ACCESS CONTROL LIST PROJECT PRESENTATION (PROJECT 6)

For DEPI

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OUR TEAM

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INRODUCTION

PROJECT OVERVIEW:

- This project utilized Cisco Packet Tracer to design and configure Access Control Lists (ACLs) in a virtual network environment.

PURPOSE:

- To manage and control the flow of network traffic between different segments of a simulated organization’s network**.**

KEY OBJECTIVE:

- Enhance the security of the network by preventing unauthorized access while allowing legitimate communication between network devices.

WHY ACLS?:

- ACLs help define rules for what traffic can enter or leave network interfaces.
- They are essential for implementing security policies within an organization’s network.

NETWORK TOPOLOGY OVERVIEW

NETWORK DESIGN:

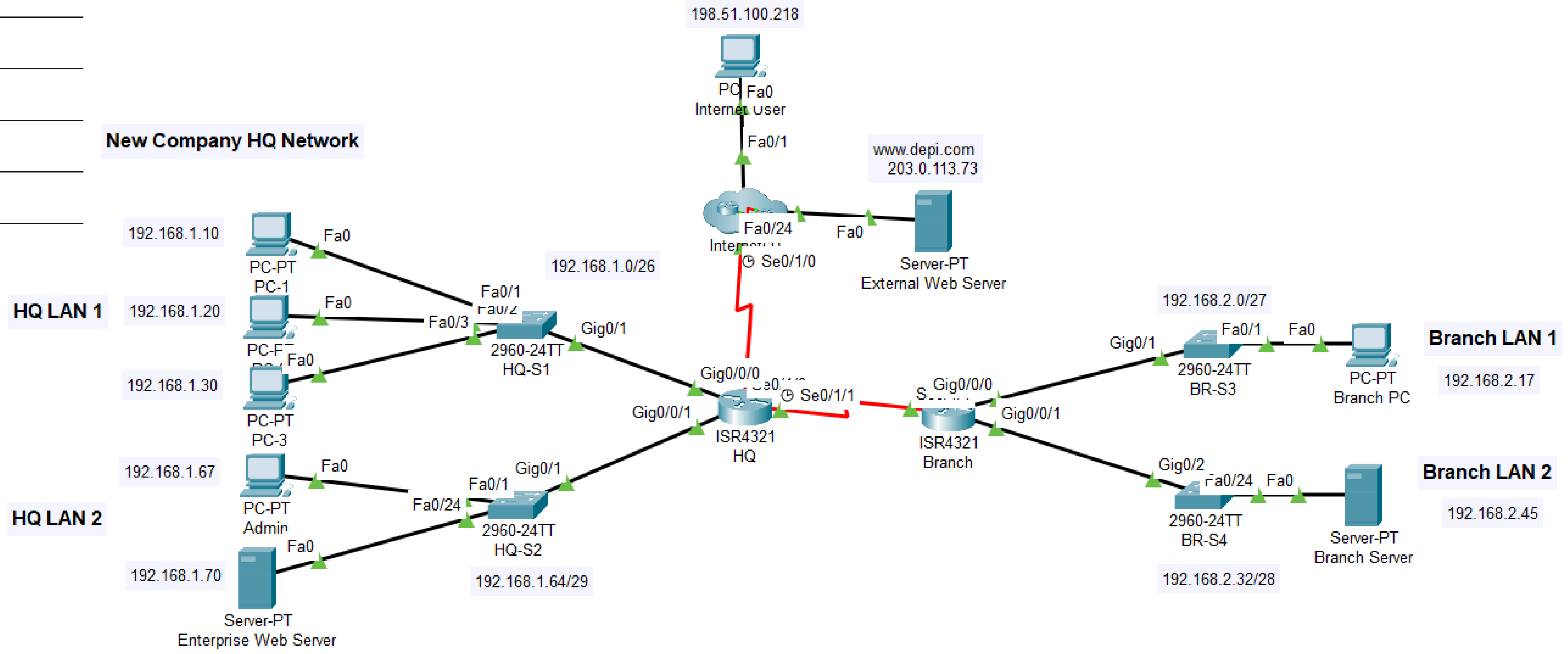
- The network includes two primary routers:
  - **HQ Router:** Manages communication within the headquarters network and connects to the internet.
  - **Branch Router:** Controls traffic at a branch office location.

