



Department of Computer Science and Engineering
Islamic University of Technology (IUT)
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Lab Report 01

CSE 4412 : Computer Networks Lab

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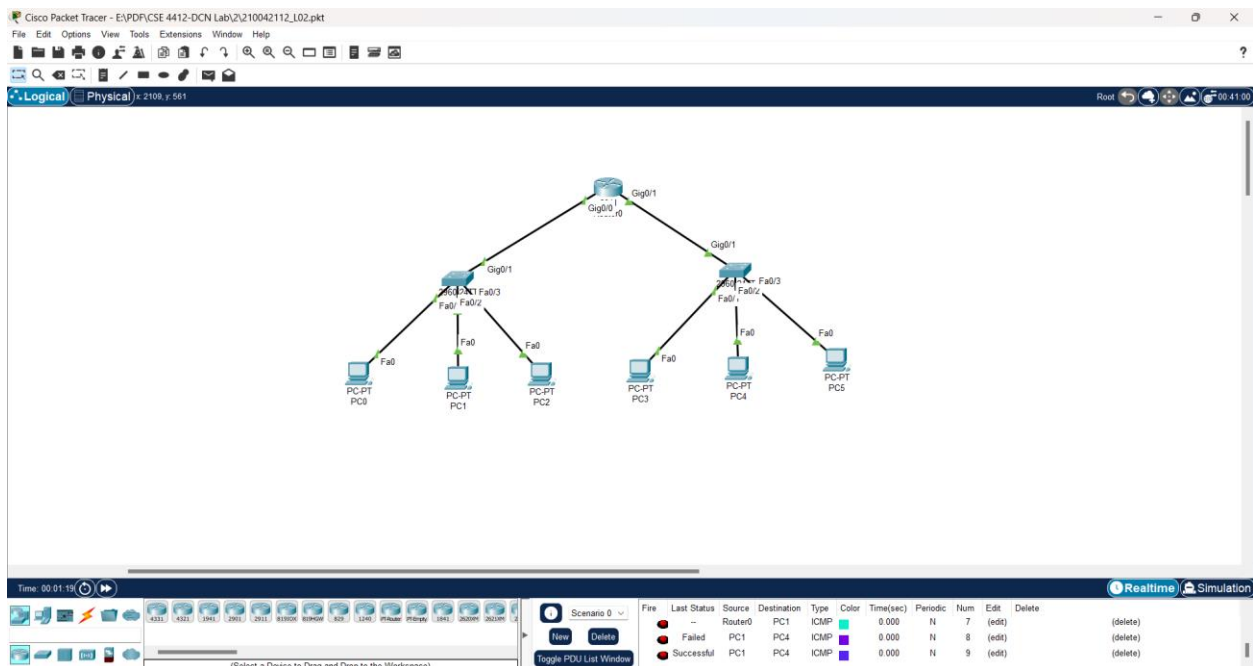
Title: Configure router using static routing to connect multiple networks in Cisco Packet Tracer

Objectives:

1. Understand how to operate Cisco Packet Tracer
2. Learn to create and connect multiple networks using static routing
3. Understand wiring of different network components like router, switch, PC etc.
4. Configure router and switch interfaces
5. Verify connectivity of the network
6. Understand the basics of IP Subnetting
7. Learn to subnet a network following given specifications

Diagram of the experiment:

(Provide screenshot of the final network topology. Make sure to label the network components.)



Working Procedure:

(Explain in brief how you completed the tasks. Provide necessary screenshots of used commands for each task.)

Task1:

I. 1 Router, 2 Switches and 6 PCs in total were needed to create this network topology. 3 of the PCs were connected to 1 switch each with fast ethernet cables and each switch is connected to the router with gigabit ethernet cables. IP address is set for each PC.

