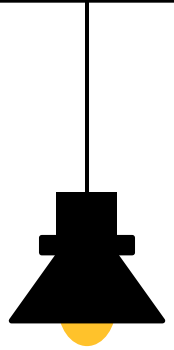
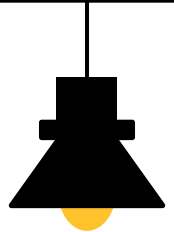


네트워크 기말고사 실무과제

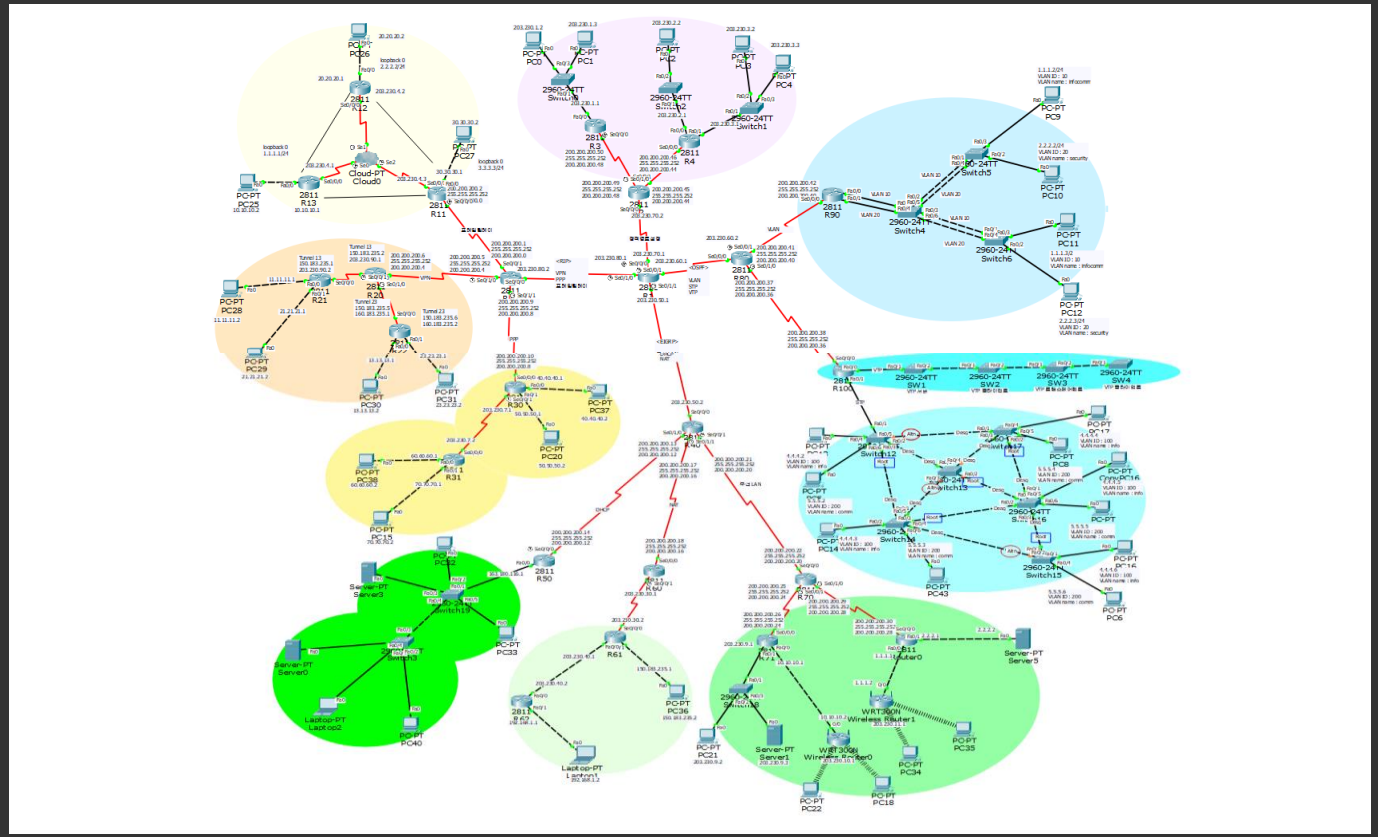
91716880 윤솔비
91707815 송유진



Index

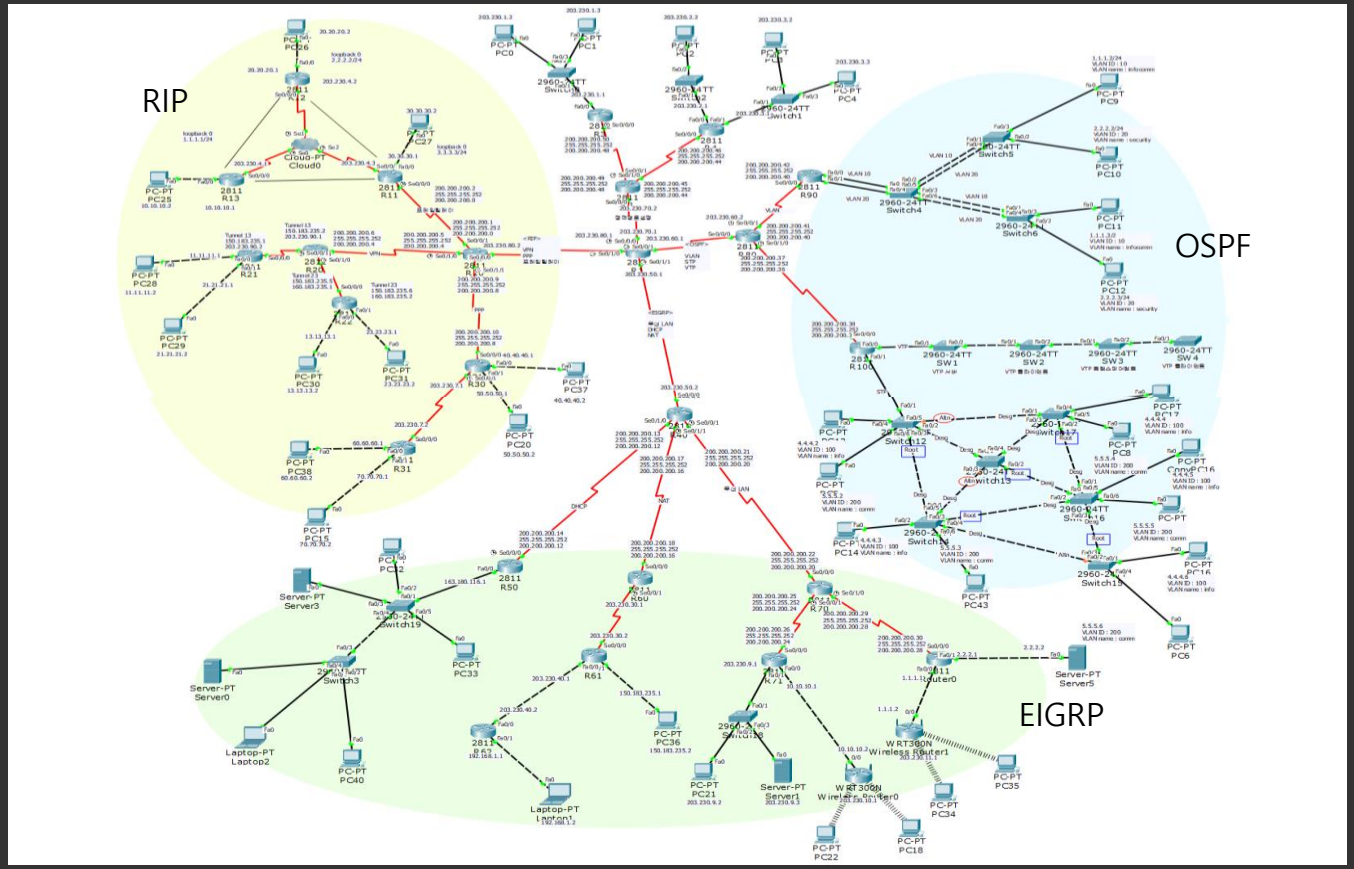
1. 전체토폴로지

RIP, EIGRP, OSPF



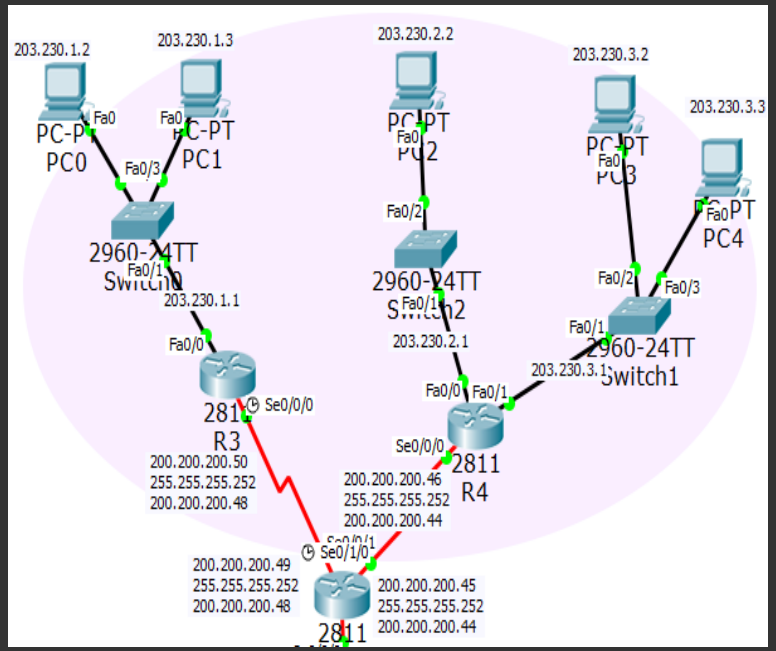
1. 전체토폴로지

RIP, EIGRP, OSPF



2. 정적경로설정

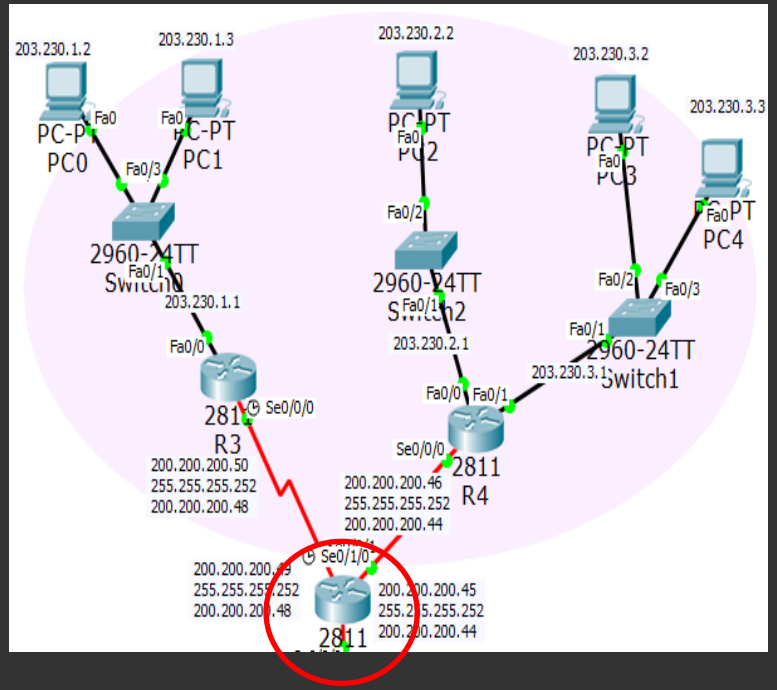
정적경로설정



- 관리자가 경로를 직접지정
- 설정이 간단
- 토폴로지가 변경되면 관리자가 직접 변경해야함
- 경로 설정을 유지하기 위한 라우팅 정보 교환이 불필요
- 소규모 네트워크, 경로가 고정된 네트워크에 주로 사용
- 두가지 방식의 정적경로설정
  - 연결된 상대방 라우터의 ip 주소로 설정
  - 자신의 출력 인터페이스명으로 설정
- 디폴트 정적경로 설정
  패킷의 출입경로가 하나밖에 없는 스터브 네트워크의 경우

2. 정적경로설정

[R2]

