR4(config-if)#ip add 11.11.45.1 255.255.255.252
cnR4(config-if)#encapsulation frame-relay
cnR4(config-if)#no frame inverse-arp
cnR4(config-if)#fram map ip 11.11.45.2 405 b
cnR4(config-if)#no shutdown
```

```
cnR5(config-if)#int s1/0
cnR5(config-if)#ip add 11.11.45.2 255.255.255.252
cnR5(config-if)#encapsulation frame-relay
cnR5(config-if)#no frame inverse-arp
cnR5(config-if)#fram map ip 11.11.45.1 504 b
cnR5(config-if)#no shutdown
```

```
cnR6(config-if)#int s1/0
cnR6(config-if)#ip add 11.11.36.2 255.255.255.252
cnR6(config-if)#encapsulation frame-relay
cnR6(config-if)#no frame inverse-arp
cnR6(config-if)#fram map ip 11.11.36.1 603 b
cnR6(config-if)#no shutdown
```

show frame-rela map 명령을 이용하여 설정한 내용을 확인

대표적으로 cnR1~2에서 확인

```
cnR1#sh frame-relay map
Serial1/0 (up): ip 11.11.12.2 dlci 102(0x66,0x1860), static,
              broadcast,
              CISCO, status defined, active
```

```
cnR2#sh frame-relay map
Serial1/0 (up): ip 11.11.12.1 dlci 201(0xC9,0x3090), static,
              broadcast,
              CISCO, status defined, active
```

2.8 라우팅 설정 확인

show ip rout 명령을 확인하여 현재까지 설정한 라우팅 정보를 cnSW1에서 확인

```
cnSW1#sh ip rou
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

      11.0.0.0/8 is variably subnetted, 26 subnets, 3 masks
O        11.11.1.0/24 [110/11] via 11.11.17.1, 00:47:46, Ethernet0/1
O IA     11.11.2.2/32 [110/12] via 11.11.44.8, 00:19:35, Vlan44
                      [110/12] via 11.11.33.8, 00:19:35, Vlan33
O IA     11.11.3.0/24 [110/75] via 11.11.67.6, 00:54:54, Ethernet1/2
O IA     11.11.4.0/24 [110/12] via 11.11.44.8, 01:14:26, Vlan44
                      [110/12] via 11.11.33.8, 01:14:11, Vlan33
O IA     11.11.5.0/24 [110/12] via 11.11.44.8, 01:14:26, Vlan44
                      [110/12] via 11.11.33.8, 01:14:11, Vlan33
O        11.11.6.0/24 [110/11] via 11.11.67.6, 01:14:53, Ethernet1/2
C        11.11.7.0/24 is directly connected, Loopback0
L        11.11.7.7/32 is directly connected, Loopback0
O        11.11.8.8/32 [110/2] via 11.11.44.8, 01:14:26, Vlan44
                      [110/2] via 11.11.33.8, 01:14:11, Vlan33
O        11.11.9.9/32 [110/2] via 11.11.33.9, 01:14:11, Vlan33
O        11.11.10.10/32 [110/2] via 11.11.44.10, 01:14:26, Vlan44
O IA     11.11.12.0/30 [110/75] via 11.11.44.8, 00:19:15, Vlan44
                       [110/75] via 11.11.33.8, 00:19:15, Vlan33
C        11.11.17.0/24 is directly connected, Ethernet0/1
L        11.11.17.7/32 is directly connected, Ethernet0/1
O IA     11.11.28.0/24 [110/11] via 11.11.44.8, 01:14:26, Vlan44
                       [110/11] via 11.11.33.8, 01:14:11, Vlan33
O IA     11.11.30.0/24 [110/84] via 11.11.67.6, 00:54:54, Ethernet1/2
O IA     11.11.31.0/24 [110/84] via 11.11.67.6, 00:54:54, Ethernet1/2
C        11.11.33.0/24 is directly connected, Vlan33
L        11.11.33.7/32 is directly connected, Vlan33
O IA     11.11.36.0/30 [110/74] via 11.11.67.6, 00:54:54, Ethernet1/2
C        11.11.44.0/24 is directly connected, Vlan44
L        11.11.44.7/32 is directly connected, Vlan44
O IA     11.11.48.0/24 [110/11] via 11.11.44.8, 01:14:26, Vlan44
                       [110/11] via 11.11.33.8, 01:14:11, Vlan33
O IA     11.11.58.0/24 [110/11] via 11.11.44.8, 01:14:26, Vlan44
                       [110/11] via 11.11.33.8, 01:14:11, Vlan33
C        11.11.67.0/24 is directly connected, Ethernet1/2
L        11.11.67.7/32 is directly connected, Ethernet1/2
```

show ip ospf neighbor 명령을 사용해서 cnSW1과 cnSW2에서 설정한 OSPF 내용을 확인

cnSW1

