

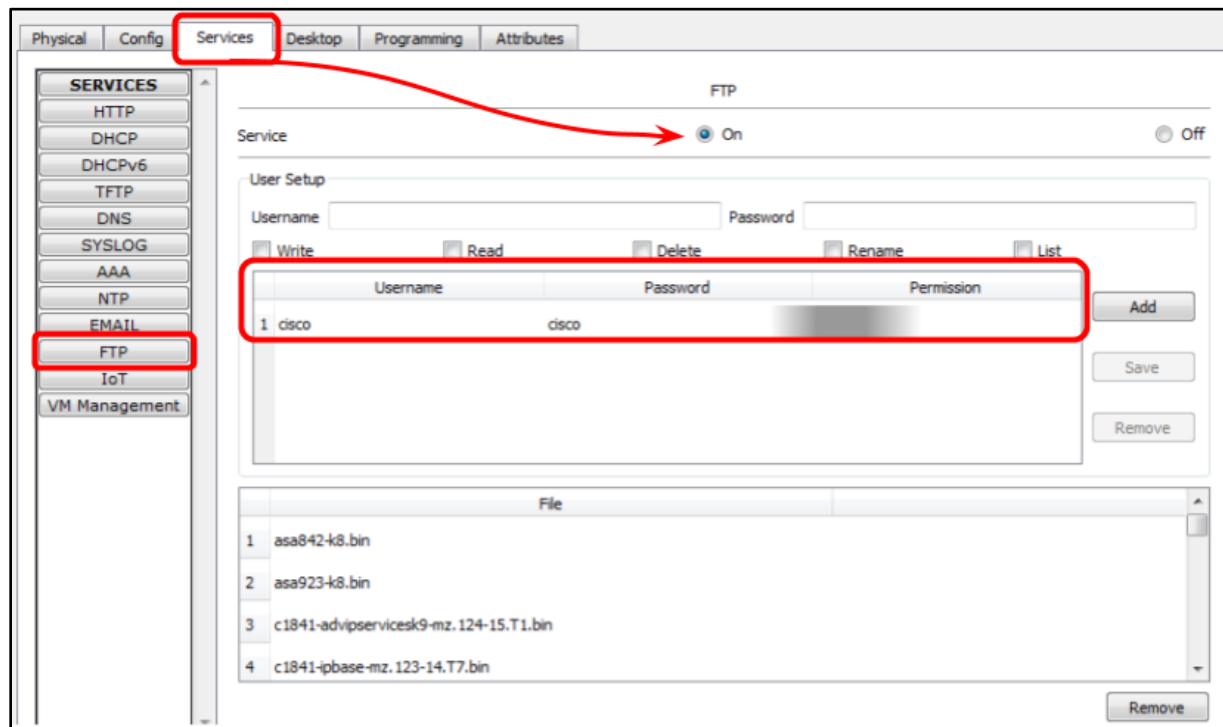
CYB 220 Module Four Activity Worksheet

Directions: Complete the guided tutorial activity using the Module Four Activity Student File available in the learning environment. Follow the steps outlined below in Packet Tracer. You will be asked to provide screenshots or answers to the questions as instructed. Complete this template by replacing the bracketed text with the relevant information.

Part I: FTP Server

FTP Access Configuration

Step 1: In the Services Tab of the FTP_Server_Public, ensure the FTP services are on. Notice that this service has a default admin account. (The username and password are both **cisco**). You will use this account for any testing.



Question 1: What are the permissions for the default FTP user cisco?

Answer: RWDNL

Step 2: From Server1_Admin, access the Command Prompt (from the Desktop tab). Use the FTP <IP Address> command, and log in with the default Cisco FTP account credentials:

```
Packet Tracer PC Command Line 1.0
C:\>FTP 10.1.10.5
Trying to connect...10.1.10.5
Connected to 10.1.10.5
220- Welcome to PT Ftp server
Username:
```

Use the `dir` command (for directory) for a list of all the files hosted on the FTP server.

Question 2: What is file number 8 in the FTP directory?

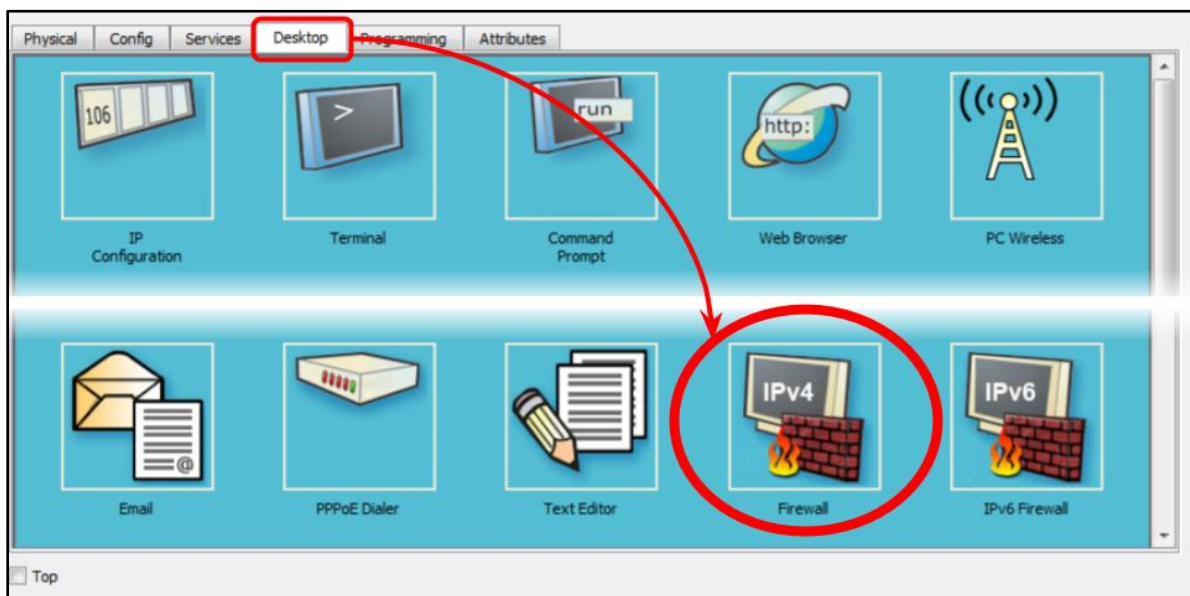
Answer: File Number > 13169700

Part II: Host-Based Firewall

Type the command `ftp>quit` before starting Part II.

