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CMPT_420N_111

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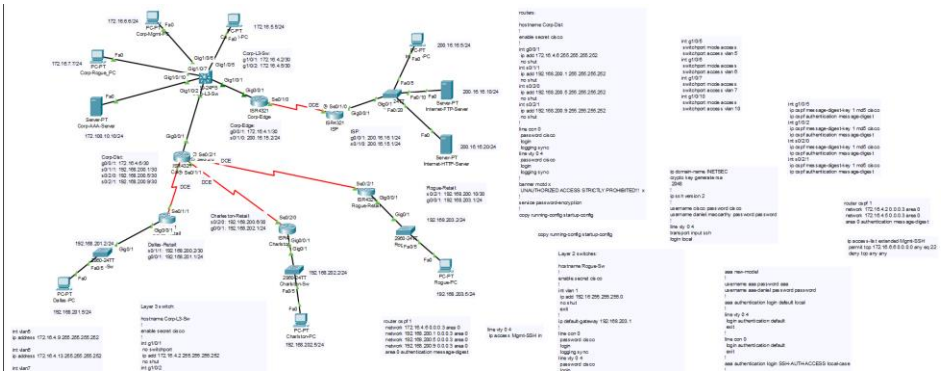
A) Description:

This lab included the use of InterVLAN routing, as well as some new features like Access Control Lists and AAA using Radius. InterVLAN routing got more complicated now that the layer 3 switch is connected to two routers. Working more with servers is interesting, as we had three different uses for the servers in this lab. The addition of having an internal rogue device was fun, as it shows how much access it could have if not for the security measures we had taken.

B) Topology:



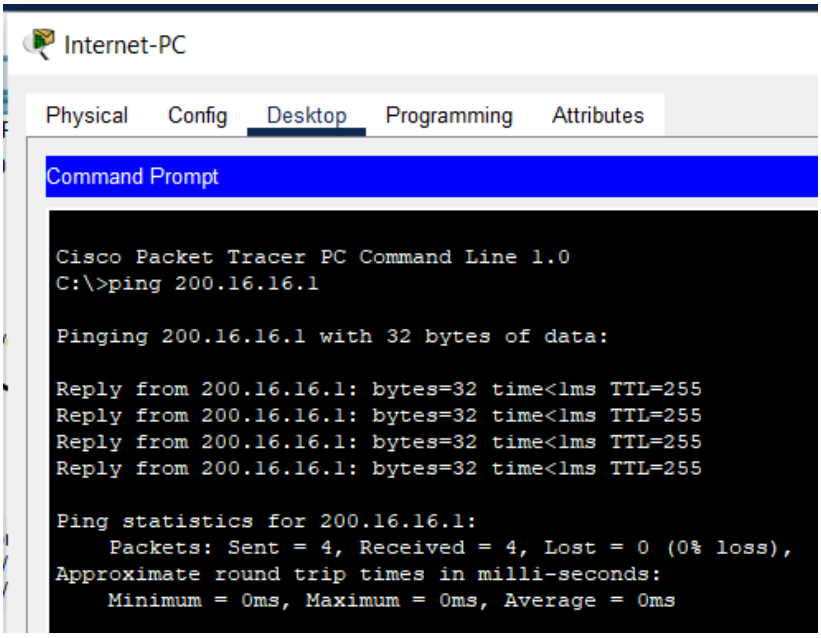
C) Key Syntax:

Command	Description	IOS Mode
hostname	Sets the name of the device	Global Configuration mode
login	Prompts the user to enter a password to gain access	Line Configuration mode
logging synchronous	Synchronizes the console line	Line Configuration modeP
int x/x	Accesses and interface	Global Configuration mode
ip config	Verifies the ip address and subnet mask of a host	CMD User mode
ping	Verify connectivity to another entity on the network through the IP address	CMD User mode