```
cnSW1#sh ip ospf nei

Neighbor ID     Pri   State           Dead Time   Address         Interface
11.11.6.6         0   FULL/  -            -        11.11.67.6      OSPF_VL1
11.11.8.8         1   FULL/BDR        00:00:35    11.11.44.8      Vlan44
11.11.10.10       1   FULL/DR         00:00:38    11.11.44.10     Vlan44
11.11.8.8         1   FULL/BDR        00:00:32    11.11.33.8      Vlan33
11.11.9.9         1   FULL/DR         00:00:35    11.11.33.9      Vlan33
11.11.6.6         1   FULL/BDR        00:00:34    11.11.67.6      Ethernet1/2
11.11.1.1         1   FULL/BDR        00:00:31    11.11.17.1      Ethernet0/1
```

cnSW2

```
cnSW2#sh ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
11.11.2.2         0   FULL/  -            -        11.11.28.2      OSPF_VL0
11.11.7.7         1   FULL/DROTHER    00:00:32    11.11.44.7      Vlan44
11.11.10.10       1   FULL/DR         00:00:32    11.11.44.10     Vlan44
11.11.7.7         1   FULL/DROTHER    00:00:35    11.11.33.7      Vlan33
11.11.9.9         1   FULL/DR         00:00:39    11.11.33.9      Vlan33
11.11.5.5         1   FULL/BDR        00:00:33    11.11.58.5      Ethernet1/1
11.11.4.4         1   FULL/BDR        00:00:31    11.11.48.4      Ethernet1/0
11.11.2.2         1   FULL/BDR        00:00:31    11.11.28.2      Ethernet0/2
```

2.9 DR 선출을 위한 우선순위 값 변경

cnSW1과 cnSW2는 OSPF Area 167과 Area 2458의 Central Device.

이 Area에 다른 Device가 추가되더라도 cnSW1과 cnSW2가 DR이 될 수 있도록 구성

cnR2, 4~6은 우선순위 0으로 설정

```
cnR1(config)#int e0/0
cnR1(config-if)#ip ospf priority 0
```

```
cnR2(config)#int e0/1
cnR2(config-if)#ip ospf priority 0
```

```
cnR4(config)#int e0/1
cnR4(config-if)#ip ospf priority 0
```

```
cnR5(config)#int e0/1
cnR5(config-if)#ip ospf priority 0
```

```
cnR6(config)#int e0/0
cnR6(config-if)#ip ospf priority 0
```

cnSW1~2는 우선순위 255로 설정

```
cnSW1(config)#int e0/1
cnSW1(config-if)#ip ospf priority 255
cnSW1(config-if)#int e1/2
cnSW1(config-if)#ip ospf pri 255
```

```
cnSW2(config)#int e0/2
cnSW2(config-if)#ip ospf priority 255
cnSW2(config-if)#int e1/0
cnSW2(config-if)#ip ospf pri 255
cnSW2(config-if)#int e1/1
cnSW2(config-if)#ip ospf pri 255
```

show ip eigrp topology 명령어를 통해 topology 확인

```
cnR4#sh ip eig topo
EIGRP-IPv4 Topology Table for AS(100)/ID(11.11.4.4)
Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - reply Status, s - sia Status

P 150.3.11.0/24, 1 successors, FD is 281600
        via Connected, Ethernet0/0

EIGRP-IPv4 Topology Table for AS(11)/ID(11.11.4.4)
Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - reply Status, s - sia Status

P 11.11.50.0/24, 1 successors, FD is 2195456
        via 11.11.45.2 (2195456/281600), Serial1/0
P 11.11.45.0/30, 1 successors, FD is 2169856
        via Connected, Serial1/0
```

2.10 RIPv2 default 설정

```
cnR1(config)#router rip
cnR1(config-router)#ver 2
cnR1(config-router)#no au
cnR1(config-router)#net 150.1.0.0
cnR1(config-router)#pass def
cnR1(config-router)#nei 150.1.11.254
```

2.11 RIPv2 재분배 및 요약