- Each router connects to multiple LAN segments, handling traffic between the HQ, branch office, internet, and internal devices like servers and PCs.-

COMPONENTS:

- HQ Network: Two LAN segments with PCs and servers.
- Branch Network: Includes PCs, a server, and internet connectivity..

Device	Interface	IP Address
HQ	G0/0/0	192.168.1.1/26
	G0/0/1	192.168.1.65/29
	S0/1/0	192.0.2.1/30
	S0/1/1	192.168.3.1/30
Branch	G0/0/0	192.168.2.1/27
	G0/0/1	192.168.2.33/28
	S0/1/1	192.168.3.2/30
PC-1	NIC	192.168.1.10/26
PC-2	NIC	192.168.1.20/26
PC-3	NIC	192.168.1.30/26
Admin	NIC	192.168.1.67/29
Enterprise Web Server	NIC	192.168.1.70/29
Branch PC	NIC	192.168.2.17/27
Branch Server	NIC	192.168.2.45/28
Internet User	NIC	198.51.100.218/24
External Web Server	NIC	203.0.113.73/24



ACL CONFIGURATION OVERVIEW

- **PURPOSE OF CONFIGURING ACLS:**
  - TO FILTER INCOMING AND OUTGOING TRAFFIC ON SPECIFIC NETWORK INTERFACES.
  - TO RESTRICT OR ALLOW ACCESS BASED ON SECURITY POLICIES FOR DIFFERENT NETWORK SEGMENTS.
  - TO ENSURE COMPLIANCE WITH SECURITY REQUIREMENTS FOR INTERNAL AND EXTERNAL COMMUNICATION.
- **TYPES OF ACLS CONFIGURED:**
  - STANDARD NAMED ACLS: USED FOR BASIC FILTERING BASED ON SOURCE IP ADDRESSES.
  - EXTENDED ACLS: PROVIDE FINE-GRAINED CONTROL OVER TRAFFIC BY FILTERING BASED ON PROTOCOLS, SOURCE, AND DESTINATION IP ADDRESSES AND PORT NUMBERS.
- **APPLICATION OF ACLS:**
  - ACLS WERE APPLIED TO SPECIFIC INTERFACES ON EACH ROUTER TO CONTROL THE FLOW OF TRAFFIC AS IT ENTERS OR EXITS THE NETWORK.

DETAILED ACL CONFIGURATIONS (HQ ROUTER)

ROUTER HQ CONFIGURATIONS:

- ACL 101:
  - Blocks FTP access to the Enterprise Web Server from external users on the internet.
  - Blocks FTP access from Internet User to the Branch Server.
  - Denies ICMP traffic from the internet to the entire HQ LAN to prevent ping attacks.
  - Permits all other types of traffic, ensuring legitimate communication is unaffected.
  - Configuration Example:

```
access-list 101 deny tcp any host 192.168.1.70 eq ftp
access-list 101 deny icmp any 192.168.1.0 0.0.0.63
access-list 101 permit ip any any
```

ACL Application:

- Applied on the Serial0/1/1 interface to control outgoing traffic from the branch to HQ.

```
interface Serial0/1/0
ip access-group 101 in
```

DETAILED ACL CONFIGURATIONS (HQ ROUTER)

ROUTER HQ CONFIGURATIONS:

- ACL 111:
  - Blocks access from HQ LAN 1 to the Branch Server.
  - Allows all other traffic.

  - Configuration:

```
access-list 111 deny ip any host 192.168.2.45
access-list 111 permit ip any any
```

- ACL Application:

-Applied on the GigabitEthernet0/0/0 to control incoming traffic from the HQ LAN 1.

```
interface GigabitEthernet0/0/0
ip access-group 111 in
```

DETAILED ACL CONFIGURATIONS (HQ ROUTER)

- STANDARD NAMED ACL (VTY_BLOCK):

- Restricts VTY (Telnet/SSH) access to the HQ router, limiting it to HQ LAN 2.