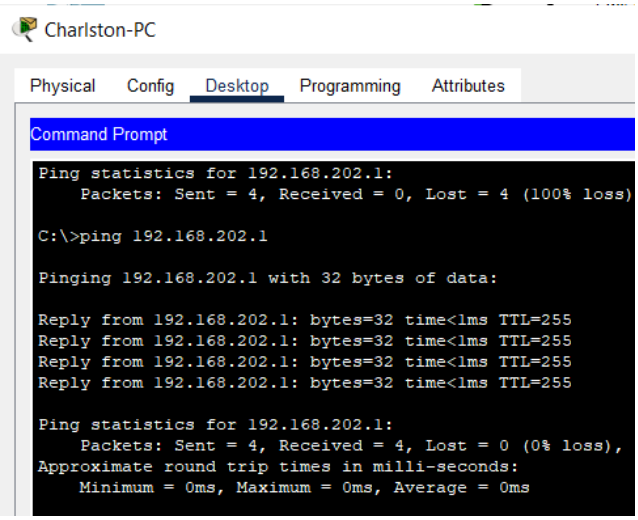
ip default-gateway	Sete the address to forward packets to on a switch	Global Configuration mode
ip route 0.0.0.0 0.0.0.0	Sets default static route to forward all packets across a connection	Global Configuration mode
SSH –l (username)(ip address)	Set up an SSH connection	Command Prompt
ntp authenticate	Uses the key to authenticate the device	Global Configuration mode
ntp authentication-key (number)(word)	Uses the key to identify the trusted device	Global Configuration mode
aaa authentication login	Sets aaa login	Global Configuration mode
Ip ospf message-digest-key (number) md5 (word)	Sets up OSPF to use an md5 key	Global Configuration mode

D) Verification:

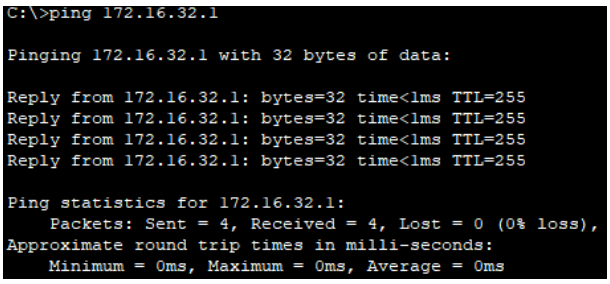
Internet PC pinging default gateway



Charleston-PC pinging default gateway



Copr-PC pinging default gateway



After setting default static route:

I did see a difference in the routing tables the default static route appeared in the ISP routing table and the Corp-Edge routing table.

ISP routing table

```
Gateway of last resort is 200.16.15.2 to network 0.0.0.0

     200.16.15.0/24 is variably subnetted, 2 subnets, 2 masks
C       200.16.15.0/24 is directly connected, Serial0/1/0
L       200.16.15.1/32 is directly connected, Serial0/1/0
     200.16.16.0/24 is variably subnetted, 2 subnets, 2 masks
C       200.16.16.0/24 is directly connected, GigabitEthernet0/0/1
L       200.16.16.1/32 is directly connected, GigabitEthernet0/0/1
S*   0.0.0.0/0 [1/0] via 200.16.15.2
```