Configure the Firewall on the FTP_Server_Public

Step 1: From the Desktop Tab, open the IPv4 Firewall application:



Step 2: Add a firewall rule according to the following settings:

1. Service: "On"
2. Interface: FastEthernet0
3. Action: "Deny"
4. Protocol: "ICMP"
5. Remote IP: 192.168.1.101
6. Remote Wildcard Mask: 0.0.0.0
7. Click "Add."

The screenshot shows the Firewall configuration window with the following elements:

- Service:** A toggle switch set to "On" (labeled 1).
- Interface:** A dropdown menu (labeled 2).
- Inbound Rules:**
 - Action:** A dropdown menu (labeled 3).
 - Protocol:** A dropdown menu (labeled 4).
 - Remote IP:** A text input field (labeled 5).
 - Remote Wildcard Mask:** A text input field (labeled 6).
 - Remote Port:** A text input field.
 - Local Port:** A text input field.
 - Buttons:** "Save", "Remove", and "Add" (labeled 7).
- Table:** A table with columns: Action, Protocol, Remote IP, Remote Wild Card, Remote Port, and Local Port.

Screenshot 1: Add a screenshot of the proper firewall rule in place.

The screenshot shows the Firewall configuration window with the following elements:

- Service:** A toggle switch set to "On".
- Interface:** A dropdown menu set to "FastEthernet0".
- Inbound Rules:**
 - Action:** A dropdown menu.
 - Protocol:** A dropdown menu.
 - Remote IP:** A text input field.
 - Remote Wildcard Mask:** A text input field.
 - Remote Port:** A text input field.
 - Local Port:** A text input field.
 - Buttons:** "Save", "Remove", and "Add".
- Table:** A table with columns: Action, Protocol, Remote IP, Remote Wild Card, Remote Port, and Local Port. It contains one rule:

	Action	Protocol	Remote IP	Remote Wild Card	Remote Port	Local Port
1	Deny	ICMP	192.168.1.101	0.0.0.0	-	-

Test the Firewall Rule

Step 1: From Server1_Admin (192.168.1.101), use FTP in the command prompt to attempt to connect to the FTP server (10.1.10.5).

Question 3: This connection is prevented if your firewall configuration is correct. What is the error message you receive when this connection is unable to be made?

Answer: C:\>FTP 10.1.10.5

Trying to connect...10.1.10.5

Connected to 10.1.10.5

220- Welcome to PT Ftp server

Username:cisco

331- Username ok, need password

Password:

Answer: %Error ftp://10.1.10.5/ (No such Account)

332- Need account for login

Modify the Firewall Rules

Step 1: From PC1_End_Users (in the End User network), ping the FTP server (10.1.10.5). You should receive a "Request timed out" message. Why? The Firewall Service is configured in a *default-deny* stance. By activating the Firewall Service and applying at least one *Inbound Rule*, all other traffic is denied unless *allowed by exception* using another rule.

Step 2: To allow specific traffic, you will need to add another rule to the FTP Server host-based firewall. Imagine you would like only the hosts in the End_User network to access the FTP services on the FTP Server. You have the options following this paragraph available to be applied. Feel free to test each out in Packet Tracer before answering Question 4.

Option One:

Action	Protocol	Remote IP	Remote Wildcard	Remote Port	Local Port
Allow	IP	192.168.2.101	0.0.0.0	any	21

Option Two:

Action	Protocol	Remote IP	Remote Wildcard	Remote Port	Local Port
Allow	IP	192.168.0.0	0.0.255.255	any	21

Option Three:

Action	Protocol	Remote IP	Remote Wildcard	Remote Port	Local Port
Allow	IP	192.168.2.96	0.0.0.15	any	21

Option Four:

Action	Protocol	Remote IP	Remote Wildcard	Remote Port	Local Port
Allow	IP	192.168.2.0	0.0.0.255	any	21

Question 4: Which option is the best to allow only the hosts in the End_User network to access the FTP services on the FTP Server? Why did you recommend this rule?

Answer: I went and chose Option 3 because it permits only the hosts in the End_User. It also provides more control and successfully blocks anyone from gaining unauthorized access. I tested out the other options, but option 3 was the one that successfully allowed traffic from the End_User network. The other options timed out.

Before moving on to Part III, be sure you have configured your selected rule on the FTP server before moving forward to the next question.

