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CPRE 489

Lab 7: Using CISCO IOS XE to Configure Cisco Switches

What I learned:

Prior to this lab, my only experience with network switches were that of the un-managed kind. One that a consumer would purchase just to have more ethernet connections available to them, without worrying about configuring it to their exact needs. I also know that ISU uses many cisco devices, and that the Network Operations team on campus probably has access to many tools like the ones used in this lab to manage the network found on campus.

The main take-away I got from the lab was how in-depth you can really make your network. Using the help command in any of the configuration modes showed that there are hundreds of different commands that let you alter the connection status of each port in any way that you would want.

Exercises:

Task 1:

```
interface Vlan1
no ip address
shutdown

interface Vlan50
ip address 10.0.50.1 255.255.255.0

ip default-gateway 192.168.254.254
ip forward-protocol nd
ip http server
ip http authentication local
ip http secure-server
ip ssh authentication-retries 2
ip ssh version 2

control-plane
service-policy input system-cpp-policy

line con 0
stopbits 1
line vty 5 15

end

co2061-9300-08#
```

```
co2061-9300-08#show vlan
```

VLAN	Name	Status	Ports
1	default	active	Gi1/0/3, Gi1/0/4, Gi1/0/5, Gi1/0/6, Gi1/0/7, Gi1/0/8, Gi1/0/9, Gi1/0/10, Gi1/0/11, Gi1/0/12, Gi1/0/13, Gi1/0/14, Gi1/0/15, Gi1/0/16, Gi1/0/17, Gi1/0/18, Gi1/0/19, Gi1/0/20, Gi1/0/21, Gi1/0/22, Gi1/0/23, Gi1/0/24, Ap1/0/1
50	lab7	active	
1002	fddi-default	act/unsup	
1003	token-ring-default	act/unsup	
1004	fddinet-default	act/unsup	
1005	trnet-default	act/unsup	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
50	enet	100050	1500	-	-	-	-	-	0	0
1002	fdi	101002	1500	-	-	-	-	-	0	0
1003	tr	101003	1500	-	-	-	-	-	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

Remote SPAN VLANs

Primary	Secondary	Type	Ports
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co2061-9300-08#

Task 2:

```

interface GigabitEthernet0/0
 vrf forwarding Mgmt-vrf
 ip address 192.168.77.108 255.255.255.0
 negotiation auto
!
interface GigabitEthernet1/0/1
 switchport access vlan 50
 switchport mode access
!
interface GigabitEthernet1/0/2
 no switchport
 no ip address
!

```

co2061-9300-08#show vlan

VLAN Name	Status	Ports
1 default	active	Gi1/0/3, Gi1/0/4, Gi1/0/5, Gi1/0/6, Gi1/0/7, Gi1/0/8, Gi1/0/9, Gi1/0/10, Gi1/0/11, Gi1/0/12, Gi1/0/13, Gi1/0/14, Gi1/0/15, Gi1/0/16, Gi1/0/17, Gi1/0/18, Gi1/0/19, Gi1/0/20, Gi1/0/21, Gi1/0/22, Gi1/0/23, Gi1/0/24, Ap1/0/1
50 lab7	active	Gi1/0/1
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
50	enet	100050	1500	-	-	-	-	-	0	0
1002	fddi	101002	1500	-	-	-	-	-	0	0
1003	tr	101003	1500	-	-	-	-	-	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

Remote SPAN VLANs

Primary	Secondary	Type	Ports
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co2061-9300-08#

Task3:

Each device was able to reach each other. The main difference I see in these pings is that the switch sends packets much faster than the PC. The switch sends them all at the same time and then waits for acknowledgment were as the PC sends one at a time.

```
co2061-9300-08#ping 10.0.50.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.50.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
co2061-9300-08#
```

```
--- 10.0.50.1 ping statistics ---
8 packets transmitted, 7 received, 12% packet loss, time 7006ms
rtt min/avg/max/mdev = 0.566/0.702/0.820/0.086 ms
[489]labuser@co2061-16 ~]$ ping 10.0.50.1
PING 10.0.50.1 (10.0.50.1) 56(84) bytes of data.
64 bytes from 10.0.50.1: icmp_seq=1 ttl=254 time=0.568 ms
64 bytes from 10.0.50.1: icmp_seq=2 ttl=254 time=0.667 ms
64 bytes from 10.0.50.1: icmp_seq=3 ttl=254 time=0.520 ms
64 bytes from 10.0.50.1: icmp_seq=4 ttl=254 time=0.625 ms
64 bytes from 10.0.50.1: icmp_seq=5 ttl=254 time=0.660 ms
64 bytes from 10.0.50.1: icmp_seq=6 ttl=254 time=0.630 ms
64 bytes from 10.0.50.1: icmp_seq=7 ttl=254 time=0.687 ms
64 bytes from 10.0.50.1: icmp_seq=8 ttl=254 time=0.885 ms

--- 10.0.50.1 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7004ms
rtt min/avg/max/mdev = 0.520/0.655/0.885/0.102 ms
```

Task4:

The ping packets that are sent and received do not appear to be any different than a standard ping from machine to machine.