II. Changing the hostname for the router-

```
Router>enable
Router#conf t
Router#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname 112
112(config)#
112(config)#exit
112#
%SYS-5-CONFIG_I: Configured from console by console
```

III. Configuring router interfaces-

```
112#
112#conf t
112#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
112(config)#interface gig
112(config)#interface gigabitEthernet 0/0
112(config-if)#ip address 192.168.12.1 255.255.255.0
112(config-if)#no shutdown

112(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
exit
112(config)#interface gig
112(config)#interface gigabitEthernet 0/1
112(config-if)#ip address 192.168.22.1 255.255.255.0
112(config-if)#no shutdown

112(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

112(config-if)#exit
112(config)#
112(config)#exit
112#
%SYS-5-CONFIG_I: Configured from console by console
```

IV. Configuring the IP addresses and the default gateway for the PCs-

For PC0:

The screenshot shows the configuration window for PC0. The 'Desktop' tab is selected, displaying the 'IP Configuration' section. The 'Interface' is set to 'FastEthernet0'. Under 'IP Configuration', 'Static' is selected, and the fields are filled with: IPv4 Address: 192.168.12.10, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.12.1, and DNS Server: 0.0.0.0. The 'IPv6 Configuration' section shows 'Static' selected, with a Link Local Address of FE80::2E0:B0FF:FE1C:3815. The '802.1X' section has 'Use 802.1X Security' unchecked, and 'Authentication' set to MD5. A 'Top' button is at the bottom left.

Section	Field	Value	
IP Configuration	Interface	FastEthernet0	
	Configuration Type	Static	
	IPv4 Address	192.168.12.10	
	Subnet Mask	255.255.255.0	
IP Configuration	Default Gateway	192.168.12.1	
	DNS Server	0.0.0.0	
	IPv6 Configuration		
	Configuration Type	Static	
IPv6 Configuration	IPv6 Address		
	Link Local Address	FE80::2E0:B0FF:FE1C:3815	
	Default Gateway		
	DNS Server		
802.1X	Use 802.1X Security	<input type="checkbox"/>	
	Authentication	MD5	
	Username		
	Password		

For PC1:

PC1

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.12.20

Subnet Mask 255.255.255.0

Default Gateway 192.168.12.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::201:C7FF:FEB7:D8CB

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

For PC2:

PC2

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.12.30

Subnet Mask 255.255.255.0

Default Gateway 192.168.12.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::207:ECFF:FE42:C20E

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

For PC3:

PC3

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.22.10

Subnet Mask 255.255.255.0

Default Gateway 192.168.22.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::260:47FF:FE9E:E179

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

For PC4:

PC4

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

Interface

FastEthernet0

IP Configuration

DHCP

Static

IPv4 Address

192.168.22.20

Subnet Mask

255.255.255.0

Default Gateway

192.168.22.1

DNS Server

0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address

/

Link Local Address

FE80::290:CFF:FE88:676B

Default Gateway

DNS Server

802.1X

Use 802.1X Security

Authentication

MD5

Username

Password

For PC5:

PC5

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.22.30

Subnet Mask 255.255.255.0

Default Gateway 192.168.22.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::201:C9FF:FE96:C4A2