Part III: Standard Access List

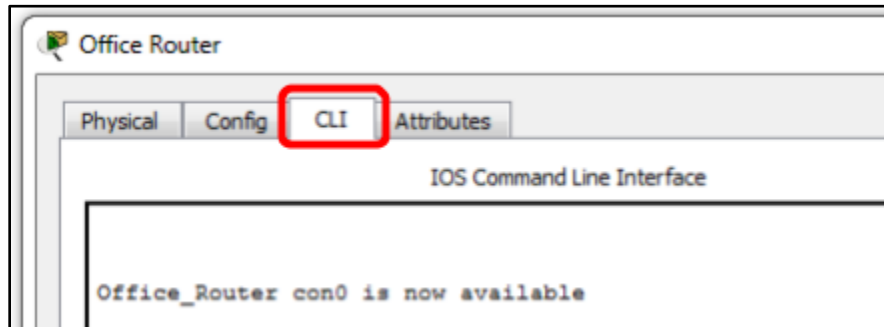
Create the Standard Access List Control List

Standard access control lists (ACLs) can be configured in two ways:

1. Numbered access list using the command `#access-list <#1-99>`
2. Named access list using the command `IP access-list standard <#1-99 or name>`

Once created, both will function identically; however, named access lists provide the advantage of being editable. With a numbered list, you must first delete the entire ACL, then recreate it with any edits you require. In this tutorial, you will use the named ACL to allow us to explore the results of making changes.

Step 1: Go to the CLI tab in the Office Router:

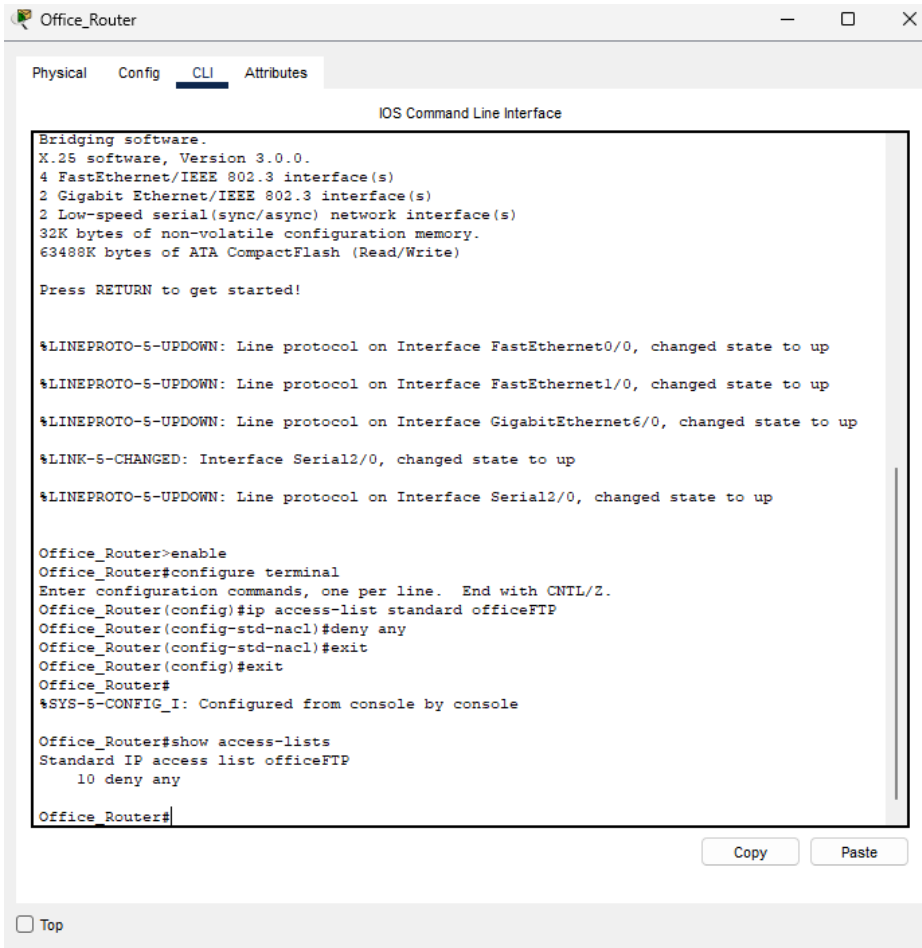


Step 2: Create the Standard Access List:

```
Office_Router>enable
Office_Router#configure terminal
Office_Router(config)#ip access-list standard officeFTP
Office_Router(config-std-nacl)#deny any
Office_Router(config-std-nacl)#exit
Office_Router(config)#exit
Office_Router#
%SYS-5-CONFIG_I: Configured from console by console

Office_Router#show access-lists
```

Screenshot 2: Add a screenshot of your configured access list.



```
Office_Router
Physical Config CLI Attributes
IOS Command Line Interface

Bridging software.
X.25 software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface(s)
2 Gigabit Ethernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)

Press RETURN to get started!

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to up
%LINK-5-CHANGED: Interface Serial2/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Office_Router>enable
Office_Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Office_Router(config)#ip access-list standard officeFTP
Office_Router(config-std-nacl)#deny any
Office_Router(config-std-nacl)#exit
Office_Router(config)#exit
Office_Router#
%SYS-5-CONFIG_I: Configured from console by console

Office_Router#show access-lists
Standard IP access list officeFTP
 10 deny any

Office_Router#
```

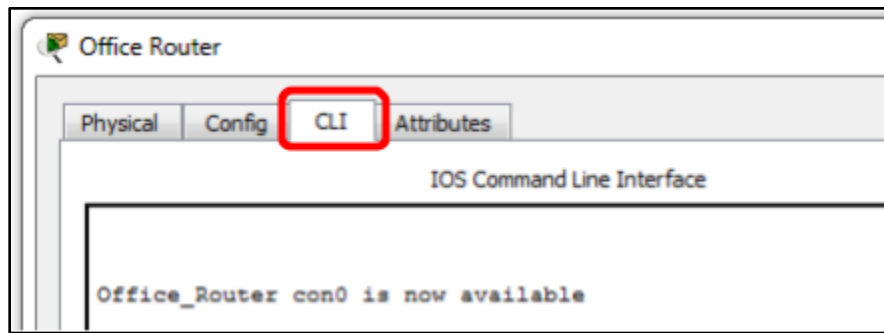
Copy Paste

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Apply the Standard Access Control List Named Office to the Gigabit Ethernet 6/0 Interface

Routers/firewall appliances filter traffic with access control lists (ACLs) assigned to a specific interface. The processing and filtering of traffic is affected by whether the ACL is designated as inbound or outbound. In this tutorial, the standard ACL, officeFTP, will be applied to the g6/0 interface as an outbound ACL. Before forwarding traffic out of the g6/0 interface, the router checks the source IP address against the ACL. If the packet source is from a “deny” address, the packets are discarded. If they are from a “permit” address, they are forwarded.