- CONFIGURATION:

```
ip access-list standard vty_block
permit 192.168.1.64 0.0.0.7
```

- ACL APPLICATION:

- Applied on the VTY lines to control incoming traffic from the HQ LAN 2.

```
line vty 0 4
access-class vty_block in
```

DETAILED ACL CONFIGURATIONS (BRANCH ROUTER)

ROUTER BRANCH CONFIGURATIONS:

- EXTENDED NAMED ACL: (BRANCH_TO_HQ):

- Blocks any access attempts from Branch LAN 1 and Branch LAN 2 to HQ LAN1.

- CONFIGURATION:

```
ip access-list extended branch_to_hq
deny ip 192.168.2.0 0.0.0.31 192.168.1.0 0.0.0.63
deny ip 192.168.2.32 0.0.0.15 192.168.1.0 0.0.0.63
permit ip any any
```

- ACL APPLICATION:

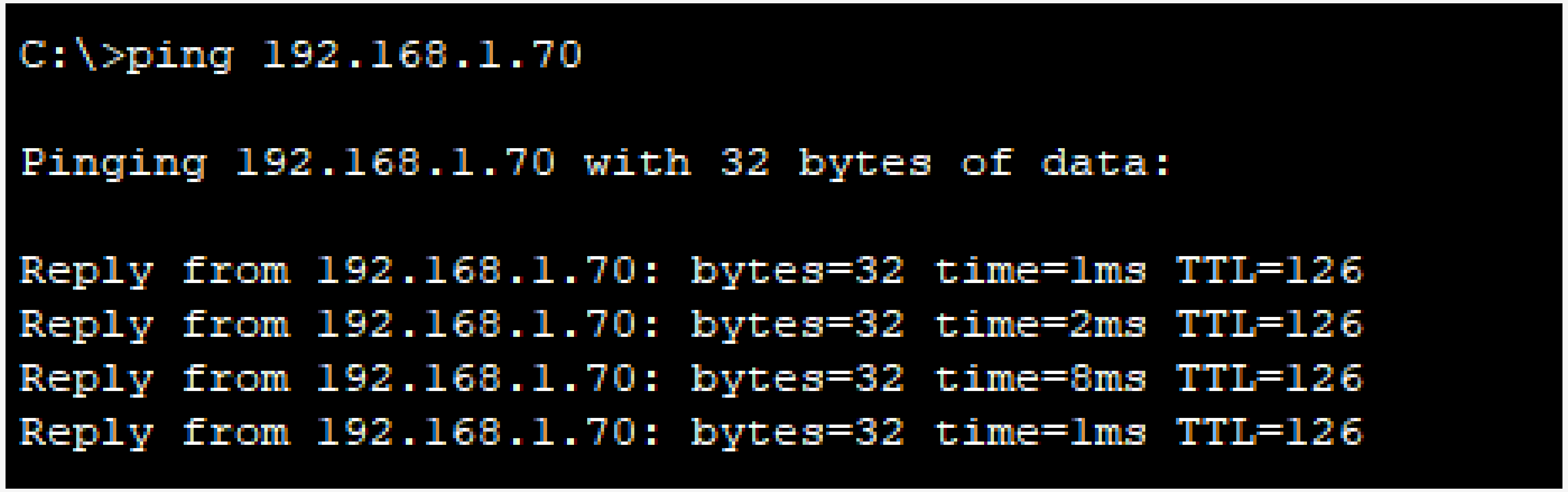
- Applied on the Serial0/1/1 interface to control outgoing traffic from the branch to HQ.

```
interface Serial0/1/1
ip access-group branch_to_hq out
```

CONNECTIVITY TESTS

- **PURPOSE OF TESTS:** TO VERIFY THAT THE ACLS WORK AS INTENDED AND RESTRICT OR ALLOW TRAFFIC ACCORDING TO THE CONFIGURED RULES.