Corp-Edge routing table

```
Gateway of last resort is not set

     172.16.0.0/16 is variably subnetted, 7 subnets, 2 masks
C       172.16.4.0/30 is directly connected, GigabitEthernet0/0/1
L       172.16.4.1/32 is directly connected, GigabitEthernet0/0/1
O       172.16.4.4/30 [110/2] via 172.16.4.2, 00:41:50, GigabitEthernet0/0/1
O       172.16.4.8/30 [110/2] via 172.16.4.2, 00:02:14, GigabitEthernet0/0/1
O       172.16.4.12/30 [110/2] via 172.16.4.2, 00:02:14, GigabitEthernet0/0/1
O       172.16.4.16/30 [110/2] via 172.16.4.2, 00:02:14, GigabitEthernet0/0/1
O       172.16.4.20/30 [110/2] via 172.16.4.2, 00:02:14, GigabitEthernet0/0/1
     192.168.200.0/30 is subnetted, 3 subnets
O       192.168.200.0/30 [110/66] via 172.16.4.2, 00:41:40,
GigabitEthernet0/0/1
O       192.168.200.4/30 [110/66] via 172.16.4.2, 00:41:40,
GigabitEthernet0/0/1
O       192.168.200.8/30 [110/66] via 172.16.4.2, 00:41:40,
GigabitEthernet0/0/1
O    192.168.201.0/24 [110/67] via 172.16.4.2, 00:34:34, GigabitEthernet0/0/1
O    192.168.202.0/24 [110/67] via 172.16.4.2, 00:36:09, GigabitEthernet0/0/1
O    192.168.203.0/24 [110/67] via 172.16.4.2, 00:41:40, GigabitEthernet0/0/1
     200.16.4.0/24 is variably subnetted, 2 subnets, 2 masks
C       200.16.4.0/24 is directly connected, Serial0/1/0
L       200.16.4.1/32 is directly connected, Serial0/1/0
```

Corp-Dist routing table

```
Gateway of last resort is not set

     172.16.0.0/16 is variably subnetted, 7 subnets, 2 masks
O       172.16.4.0/30 [110/2] via 172.16.4.5, 00:40:20, GigabitEthernet0/0/1
C       172.16.4.4/30 is directly connected, GigabitEthernet0/0/1
L       172.16.4.6/32 is directly connected, GigabitEthernet0/0/1
O       172.16.4.8/30 [110/2] via 172.16.4.5, 00:00:44, GigabitEthernet0/0/1
O       172.16.4.12/30 [110/2] via 172.16.4.5, 00:00:44, GigabitEthernet0/0/1
O       172.16.4.16/30 [110/2] via 172.16.4.5, 00:00:44, GigabitEthernet0/0/1
O       172.16.4.20/30 [110/2] via 172.16.4.5, 00:00:44, GigabitEthernet0/0/1
     192.168.200.0/24 is variably subnetted, 6 subnets, 2 masks
C       192.168.200.0/30 is directly connected, Serial0/1/1
L       192.168.200.1/32 is directly connected, Serial0/1/1
C       192.168.200.4/30 is directly connected, Serial0/2/0
L       192.168.200.5/32 is directly connected, Serial0/2/0
C       192.168.200.8/30 is directly connected, Serial0/2/1
L       192.168.200.9/32 is directly connected, Serial0/2/1
O    192.168.201.0/24 [110/65] via 192.168.200.2, 00:33:08, Serial0/1/1
O    192.168.202.0/24 [110/65] via 192.168.200.6, 00:34:44, Serial0/2/0
O    192.168.203.0/24 [110/65] via 192.168.200.10, 00:42:53, Serial0/2/1
```

Dallas-Retail routing table

```
Gateway of last resort is not set

     172.16.0.0/30 is subnetted, 6 subnets
O       172.16.4.0/30 [110/66] via 192.168.200.1, 00:35:26, Serial0/1/1
O       172.16.4.4/30 [110/65] via 192.168.200.1, 00:35:26, Serial0/1/1
O       172.16.4.8/30 [110/66] via 192.168.200.1, 00:02:46, Serial0/1/1
O       172.16.4.12/30 [110/66] via 192.168.200.1, 00:02:46, Serial0/1/1
O       172.16.4.16/30 [110/66] via 192.168.200.1, 00:02:46, Serial0/1/1
O       172.16.4.20/30 [110/66] via 192.168.200.1, 00:02:46, Serial0/1/1
     192.168.200.0/24 is variably subnetted, 4 subnets, 2 masks
C       192.168.200.0/30 is directly connected, Serial0/1/1
L       192.168.200.2/32 is directly connected, Serial0/1/1
O       192.168.200.4/30 [110/128] via 192.168.200.1, 00:35:26, Serial0/1/1
O       192.168.200.8/30 [110/128] via 192.168.200.1, 00:35:26, Serial0/1/1
     192.168.201.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.201.0/24 is directly connected, GigabitEthernet0/0/1
L       192.168.201.1/32 is directly connected, GigabitEthernet0/0/1
O    192.168.202.0/24 [110/129] via 192.168.200.1, 00:35:26, Serial0/1/1
O    192.168.203.0/24 [110/129] via 192.168.200.1, 00:35:26, Serial0/1/1
```