Step 1: Go to the CLI tab in the Office Router:



Step 2: Apply the standard access control list to a specific interface.

```
Office_Router#configure terminal
Office_Router(config)#interface g6/0
Office_Router(config-if)#ip access-group officeFTP out
Office_Router(config-if)#exit
Office_Router(config)#exit
%SYS-5-CONFIG_I: Configured from console by console
```

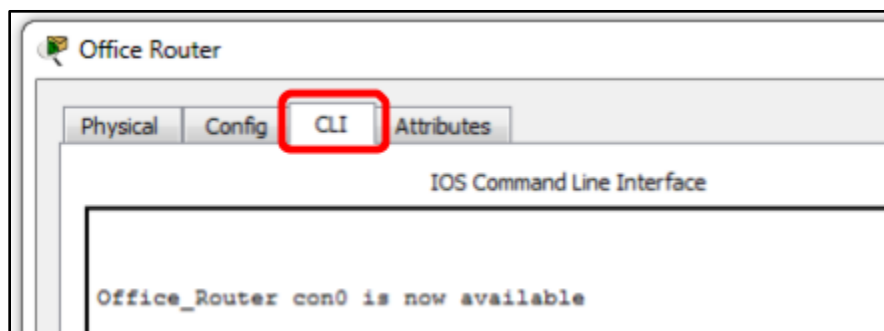
Step 3: From PC1_End_Users, use the command `C:\>ftp 10.1.10.5` to access the FTP Server.

Question 5: Explain the interaction between the FTP's host-based firewall and the router's access list.

Answer: When an FTP request is made, the firewall for the host checks the request against the set of rules. Approval of the request sends it to the router. The router then checks the request against its own access list. Then the request is either denied or approved and then sent to the destination.

Modify the Standard ACL on Gig6/0:

Step 1: Go to the CLI tab in the Office Router:



Step 2: Add a new rule to the standard ACL.

```
Office_Router_>enable
Office_Router#configure terminal
Office_Router(config)#ip access-list standard officeFTP
Office_Router(config-std-nacl)#permit 192.168.2.0 0.0.0.255
```



```
Office_Router(config-std-nacl)#exit
Office_Router(config)#exit
%SYS-5-CONFIG_I: Configured from console by console
```

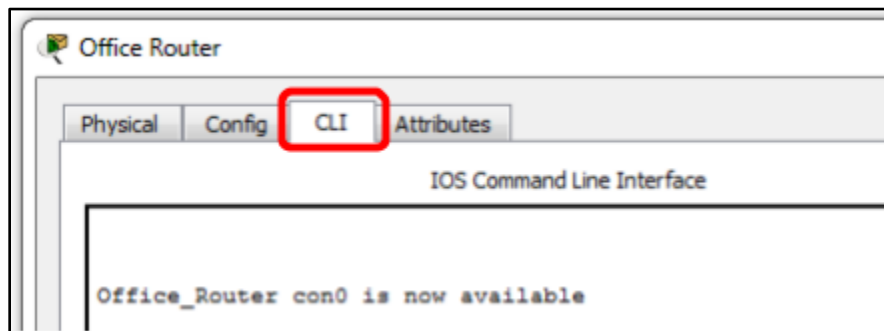
Step 3: From PC1_End_Users, use the command `C:\>ftp 10.1.10.5` to access the FTP Server.

Question 6: Explain why the connection times out despite adding the “permit” statement for the End_User network to the ACL.

Answer: The connection times out because the ACL has a "deny all" rule that blocks return traffic. The access list is too strict, and related ports may also be blocked.