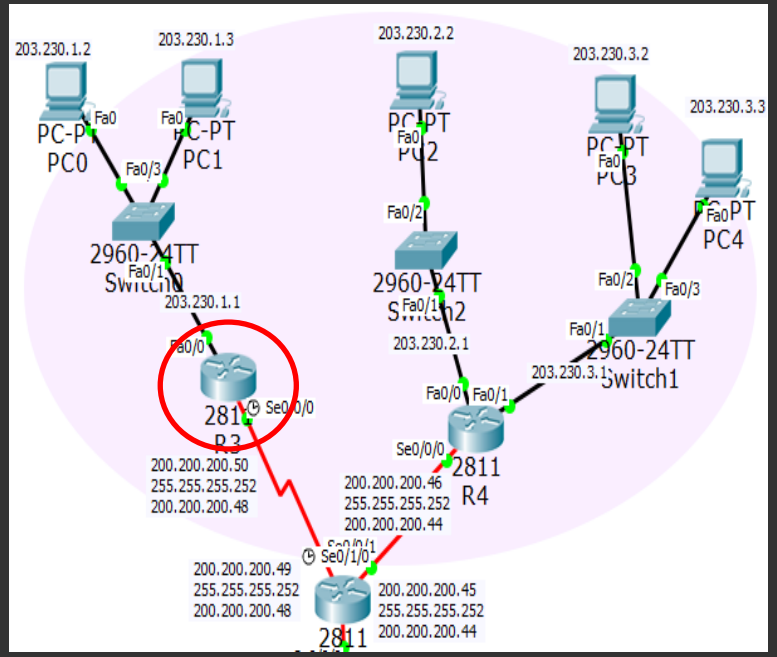



```
R2(config)#ip route 203.230.1.0 255.255.255.0 200.200.200.50
R2(config)#ip route 203.230.2.0 255.255.255.0 200.200.200.46
R2(config)#ip route 203.230.3.0 255.255.255.0 200.200.200.46
```

```
R2#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

Gateway of last resort is not set

     200.200.200.0/30 is subnetted, 2 subnets
C       200.200.200.44 is directly connected, Serial0/1/0
C       200.200.200.48 is directly connected, Serial0/0/1
S    203.230.1.0/24 [1/0] via 200.200.200.50
S    203.230.2.0/24 [1/0] via 200.200.200.46
S    203.230.3.0/24 [1/0] via 200.200.200.46
C    203.230.70.0/24 is directly connected, Serial0/0/0
```

2. 정적경로설정

[R3]

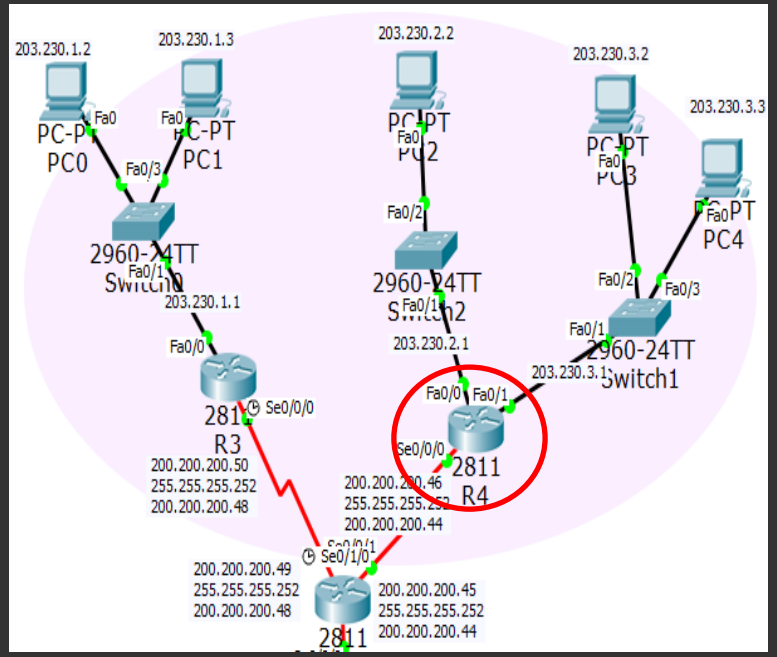



```
R3(config)#ip route 203.230.2.0 255.255.255.0 200.200.200.49
R3(config)#ip route 203.230.3.0 255.255.255.0 200.200.200.49
```

```
R3#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

Gateway of last resort is not set

     200.200.200.0/30 is subnetted, 1 subnets
C       200.200.200.48 is directly connected, Serial0/0/0
C    203.230.1.0/24 is directly connected, FastEthernet0/0
S    203.230.2.0/24 [1/0] via 200.200.200.49
S    203.230.3.0/24 [1/0] via 200.200.200.49
```

2. 정적경로설정

[R4]




```
R4(config)#ip route 203.230.1.0 255.255.255.0 200.200.200.45
```

```
R4#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

Gateway of last resort is not set

     200.200.200.0/30 is subnetted, 1 subnets
C       200.200.200.44 is directly connected, Serial0/0/0
S    203.230.1.0/24 [1/0] via 200.200.200.45
C    203.230.2.0/24 is directly connected, FastEthernet0/0
C    203.230.3.0/24 is directly connected, FastEthernet0/1
```

2. 정적경로설정

디폴트정적경로설정

[R3]

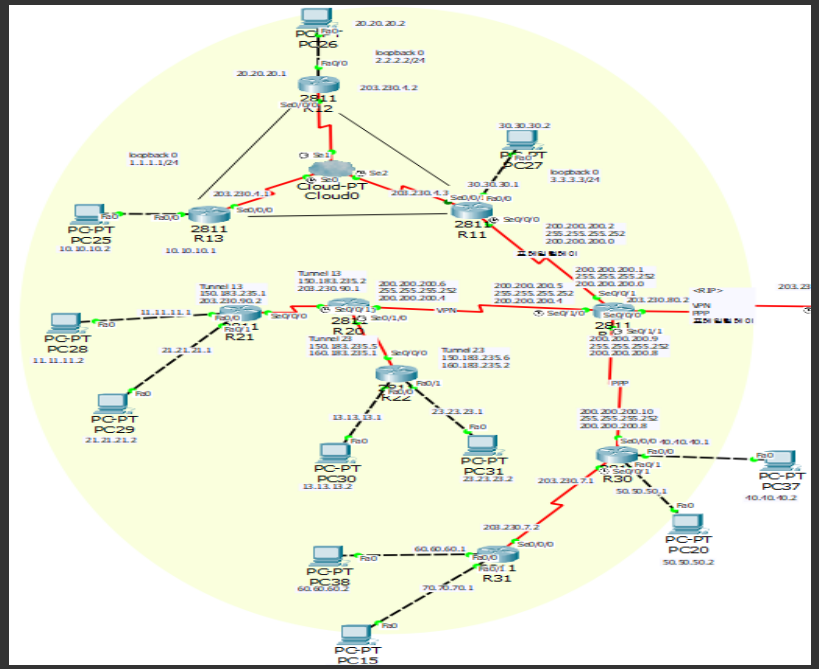
```
R3(config)#ip route 0.0.0.0 0.0.0.0 200.200.200.49
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

Gateway of last resort is 200.200.200.49 to network 0.0.0.0

     200.200.200.0/30 is subnetted, 1 subnets
C       200.200.200.48 is directly connected, Serial0/0/0
C    203.230.1.0/24 is directly connected, FastEthernet0/0
S    203.230.2.0/24 [1/0] via 200.200.200.49
S    203.230.3.0/24 [1/0] via 200.200.200.49
S*   0.0.0.0/0 [1/0] via 200.200.200.49
```

[R4]

```
R4(config)#ip route 0.0.0.0 0.0.0.0 200.200.200.45
R4(config)#exit
R4#
%SYS-5-CONFIG_I: Configured from console by console

R4#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

Gateway of last resort is 200.200.200.45 to network 0.0.0.0

     200.200.200.0/30 is subnetted, 1 subnets
C       200.200.200.44 is directly connected, Serial0/0/0
S    203.230.1.0/24 [1/0] via 200.200.200.45
C    203.230.2.0/24 is directly connected, FastEthernet0/0
C    203.230.3.0/24 is directly connected, FastEthernet0/1
S*   0.0.0.0/0 [1/0] via 200.200.200.45
```

3. RIP v2

RIP v2



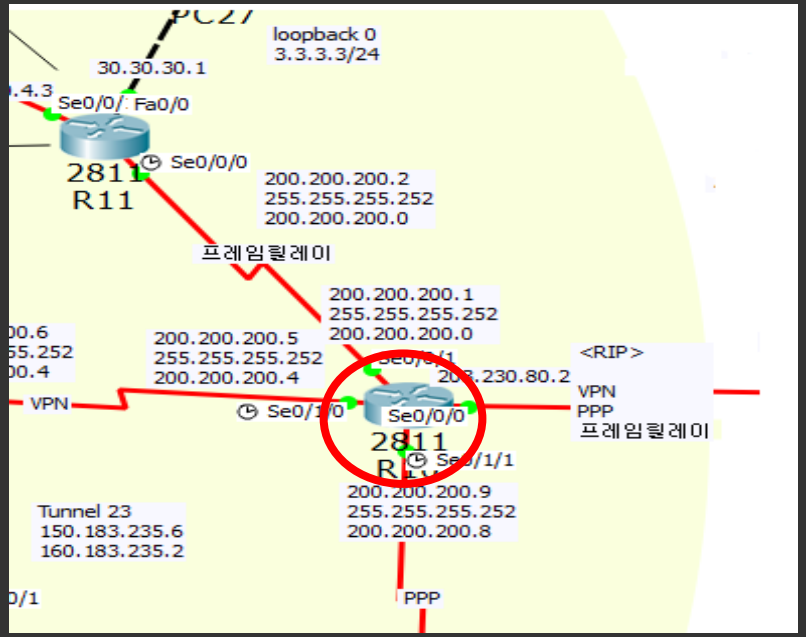
- 클래스리스 라우팅 프로토콜
- 라우팅 업데이트시 서브넷마스크 정보도 전달
- 자동요약은 설정/해제 선택 가능
- RIPv2는 라우팅정보 전달시 멀티캐스트 주소 사용 (244.0.0.9)

- 사용방법

```
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#no auto-summary
```

3. RIP v2

[R10]

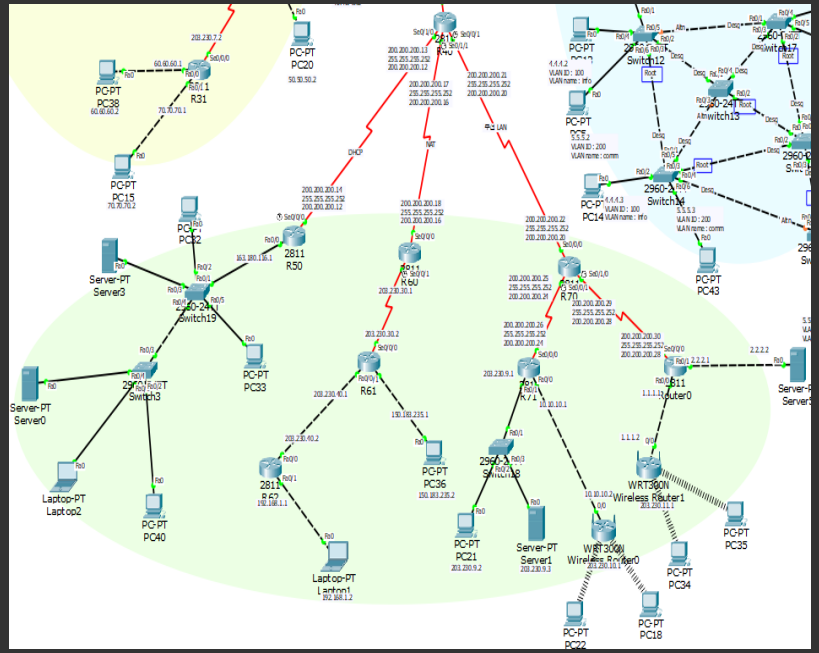



```
R10(config)#router rip
R10(config-router)#version 2
R10(config-router)#no auto-summary
R10(config-router)#network 203.230.80.0
R10(config-router)#network 200.200.200.0
```

```
Gateway of last resort is not set

     1.0.0.0/24 is subnetted, 1 subnets
R       1.1.1.0 [120/3] via 200.200.200.2, 00:00:02,
Serial0/0/1
     2.0.0.0/24 is subnetted, 1 subnets
R       2.2.2.0 [120/2] via 200.200.200.2, 00:00:02,
Serial0/0/1
     3.0.0.0/24 is subnetted, 1 subnets
R       3.3.3.0 [120/1] via 200.200.200.2, 00:00:02,
Serial0/0/1
     10.0.0.0/24 is subnetted, 1 subnets
R       10.10.10.0 [120/3] via 200.200.200.2, 00:00:02,
Serial0/0/1
     11.0.0.0/24 is subnetted, 1 subnets
R       11.11.11.0 [120/2] via 200.200.200.6, 00:00:16,
Serial0/1/0
     13.0.0.0/24 is subnetted, 1 subnets
R       13.13.13.0 [120/2] via 200.200.200.6, 00:00:16,
```

4. EIGRP

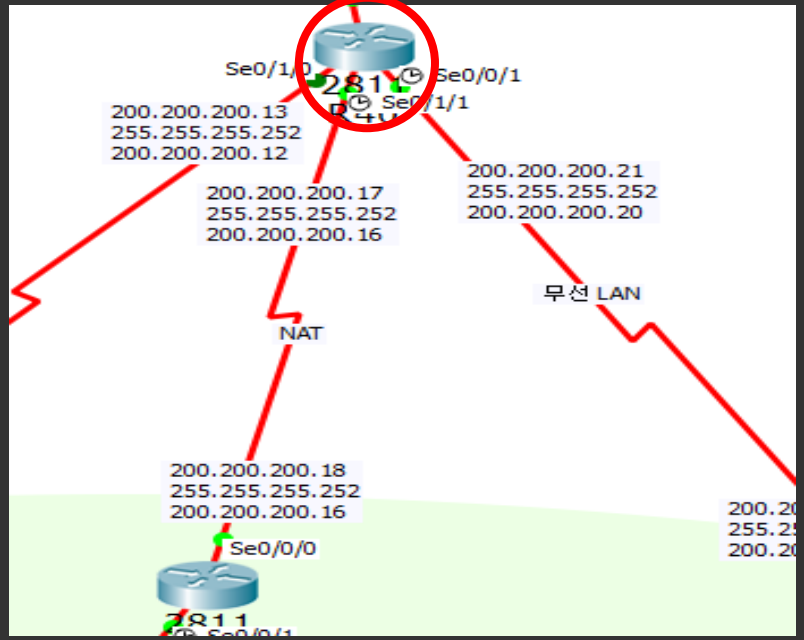
EIGRP



- 거리 벡터 라우팅 프로토콜
- 224.0.0.10의 멀티캐스트 주소, 88번 포트 사용
- 자동요약기능을 수행
- Process-ID로 자율시스템번호를 사용
- Process-ID가 서로 다른 여러 개의 EIGRP가 한 라우터상에서 동작 가능
- EIGRP패킷 전달에 신뢰성 있는 RTP를 사용
- 라우팅테이블에 등록된 경로가 네트워크 상태변화로 사용할 수 없게 된 경우 토폴로지 테이블로부터 다른 우회경로를 찾아서 제시
- 라우터들간의 경로계산을 통해 루프없는 경로를 찾아냄

