

WIPRO NGA Program – Data Center- Batch 2

Capstone Project Presentation – 6th Dec & 7th Dec
2024

Project Title Here – Small organization Setup in
Cisco Packet Tracer

Presented by – SUVENDU DAS

Cisco Packet Tracer

Cisco Packet Tracer is a powerful **network simulation software** developed by **Cisco Systems**. It enables users to **design, configure, and troubleshoot networks** in a virtual environment.

Key Features

Simulation:

- Simulates network devices, protocols, and topologies.
- Enables experimentation without impacting physical networks.

Drag-and-Drop Interface:

- Allows easy addition and removal of simulated devices like routers, switches, and servers.

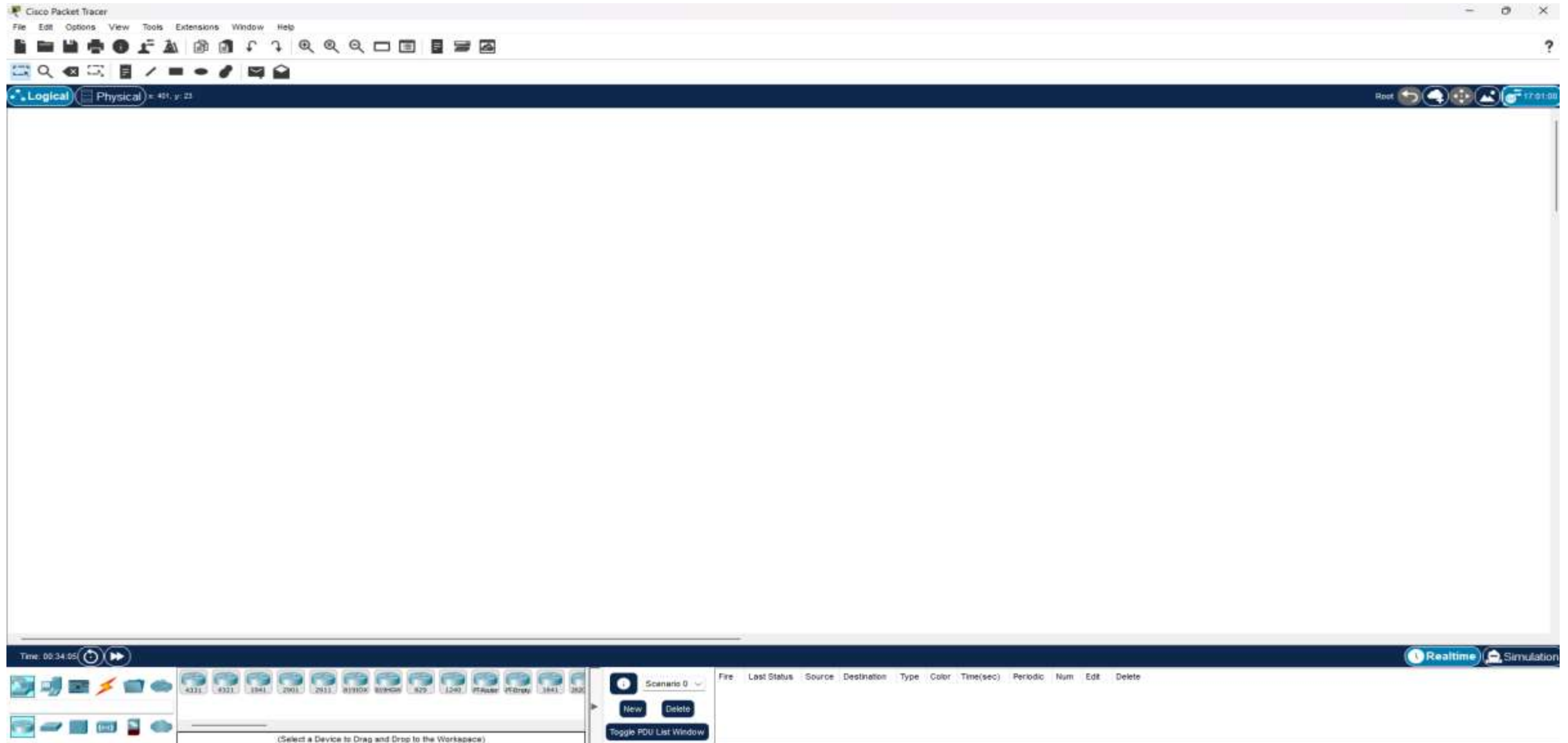
Multi-User Collaboration:

- Supports teamwork in **Packet Tracer 5.0 and later**.
- Multiple users can connect and collaborate on different network topologies.

Activity Creation:

- Educators can create activities for students to complete.
- Facilitates learning and assessment of networking concepts.

Interface of Cisco Packet Tracer



Small Organization Network Setup

Components:

- 1 Server
- 1 Router
- 4 Switches
- 6 PCs

Organizational Sections:

- Administration
- Accounts and Finance
- Information Technology (IT)
- Database

Network Addressing:

Network 1: 192.168.1.0/24

Network 2: 192.168.2.0/24

Network 3: 192.168.3.0/24

Network 4: 192.168.4.0/24

Connections

Router

- Connect the router to 4 switches via 4 interfaces, each for a different subnetwork.

•Steps:

- 1.Power off the router and insert the **NM-2FE2W** module.
- 2.Power the router back on.
- 3.Use copper straight-through cables to connect the router interfaces to the switches.

Switches:

Switch 1: Connects 2 PCs (Network 2: 192.168.2.0/24).

Switch 2: Connects 2 PCs (Network 3: 192.168.3.0/24).

Switch 3: Connects 2 PCs (Network 4: 192.168.4.0/24).

Switch 4: Connects to the server (Network 1: 192.168.1.0/24).