Edit the Standard ACL on Gig6/0

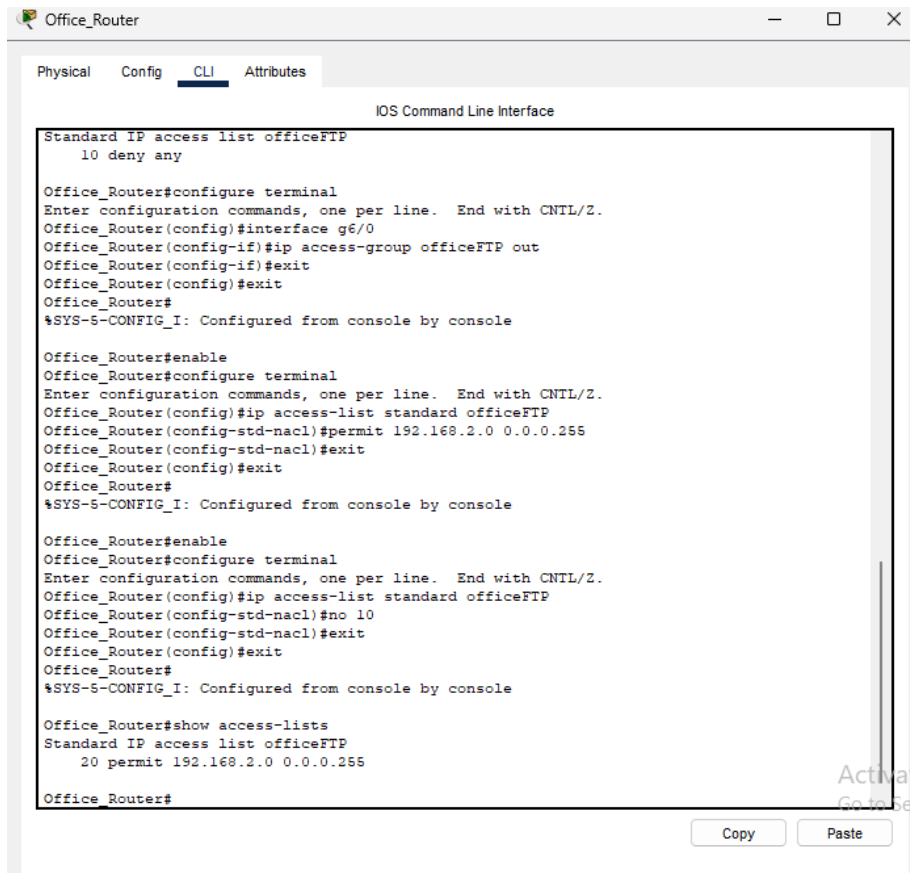
Step 1: Go to the CLI tab in the Office Router:



Step 2: Edit the standard ACL.

```
Office_Router>enable
Office_Router#configure terminal
Office_Router(config)#ip access-list standard officeFTP
Office_Router(config-std-nacl)#no 10
Office_Router(config-std-nacl)#exit
Office_Router(config)#exit
%SYS-5-CONFIG_I: Configured from console by console
Office_Router#show access-lists
```

Screenshot 3: Add a screenshot of your configured access list.



```
Office_Router
Physical Config CLI Attributes
IOS Command Line Interface

Standard IP access list officeFTP
10 deny any

Office_Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Office_Router(config)#interface g6/0
Office_Router(config-if)#ip access-group officeFTP out
Office_Router(config-if)#exit
Office_Router(config)#exit
Office_Router#
%SYS-5-CONFIG_I: Configured from console by console

Office_Router#enable
Office_Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Office_Router(config)#ip access-list standard officeFTP
Office_Router(config-std-nacl)#permit 192.168.2.0 0.0.0.255
Office_Router(config-std-nacl)#exit
Office_Router(config)#exit
Office_Router#
%SYS-5-CONFIG_I: Configured from console by console

Office_Router#enable
Office_Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Office_Router(config)#ip access-list standard officeFTP
Office_Router(config-std-nacl)#no 10
Office_Router(config-std-nacl)#exit
Office_Router(config)#exit
Office_Router#
%SYS-5-CONFIG_I: Configured from console by console

Office_Router#show access-lists
Standard IP access list officeFTP
20 permit 192.168.2.0 0.0.0.255

Office_Router#
```

FTP Server Access

Step 1: Use the command `C:\>ftp 10.1.10.5` to access the FTP server from:

- PC1_End_Users
- Kiosk1_Remote_Access

Question 7: Explain the effects of editing the office FTP ACL. Why are the two hosts above permitted or denied access to the FTP server?

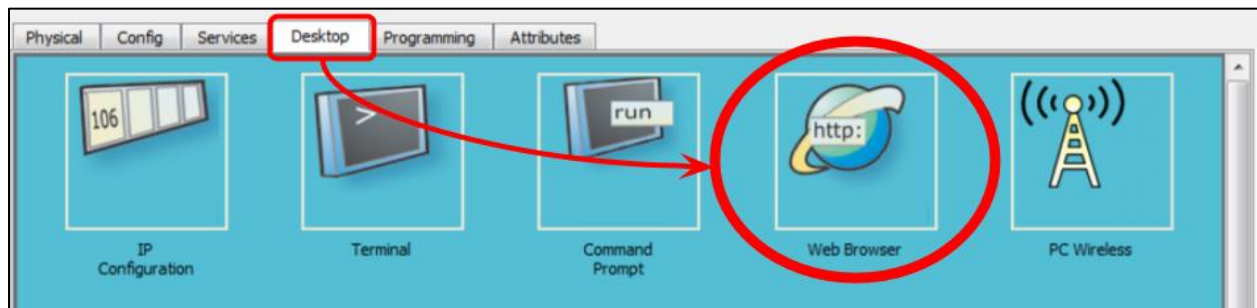
Answer: One reason for the two hosts being permitted or denied is because of certain privileges that might be based on the level of trust the hosts may have. Controlling user access, handling file permissions, and overall improving security is what editing the office FTP ACL does.

Part IV: Extended Access Control List

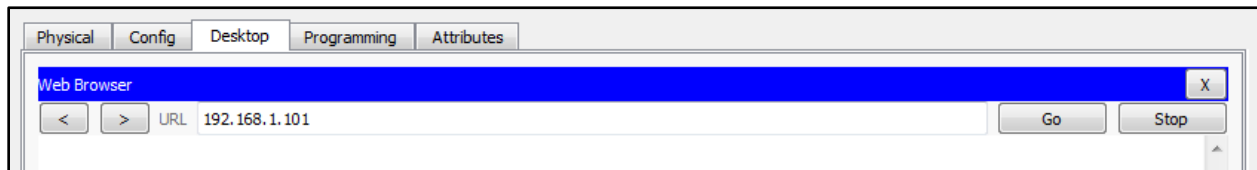
Extended Access Control List (ACL) was implemented to filter specific protocols without the need to call out specific hosts/network addresses.