4. EIGRP

[R40]

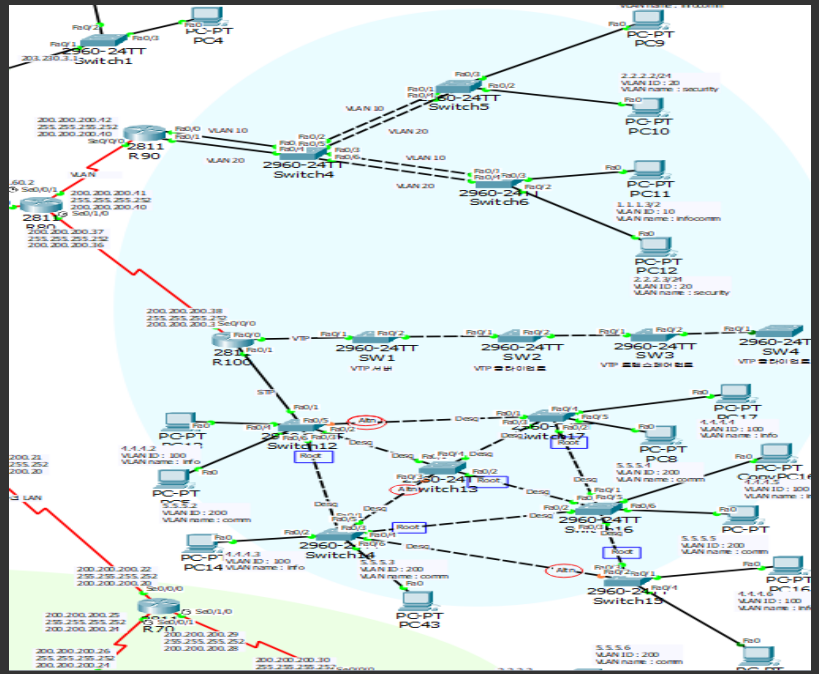



```
R40(config)#router eigrp 7
R40(config-router)#network 203.230.50.0
R40(config-router)#network 200.200.200.0
R40(config-router)#no auto-summary
```

```
Gateway of last resort is not set

     1.0.0.0/24 is subnetted, 1 subnets
D       1.1.1.0 [90/2684416] via 200.200.200.22,
00:16:17, Serial0/0/1
     2.0.0.0/24 is subnetted, 1 subnets
D       2.2.2.0 [90/2684416] via 200.200.200.22,
00:16:17, Serial0/0/1
     3.0.0.0/24 is subnetted, 1 subnets
O E2    3.3.3.0 [110/20] via 203.230.50.1, 00:16:09,
Serial0/0/0
     10.0.0.0/24 is subnetted, 1 subnets
D       10.10.10.0 [90/2684416] via 200.200.200.22,
00:16:15, Serial0/0/1
     11.0.0.0/24 is subnetted, 1 subnets
O E2    11.11.11.0 [110/20] via 203.230.50.1, 00:16:09,
Serial0/0/0
     13.0.0.0/24 is subnetted, 1 subnets
O E2    13.13.13.0 [110/20] via 203.230.50.1, 00:16:09,
Serial0/0/0
```

5.OSPF

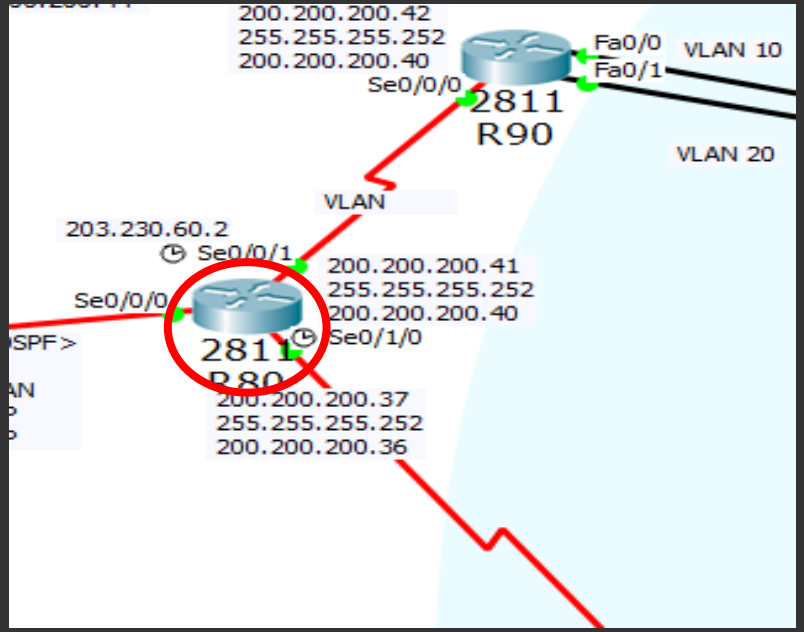
OSPF



- 계층화된 라우팅 동작 수행
- 중대규모 네트워크에 가장 많이 사용되는 프로토콜
- 멀티캐스트 주소 이용하여 라우팅 정보 업데이트
- OSPF에서는 모든 라우터가 동일한 네트워크 토폴로지 데이터베이스를 기반으로 경로를 계산하기 때문에 라우팅 루프가 발생하지 않는다.
- 네트워크 변화 시에만 라우팅 정보를 전송하기 때문에 라우팅 트래픽의 양을 줄일 수 있다.

5.OSPF

[R80]

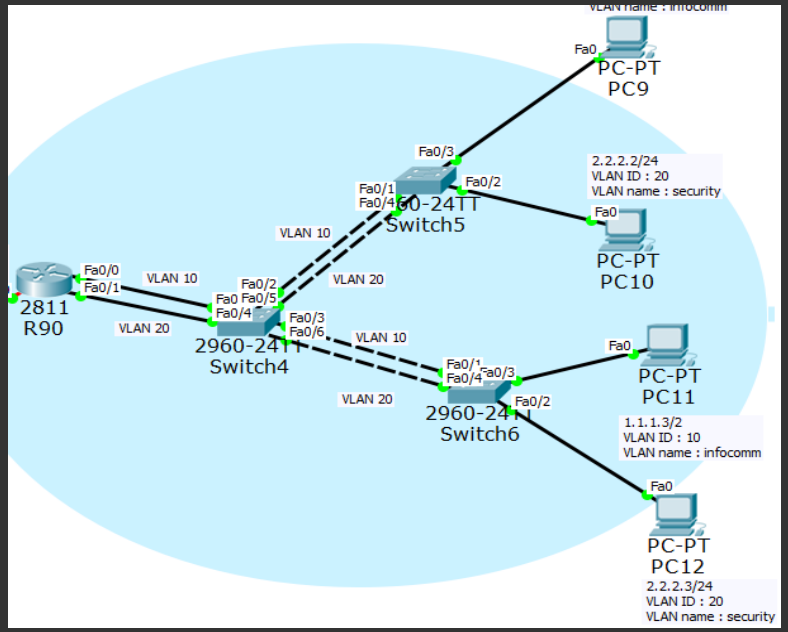



```
R80(config)#router ospf 7
R80(config-router)#network 203.230.60.0 0.0.0.255 a 0
R80(config-router)#network 200.200.200.0 0.0.0.255 a 0
```

```
Gateway of last resort is not set

     1.0.0.0/24 is subnetted, 1 subnets
C       1.1.1.0 is directly connected, FastEthernet0/0
     2.0.0.0/24 is subnetted, 1 subnets
C       2.2.2.0 is directly connected, FastEthernet0/1
     3.0.0.0/24 is subnetted, 1 subnets
D EX    3.3.3.0 [170/2681856] via 200.200.200.41,
00:24:59, Serial0/0/0
     10.0.0.0/24 is subnetted, 1 subnets
D EX    10.10.10.0 [170/2681856] via 200.200.200.41,
00:24:59, Serial0/0/0
     11.0.0.0/24 is subnetted, 1 subnets
D EX    11.11.11.0 [170/2681856] via 200.200.200.41,
00:24:57, Serial0/0/0
     13.0.0.0/24 is subnetted, 1 subnets
D EX    13.13.13.0 [170/2681856] via 200.200.200.41,
00:24:58, Serial0/0/0
```

6. VLAN

VLAN



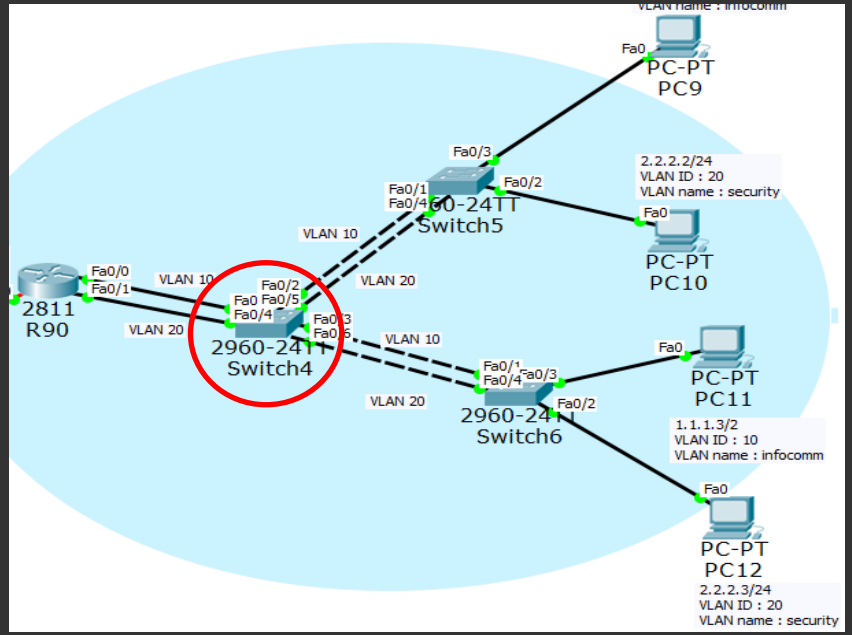
- VLAN의 필요성
  - 네트워크의 크기가 커지면 플러딩 데이터가 커짐
  - 내부에서 권한이 없는 사용자가 제약없이 특정 장치에 접속 가능
- VLAN의 역할
  - 브로드캐스트 도메인을 분할하여 브로드캐스트 트래픽으로 인한 장비들의 성능저하를 막고자 함
  - 서로 다른 VLAM에 속한 장치들은 통신이 불가능하여 보안에 도움
  - 서로 다른 VLAN이 통신하려면 라우터가 L3 스위치가 필요
  - 스위치의 모든 포트는 기본 VLAN 1번에 속해있음
- Inter-VLAN

  서로 다른 VLAN에 속한 PC가 서로 통신할 수 있도록 설정하는 것

6. VLAN

Inter-VLAN

[Switch4]



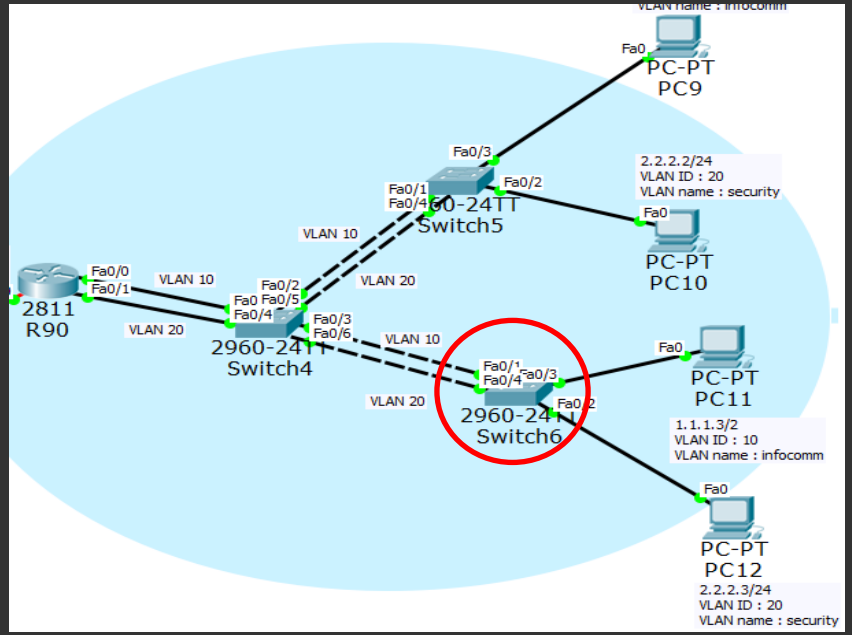

```
Switch(config)#vlan 10
Switch(config-vlan)#name infocomm
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name security
Switch(config-vlan)#exit
```

```
Switch(config)#int fa0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#int fa0/5
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#int fa0/3
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#int fa0/6
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#int fa0/1
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#int fa0/4
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
```