Charleston-Retail routing table

```
Gateway of last resort is not set

     172.16.0.0/30 is subnetted, 6 subnets
O       172.16.4.0/30 [110/66] via 192.168.200.5, 00:37:09, Serial0/2/0
O       172.16.4.4/30 [110/65] via 192.168.200.5, 00:37:09, Serial0/2/0
O       172.16.4.8/30 [110/66] via 192.168.200.5, 00:03:09, Serial0/2/0
O       172.16.4.12/30 [110/66] via 192.168.200.5, 00:03:09, Serial0/2/0
O       172.16.4.16/30 [110/66] via 192.168.200.5, 00:03:09, Serial0/2/0
O       172.16.4.20/30 [110/66] via 192.168.200.5, 00:03:09, Serial0/2/0
     192.168.200.0/24 is variably subnetted, 4 subnets, 2 masks
O       192.168.200.0/30 [110/128] via 192.168.200.5, 00:37:09, Serial0/2/0
C       192.168.200.4/30 is directly connected, Serial0/2/0
L       192.168.200.6/32 is directly connected, Serial0/2/0
O       192.168.200.8/30 [110/128] via 192.168.200.5, 00:37:09, Serial0/2/0
O    192.168.201.0/24 [110/129] via 192.168.200.5, 00:35:29, Serial0/2/0
     192.168.202.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.202.0/24 is directly connected, GigabitEthernet0/0/1
L       192.168.202.1/32 is directly connected, GigabitEthernet0/0/1
O    192.168.203.0/24 [110/129] via 192.168.200.5, 00:37:09, Serial0/2/0
```

Rogue-Retail routing table

```
Gateway of last resort is not set

     172.16.0.0/30 is subnetted, 6 subnets
O       172.16.4.0/30 [110/66] via 192.168.200.9, 00:43:03, Serial0/2/1
O       172.16.4.4/30 [110/65] via 192.168.200.9, 00:43:03, Serial0/2/1
O       172.16.4.8/30 [110/66] via 192.168.200.9, 00:03:32, Serial0/2/1
O       172.16.4.12/30 [110/66] via 192.168.200.9, 00:03:32, Serial0/2/1
O       172.16.4.16/30 [110/66] via 192.168.200.9, 00:03:32, Serial0/2/1
O       172.16.4.20/30 [110/66] via 192.168.200.9, 00:03:32, Serial0/2/1
     192.168.200.0/24 is variably subnetted, 4 subnets, 2 masks
O       192.168.200.0/30 [110/128] via 192.168.200.9, 00:45:41, Serial0/2/1
O       192.168.200.4/30 [110/128] via 192.168.200.9, 00:45:41, Serial0/2/1
C       192.168.200.8/30 is directly connected, Serial0/2/1
L       192.168.200.10/32 is directly connected, Serial0/2/1
O    192.168.201.0/24 [110/129] via 192.168.200.9, 00:35:52, Serial0/2/1
O    192.168.202.0/24 [110/129] via 192.168.200.9, 00:37:22, Serial0/2/1
     192.168.203.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.203.0/24 is directly connected, GigabitEthernet0/0/1
L       192.168.203.1/32 is directly connected, GigabitEthernet0/0/1
```

