

Lab Project 6: DHCP Sever, Inter-VLAN Routing, EtherChannel PAgP

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Topology recap

- Router2911 (Gig0/1) → Gig0/1 on Core Switch (3560-24PS multilayer switch)
 - Core Switch → Laptop1
 - Core Switch → Fa0/1-2 (EtherChannel 1, PAgP) → Access Switch 0 (2960) → Laptop0
 - Core Switch → Fa0/3-4 (EtherChannel 2, PAgP) → Access Switch 1 (2960) → Laptop2
 - VLAN 10 = 10.10.10.0/24 | VLAN 20 = 20.20.20.0/24 | VLAN 30 = 30.30.30.0/24
 - Router subinterfaces: G0/1.10, G0/1.20, G0/1.30 (router-on-a-stick does the inter-VLAN routing)
 - Port mapping on both access switches: Fa0/3 → VLAN10, Fa0/7 → VLAN20, Fa0/1 → VLAN30
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1. Router2911 — DHCP + Inter-VLAN Routing

```
enable
configure terminal

interface GigabitEthernet0/1
  no shutdown
exit

interface GigabitEthernet0/1.10
  encapsulation dot1Q 10
  ip address 10.10.10.1 255.255.255.0
exit

interface GigabitEthernet0/1.20
  encapsulation dot1Q 20
  ip address 20.20.20.1 255.255.255.0
exit

interface GigabitEthernet0/1.30
  encapsulation dot1Q 30
  ip address 30.30.30.1 255.255.255.0
exit

! --- DHCP Pools ---
ip dhcp excluded-address 10.10.10.1 10.10.10.10
ip dhcp excluded-address 20.20.20.1 20.20.20.10
ip dhcp excluded-address 30.30.30.1 30.30.30.10

ip dhcp pool VLAN10_POOL
```

```
network 10.10.10.0 255.255.255.0
default-router 10.10.10.1
dns-server 8.8.8.8
exit

ip dhcp pool VLAN20_POOL
network 20.20.20.0 255.255.255.0
default-router 20.20.20.1
dns-server 8.8.8.8
exit

ip dhcp pool VLAN30_POOL
network 30.30.30.0 255.255.255.0
default-router 30.30.30.1
dns-server 8.8.8.8
exit

end
write memory
```

2. Core Switch ("Multilayer Switch") — VLANs + Trunk to Router + EtherChannel PAgP

```
enable
configure terminal

vlan 10
name VLAN10_LAN
vlan 20
name VLAN20_LAN
vlan 30
name VLAN30_LAN
exit

! --- EtherChannel 1&2 ---
interface range FastEthernet0/1 - 2
channel-group 1 mode desirable
exit

interface range FastEthernet0/3 - 6
channel-group 2 mode desirable
exit

! --- Trunk to Router ---
interface GigabitEthernet0/1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk allowed vlan 10,20,30
exit

! --- Access Port for Laptop1 (VLAN 20) ---
interface FastEthernet0/7
switchport mode access
```

```
switchport access vlan 20
no shutdown
exit

end
write memory
```

PAgP note: desirable actively negotiates the channel; the partner side can be desirable or auto. Two auto ends will never form a channel — at least one side must be desirable. The core switch initiates with desirable.

3. Access Switch 1 (2960 — PC1 to PC6) — VLANs + EtherChannel PAgP

```
enable
configure terminal

vlan 10
  name VLAN10_LAN
vlan 20
  name VLAN20_LAN
vlan 30
  name VLAN30_LAN
exit

! --- EtherChannel 1 ---
interface range FastEthernet0/1 - 2
  switchport mode trunk
  switchport trunk allowed vlan 10,20,30
  channel-group 1 mode desirable
exit

! --- Access Port for Laptop0 (VLAN 10) ---
interface FastEthernet0/3
  switchport mode access
  switchport access vlan 10
  no shutdown
exit

end
write memory
```

4. Access Switch 2 (2960 — PC7 to PC12) — VLANs + EtherChannel PAgP

```
enable
configure terminal
```

```

vlan 10
  name VLAN10_LAN
vlan 20
  name VLAN20_LAN
vlan 30
  name VLAN30_LAN
exit

! --- EtherChannel 2 ---
interface range FastEthernet0/3 - 6
  switchport mode trunk
  switchport trunk allowed vlan 10,20,30
  channel-group 2 mode desirable
exit

! --- Access Port for Laptop2 (VLAN 30) ---
interface FastEthernet0/1
  switchport mode access
  switchport access vlan 30
  no shutdown
exit

end
write memory

```

Laptop (Laptop0 - Laptop2)

Set each Laptop's IP Configuration to **DHCP** — they should pull an address from the matching VLAN10/20/30 pool once the trunks and Port-channels are up.

Verification commands

```

! On Router
show ip interface brief
show ip dhcp binding

! On CoreSwitch / Switch0 / Switch1
show vlan brief
show interfaces trunk
show etherchannel summary

! On a PC
ipconfig /all      ! confirm DHCP address in the right VLAN subnet
ping 10.10.10.1    ! (or 20.20.20.1 / 30.30.30.1) - tests inter-VLAN routing

```

show etherchannel summary should show SU next to each Port-channel once PAgP has successfully bundled the links.