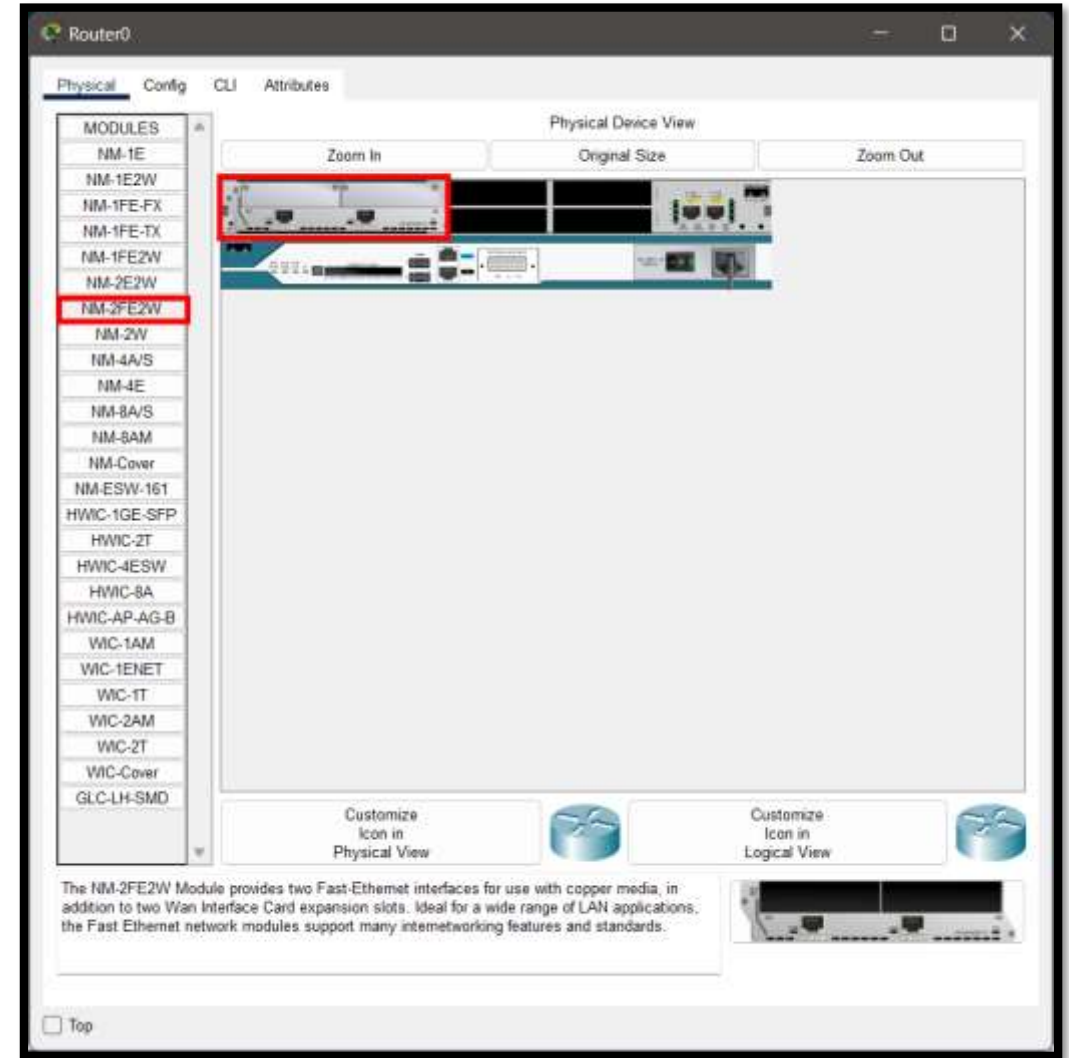
Server:

Provides services such as DNS and HTTP.

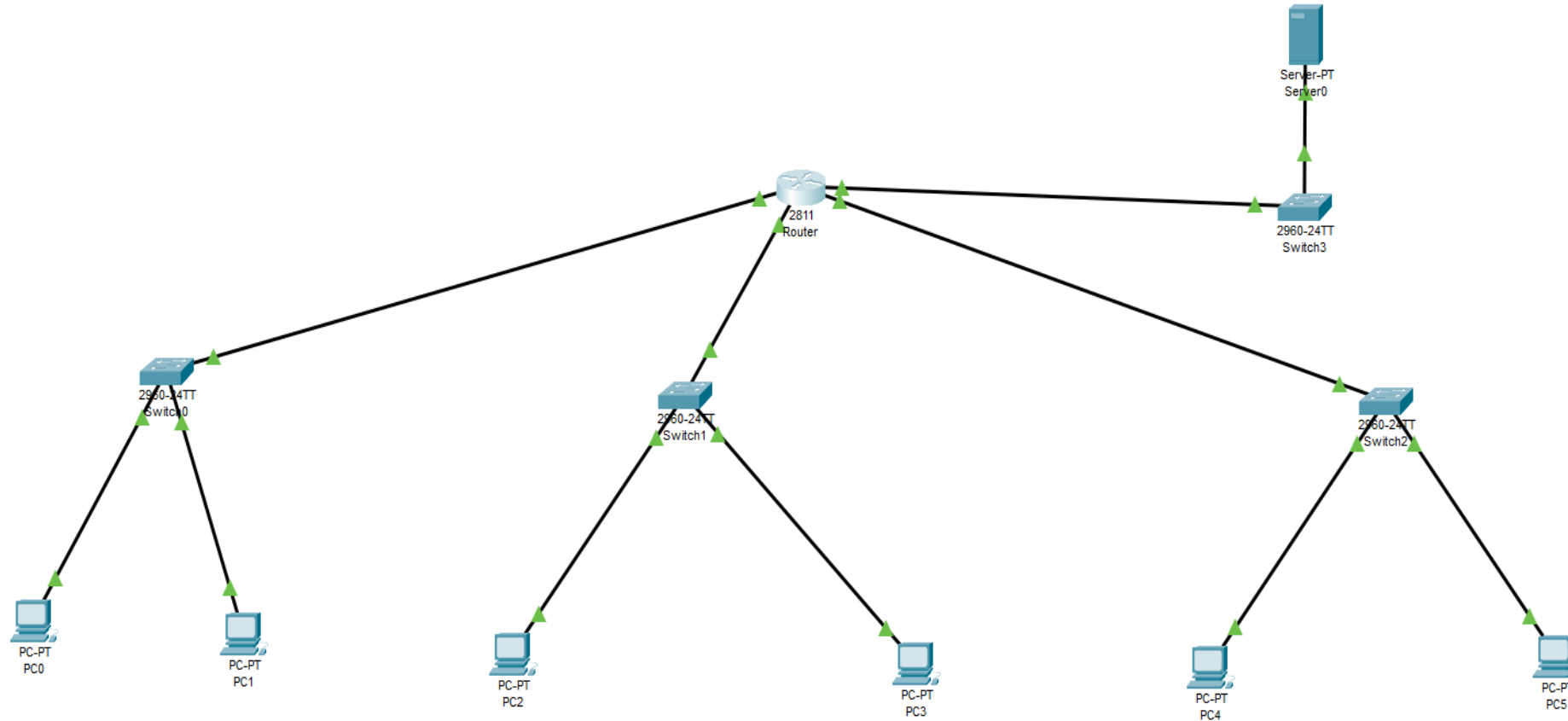
Connected to Switch 4 in the **192.168.1.0/24** network.