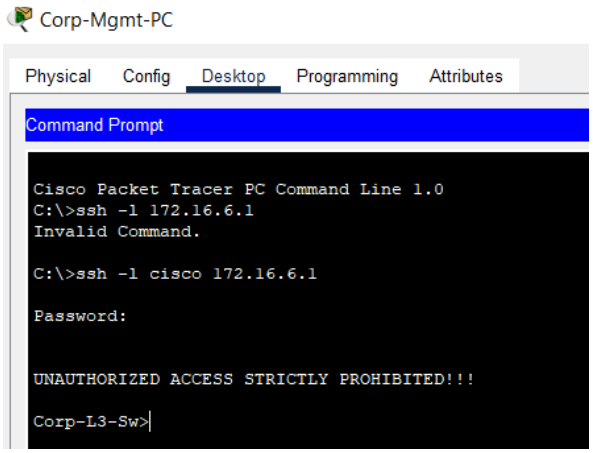
Corp-L3-Sw routing table

```
Gateway of last resort is not set

     172.16.0.0/30 is subnetted, 6 subnets
C       172.16.4.0 is directly connected, GigabitEthernet1/0/1
C       172.16.4.4 is directly connected, GigabitEthernet1/0/2
C       172.16.4.8 is directly connected, Vlan5
C       172.16.4.12 is directly connected, Vlan6
C       172.16.4.16 is directly connected, Vlan7
C       172.16.4.20 is directly connected, Vlan10
     192.168.200.0/30 is subnetted, 3 subnets
O       192.168.200.0 [110/65] via 172.16.4.6, 00:41:14, GigabitEthernet1/0/2
O       192.168.200.4 [110/65] via 172.16.4.6, 00:41:14, GigabitEthernet1/0/2
O       192.168.200.8 [110/65] via 172.16.4.6, 00:41:14, GigabitEthernet1/0/2
O    192.168.201.0/24 [110/66] via 172.16.4.6, 00:33:58, GigabitEthernet1/0/2
O    192.168.202.0/24 [110/66] via 172.16.4.6, 00:35:28, GigabitEthernet1/0/2
O    192.168.203.0/24 [110/66] via 172.16.4.6, 00:41:14, GigabitEthernet1/0/2
```

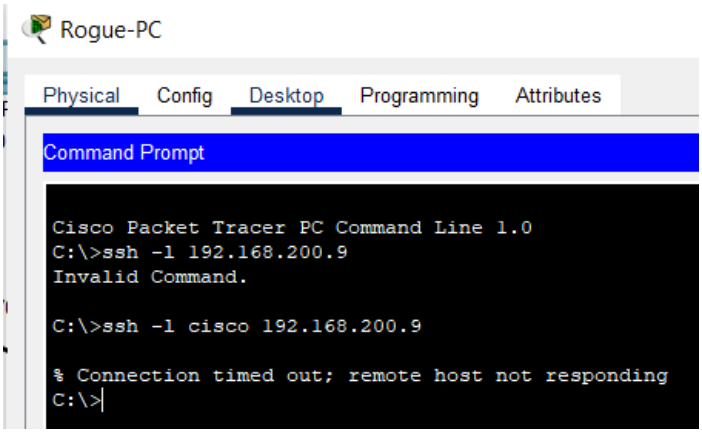
Rogue PC pinging Dallas PC and Charleston PC

```
C:\>ping 192.168.201.5

Pinging 192.168.201.5 with 32 bytes of data:

Reply from 192.168.201.5: bytes=32 time=41ms TTL=125
Reply from 192.168.201.5: bytes=32 time=10ms TTL=125
Reply from 192.168.201.5: bytes=32 time=11ms TTL=125
Reply from 192.168.201.5: bytes=32 time=10ms TTL=125

Ping statistics for 192.168.201.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 41ms, Average = 18ms

C:\>ping 192.168.202.5

Pinging 192.168.202.5 with 32 bytes of data:

Reply from 192.168.202.5: bytes=32 time=39ms TTL=125
Reply from 192.168.202.5: bytes=32 time=10ms TTL=125
Reply from 192.168.202.5: bytes=32 time=11ms TTL=125
Reply from 192.168.202.5: bytes=32 time=2ms TTL=125

Ping statistics for 192.168.202.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 39ms, Average = 15ms
```

