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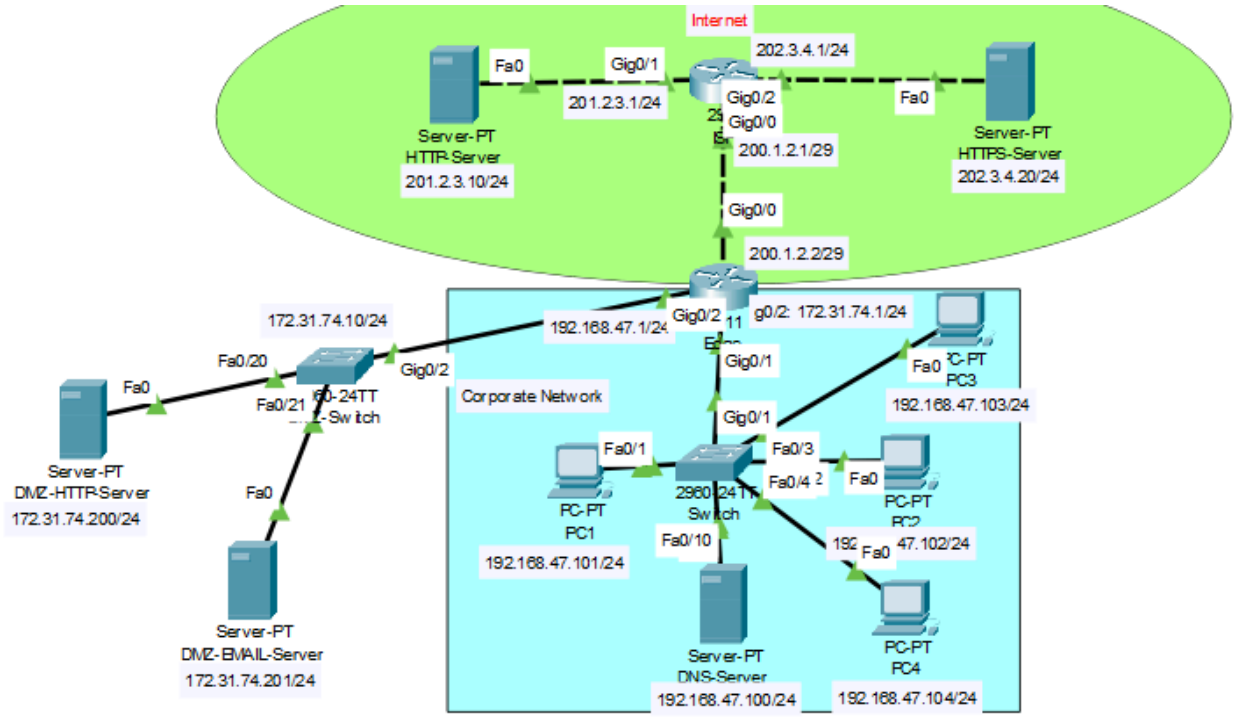
Internetworking

Lab 6

Description: In this lab we configured an access control list for our corporate network.

Topology:



Syntax:

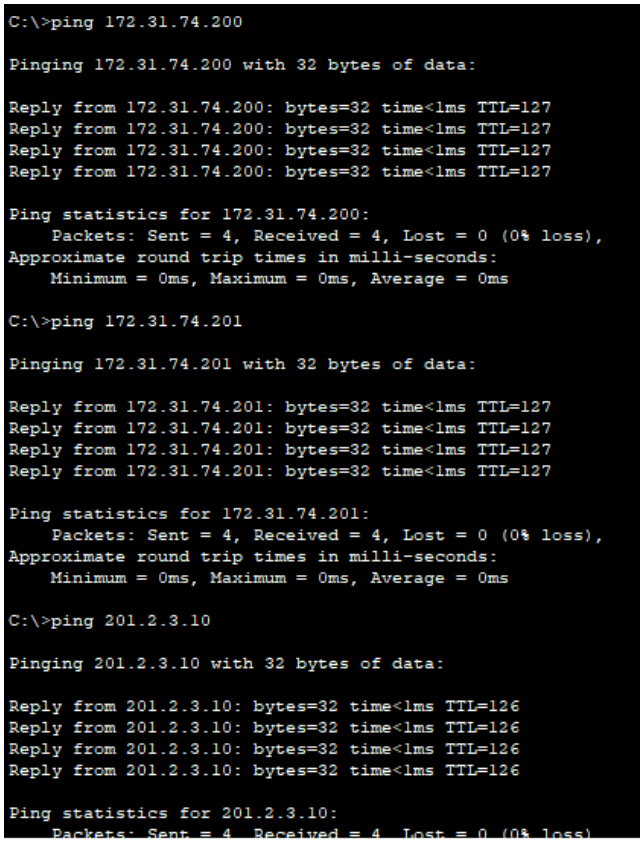
Command	Description	IOS Mode
access-list 123 permit tcp any any eq 25	Permits SMTP traffic	Global Configuration Mode
ip access-group 123 in	Applies the ACL	Interface Configuration Mode
Clear access list counters	Resets all access list hit counter	Privileged Exec Mode