Adding NM-2FE2W Module for 4 Ports

- Power off the router before inserting the **NM-2FE2W** module.
- Drag and drop the **NM-2FE2W** module into the available port slot.
- Power on the router once the module is securely in place.



Connections



IP Configuration Table

Components	IP Address	Subnet Mask	Default Gateway	DNS server
PC0	192.168.2.3	255.255.255.0	192.168.2.1	192.168..1.100
PC1	192.168.2.2	255.255.255.0	192.168.2.1	192.168.1.100
PC2	192.168.3.3	255.255.255.0	192.168.3.1	192.168.1.100
PC3	192.168.3.2	255.255.255.0	192.168.3.1	192.168.1.100
PC4	192.168.4.3	255.255.255.0	192.168.4.1	192.168.1.100
PC5	192.168.4.2	255.255.255.0	192.168.4.1	192.168.1.100
Server	192.168.1.100	255.255.255.0	192.168.1.1	192.168.1.100

PC0:

IPV4-192.168.2.3

Default Gateway-192.168.2.1

DNS server-192.168.1.100

The screenshot shows the configuration window for PC0, specifically the 'Desktop' tab. The 'IP Configuration' section is highlighted in blue. The 'Interface' is set to 'FastEthernet0'. The 'IP Configuration' section has two radio buttons: 'DHCP' (unselected) and 'Static' (selected). The 'Static' configuration fields are filled with the following values: IPv4 Address: 192.168.2.3, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.2.1, and DNS Server: 192.168.1.100. The 'IPv6 Configuration' section has two radio buttons: 'Automatic' (unselected) and 'Static' (selected). The 'Static' configuration fields are filled with the following values: IPv6 Address: (empty), Link Local Address: FE80::202:16FF:FE7E:EAE, Default Gateway: (empty), and DNS Server: (empty). The '802.1X' section has a checkbox for 'Use 802.1X Security' (unchecked). The 'Authentication' dropdown is set to 'MD5'. The 'Username' and 'Password' fields are empty. There is a 'Top' button at the bottom left of the window.

PC0

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.2.1

DNS Server 192.168.1.100

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::202:16FF:FE7E:EAE

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

PC1:

IPV4-192.168.2.2

Default Gateway-192.168.2.1

DNS server-192.168.1.100

The screenshot shows the configuration window for PC1, specifically the 'Desktop' tab. The 'IP Configuration' section is active, showing settings for the 'FastEthernet0' interface. The 'IP Configuration' section has two radio buttons: 'DHCP' (unselected) and 'Static' (selected). Below these are fields for 'IPv4 Address' (192.168.2.2), 'Subnet Mask' (255.255.255.0), 'Default Gateway' (192.168.2.1), and 'DNS Server' (192.168.1.100). The 'IPv6 Configuration' section also has two radio buttons: 'Automatic' (unselected) and 'Static' (selected). Below these are fields for 'IPv6 Address' (empty), 'Link Local Address' (FE80::20A:F3FF:FE14:A0BC), 'Default Gateway' (empty), and 'DNS Server' (empty). The '802.1X' section has a checkbox for 'Use 802.1X Security' (unchecked), and fields for 'Authentication' (MD5), 'Username' (empty), and 'Password' (empty).

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.2.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.2.1
DNS Server	192.168.1.100
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::20A:F3FF:FE14:A0BC
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

PC2:
IPV4-192.168.3.3
Default Gateway-192.168.3.1
DNS server-192.168.1.100

The screenshot shows the configuration interface for PC2, specifically the 'Desktop' tab. The 'IP Configuration' section is highlighted in blue. Below it, the 'Interface' is set to 'FastEthernet0'. The 'IP Configuration' section has two radio buttons: 'DHCP' (unselected) and 'Static' (selected). The 'Static' configuration is shown with the following values: IPv4 Address: 192.168.3.3, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.3.1, and DNS Server: 192.168.1.100. The 'IPv6 Configuration' section also has two radio buttons: 'Automatic' (unselected) and 'Static' (selected). The 'Static' configuration is shown with the following values: IPv6 Address: (empty), Link Local Address: FE80::230:A3FF:FEC9:7E33, Default Gateway: (empty), and DNS Server: (empty). The '802.1X' section has a checkbox for 'Use 802.1X Security' (unchecked), and the 'Authentication' is set to 'MD5'. The 'Username' and 'Password' fields are empty.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.3.3
Subnet Mask	255.255.255.0
Default Gateway	192.168.3.1
DNS Server	192.168.1.100
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::230:A3FF:FEC9:7E33
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

PC3:

IPV4-192.168.3.2

Default Gateway-192.168.3.1

DNS server-192.168.1.100

The screenshot shows the configuration interface for PC3, specifically the 'Desktop' tab. The 'IP Configuration' section is active, showing settings for the 'FastEthernet0' interface. The 'IP Configuration' section has two radio buttons: 'DHCP' (unselected) and 'Static' (selected). Below these are fields for 'IPv4 Address' (192.168.3.2), 'Subnet Mask' (255.255.255.0), 'Default Gateway' (192.168.3.1), and 'DNS Server' (192.168.1.100). The 'IPv6 Configuration' section also has two radio buttons: 'Automatic' (unselected) and 'Static' (selected). Below these are fields for 'IPv6 Address' (empty), 'Link Local Address' (FE80::201:63FF:FE1A:1949), 'Default Gateway' (empty), and 'DNS Server' (empty). The '802.1X' section has a checkbox for 'Use 802.1X Security' (unchecked), and fields for 'Authentication' (MD5), 'Username' (empty), and 'Password' (empty).