6. VLAN

Inter-VLAN

[Switch6]

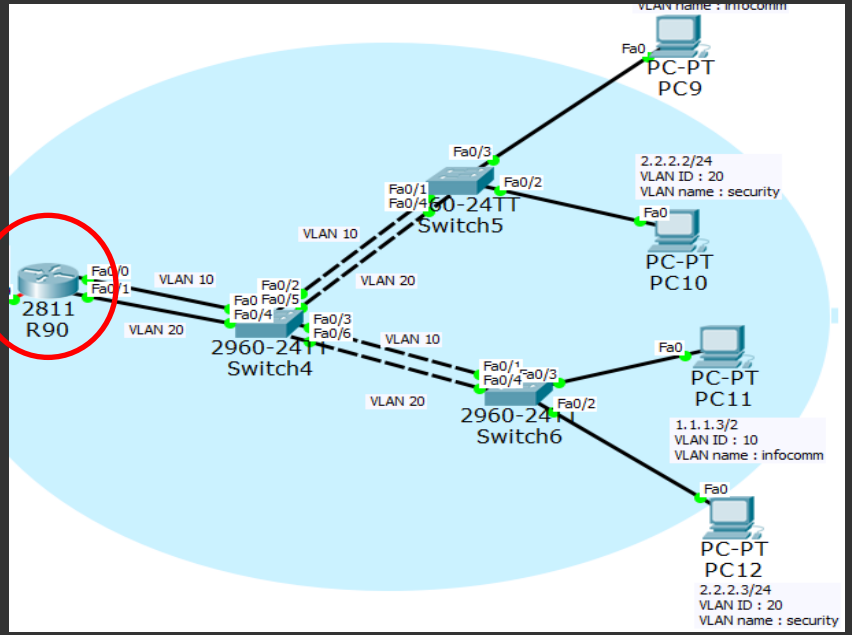



```
Switch(config)#vlan 10
Switch(config-vlan)#name infocomm
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name security
Switch(config-vlan)#exit
```

```
Switch(config)#int fa0/3
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#int fa0/2
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#int fa0/1
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#int fa0/4
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
```

6. VLAN

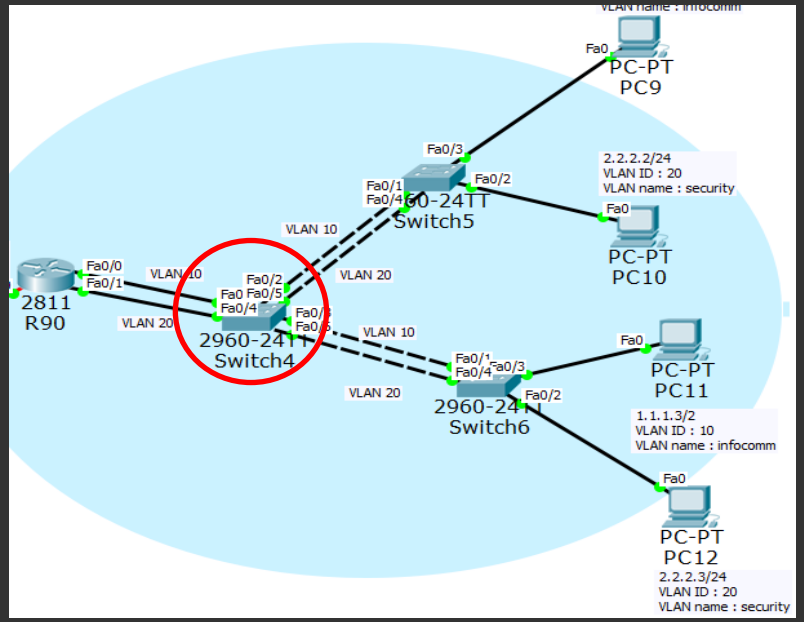
[R90]




```
R90(vlan)#vlan10 name infocomm
VLAN 10 Modified:
    Name: infocomm
R90(vlan)#vlan70 name security
VLAN 70 modified
   Name: security
```

```
R90(config)#int fa0/0
R90(config-if)#ip add 1.1.1.1 255.255.255.0
R90(config-if)#exit
R90(config)#int fa0/1
R90(config-if)#ip add 2.2.2.1 255.255.255.0
R90(config-if)#exit
```

Port-Security

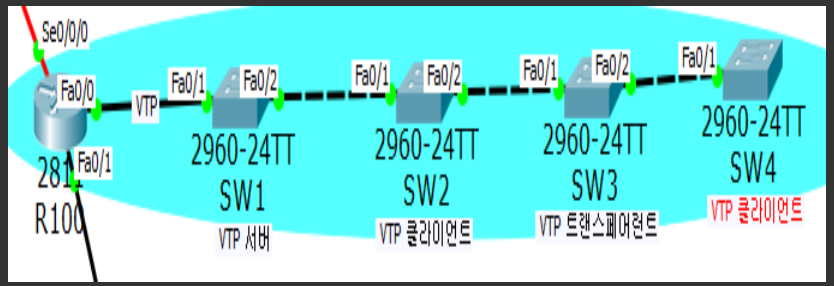


스위치에서 L2의 MAC주소를 기반으로 프레임 수신 여부를 설정하는 것

[Switch4]

```
Swtich(config)#int fa0/4
Swtich(config-if)#switchport mode access
Swtich(config-if)#switchport port-security
Swtich(config-if)#switchport port-security maximum1
Swtich(config-if)#switchport port-security violation
shutdowm
```

7.VTP



VTP

- 규모가 큰 네트워크에서 스위치별로 VLAN을 생성, 수정, 삭제 등을 직접 관리해야 한다면 매우 번거로움
- VLAN의 생성, 수정, 삭제 등의 관리를 쉽게 할 수 있도록 하는 프로토콜
- 스위치마다 일일이 VLAM을 설정하지 않아도 네트워크 시스코 전용 프로토콜

7.VTP

VTP 설정

[SW1]

```
SW1(config)#vtp version 2
VTP mode already in V2.
SW1(config)#vtp mode server
Device mode already VTP SERVER.
SW1(config)#vtp domain infocomm
Changing VTP domain name from NULL to infocomm
SW1(config-if)#vtp password infocomm
Setting device VLAN database password to infocomm
SW1(config)#int fa0/1
SW1(config-if)#switchport mode trunk
```

[SW2]

```
SW2(config)#vtp version 2
VTP mode already in V2.
SW2(config)#vtp mode client
Setting device to VTP CLIENT mode.
SW2(config)#vtp domain infocomm
Domain name already set to infocomm.
SW2(config)#vtp password infocomm
Setting device VLAN database password to infocomm
SW2(config)#int range fa0/1-2
SW2(config-if-range)#switchport mode trunk
```

[SW3]

```
SW3(config)#vtp version 2
SW3(config)#vtp mode transparent
Setting device to VTP TRANSPARENT mode.
SW3(config)#vtp domain infocomm
Domain name already set to infocomm.
SW3(config)#vtp password infocomm
Setting device VLAN database password to infocomm
SW3(config)#int range fa0/1-2
SW3(config-if-range)#switchport mode trunk
```

[SW4]

```
SW4(config)#vtp version 2
SW4(config)#vtp mode client
Setting device to VTP CLIENT mode.
SW4(config)#vtp domain infocomm
Changing VTP domain name from NULL to infocomm
SW4(config)#vtp password infocomm
Setting device VLAN database password to infocomm
SW4(config)#int fa0/1
SW4(config-if)#switchport mode trunk
```

7.VTP

Show VTP status

[SW1]

```
SW1#show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Server
VTP Domain Name                 : infocomm
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Enabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0x9E 0xBB 0x15 0x82
0x65 0x6B 0x16 0x17
Configuration last modified by 0.0.0.0 at 3-1-93 00:04:38
Local updater ID is 0.0.0.0 (no valid interface found)
```

[SW2]

```
SW2#show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Client
VTP Domain Name                 : infocomm
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Enabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0x9E 0xBB 0x15 0x82
0x65 0x6B 0x16 0x17
Configuration last modified by 0.0.0.0 at 3-1-93 00:04:38
```

[SW3]

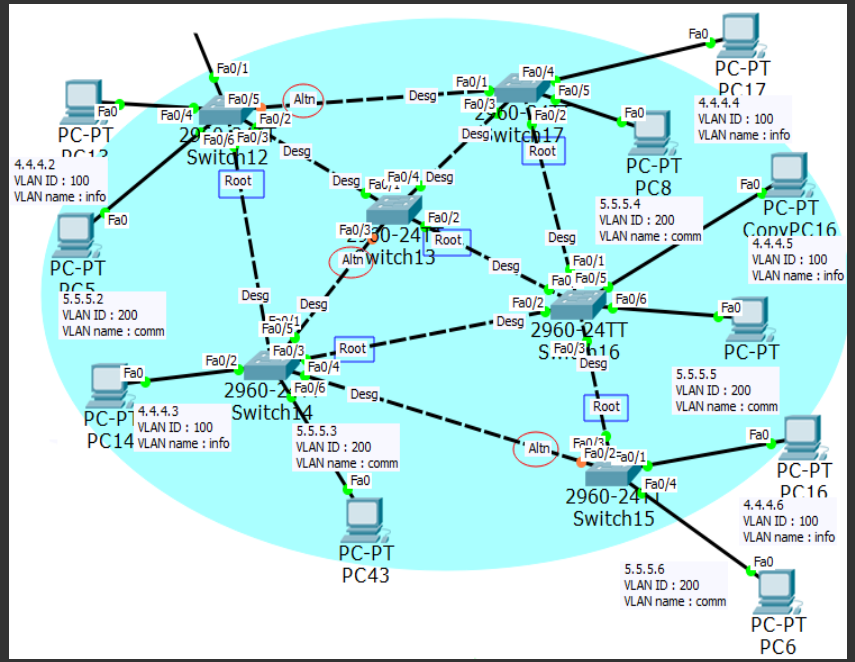
```
SW3#show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Transparent
VTP Domain Name                 : infocomm
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Enabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0xC2 0xF1 0x1E 0x2D
0x2F 0x63 0x5A 0xF9
Configuration last modified by 0.0.0.0 at 3-1-93 00:05:52
```

[SW4]

```
SW4#show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Client
VTP Domain Name                 : infocomm
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Enabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0x9E 0xBB 0x15 0x82
0x65 0x6B 0x16 0x17
Configuration last modified by 0.0.0.0 at 3-1-93 00:04:38
```

8.STP

STP

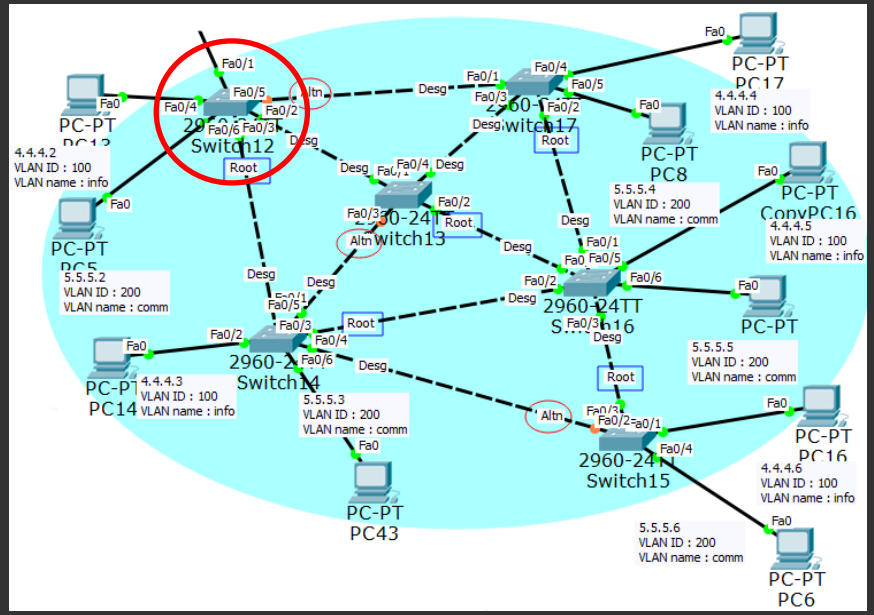


- 프레임 플러딩과 루프 발생을 방지하기 위한 프로토콜
- STP는 모든 스위치에서 기본적으로 동작
- IEEE 802.1D 표준
- 루프가 발생할 수 있는 경로를 논리적으로 차단함으로써 목적지로 가는 경로를 하나로 만듬
- 사용하던 경로에 문제가 발생할 경우 대체경로를 통해 통신할 수 있도록 운영

8.STP

스위치 설정

[Switch12]




```
switch(config)#vlan 100
switch(config-vlan)#name info
switch(config-vlan)#exit
switch(config-vlan)#vlan 200
switch(config-vlan)#name comm
switch(config-vlan)#exit

switch(config)#int fa0/4
switch(config-if)#switchport access vlan 100
switch(config-if)#exit
switch(config)#int fa0/6
switch(config-if)#switchport access vlan 200

switch(config)#int fa0/2
switch(config-if)#switchport mode trunk
switch(config-if)#exit
switch(config)#int fa0/3
switch(config-if)#switchport mode trunk
switch(config-if)#exit
switch(config)#int fa0/5
switch(config-if)#switchport mode trunk
switch(config-if)#exit
```