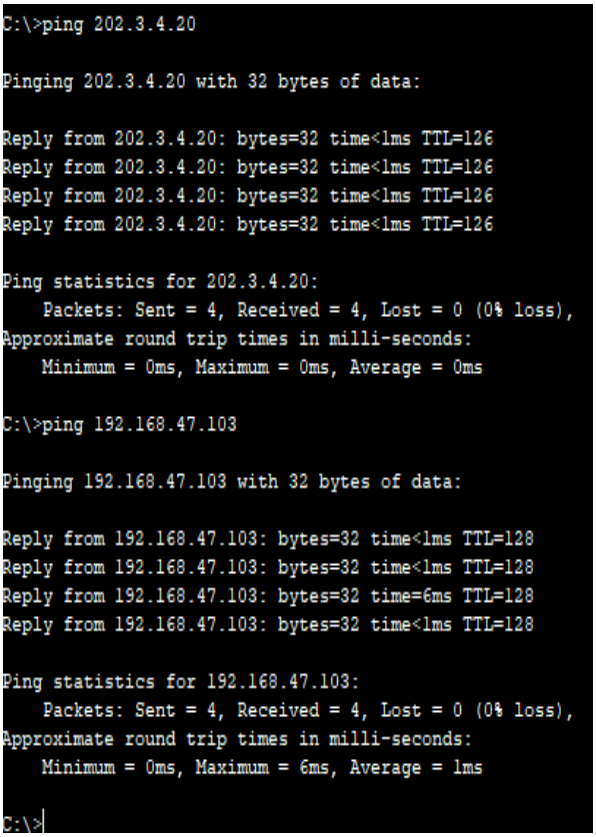
No access-list 123	Removes ACL 123	Global Configuration Mode
access-list 123 deny ip any any	Denies all traffic	Global Configuration Mode

Verification/Test Cases:

A. Initial connectivity -

These screenshots show that PC1 can ping everything in the topology.





B. This is a screenshot of the Edge routers IPv4 routing table.

```
Edge#show 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, 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 200.1.2.1 to network 0.0.0.0

     172.31.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.31.74.0/24 is directly connected, GigabitEthernet0/2
L       172.31.74.1/32 is directly connected, GigabitEthernet0/2
     192.168.47.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.47.0/24 is directly connected, GigabitEthernet0/1
L       192.168.47.1/32 is directly connected, GigabitEthernet0/1
     200.1.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       200.1.2.0/29 is directly connected, GigabitEthernet0/0
L       200.1.2.2/32 is directly connected, GigabitEthernet0/0
S*   0.0.0.0/0 [1/0] via 200.1.2.1
```