No.	Time	Source	Destination	Protoc	Lengt	Info
4	2.737459244	10.0.50.1	10.0.50.2	ICMP	114	Echo (ping) request id=0x003c, seq=0/0, ttl=254
5	2.737511457	10.0.50.2	10.0.50.1	ICMP	114	Echo (ping) reply id=0x003c, seq=0/0, ttl=64 (request in 4)
6	2.737984751	10.0.50.1	10.0.50.2	ICMP	114	Echo (ping) request id=0x003c, seq=1/256, ttl=254 (reply in 7)
7	2.738015841	10.0.50.2	10.0.50.1	ICMP	114	Echo (ping) reply id=0x003c, seq=1/256, ttl=64 (request in 6)
8	2.738344752	10.0.50.1	10.0.50.2	ICMP	114	Echo (ping) request id=0x003c, seq=2/512, ttl=254 (reply in 9)
9	2.738377000	10.0.50.2	10.0.50.1	ICMP	114	Echo (ping) reply id=0x003c, seq=2/512, ttl=64 (request in 8)
10	2.738709865	10.0.50.1	10.0.50.2	ICMP	114	Echo (ping) request id=0x003c, seq=3/768, ttl=254 (reply in 11)
11	2.738745628	10.0.50.2	10.0.50.1	ICMP	114	Echo (ping) reply id=0x003c, seq=3/768, ttl=64 (request in 10)
12	2.739104548	10.0.50.1	10.0.50.2	ICMP	114	Echo (ping) request id=0x003c, seq=4/1024, ttl=254 (reply in 13)
13	2.739137343	10.0.50.2	10.0.50.1	ICMP	114	Echo (ping) reply id=0x003c, seq=4/1024, ttl=64 (request in 12)

Task5:

```
!
ip dhcp pool VLAN50
 network 10.0.50.0 255.255.255.0
 default-router 10.0.50.1
 dns-server 4.8.9.50
 lease 0 2
!
```

Task6: The old IP was 10.0.50.2. On Reset it was set to 10.0.50.4

```
[489labuser@co2061-16 ~]$ ifconfig
enp0s31f6: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.254.16 netmask 255.255.255.0 broadcast 192.168.254.255
    ether 50:9a:4c:47:66:42 txqueuelen 1000 (Ethernet)
    RX packets 4554869 bytes 1017051883 (969.9 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 12057292 bytes 15463881895 (14.4 GiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 16 memory 0xef200000-ef220000

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 1274145 bytes 13236270083 (12.3 GiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1274145 bytes 13236270083 (12.3 GiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

p1p1: flags=-28605<UP,BROADCAST,RUNNING,MULTICAST,DYNAMIC> mtu 1500
    inet 10.0.50.4 netmask 255.255.255.0 broadcast 10.0.50.255
    ether 68:05:ca:47:ce:40 txqueuelen 1000 (Ethernet)
    RX packets 841 bytes 71100 (69.4 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 4358 bytes 1381632 (1.3 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 16 memory 0xef1c0000-ef1e0000

virbr0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.122.1 netmask 255.255.255.0 broadcast 192.168.122.255
    ether 52:54:00:b2:00:71 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[489labuser@co2061-16 ~]$
```

Task7:

16 24.745471540	10:b3:c6:2e:bc:81	CDP/VTP/DTP/PAgP/UDLD CDP	426 Device ID: co2061-9300-08.ece.iastate.edu Port ID: GigabitEthernet1/0
32 47.891293098	0.0.0.0	255.255.255.255 DHCP	342 DHCP Request - Transaction ID 0x7c204059
33 47.892206670	10.0.50.1	10.0.50.4 DHCP	342 DHCP ACK - Transaction ID 0x7c204059
31 47.464098906	192.168.122.1	224.0.0.22 IGMPv3	54 Membership Report / Leave group 224.0.0.251
34 47.897094241	10.0.50.4	224.0.0.22 IGMPv3	54 Membership Report / Join group 224.0.0.251 for any sources
38 48.064310071	10.0.50.4	224.0.0.22 IGMPv3	54 Membership Report / Join group 224.0.0.251 for any sources

My capture never showed all 4 DHCP packets. The two shown work as follows:

- DHCP request
 - This packet tells the computer to choose an IP address based on the rules that the switch has created (basically don't pick 10.0.50.1)
- DHCP Ack
 - This packet tells the switch what ip address the even PC chose (In my case it was 10.0.50.4)

Task8:

The commands I used to set the switch back to default values are as follows:

- No ip dhcp excluded-address 10.0.50.1
 - This removes the excluded address of dhcp
- No ip dhcp pool VLAN50
 - This removes the dhcp pool called VLAN50
- No switchport
 - This removes the switchport settings on GigabitEthernet1/0/1
- No vlan 50
 - This removes the interface vlan 50