- **TEST SCENARIOS:**
  - **TEST 1:** PING FROM BRANCH PC TO THE ENTERPRISE WEB SERVER.
  - **RESULT:** SUCCESSFUL PING, AS ACL 101 ONLY BLOCKS FTP TRAFFIC, NOT ICMP OR HTTP.
  - **OUTCOME:** CONFIRMS THAT REGULAR TRAFFIC BETWEEN THE BRANCH AND WEB SERVER IS ALLOWED.



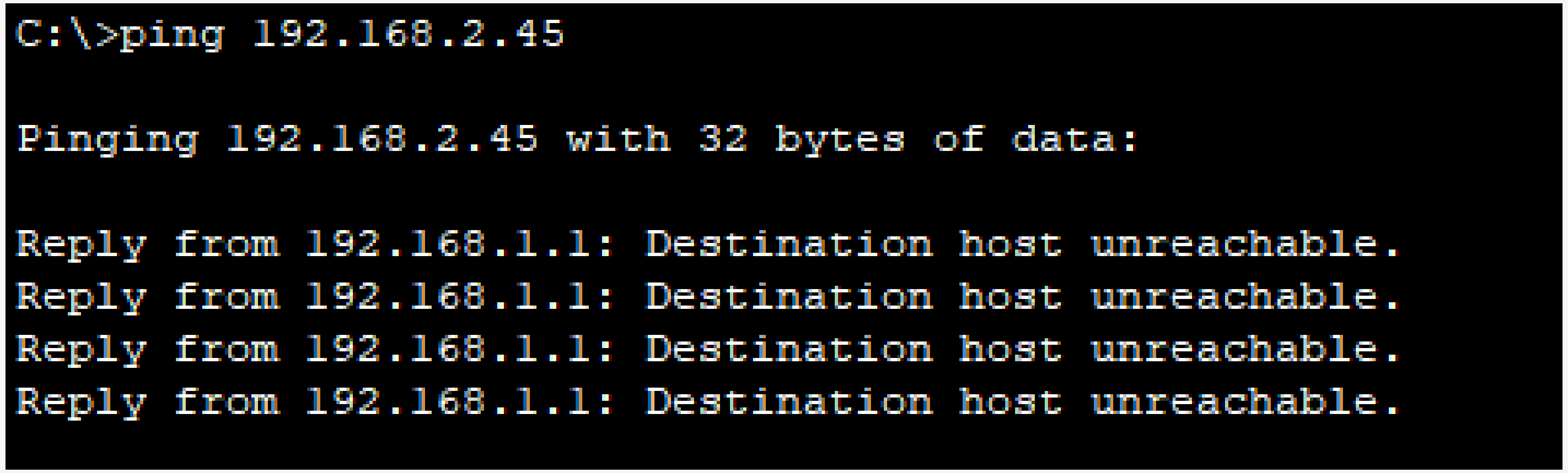
```
C:\>ping 192.168.1.70

Pinging 192.168.1.70 with 32 bytes of data:

Reply from 192.168.1.70: bytes=32 time=1ms TTL=126
Reply from 192.168.1.70: bytes=32 time=2ms TTL=126
Reply from 192.168.1.70: bytes=32 time=8ms TTL=126
Reply from 192.168.1.70: bytes=32 time=1ms TTL=126
```

CONNECTIVITY TESTS

- **Test 2:** Ping from HQ PC-1 to Branch Server.
- **RESULT:** UNSUCCESSFUL PING, AS ACL 111 BLOCKS TRAFFIC TO THE BRANCH SERVER.
- **OUTCOME:** VALIDATES THAT HQ LAN 1 CANNOT ACCESS RESTRICTED BRANCH RESOURCES.