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.3.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.3.1
DNS Server	192.168.1.100
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::201:63FF:FE1A:1949
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

PC4:

IPV4-192.168.4.3

Default Gateway-192.168.4.1

DNS server-192.168.1.100

The screenshot shows the configuration interface for PC4, specifically the 'Desktop' tab. The 'IP Configuration' section is active, showing settings for the 'FastEthernet0' interface. The 'IP Configuration' section has two radio buttons: 'DHCP' (unselected) and 'Static' (selected). Below these are fields for 'IPv4 Address' (192.168.4.3), 'Subnet Mask' (255.255.255.0), 'Default Gateway' (192.168.4.1), and 'DNS Server' (192.168.1.100). The 'IPv6 Configuration' section also has two radio buttons: 'Automatic' (unselected) and 'Static' (selected). Below these are fields for 'IPv6 Address' (empty), 'Link Local Address' (FE80::201:43FF:FE2B:82D0), 'Default Gateway' (empty), and 'DNS Server' (empty). The '802.1X' section has a checkbox for 'Use 802.1X Security' (unchecked). Below this are fields for 'Authentication' (MD5), 'Username' (empty), and 'Password' (empty).

PC4

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.4.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.4.1

DNS Server 192.168.1.100

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address FE80::201:43FF:FE2B:82D0

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

PC5:

IPV4-192.168.4.2

Default Gateway-192.168.4.1

DNS server-192.168.1.100

The screenshot shows the configuration window for PC5, specifically the 'Desktop' tab. The 'IP Configuration' section is highlighted in blue. Under 'Interface', 'FastEthernet0' is selected. The 'IP Configuration' section has two radio buttons: 'DHCP' (unselected) and 'Static' (selected). Below these, the following fields are filled in:

Field	Value
IPv4 Address	192.168.4.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.4.1
DNS Server	192.168.1.100

The 'IPv6 Configuration' section is also visible, with 'Automatic' (unselected) and 'Static' (selected) radio buttons. The following fields are filled in:

Field	Value
IPv6 Address	
Link Local Address	FE80::290:2BFF:FE78:2422
Default Gateway	
DNS Server	

The '802.1X' section is at the bottom, with 'Use 802.1X Security' (unchecked) and 'Authentication' set to 'MD5'. The 'Username' and 'Password' fields are empty.

SERVER:

IPV4-192.168.1.100

Default Gateway-192.168.1.1

DNS server-192.168.1.100

The screenshot shows the 'Server0' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is active, showing settings for both IPv4 and IPv6. The IPv4 configuration is set to 'Static' with an IP address of 192.168.1.100, a subnet mask of 255.255.255.0, a default gateway of 192.168.1.1, and a DNS server of 192.168.1.100. The IPv6 configuration is also set to 'Static' with a link local address of FE80::2D0:D3FF:FE64:673. The 802.1X section is currently inactive, with 'Use 802.1X Security' unchecked. The 'Authentication' dropdown is set to 'MD5', and there are empty fields for 'Username' and 'Password'. A 'Top' button is located at the bottom left of the window.

Section	Option	Value
IP Configuration	<input type="radio"/> DHCP	
	<input checked="" type="radio"/> Static	
	IPv4 Address	192.168.1.100
	Subnet Mask	255.255.255.0
	Default Gateway	192.168.1.1
IPv6 Configuration	<input type="radio"/> Automatic	
	<input checked="" type="radio"/> Static	
	IPv6 Address	
	Link Local Address	FE80::2D0:D3FF:FE64:673
	Default Gateway	
802.1X	<input type="checkbox"/> Use 802.1X Security	
	Authentication	MD5
	Username	
	Password	

Router Configuration

FastEthernet0/0	192.168.2.1	255.255.255.0
FastEthernet0/1	192.168.3.1	255.255.255.0
FastEthernet1/0	192.168.1.1	255.255.255.0
FastEthernet1/1	192.168.4.1	255.255.255.0

Router0 FastEthernet0/0

Router0

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet1/0

FastEthernet1/1

FastEthernet0/0

Port Status

☒ On

Bandwidth

☒ 100 Mbps

☐ 10 Mbps

Duplex

☐ Half Duplex

☒ Full Duplex

MAC Address

00E0.F925.2101

IP Configuration

IPv4 Address

192.168.2.1

Subnet Mask

255.255.255.0

Tx Ring Limit

10

Router0 FastEthernet0/1

Router0

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet1/0

FastEthernet1/1

FastEthernet0/1

Port Status

Bandwidth

Duplex

MAC Address

00E0.F925.2102

IP Configuration

IPv4 Address

192.168.3.1

Subnet Mask

255.255.255.0

Tx Ring Limit

10

Equivalent IOS Commands

Router0 FastEthernet1/0

Router0

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet1/0

FastEthernet1/1

FastEthernet1/0

Port Status

Bandwidth

Duplex

MAC Address

IP Configuration

IPv4 Address

Subnet Mask

Tx Ring Limit

100 Mbps

10 Mbps

☒

Auto

Half Duplex

☒

Full Duplex

☒

Auto

0060.2F1A.3801

192.168.1.1

255.255.255.0

10

RPS
learn..evolve

2024 - RPS Consulting all rights reserved

19

Router0 FastEthernet1/1

Router0

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet1/0

FastEthernet1/1

FastEthernet1/1

Port Status

☒ On

Bandwidth

☒ 100 Mbps

☐ 10 Mbps

Duplex

☐ Half Duplex

☒ Full Duplex

MAC Address0060.2F1A.3802

IP Configuration

IPv4 Address192.168.4.1

Subnet Mask255.255.255.0

Tx Ring Limit10

Server Configuration

Configure DNS Server

Click on the Server.