8.STP

show spanning-tree

[Switch16]

```
Switch#show spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID     Priority    32769
              Address     0001.4355.400A
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32769  (priority 32768 sys-id-ext 1)
              Address     0001.4355.400A
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/3            Desg FWD 19        128.3    P2p
Fa0/4            Desg FWD 19        128.4    P2p
Fa0/2            Desg FWD 19        128.2    P2p
```

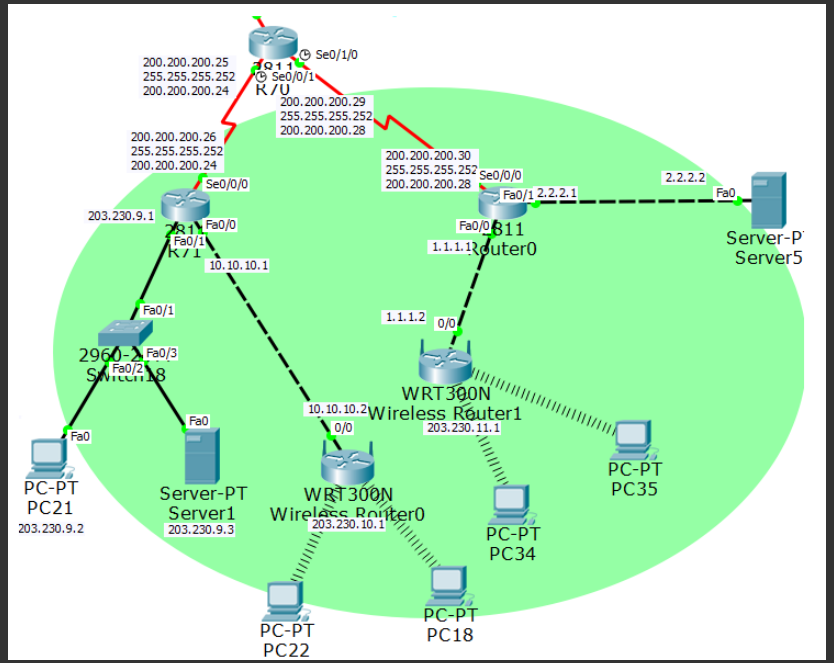
```
VLAN0200
  Spanning tree enabled protocol ieee
  Root ID     Priority    32968
              Address     0001.4355.400A
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32968  (priority 32768 sys-id-ext 200)
              Address     0001.4355.400A
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/3            Desg FWD 19        128.3    P2p
Fa0/4            Desg FWD 19        128.4    P2p
Fa0/2            Desg FWD 19        128.2    P2p
Fa0/6            Desg FWD 19        128.6    P2p
```

```
VLAN0100
  Spanning tree enabled protocol ieee
  Root ID     Priority    32868
              Address     0001.4355.400A
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32868  (priority 32768 sys-id-ext 100)
              Address     0001.4355.400A
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/3            Desg FWD 19        128.3    P2p
Fa0/4            Desg FWD 19        128.4    P2p
Fa0/2            Desg FWD 19        128.2    P2p
Fa0/5            Desg FWD 19        128.5    P2p
```

→ Switch16이 루트브리지로 선출

9. 무선LAN

무선LAN



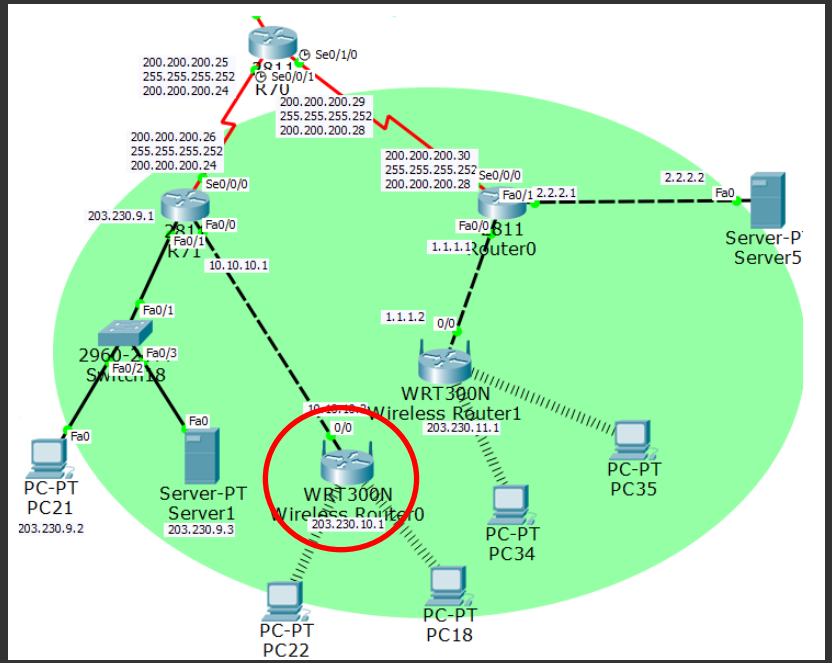
- Layer1 에서 Layer2로의 연결회선이
  - 유선이면 유선 LAN
  - 무선이면 무선 LAN

- 네트워크의 규모
  - LAN: Local Area Network
  - MAN: Metropolitan Area Network
  - WAN: Wide Area Network
  - PAN: Personal Area Network.
    개인사용자가 사용하는 네트워크

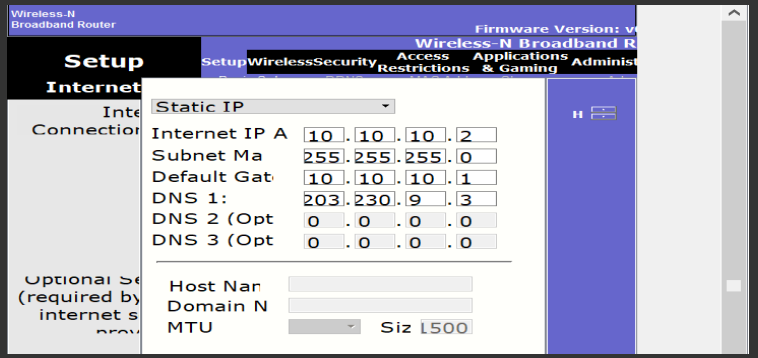
9. 무선LAN

무선라우터 설정

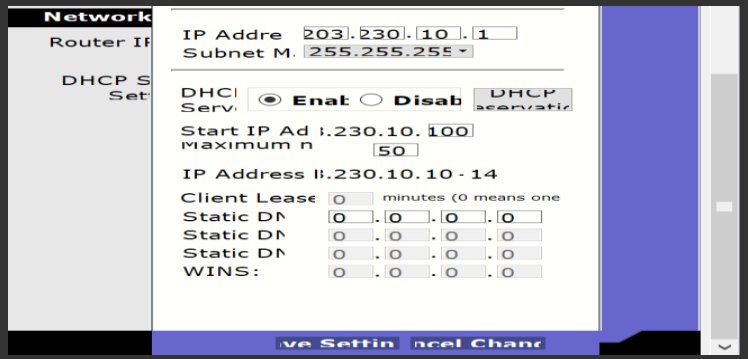
[Wireless Router0]



인터넷 설정

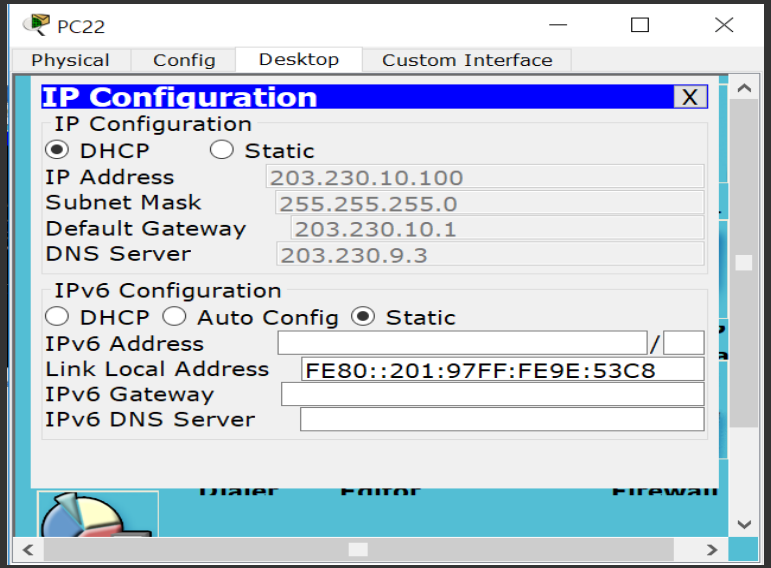


무선랜 설정

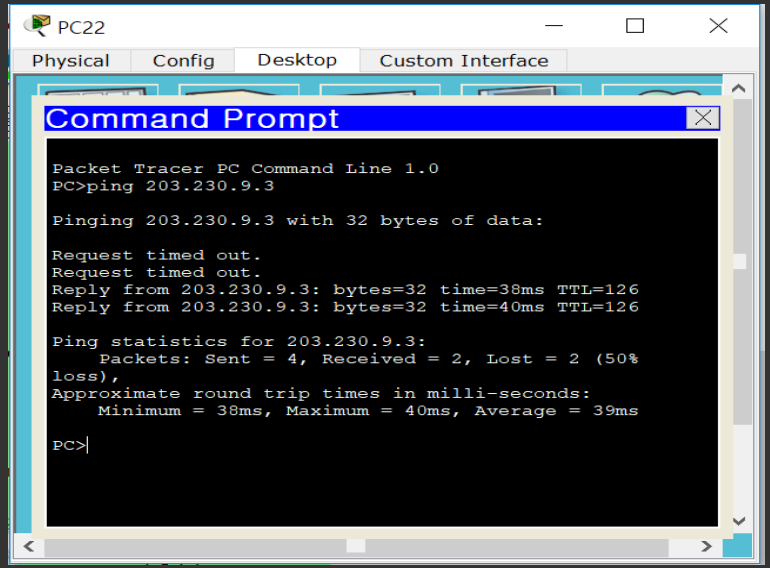


9. 무선LAN

무선라우터 설정



PC는 DHCP 서버로부터 IP 주소를 자동으로 받아옴

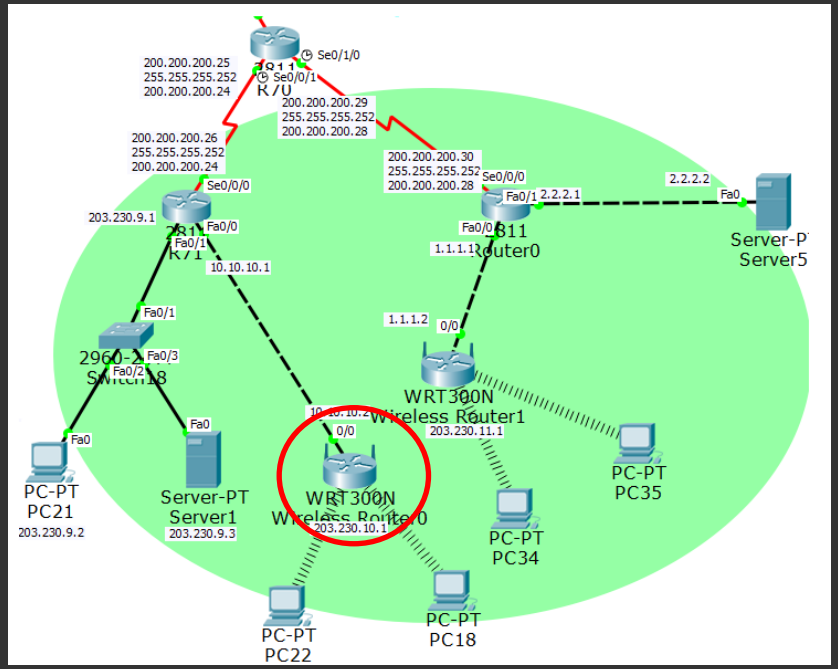


통신성공

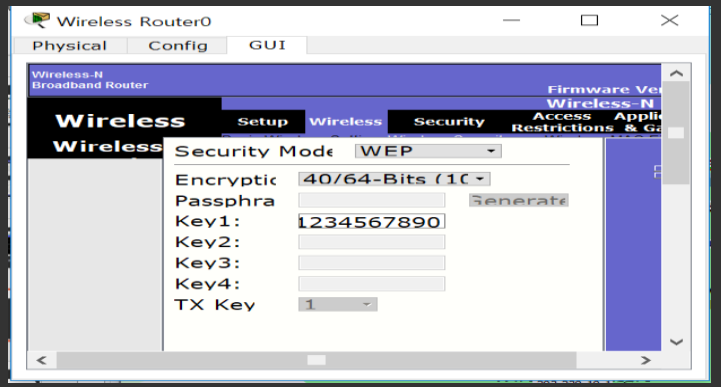
9. 무선LAN

WEP 설정

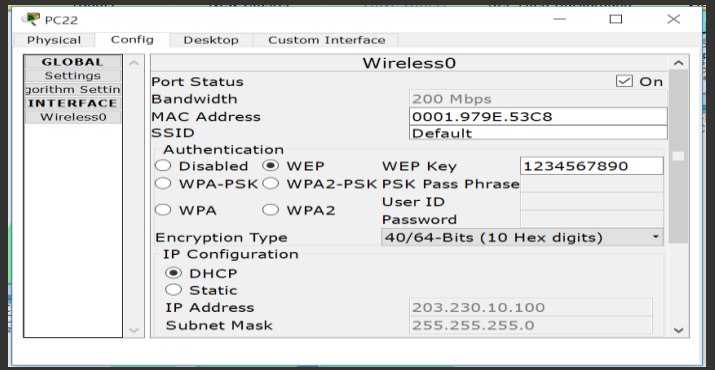
[Wireless Router0]