Show Kiosk1_Remote_Access Initially Has Access to Server1_Admin File Server:

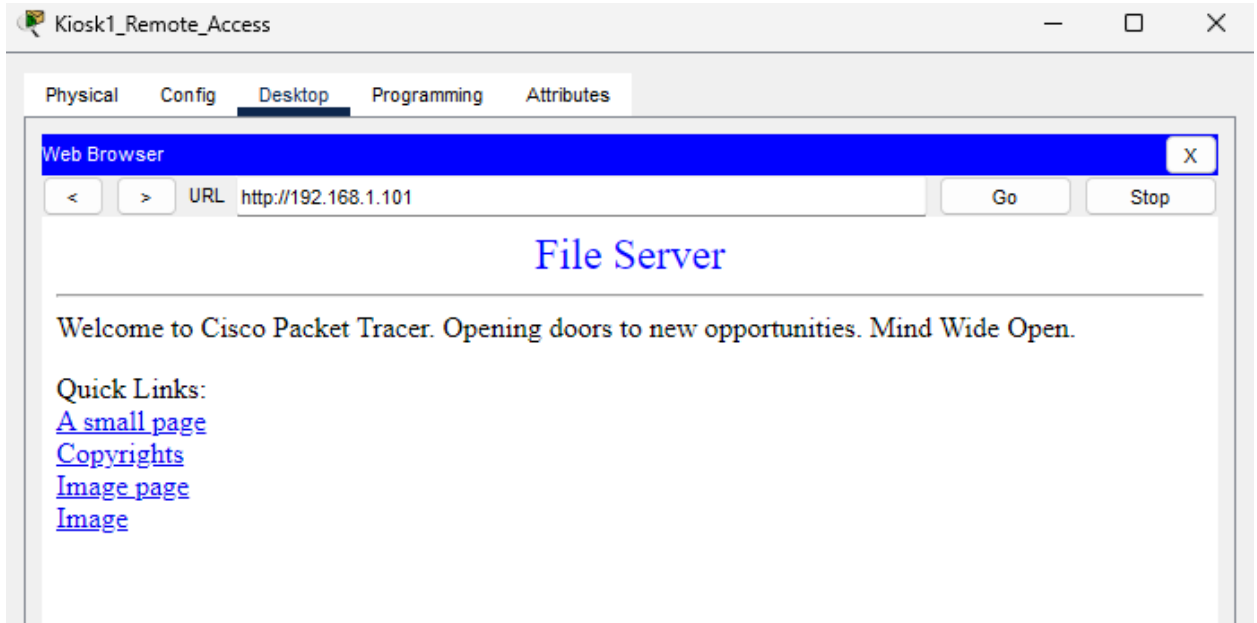
Step 1: Use the Desktop Menu to access the Web Browser:



Step 2: Navigate to File server on Server1_Admin (192.168.1.101).



Screenshot 4: Add a screenshot of your results attempting to access the file server.



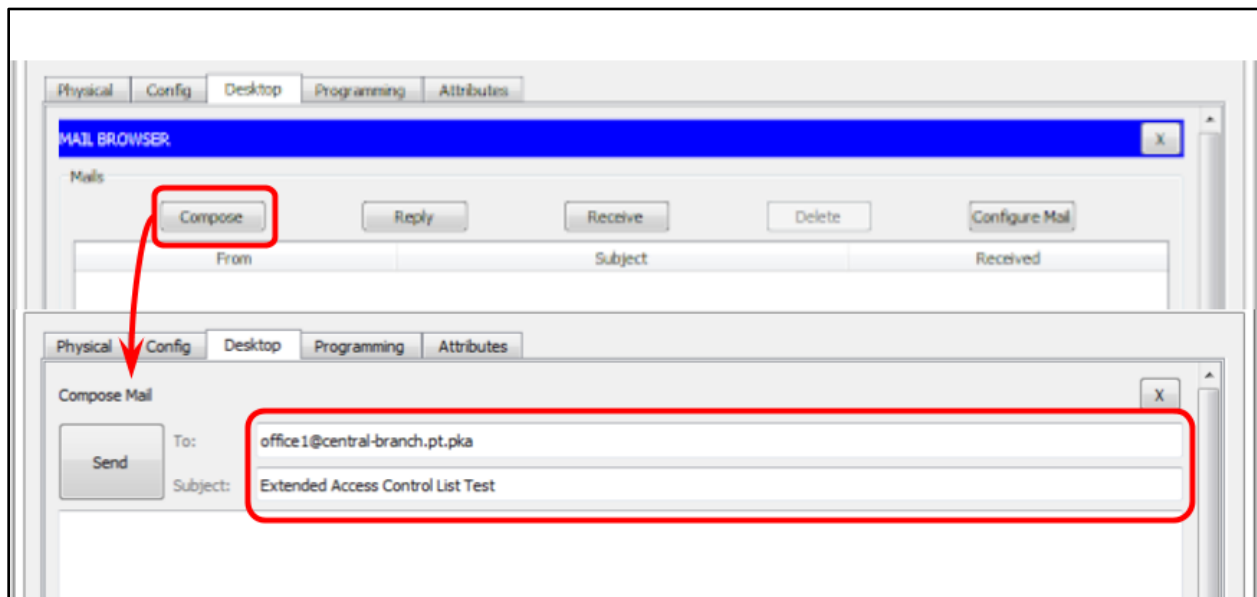
Configure Remote_Router Extended ACL for SMTP/POP3 Traffic to Email Server

Step 1: In the Remote_Router CLI tab, add:

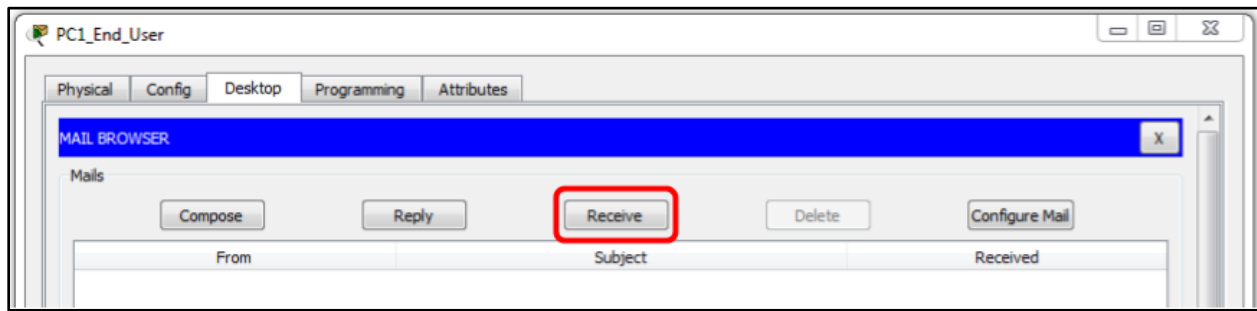
```
Remote_Router>enable
Remote_Router#configure terminal
Remote_Router(config)#ip access-list extended email
Remote_Router(config-ext-nacl)#permit tcp 192.168.3.2 0.0.0.0 host
10.1.10.6 eq smtp
```

```
Remote_Router(config-ext-nacl)#permit tcp 192.168.3.2 0.0.0.0 host
10.1.10.6 eq pop3
Remote_Router(config-ext-nacl)#exit
Remote_Router(config)#interface g0/0/1
Remote_Router(config-if)#ip access-group email in
Remote_Router(config)#exit
%SYS-5-CONFIG_I: Configured from console by console
```

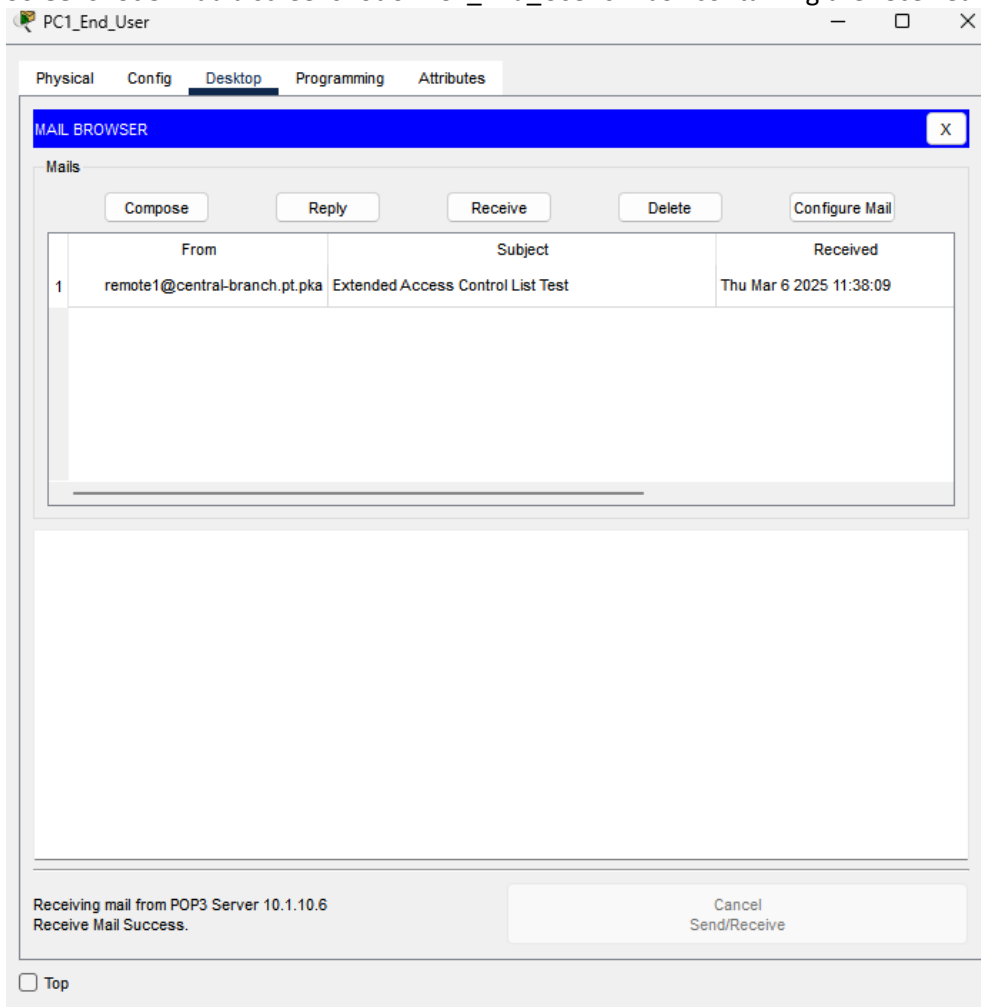
Step 2: Compose email from Kiosk1 to PC1_End_User (office1@central-branch-pt.pka).