```
cnR1(config-router)#router rip
cnR1(config-router)#redi ospf 1 met 3
cnR1(config-router)#distribute-list prefix to_bb1 out e0/1
cnR1(config-router)#int e0/1
cnR1(config-if)#ip summ rip 11.0.0.0 255.0.0.0
cnR1(config-if)#ip prefix-list to_bb1 per 11.0.0.0/8
cnR1(config)#router ospf 1
cnR1(config-router)#redi rip sub route-map rto
cnR1(config-router)#ip acce extended r-n
cnR1(config-ext-nacl)#per ip host 150.100.1.0 any
cnR1(config-ext-nacl)#route-map rto per 10
cnR1(config-route-map)#match ip addr r-n
```

2.12 OSPF 재분배 및 neighbor

cnR4에서 neighbor설정 및 재분배

```
cnR4(config)#router ospf 1
cnR4(config-router)#nei 11.11.45.2
cnR4(config-router)#redi eig 100 sub metr 150 tag 20
```

cnR6에서 재분배

```
cnR6(config)#router ospf 1
cnR6(config-router)#redis eig 1 sub
```

cnSW1에서 show ip route 명령을 사용하여 재분배한 내용 확인

```
cnSW1#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

      11.0.0.0/8 is variably subnetted, 26 subnets, 3 masks
O        11.11.1.0/24 [110/11] via 11.11.17.1, 01:25:34, Ethernet0/1
O IA     11.11.2.2/32 [110/12] via 11.11.44.8, 01:25:04, Vlan44
                      [110/12] via 11.11.33.8, 01:25:04, Vlan33
O IA     11.11.3.0/24 [110/75] via 11.11.67.6, 01:24:11, Ethernet1/2
O IA     11.11.4.0/24 [110/12] via 11.11.44.8, 01:25:04, Vlan44
                      [110/12] via 11.11.33.8, 01:25:04, Vlan33
O IA     11.11.5.0/24 [110/12] via 11.11.44.8, 01:25:04, Vlan44
                      [110/12] via 11.11.33.8, 01:25:04, Vlan33
O        11.11.6.0/24 [110/11] via 11.11.67.6, 01:25:34, Ethernet1/2
C        11.11.7.0/24 is directly connected, Loopback0
L        11.11.7.7/32 is directly connected, Loopback0
O        11.11.8.8/32 [110/2] via 11.11.44.8, 01:25:04, Vlan44
                      [110/2] via 11.11.33.8, 01:25:04, Vlan33
O        11.11.9.9/32 [110/2] via 11.11.33.9, 01:25:04, Vlan33
O        11.11.10.10/32 [110/2] via 11.11.44.10, 01:25:14, Vlan44
O IA     11.11.12.0/30 [110/74] via 11.11.17.1, 00:04:26, Ethernet0/1
C        11.11.17.0/24 is directly connected, Ethernet0/1
L        11.11.17.7/32 is directly connected, Ethernet0/1
O IA     11.11.28.0/24 [110/11] via 11.11.44.8, 01:25:04, Vlan44
                       [110/11] via 11.11.33.8, 01:25:04, Vlan33
O IA     11.11.30.0/24 [110/84] via 11.11.67.6, 01:24:11, Ethernet1/2
O IA     11.11.31.0/24 [110/84] via 11.11.67.6, 01:24:11, Ethernet1/2
C        11.11.33.0/24 is directly connected, Vlan33
L        11.11.33.7/32 is directly connected, Vlan33
O IA     11.11.36.0/30 [110/74] via 11.11.67.6, 01:25:19, Ethernet1/2
C        11.11.44.0/24 is directly connected, Vlan44
L        11.11.44.7/32 is directly connected, Vlan44
O IA     11.11.48.0/24 [110/11] via 11.11.44.8, 01:25:04, Vlan44
                       [110/11] via 11.11.33.8, 01:25:04, Vlan33
O IA     11.11.58.0/24 [110/11] via 11.11.44.8, 01:25:04, Vlan44
                       [110/11] via 11.11.33.8, 01:25:04, Vlan33
C        11.11.67.0/24 is directly connected, Ethernet1/2
L        11.11.67.7/32 is directly connected, Ethernet1/2
      150.3.0.0/24 is subnetted, 1 subnets
O E2     150.3.11.0 [110/150] via 11.11.44.8, 00:00:10, Vlan44
                    [110/150] via 11.11.33.8, 00:00:10, Vlan33
```

2.13 Core Dump

ftp에 id과 password를 설정

protocol은 기본적으로 ftp 사용

충돌 시 라우터가 코어 더프를 전송하는 서버의 ip 주소 구성

core-file 이름은 장비 호스트네임-core로 저장되기 때문에 옵션