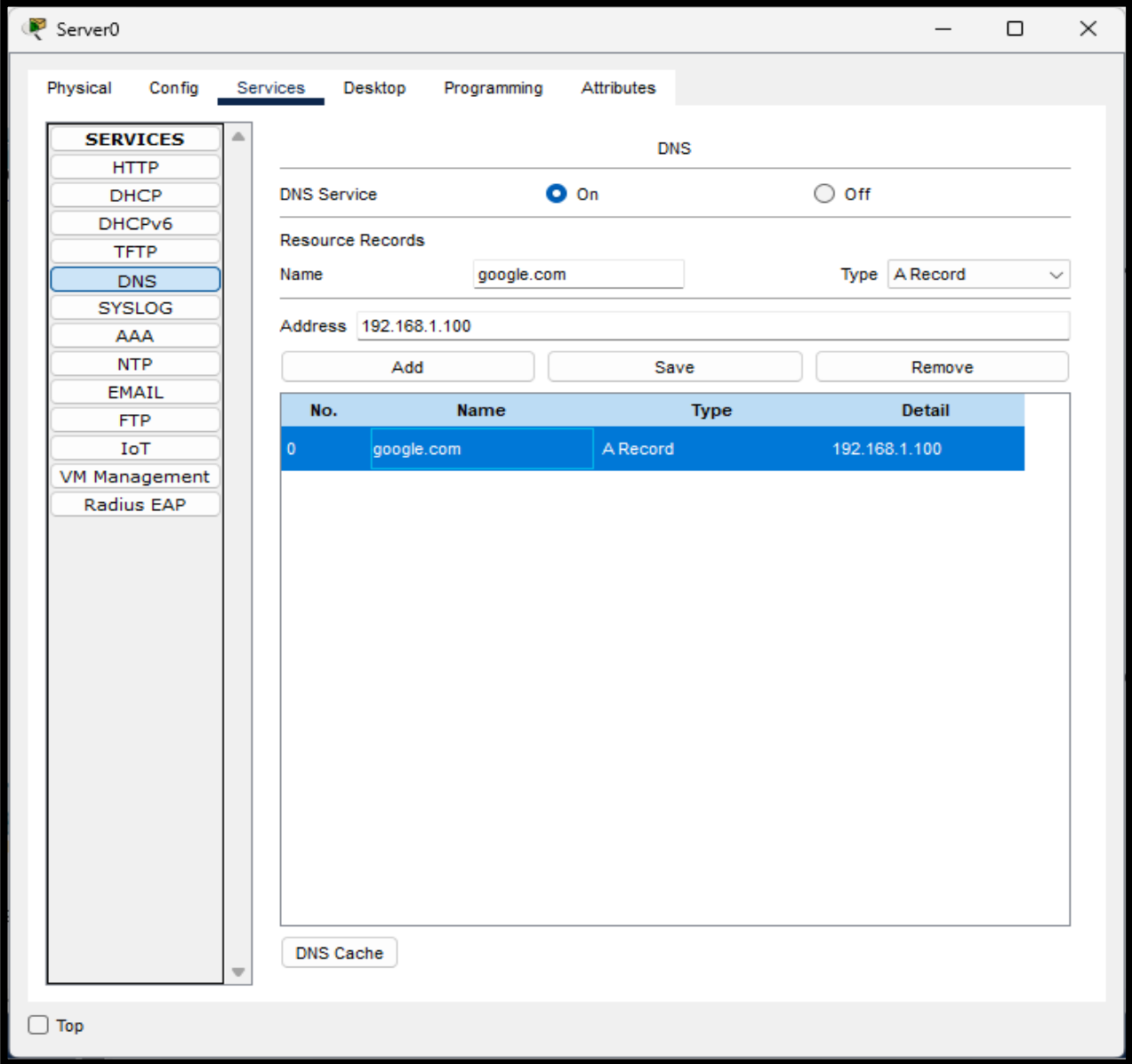
Navigate to the Services section and select DNS.

Turn on the DNS service.

In the Name field, enter a domain name

In the Address field, enter the server's IP address

Click Save to apply the settings.



The screenshot shows the 'Server0' configuration window with the 'Services' tab selected. On the left, a list of services includes HTTP, DHCP, DHCPv6, TFTP, DNS (highlighted), SYSLOG, AAA, NTP, EMAIL, FTP, IoT, VM Management, and Radius EAP. The main area is titled 'DNS' and contains the following settings:

- DNS Service:** A toggle switch set to 'On'.
- Resource Records:**
 - Name:** A text field containing 'google.com'.
 - Type:** A dropdown menu set to 'A Record'.
 - Address:** A text field containing '192.168.1.100'.
 - Buttons: 'Add', 'Save', and 'Remove'.
- Table:** A table with columns 'No.', 'Name', 'Type', and 'Detail'. It contains one entry:

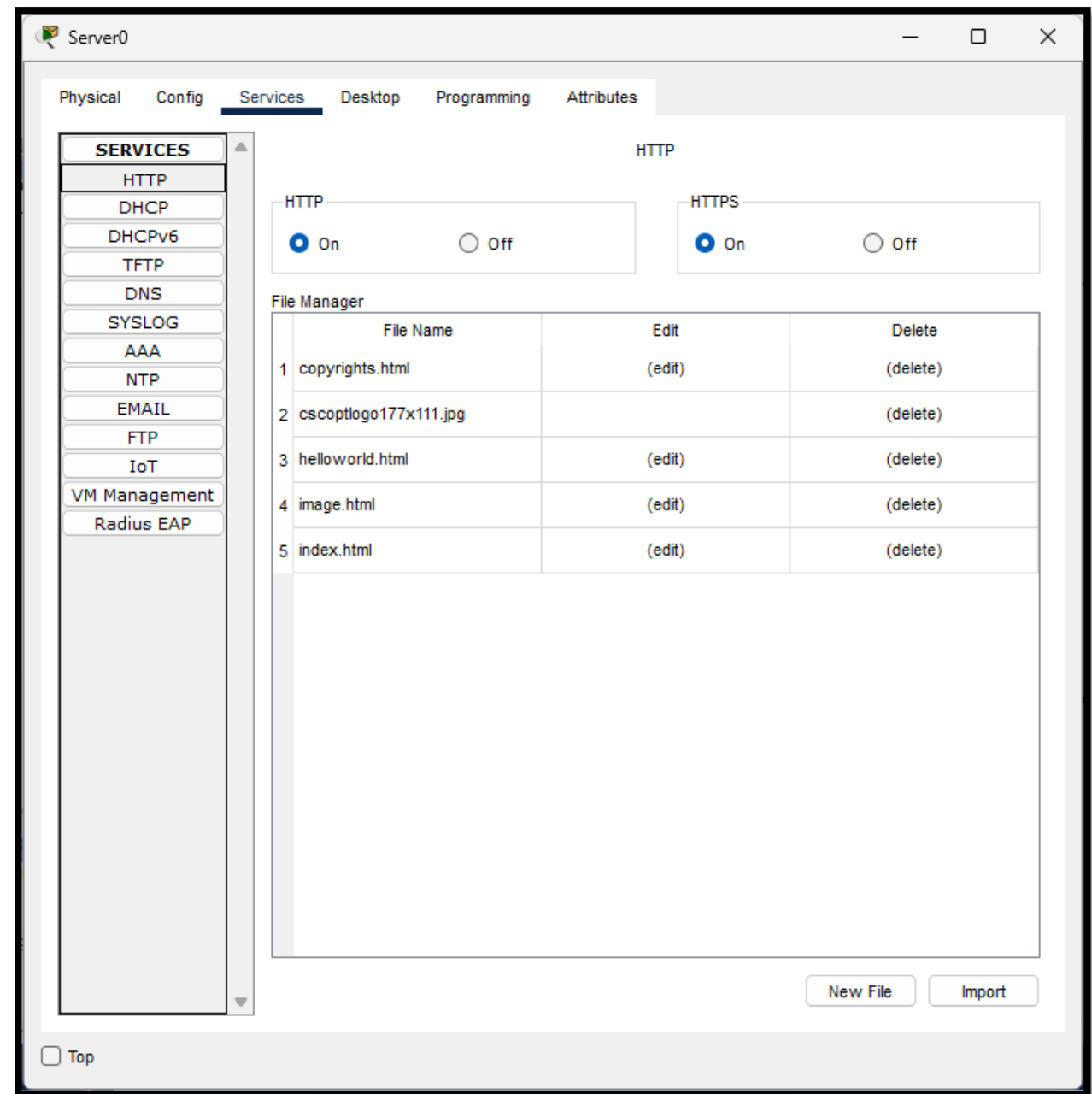
No.	Name	Type	Detail
0	google.com	A Record	192.168.1.100
- DNS Cache:** A button at the bottom.