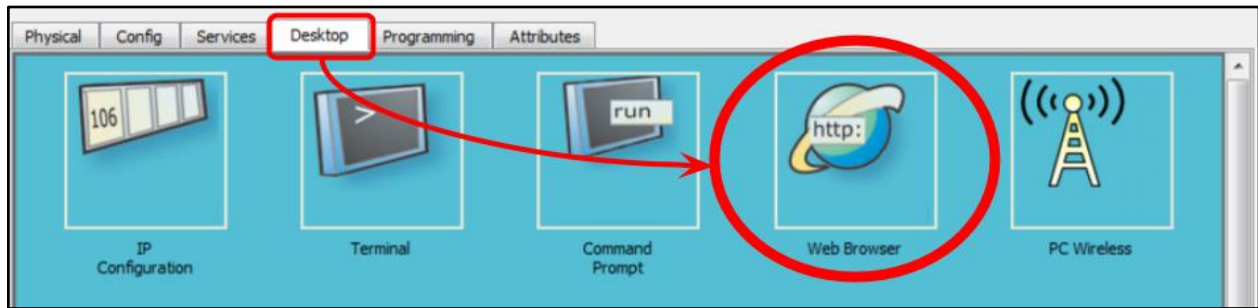
Step 3: Confirm PC1_End_User's inbox contains the received email from Kiosk1.



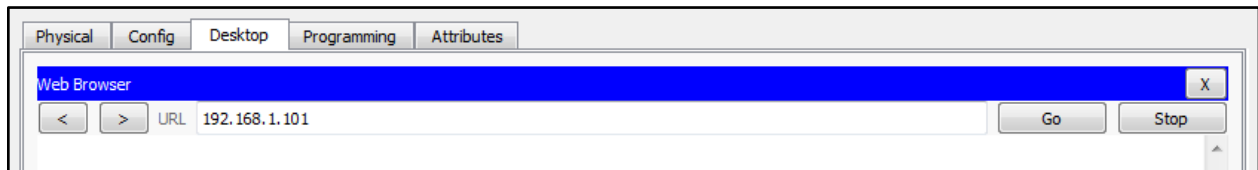
Screenshot 5: Add a screenshot of PC1_End_User's inbox containing the received email.



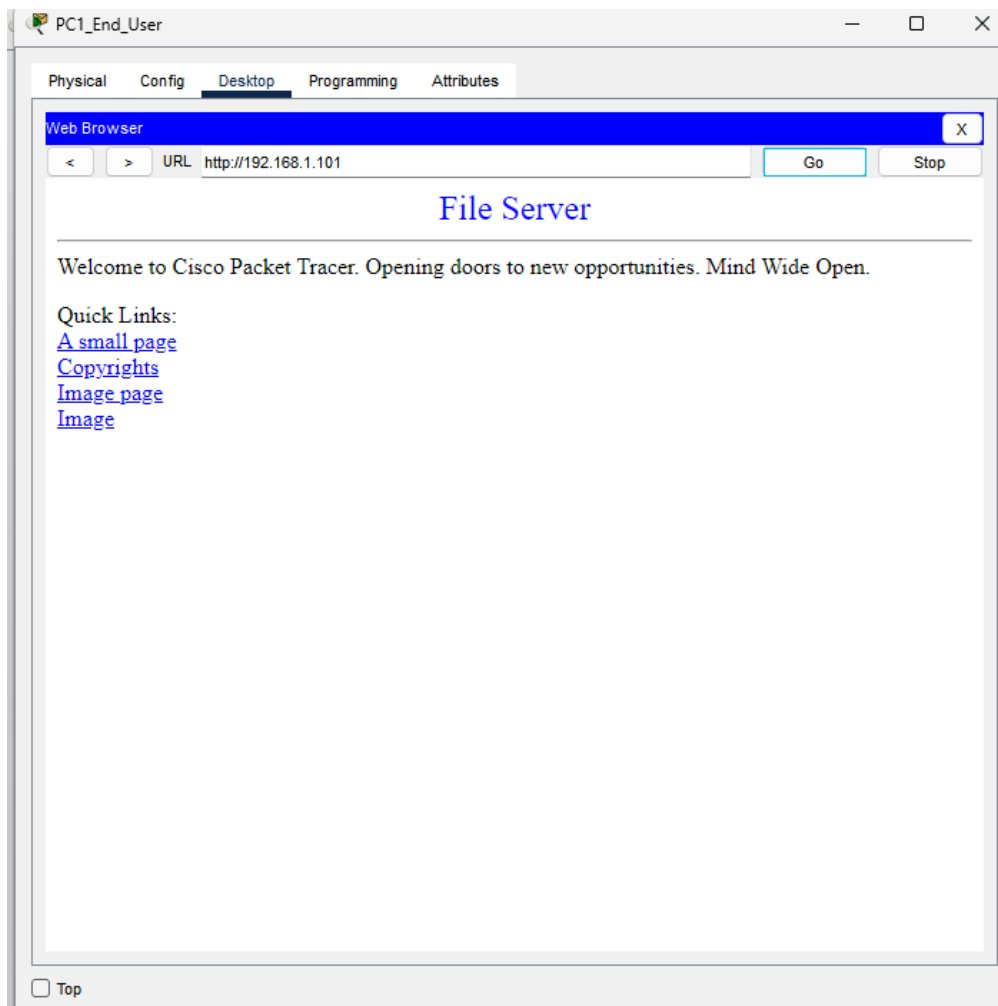
Step 4: Verify That the ACL Has Prevented Access to the File Server
a. Use the Desktop Menu to access the Web Browser:



b. Navigate to the file server on Server1_Admin (192.168.1.101).



Screenshot 6: Add a screenshot of the file server.



Question 8: How would you configure the Extended ACL for scalability? In other words, how could you set up the extended ACL to avoid having to modify the ACL every time you add a new host?

Answer: If I were to configure an Extended ACL for its scalability, my method would have to be using wildcard masks. By using a wildcard, I can apply the ACL within its IP range, addressing a subnet, meaning that I don't have to update the ACL every time.