무선라우터 WEP설정



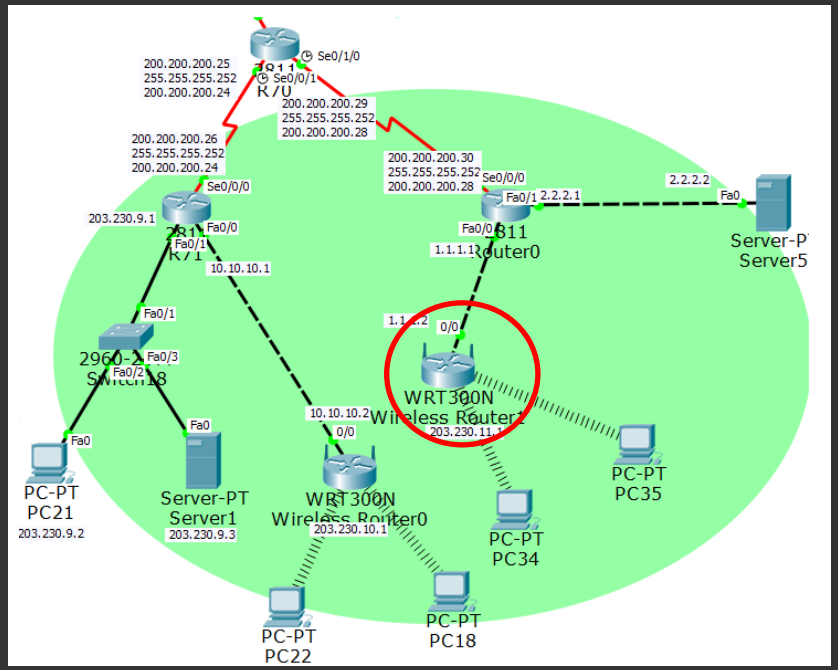
PC의 WEP설정



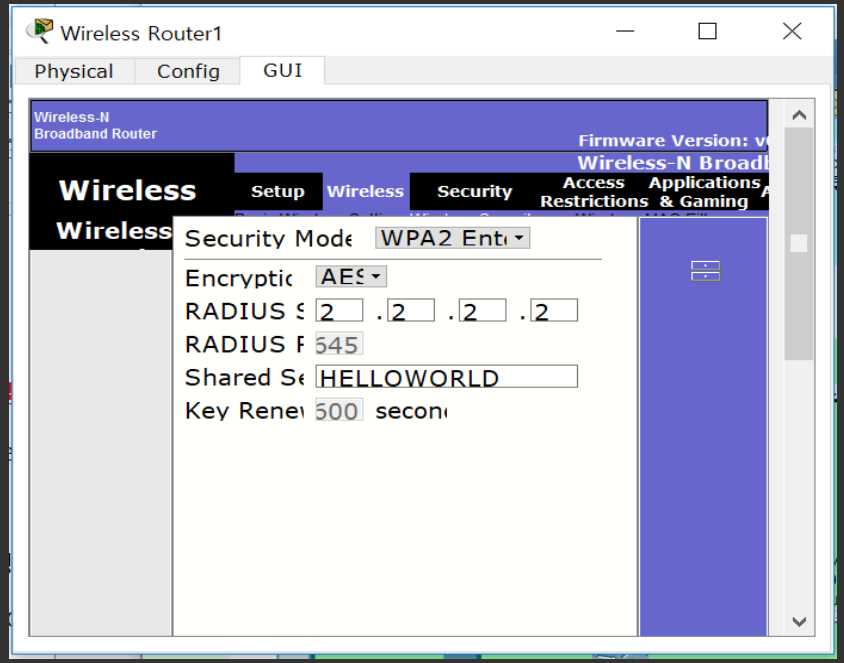
9. 무선LAN

WPA2-Enterprise 설정

[Wireless Router1]



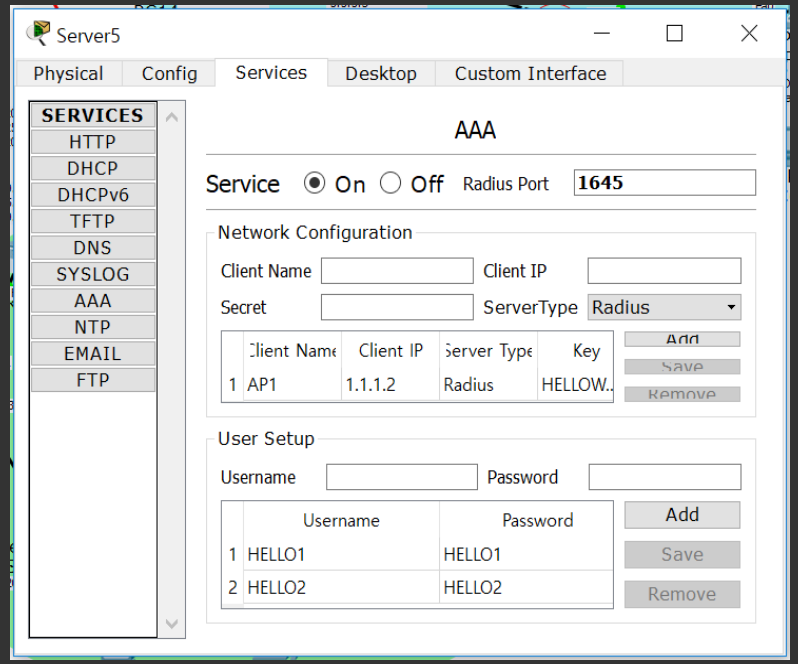
무선라우터 설정



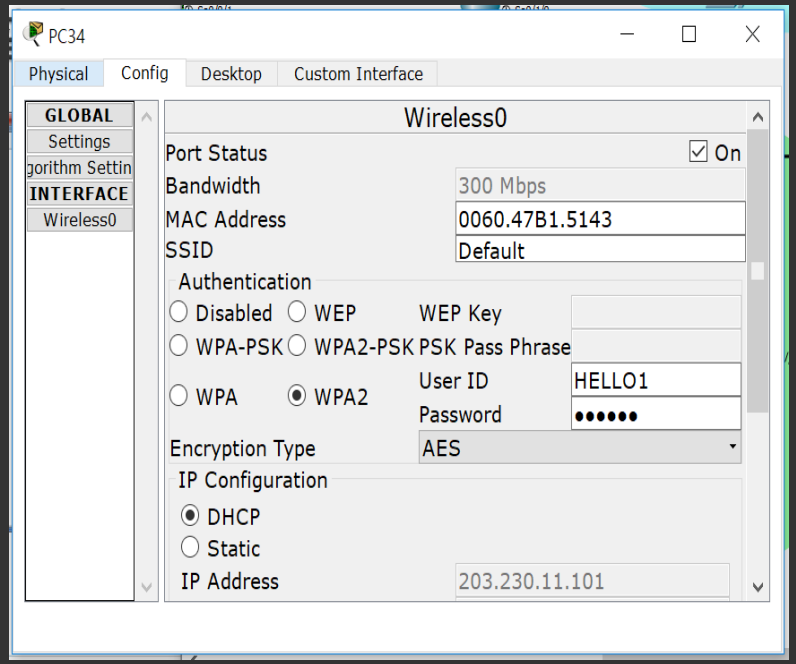
9. 무선LAN

WPA2-Enterprise 설정

AAA서버 설정

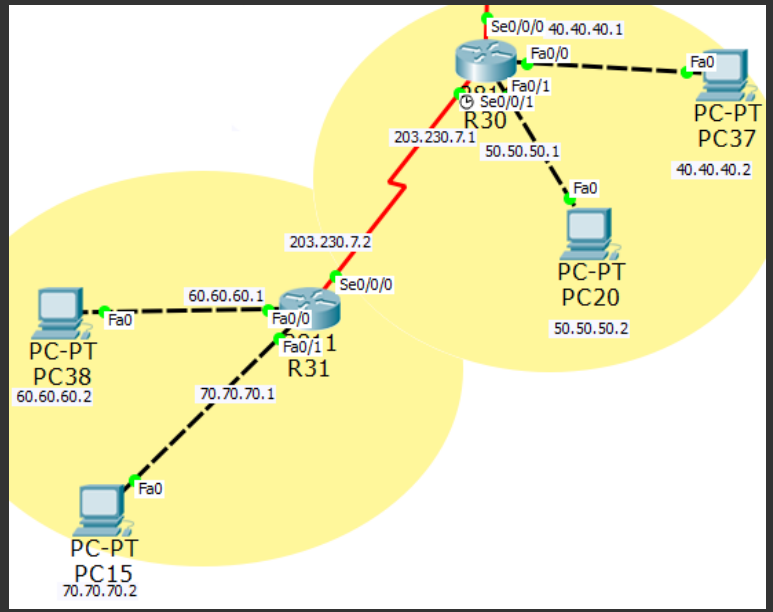


사용자PC 설정



10. WAN

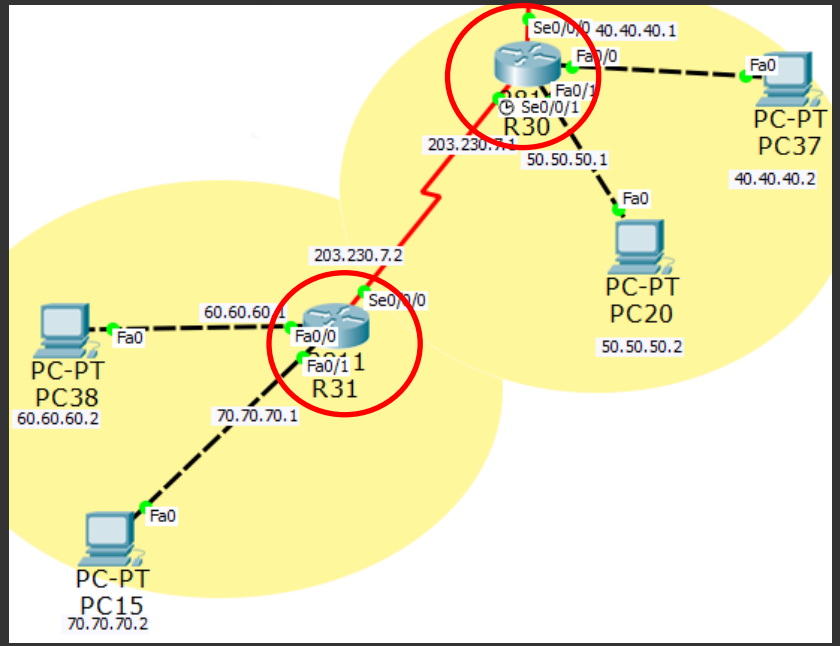
PPP



- WAN
  - LAN과 MAN을 포괄하는 광역 네트워크
  - 라우터, 스위치 뿐만 아니라 다양한 장비들이 사용됨
  - 다양한 접속기술과 접속장치들을 통해 네트워크 구성
- PPP
  캡슐화 방식을 PPP로 변경
- CHAP
  - PAP는 사용자이름과 암호를 평문으로 전달
  - CHAP는 3-way handshake 방식으로 주기적 인증
  - 사용자이름과 암호가 MD5 해쉬값으로 전송

10. WAN

PPP CHAP 설정



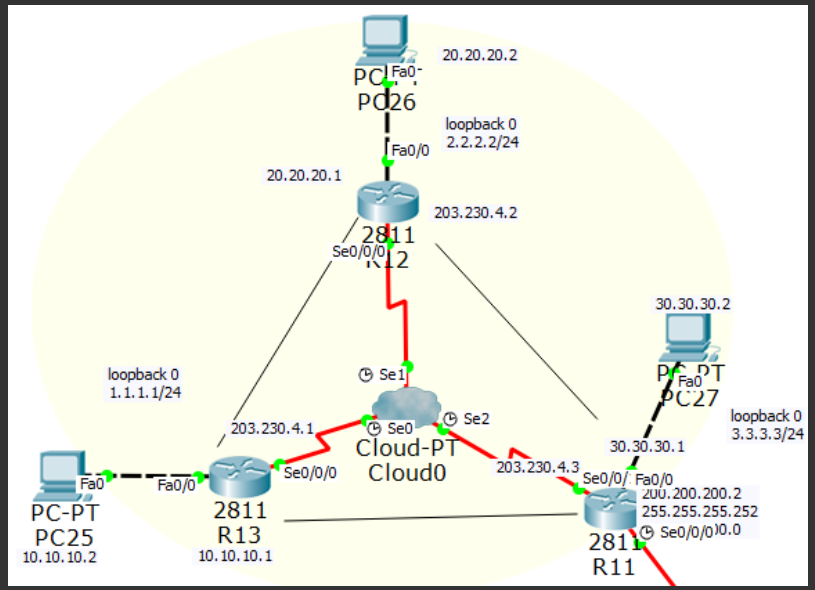
[R30]

```
R30(config)#username R31 password infocomm
R30(config)#int s0/0/1
R30(config-if)#encapsulation ppp
R30(config-if)#ppp authentication chap
```