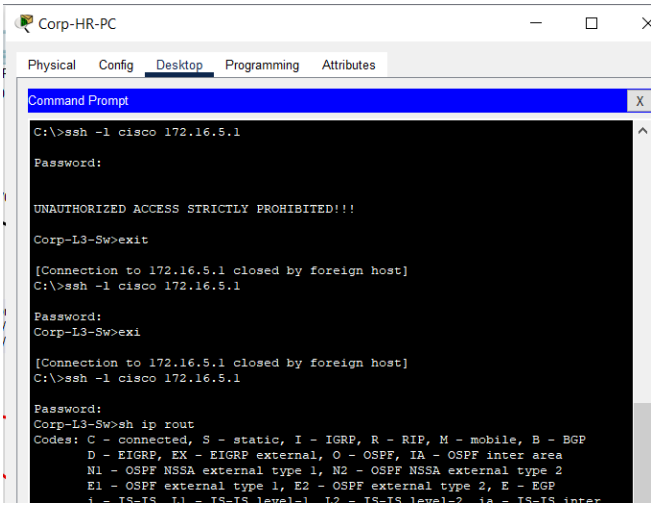
Corp-Mgmt PC ssh



Rogue-retail PC failing ssh



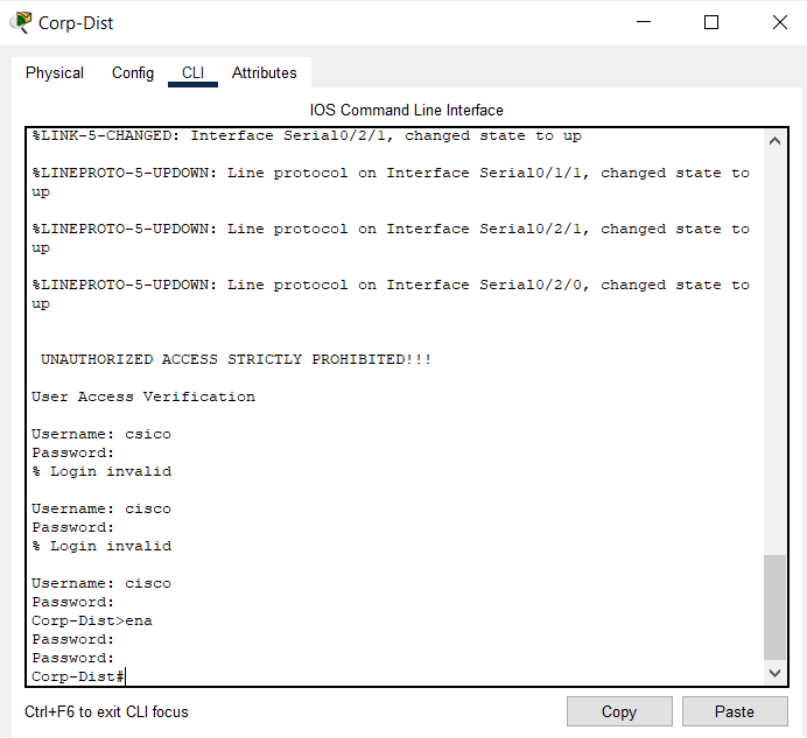
Corp-HR-PC using ssh after RADIUS



Using HTTP

After I broke OSPF I could only get the ISP PC to use HTTP and FTP

Corp-Dist asking for username and password



G) Conclusion:

This lab went as badly as it could have for me. I spent large amounts of time trying to fix simple things and when I thought I fixed them it seemed to break something else. For example, something happened during my implementation of RADIUS that just completely broke my OSPF and routing tables. I then spent hours trying to fix that in different ways by back on everything I had done and then re-doing it, as well as loading a previous file and trying all over again. I did a lot of this lab well but this did not go according to plan.