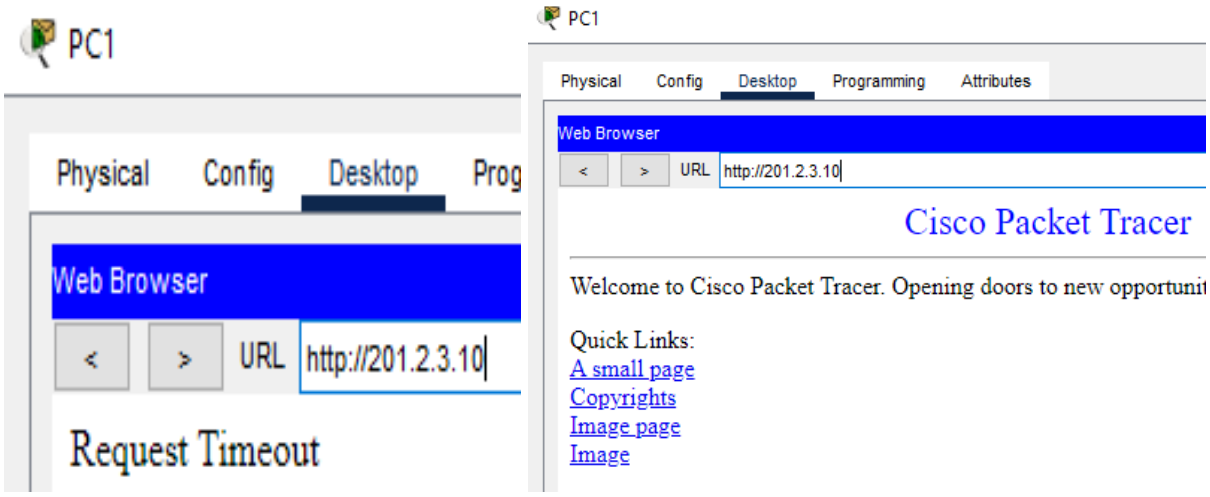
C. This screenshot shows all of the ACLs I made on the Edge router.

```
Edge#show access-lists
Extended IP access list 123
    10 permit tcp host 192.168.47.101 host 201.2.3.10 eq www
    20 permit tcp host 192.168.47.102 host 201.2.3.10 eq www
    30 permit tcp host 192.168.47.103 host 202.3.4.20 eq 443
    40 permit tcp host 192.168.47.104 host 202.3.4.20 eq 443
    50 permit tcp host 192.168.47.101 host 172.31.74.200 eq 443
    60 permit tcp host 192.168.47.102 host 172.31.74.200 eq 443
    70 permit tcp host 192.168.47.103 host 172.31.74.200 eq 443
    80 permit tcp host 192.168.47.104 host 172.31.74.200 eq 443
    90 permit tcp host 192.168.47.101 host 172.31.74.201 eq smtp
    100 permit tcp host 192.168.47.102 host 172.31.74.201 eq smtp
    110 permit tcp host 192.168.47.103 host 172.31.74.201 eq smtp
    120 permit tcp host 192.168.47.104 host 172.31.74.201 eq smtp
    130 permit tcp host 192.168.47.101 host 172.31.74.201 eq pop3
    140 permit tcp host 192.168.47.102 host 172.31.74.201 eq pop3
    150 permit tcp host 192.168.47.103 host 172.31.74.201 eq pop3
    160 permit tcp host 192.168.47.104 host 172.31.74.201 eq pop3
    170 permit icmp host 192.168.47.101 host 200.1.2.1
    180 permit icmp host 192.168.47.102 host 200.1.2.1
    190 permit icmp host 192.168.47.103 host 200.1.2.1
    200 permit icmp host 192.168.47.104 host 200.1.2.1
    210 deny ip any any
```

D. Test Cases -

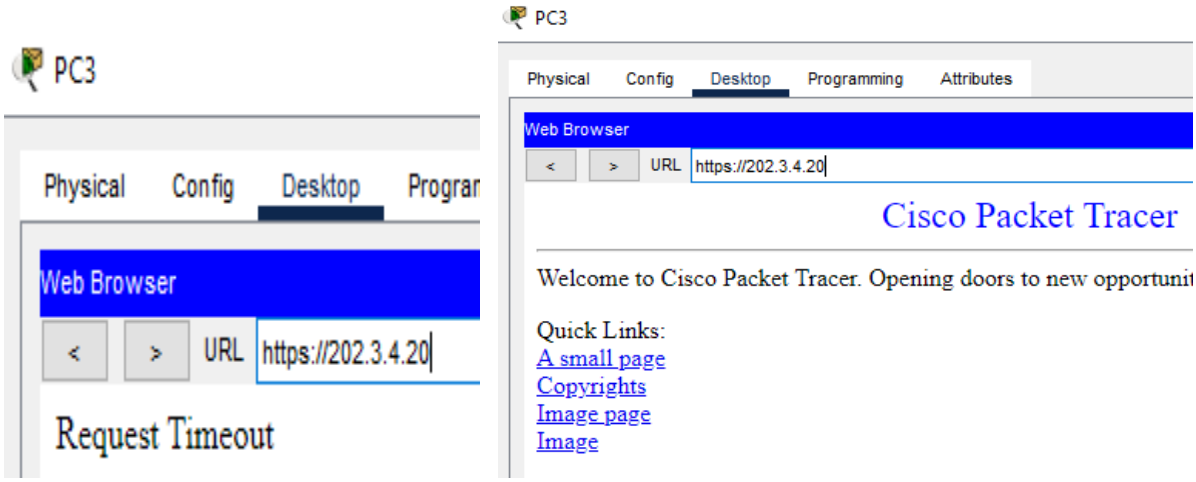
a. I used the commands “access-list 123 permit tcp 192.168.47.101 0.0.0.0 201.2.3.10 0.0.0.0 eq 80” to allow PC1 and 2 to access the Internet HTTP-Server via HTTP.