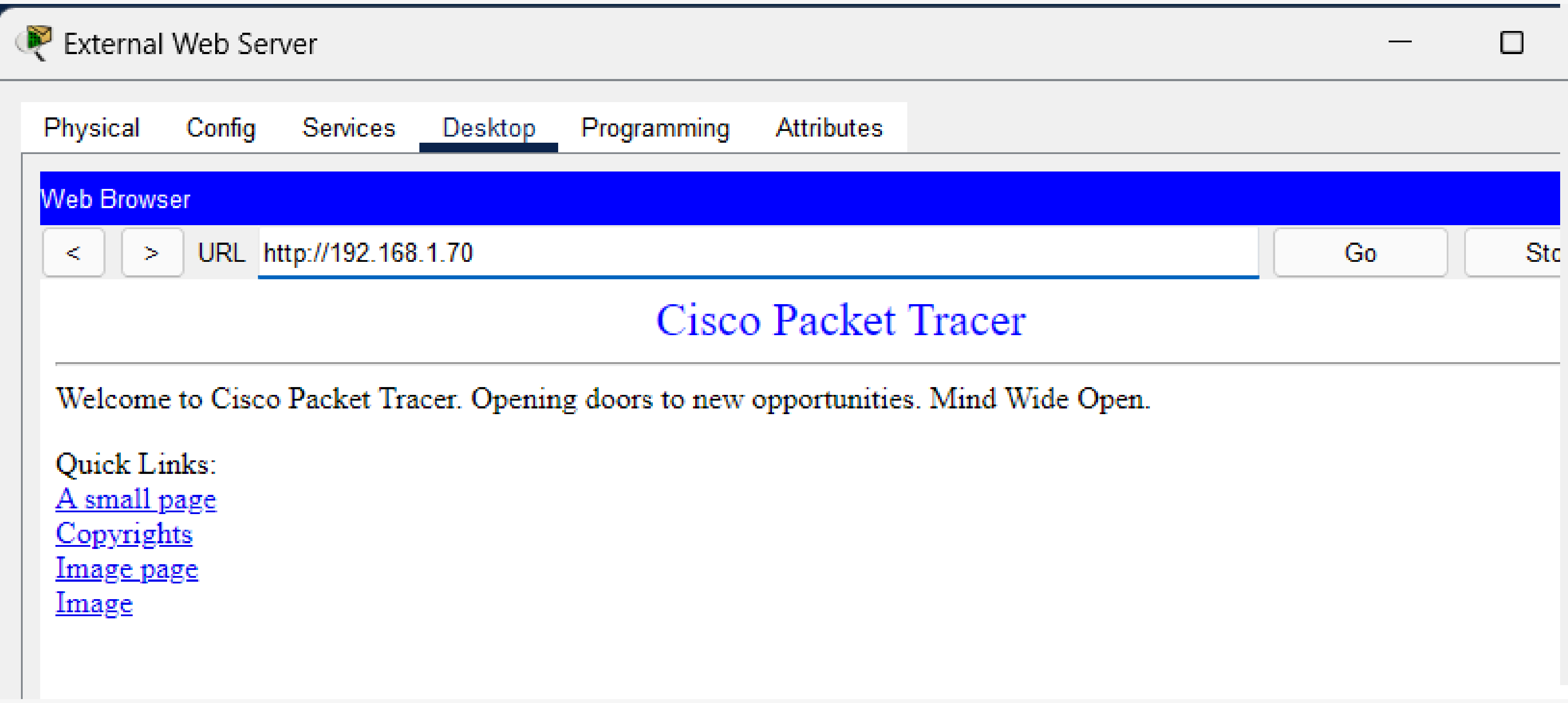
```
C:\>ping 192.168.2.45

Pinging 192.168.2.45 with 32 bytes of data:

Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
```

CONNECTIVITY TESTS

- **TEST 3:** HTTP ACCESS FROM EXTERNAL WEB SERVER TO THE ENTERPRISE WEB SERVER.
- **RESULT:** ACCESS WAS SUCCESSFUL, SHOWING THAT ACL 101 PERMITS HTTP TRAFFIC WHILE BLOCKING FTP.
- **OUTCOME:** CONFIRMS SECURE ACCESS FROM EXTERNAL SOURCES TO INTERNAL SERVERS.