At the bottom left of the window, there is a 'Top' link.

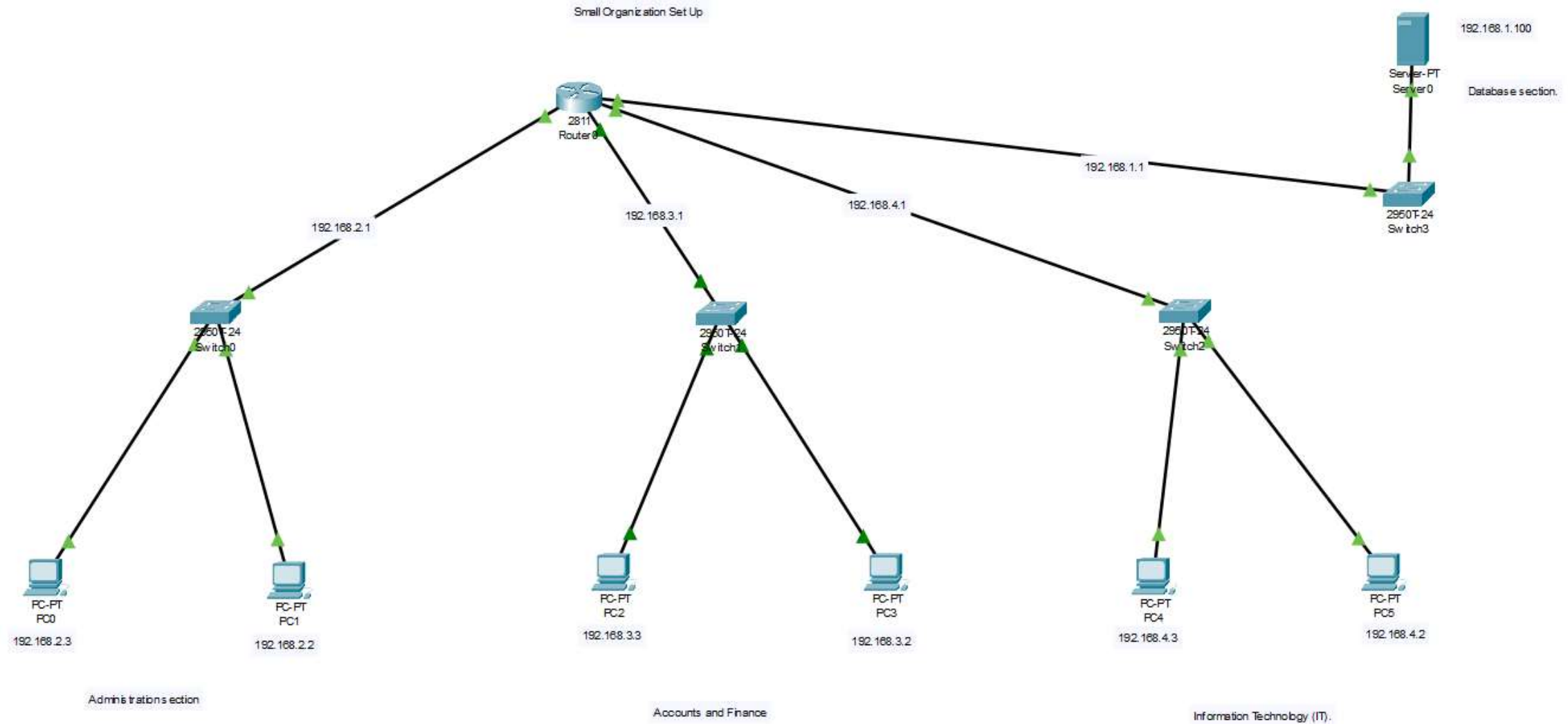
Server Configuration

Enable HTTP/HTTPS Services

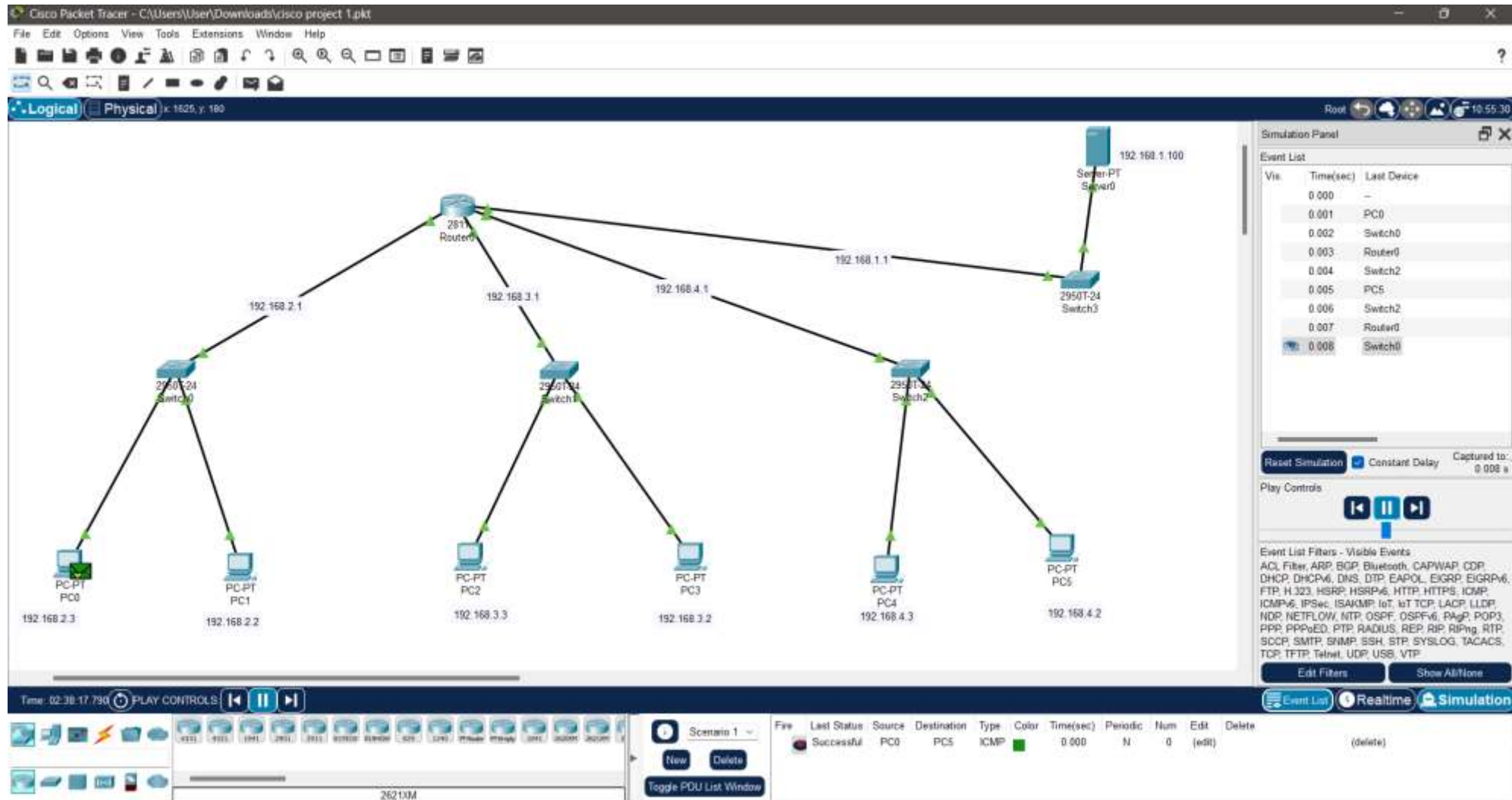
Go back to the Services section of the Server.
Select HTTP and HTTPS services.
Turn both services ON.
Optionally, Edit index.html to customize the
webpage displayed in browser.