Before: After:



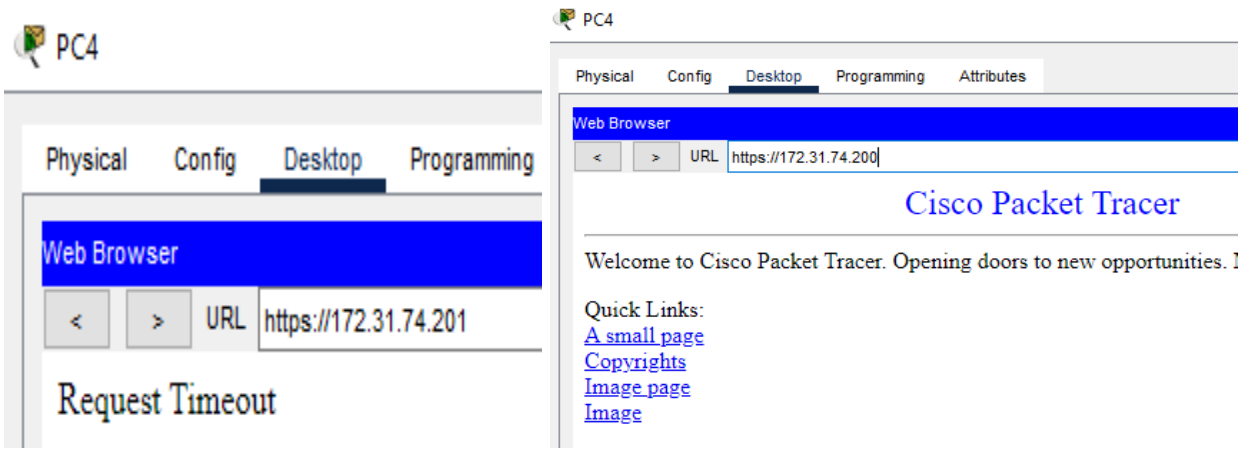
b. I used the commands “access-list 123 permit tcp 192.168.47.103 0.0.0.0 202.3.4.20 0.0.0.0 eq 443” to allow PC3 and 4 to access the Internet HTTPS-Server via HTTPS.

Before: After:

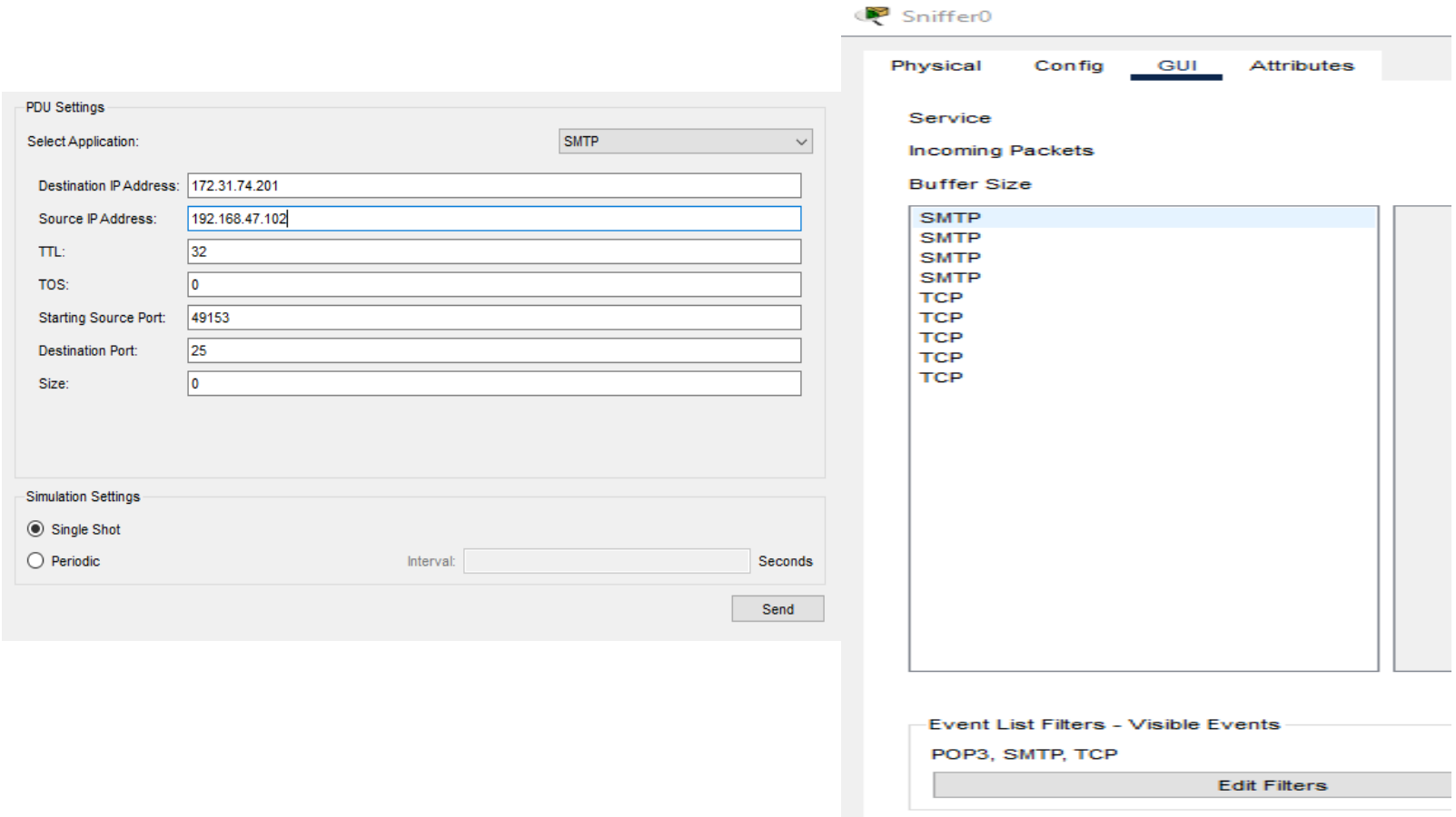


c. I used the commands “access-list 123 permit tcp 192.168.47.104 0.0.0.0 172.31.74.200 0.0.0.0 eq 443” to allow every corporate PC to access the DMZ-HTTP-Server via HTTPS.

Before: After:

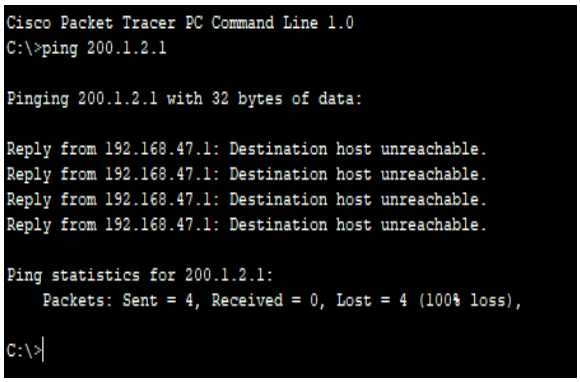


d. I used the commands “access-list 123 permit tcp 192.168.47.102 0.0.0.0 172.31.74.201 0.0.0.0 eq 25” and “access-list 123 permit tcp 192.168.47.102 0.0.0.0 172.31.74.201 0.0.0.0 eq 110” to allow all corporate PCs to access the DMZ-EMAIL-Server via SMTP and POP3. I did not know a good way to generate SMTP and POP3 traffic, so I put a sniffer in between the email server and the switch, proving that the packets were able to be sent through to the server even with the ACL. I used the traffic generator application on the PC to create the traffic (for some reason the POP3 traffic only came up as TCP on the sniffer and I am unsure why). I hope this is okay.

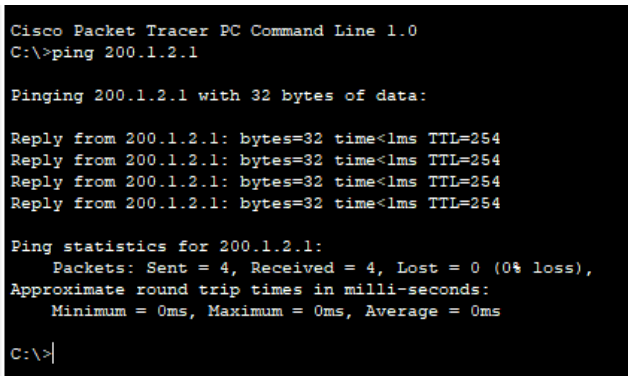


e. I used the commands “access-list 123 permit icmp 192.168.47.102 0.0.0.0 200.1.2.1 0.0.0.0 “ to allow all corporate PCs to ping the ISP interface that is connected to the Edge router.