URL http://192.168.1.70

Cisco Packet Tracer

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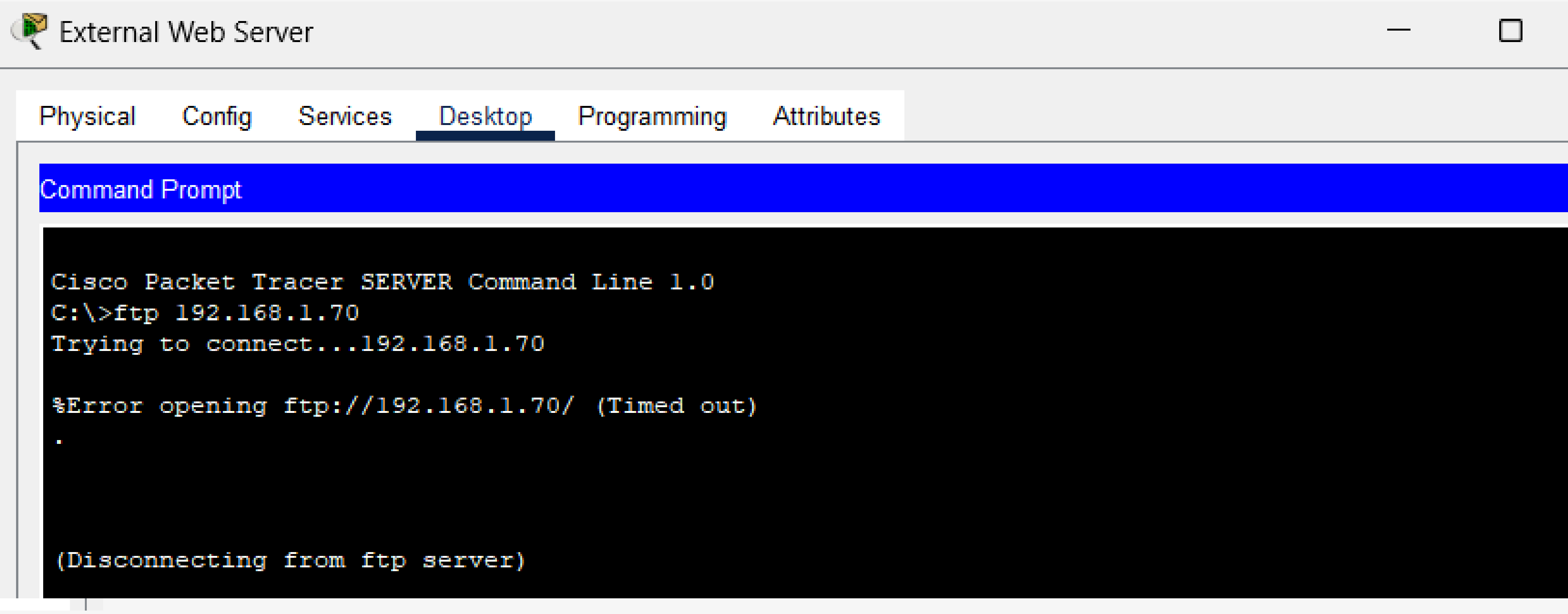

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>ftp 192.168.1.70
Trying to connect...192.168.1.70

%Error opening ftp://192.168.1.70/ (Timed out)
.



(Disconnecting from ftp server)
```

CONCLUSION

- **Key Takeaways**:
  - Successfully configured ACLs provide a **layered security approach** in managing access between different network segments.
  - ACLs ensured that **specific traffic types** (e.g., FTP and ICMP) were blocked based on security requirements while allowing other legitimate communications.
  - **Validation** through connectivity tests confirmed that the ACL rules were applied correctly, securing the network.
- **Future Considerations**:
  - **Additional Adjustments**: Further improvements could involve blocking **unused ports** and **additional protocols** to enhance security.
  - Regular **review and updates** to ACL rules are essential to adapt to evolving security threats.

THANK YOU