```
cnR5(config)#ip ftp username clin2
cnR5(config)#ip ftp password cisco
cnR5(config)#exception protocol ftp
cnR5(config)#exception dump 11.11.50.254
cnR5(config)#exception core-file r5dump
```

2.14 cnSW1~4 사이의 MD5 알고리즘 암호 설정

```
cnSW1(config-if)#router ospf 1
cnSW1(config-router)#area 0 authentication message-digest
cnSW1(config-router)#int vlan 33
cnSW1(config-if)#ip ospf message-digest-key 1 md5 cisco
cnSW1(config-if)#int vlan 44
cnSW1(config-if)#ip ospf message-digest-key 1 md5 cisco
```

```
cnSW2(config-if)#router ospf 1
cnSW2(config-router)#area 0 authentication message-digest
cnSW2(config-router)#int vlan 33
cnSW2(config-if)#ip ospf message-digest-key 1 md5 cisco
cnSW2(config-if)#int vlan 44
cnSW2(config-if)#ip ospf message-digest-key 1 md5 cisco
```

```
cnSW3(config-router)#area 0 authentication message-digest
cnSW3(config-router)#int vlan 33
cnSW3(config-if)#ip ospf message-digest-key 1 md5 cisco
```

```
cnSW4(config-router)#area 0 authentication message-digest
cnSW4(config-router)#int vlan 44
cnSW4(config-if)#ip ospf message-digest-key 1 md5 cisco
```

```
cnR1(config-if)#router ospf 1
cnR1(config-router)#area 0 authentication message-digest
```

```
cnR2(config-if)#router ospf 1
cnR2(config-router)#area 0 authentication message-digest
```

```
cnR2(config-if)#router ospf 1
cnR2(config-router)#area 0 authentication message-digest
```

```
cnR6(config-if)#router ospf 1
cnR6(config-router)#area 0 authentication message-digest
```

2.15 SSH 접속을 위한 설정

USERNAME: clin2

PASSWORD: cisco

Domain-name: clin2.cisco.com

cnSW1에서 cnR2의 접속을 위해 SSH에 access-list로 cnR2의 주소 허용

```
cnSW1(config)#username clin2 password cisco
cnSW1(config)#ip domain-name clin2.cisco.com
cnSW1(config)#crypto key generate rsa
The name for the keys will be: cnSW1.clin2.cisco.com
Choose the size of the key modulus in the range of 360 to 4096 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 512
% Generating 512 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 1 seconds)

cnSW1(config)#ip ssh logging event
cnSW1(config)#access-list 2 permit 11.11.2.2
cnSW1(config)#line vty 0 4
cnSW1(config-line)#transport input ssh
cnSW1(config-line)#login local
cnSW1(config-line)#access-class 2 in
```

cnR2에서 SSH로 로그인을 위한 설정

```
cnR2(config)#ip domain-name clin2.cisco.com
cnR2(config)#ip ssh source-interface lo0
Please create RSA keys (of atleast 768 bits size) to enable SSH v2.
cnR2(config)#crypto key generate rsa
The name for the keys will be: cnR2.clin2.cisco.com
Choose the size of the key modulus in the range of 360 to 2048 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 512
% Generating 512 bit RSA keys, keys will be non-exportable...[OK]
```

cnR2에서 SSH를 활용하여 cnSW1에 접속

```
cnR2#ssh -l clin2 11.11.7.7

Password:

cnSW1>
```

logging 확인을 통해 USERNAME clin2로 접속한 것을 확인

```
cnSW1#sh ssh
Connection      Version Encryption      State                   Username
0               1.5     3DES            Session started         clin2
```

2.16 Port Security

cnSW4에서 Port Security설정

```
cnSW4(config)#int e1/3
cnSW4(config-if)#switchport mode access
cnSW4(config-if)#switchport access vlan 44
cnSW4(config-if)#switch port-security max 2
cnSW4(config-if)#switch port-security mac-address sticky
cnSW4(config-if)#switch port-security violation restrict
cnSW4(config-if)#switch port-security
```

cnSW4에 설정한 Port-Security 내용 확인

```
cnSW4#sh port-security int e1/3
Port Security              : Enabled
Port Status                : Secure-up
Violation Mode             : Restrict
Aging Time                 : 0 mins
Aging Type                 : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses      : 2
Total MAC Addresses        : 0
Configured MAC Addresses   : 0
Sticky MAC Addresses       : 0
Last Source Address:Vlan   : 0000.0000.0000:0
Security Violation Count   : 0
```

감사합니다.

CLIN2

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