Before:

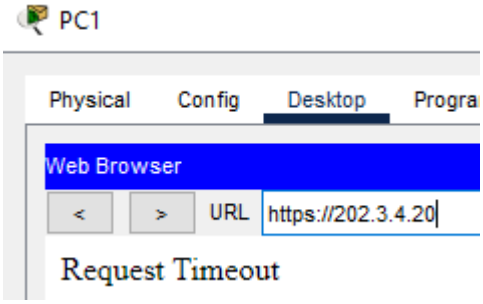


After:

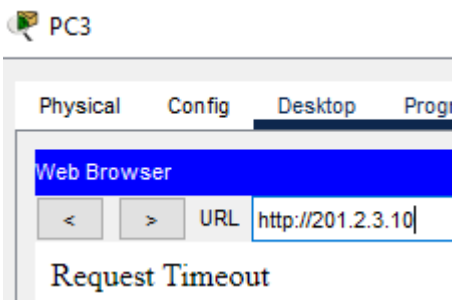


f. I used the command “access-list 123 deny ip any any” to stop any other traffic from going through. Here I show that PC1 can not access the internet through the HTTPS server, PC3 can not access the internet through the HTTP server, and PC2 can not ping anything besides what it is allowed to.

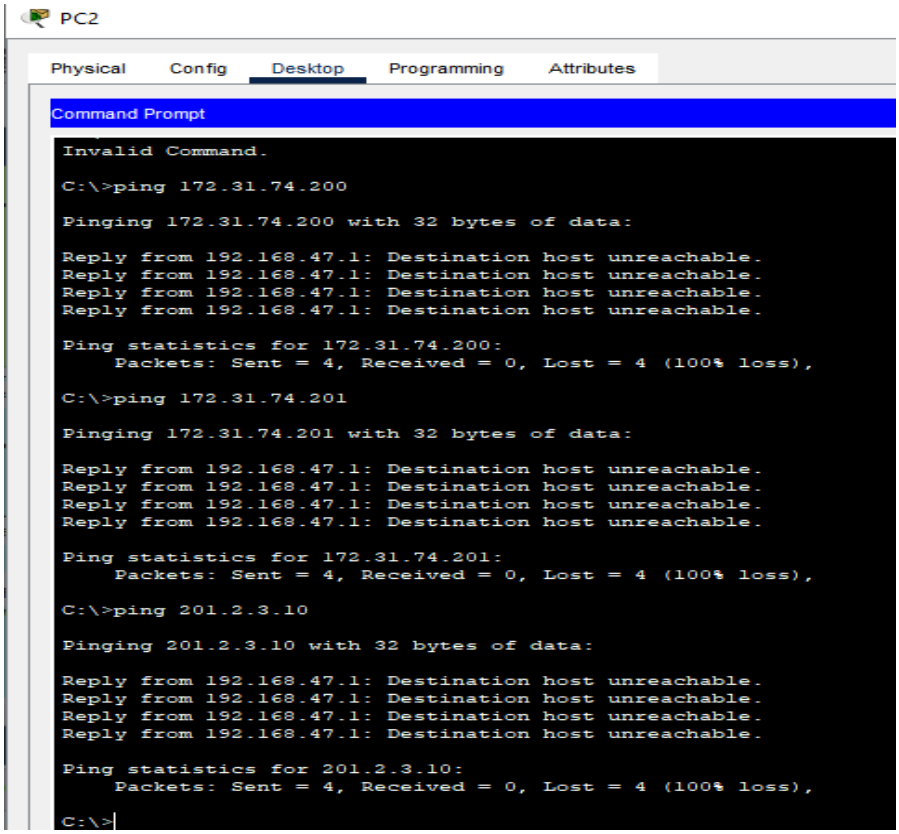
PC1:



PC3:



PC2:



Conclusion: In conclusion, access control lists are a little more complicated than I imagined. There is a lot of specific syntax that you need to know to be successful here. The videos that you had on this were very useful, so thank you. The only thing I would say I really struggled with was finding a way to create and capture the SMTP and POP3 traffic. I hope the method I used was able to verify that my configuration was successful and I apologize if there was a simpler method that I missed.