[R31]

```
R30(config)#username R30 password infocomm
R30(config)#int s0/0/0
R30(config-if)#encapsulation ppp
R30(config-if)#ppp authentication chap
```

Frame-relay



- 물리계층, 데이터링크계층에서 동작하는 WAN프로토콜
- X.25 패킷스위칭의 오버헤드를 제거
- 패킷에서 오류가 검출되면 오류복원을 제공하는 것이 아니라 패킷을 폐기해 버린다.
- 하나의 물리적인 회선에 여러 가상회선을 만들어 전용선처럼 취급하여 서비스

- 가상회선
  - SVC - 임시적인 패킷 전송에 사용되는 임시 회선
  - PVC – 고정적인 논리 경로를 가지며 가입자마다 고유 식별번호(DLCI)가 제공됨

10. WAN

Frame-relay 연결을 위한 라우터 설정

[R11]

```
R11(config)#int lo 0
R11(config-if)#ip add 3.3.3.3 255.255.255.0
R11(config-if)#exit
R11(config)#int fa0/0
R11(config-if)#ip add 30.30.30.1 255.255.255.0
R11(config-if)#no shutdown
R11(config-if)#exit
R11(config)#int s0/0/0
R11(config-if)#ip add 203.230.4.3 255.255.255.0
R11(config-if)#encapsulation frame-relay
R11(config-if)#frame-relay map ip 203.230.4.2 302 broadcast
R11(config-if)#frame-relay map ip 203.230.4.1 302 broadcast
R11(config-if)#no shutdown
R11(config-if)#exit
R11(config)#router rip
R11(config-if)#version 2
R11(config-if)#network 3.0.0.0
R11(config-if)#network 30.0.0.0
R11(config-if)#network 203.230.4.0
R11(config-if)#no auto-summary
```

[R12]

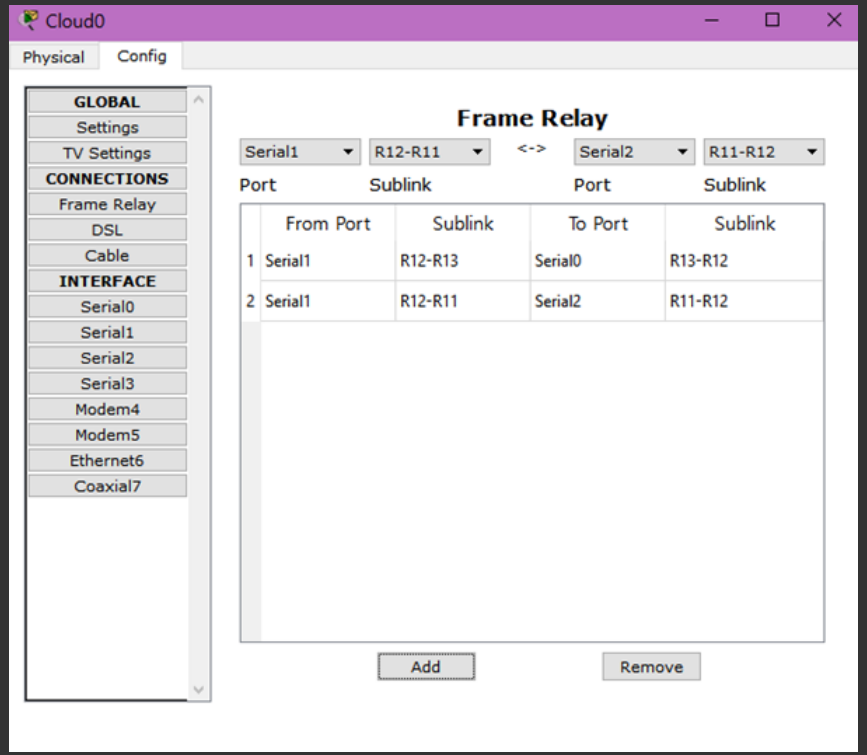
```
R12(config)#int lo 0
R12(config-if)#ip add 2.2.2.2 255.255.255.0
R12(config-if)#exit
R12(config)#int fa0/0
R12(config-if)#ip add 20.20.20.1 255.255.255.0
R12(config-if)#no shutdown
R12(config-if)#exit
R12(config)#int s0/0/0
R12(config-if)#ip add 203.230.4.2 255.255.255.0
R12(config-if)#encapsulation frame-relay
R12(config-if)#frame-relay map ip 203.230.4.1 201 broadcast
R12(config-if)#frame-relay map ip 203.230.4.3 203 broadcast
R12(config-if)#no shutdown
R12(config-if)#exit
R12(config)#router rip
R12(config-if)#version 2
R12(config-if)#network 2.0.0.0
R12(config-if)#network 20.0.0.0
R12(config-if)#network 203.230.4.0
R12(config-if)#no auto-summary
```

[R13]

```
R13(config)#int lo 0
R13(config-if)#ip add 1.1.1.1 255.255.255.0
R13(config-if)#exit
R13(config)#int fa0/0
R13(config-if)#ip add 10.10.10.1 255.255.255.0
R13(config-if)#no shutdown
R13(config-if)#exit
R13(config)#int s0/0/0
R13(config-if)#ip add 203.230.4.1 255.255.255.0
R13(config-if)#encapsulation frame-relay
R13(config-if)#frame-relay map ip 203.230.4.2 102 broadcast
R13(config-if)#frame-relay map ip 203.230.4.3 102 broadcast
R13(config-if)#no shutdown
R13(config-if)#exit
R13(config)#router rip
R13(config-if)#version 2
R13(config-if)#network 1.0.0.0
R13(config-if)#network 10.0.0.0
R13(config-if)#network 203.230.4.0
R13(config-if)#no auto-summary
```

10. WAN

Frame-relay에서 DCLI 연결



201 – 102 연결

203 – 302 연결

10. WAN

Frame-relay 라우팅 테이블

[R12]

```
     1.0.0.0/24 is subnetted, 1 subnets
R       1.1.1.0 [120/1] via 203.230.4.1, 00:00:13, Serial0/0/0
     2.0.0.0/24 is subnetted, 1 subnets
C       2.2.2.0 is directly connected, Loopback0
     3.0.0.0/24 is subnetted, 1 subnets
R       3.3.3.0 [120/1] via 203.230.4.3, 00:00:05, Serial0/0/0
     10.0.0.0/24 is subnetted, 1 subnets
R       10.10.10.0 [120/1] via 203.230.4.1, 00:00:13, Serial0/0/0
     20.0.0.0/24 is subnetted, 1 subnets
C       20.20.20.0 is directly connected, FastEthernet0/0
     30.0.0.0/24 is subnetted, 1 subnets
R       30.30.30.0 [120/1] via 203.230.4.3, 00:00:05, Serial0/0/0
C    203.230.4.0/24 is directly connected, Serial0/0/0
```

R11 – R12 연결

R12 – R13 연결

R11 – R13 연결안됨

[R11]

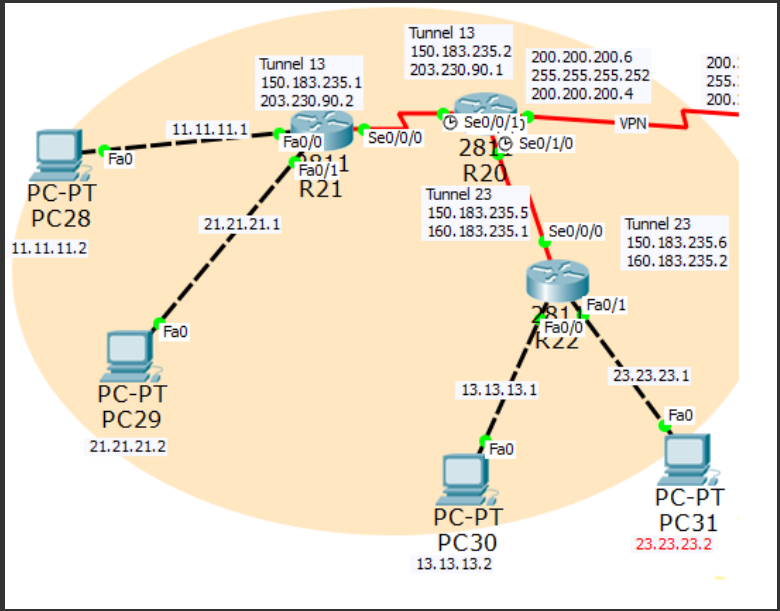
```
     3.0.0.0/24 is subnetted, 1 subnets
C       3.3.3.0 is directly connected, Loopback0
     30.0.0.0/24 is subnetted, 1 subnets
C       30.30.30.0 is directly connected, FastEthernet0/0
     200.200.200.0/30 is subnetted, 1 subnets
C       200.200.200.0 is directly connected, Serial0/0/0
C    203.230.4.0/24 is directly connected, Serial0/0/1
```

[R13]

```
     1.0.0.0/24 is subnetted, 1 subnets
C       1.1.1.0 is directly connected, Loopback0
     2.0.0.0/24 is subnetted, 1 subnets
R       2.2.2.0 [120/1] via 203.230.4.2, 00:00:10, Serial0/0/0
     10.0.0.0/24 is subnetted, 1 subnets
C       10.10.10.0 is directly connected, FastEthernet0/0
     20.0.0.0/24 is subnetted, 1 subnets
R       20.20.20.0 [120/1] via 203.230.4.2, 00:00:10, Serial0/0/0
C    203.230.4.0/24 is directly connected, Serial0/0/0
```

11. VPN

VPN

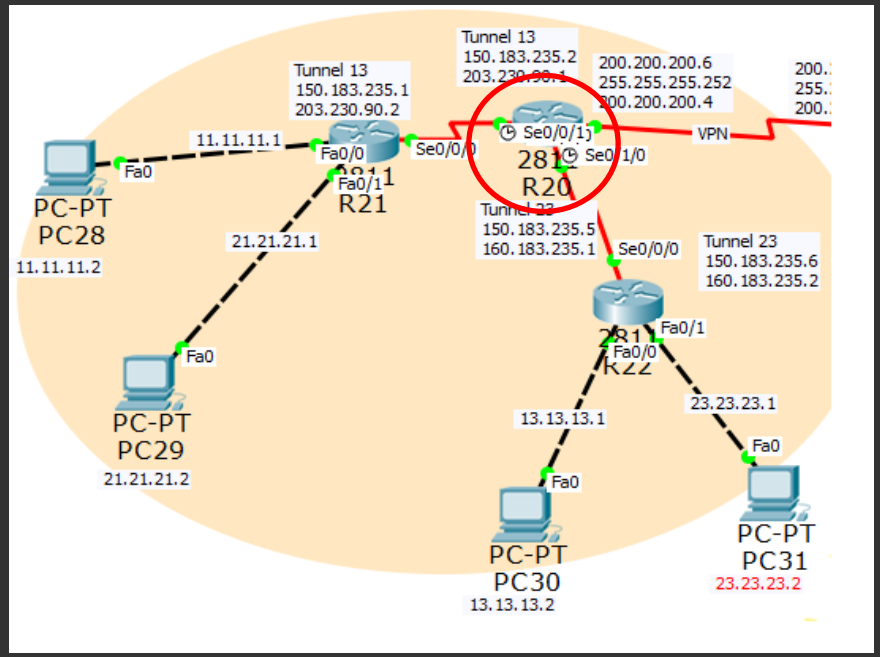


- 공중망에서 터널링 기술을 이용하여 사설망 처럼 이용할 수 있도록 하는 기술
- 값싸게 보안통신을 이용할 수 있음
- 안전한 기업 업무환경 구축
  - 본사 – 지사간의 안전한 네트워크 연결
  - 재택근무: 집에서 회사 서버에 안전하게 접속
- VoIP네트워크: 인터넷전화
- IPTV, 비디오 회의

11. VPN

GRE + IPSec VP

[R20]



터널 설정

```
R20(conifg)#int tunnel 13
R20(conifg-if)#ip add 150.183.235.2 255.255.255.252
R20(conifg-if)#tunnel source s0/0/1
R20(conifg-if)#sunnel destination 203.230.90.2
R20(conifg-if)#exit
R20(conifg)#int tunnel 23
R20(conifg-if)#ip add 150.183.235.5 255.255.255.252
R20(conifg-if)#tunnel source s0/0/1
R20(conifg-if)#sunnel destination 160.183.235.2
R20(conifg-if)#exit
```

Isakmp policy 설정

```
R20(config)#crypto isakmp policy 10
R20(config-isakmp)#encryption aes 256
R20(config-isakmp)#authentication pre-share
R20(config-isakmp)#lifetime 36000
R20(config-isakmp)#hash sha
```

Ipsec transform-set 설정

```
R20(config)#cryto ipsec transform-set STRONG esp-3des esp-md5-hmac
```

4. VPN

GRE + IPSec VP

Isapkm key 설정

```
R20(config)#cryto iskmp keycisco 123 address 0.0.0.0 0.0.0.0
```