Final Network Configuration in Cisco Packet Tracer

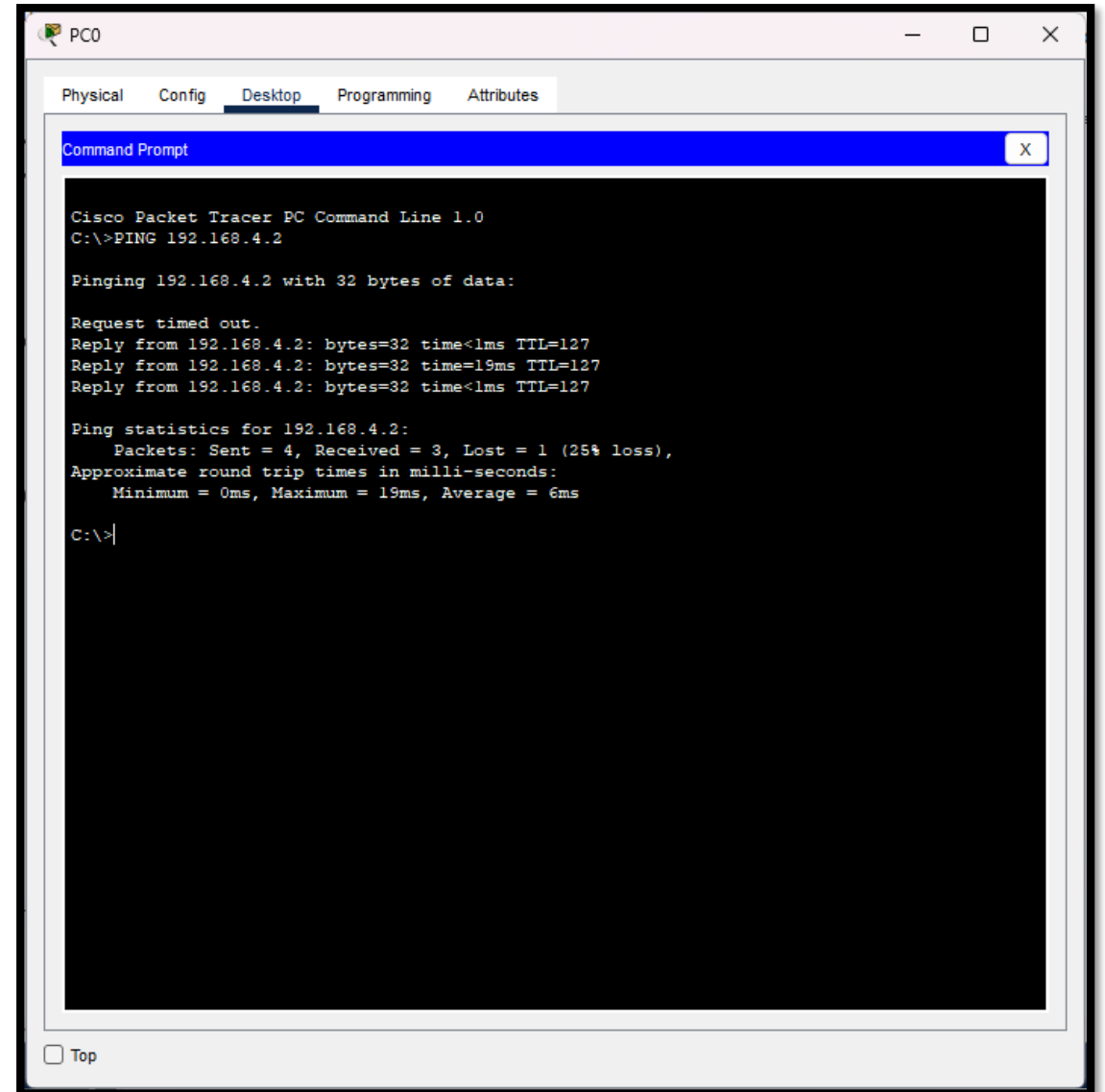


Verify Network Configuration in Cisco Packet Tracer



Checking Network Connectivity Between PCs

Open Command Prompt on any PC.
Use the ping command to test connectivity
Verify communication across different networks.



The screenshot shows a Cisco Packet Tracer PC Command Line window for PC0. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, and a Command Prompt window is open. The Command Prompt shows the following text:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>PING 192.168.4.2

Pinging 192.168.4.2 with 32 bytes of data:

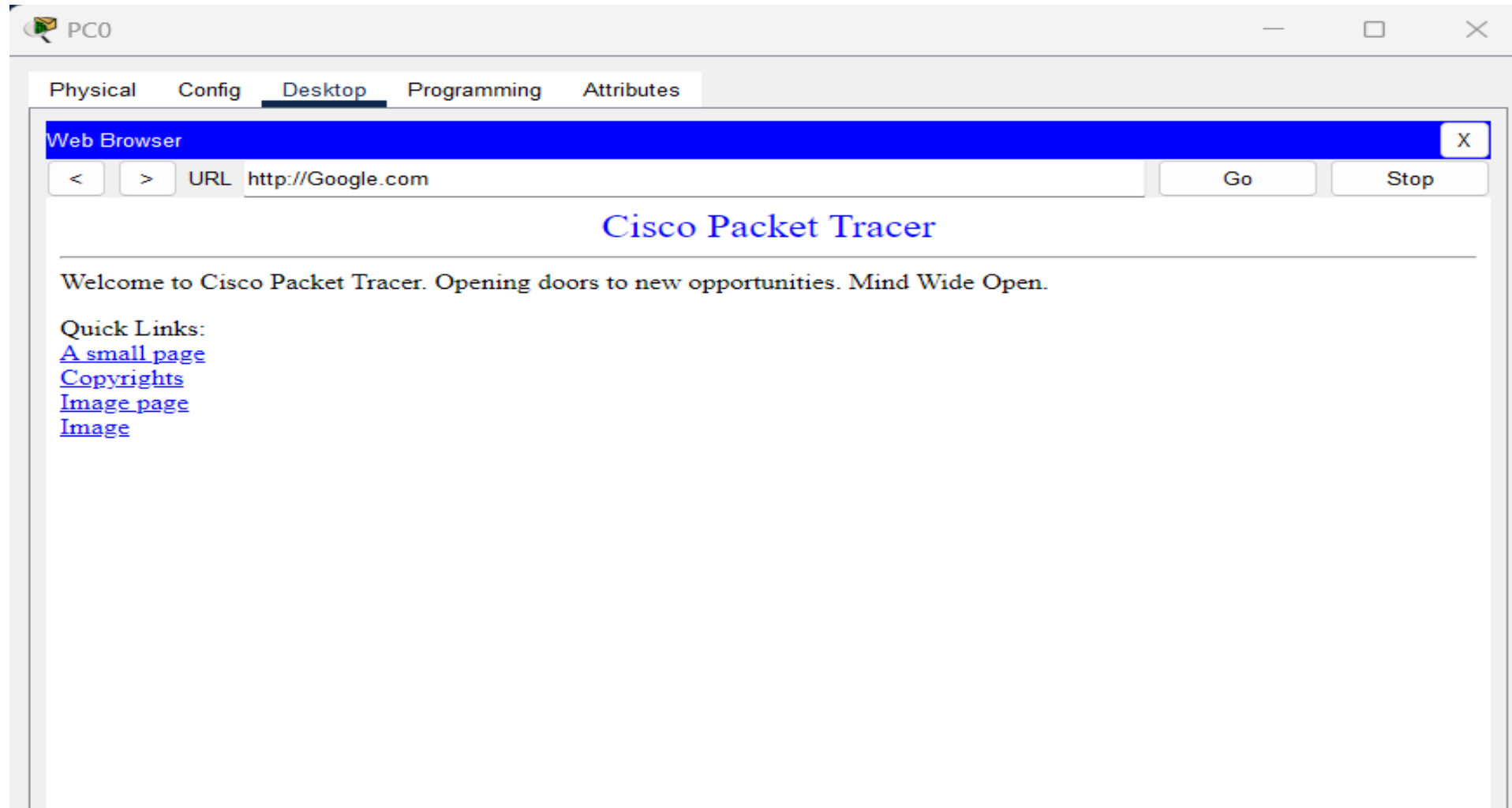
Request timed out.
Reply from 192.168.4.2: bytes=32 time<1ms TTL=127
Reply from 192.168.4.2: bytes=32 time=19ms TTL=127
Reply from 192.168.4.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.4.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 19ms, Average = 6ms

C:\>|
```

At the bottom of the Command Prompt window, there is a checkbox labeled "Top".

Web Services from PC



Conclusion

A small organizational network was set up in Cisco Packet Tracer with four sections, each having its own subnet. The router connected to 4 switches, and IP addresses were assigned to PCs and the server. DNS and HTTP services were configured on the server for domain resolution and web access. Connectivity was verified using the ping command and web browser. This project reinforced networking principles, including configuration, resource sharing, and troubleshooting.

THANK YOU