Crypto map 설정

```
R20(config)#cryto map VPN1 110 ipsec-isakmp
%NOTE:This new cryto map will remain disabled until a peer
      and a valid access list have been configured.
R20(config-crypto-map)#set peer 203.230.90.2
R20(config-crypto-map)#set transform-set strong
R20(config-crypto-map)#match address 110
R20(config-crypto-map)#exit
R20(config)#cryto map VPN 120 ipsec-isakmp
%NOTE:This new cryto map will remain disabled until a peer
      and a valid access list have been configured.
R20(config-crypto-map)#set peer 160,183.235.2
R20(config-crypto-map)#set transform-set strong
R20(config-crypto-map)#match address 120
R20(config-crypto-map)#exit
```

Access-list 설정

```
R20(config)#access-list 110 permit qre host 203.230.9.1 host 203.230.9.2
R20(config)#access-list 120 permit gre host 160.183.235.1 host
            160.183.235.2
```

인터페이스에 VPN 설정

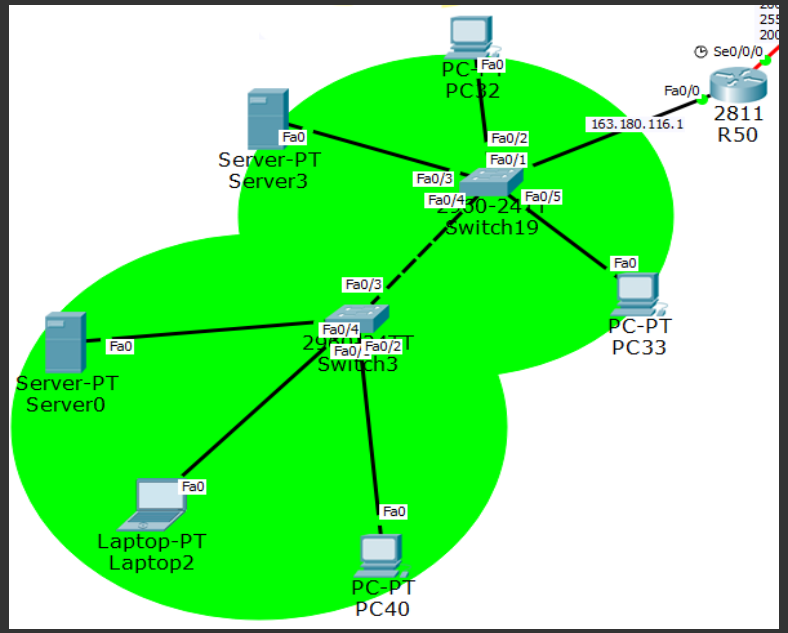
```
R20(config)#int s0/0/1
R20(conifg-if)#crypto map VPN1
R20(config-if)#exit
R20(config)#int s0/1/0
R20(conifg-if)#crypto map VPN2
R20(config-if)#exit
```

라우터 설정

```
R20(config)#router rip
R20(config-router)#version 2
R20(config-router)#no auto-summary
R20(config-router)#network 200.200.200.0
R20(config-router)#network 203.230.90.0
R20(config-router)#network 160.183.235.0
```

12. DHCP

DHCP

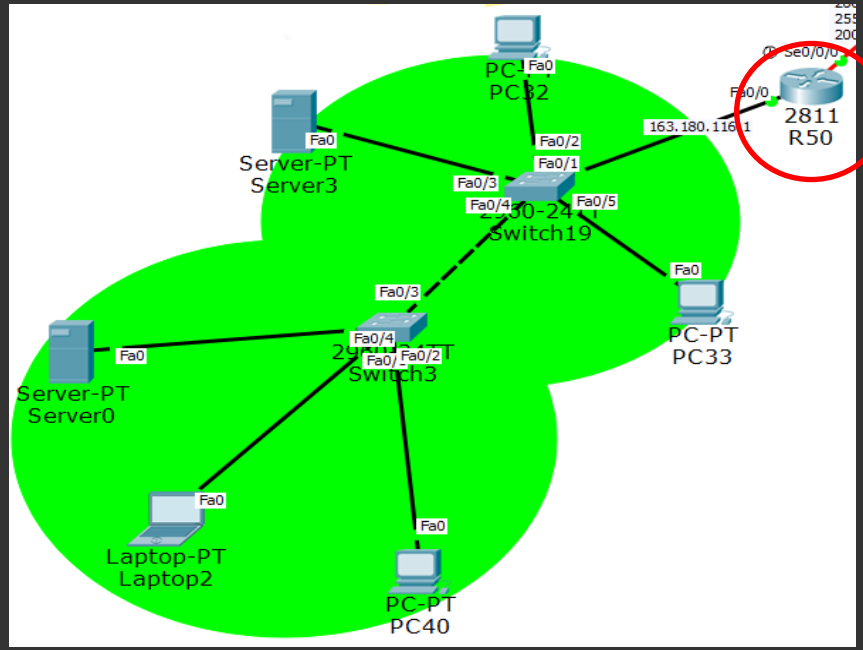


- 동적 호스트 구성 프로토콜
- TCP/IP통신을 실행하기 위해 필요한 설정 정보를 자동적으로 할당하고 관리하기 위한 통신 규약
- IP주소의 자동관리로 관리의 편리성 향상
- IP주소의 가용성을 높여줌 – 할당만 하고 사용하지 않는 주소를 줄임

12. DHCP

라우터에서 DHCP 서버 설정

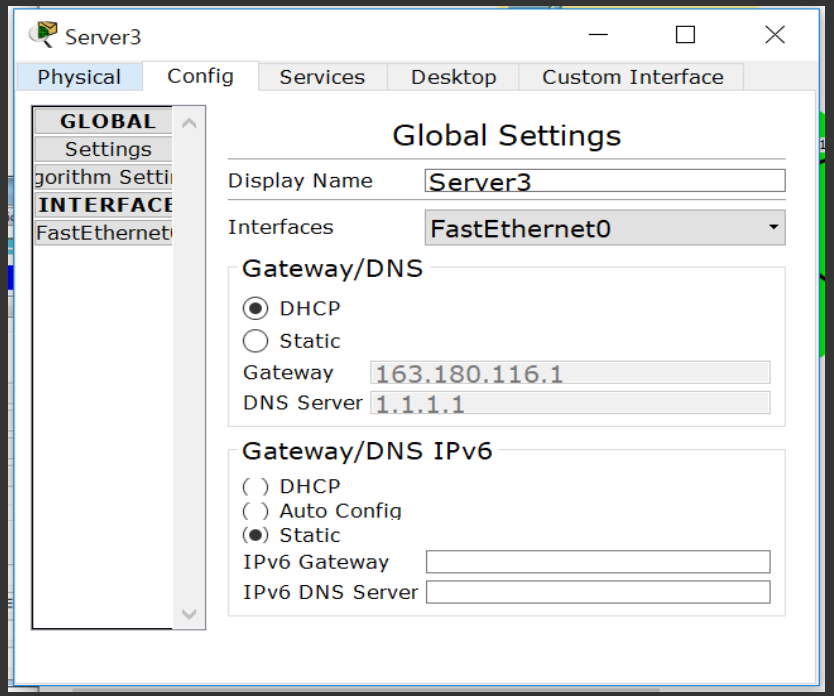
[R50]

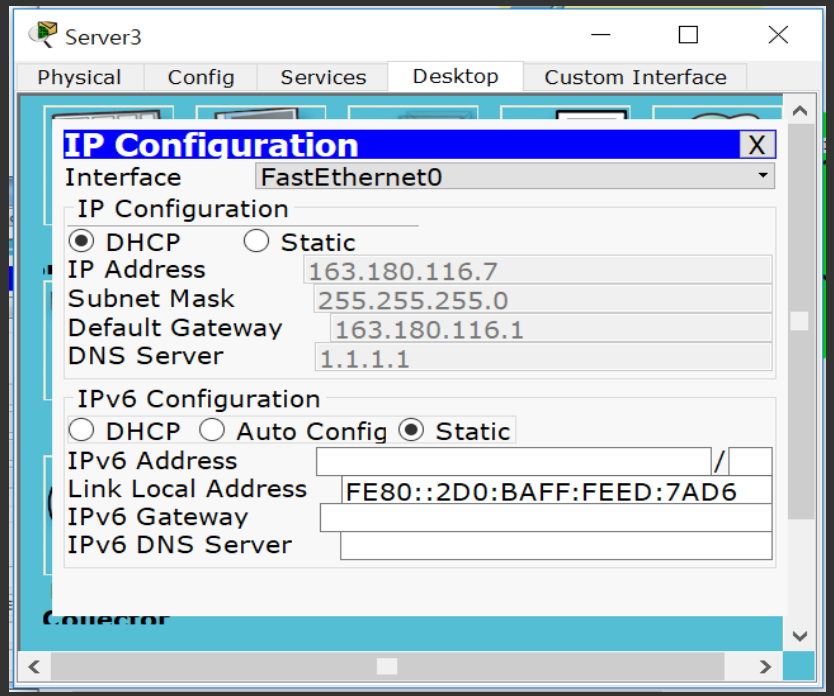



```
R50(config)#ip dhcp excluded-address 163.180.116.1
R50(config)#ip dhcp excluded-address
163.180.116.255

R50(config)#ip dhcp pool inokyuni

R50(config)#network 163.180.116.0 255.255.255.0

R50(config)#dns-sever 1.1.1.1

R50(config)#default-router 163.180.116.1
R50(config)#exit
```

12. DHCP

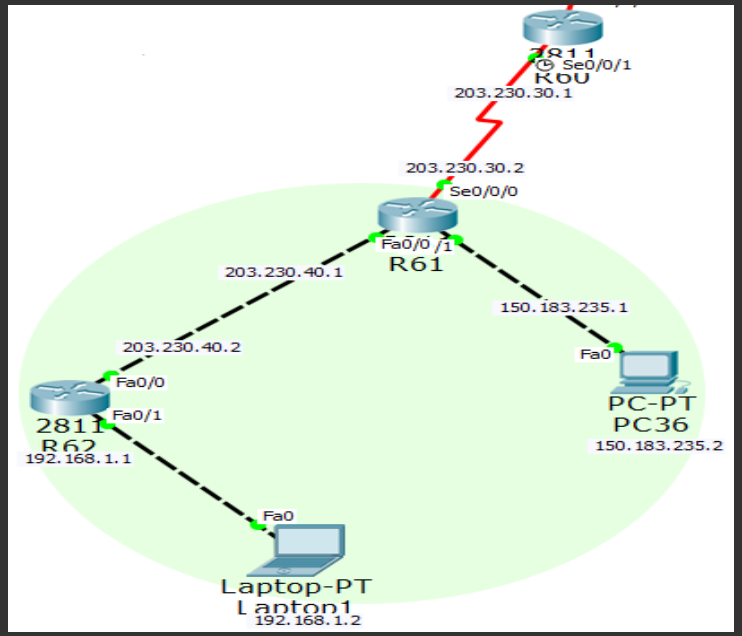
IP 자동설정 결과





13. NAT

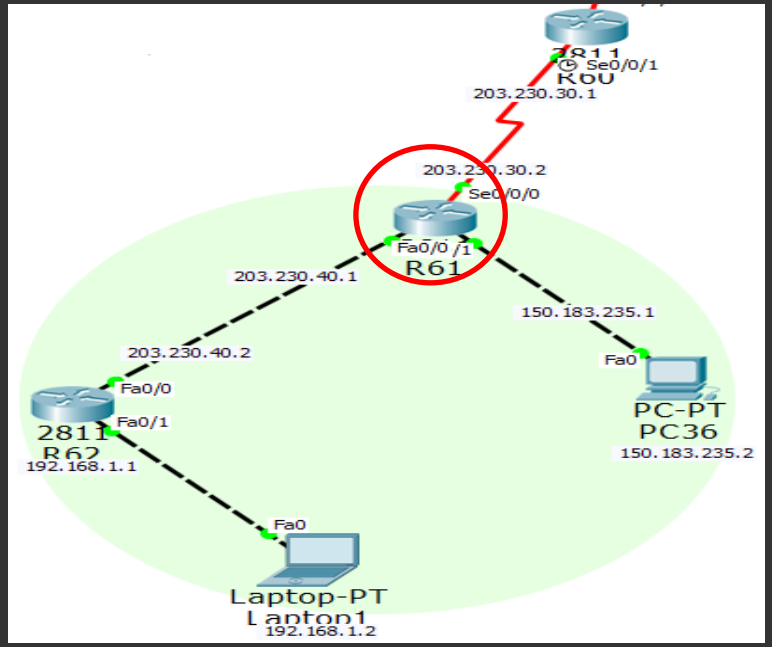
NAT



- 사설주소를 사용하는 장치가 공중네트워크와 통신하고자 할 때 사설IP주소를 공인IP주소로 변환해 주는 기술
- 내부 네트워크에서는 사설IP주소를 사용하고, 외부 네트워크로 나가는 경우 공인IP주소로 변환돼서 나가게 하는 기술

13. NAT

[R61]



150.183.235.2 -> 203.230.40.3

```
R60(config)#ip nat inside source static 150.183.235.2
                203.230.40.3
R60(config-if)#int fa0/0
R60(config-if)#ip nat inside
R60(config-if)#int fa0/1
R60(config-if)#ip nat outside
```

```
R61#show ip nat translations
Pro  Inside global     Inside local       Outside local
Outside global
---  203.230.40.3      150.183.235.2      ---
---
```

감사합니다