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

IV.

```
PCO
Physical Config Desktop Programming Attributes
Command Prompt
C:\>
C:\>
C:\>ping 192.168.22.10

Pinging 192.168.22.10 with 32 bytes of data:

Reply from 192.168.22.10: bytes=32 time<1ms TTL=127
Reply from 192.168.22.10: bytes=32 time<1ms TTL=127
Reply from 192.168.22.10: bytes=32 time<1ms TTL=127
Reply from 192.168.22.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.22.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.22.20

Pinging 192.168.22.20 with 32 bytes of data:

Reply from 192.168.22.20: bytes=32 time<1ms TTL=127
Reply from 192.168.22.20: bytes=32 time<1ms TTL=127
Reply from 192.168.22.20: bytes=32 time=1ms TTL=127
Reply from 192.168.22.20: bytes=32 time=2ms TTL=127

Ping statistics for 192.168.22.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>ping 192.168.22.30

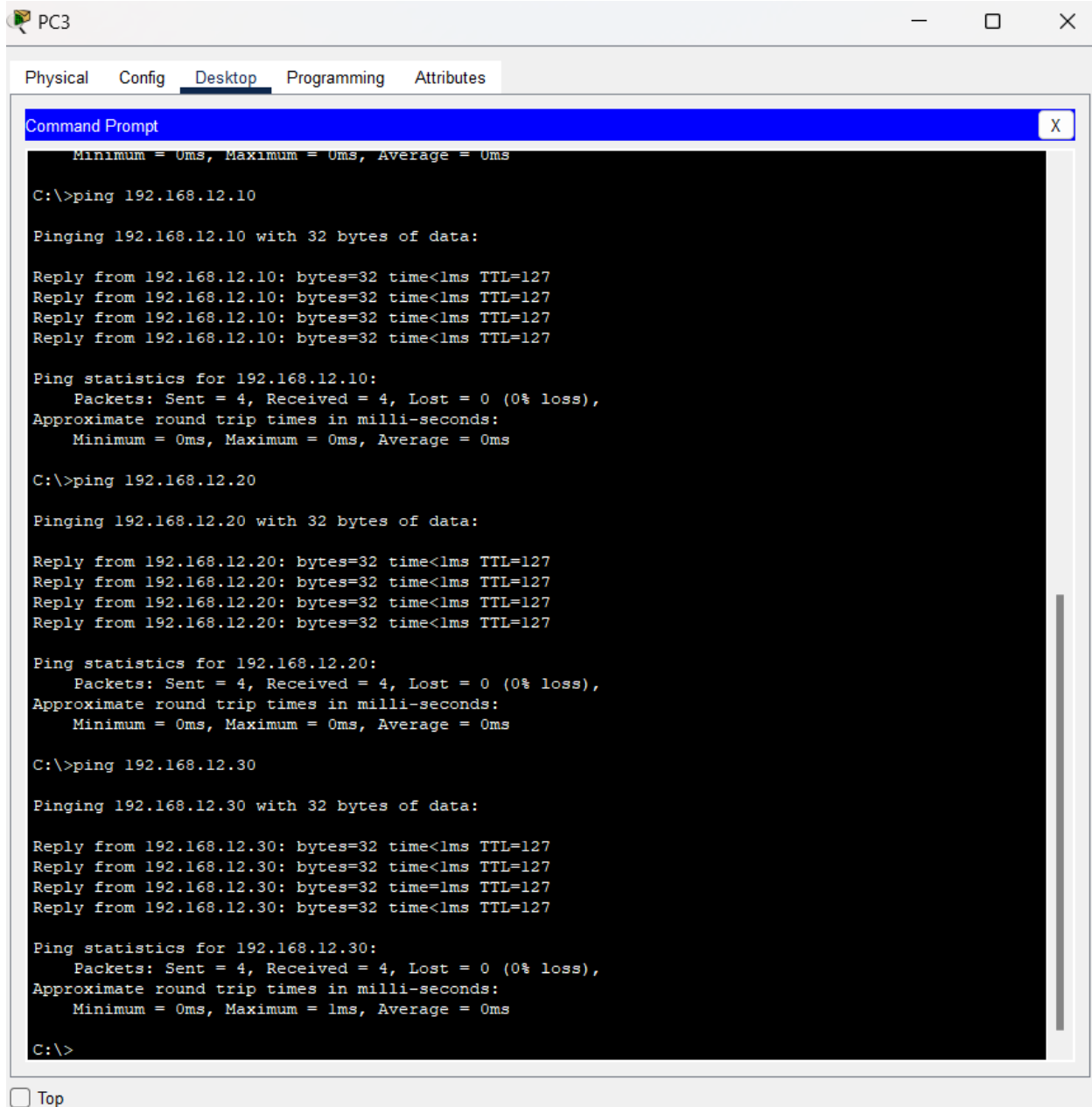
Pinging 192.168.22.30 with 32 bytes of data:

Reply from 192.168.22.30: bytes=32 time<1ms TTL=127
Reply from 192.168.22.30: bytes=32 time=1ms TTL=127
Reply from 192.168.22.30: bytes=32 time=1ms TTL=127
Reply from 192.168.22.30: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.22.30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>|
```

☐ Top



The screenshot shows a PC3 window with a menu bar (Physical, Config, Desktop, Programming, Attributes) and a Command Prompt window. The Command Prompt displays the following text:

```
Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.12.10

Pinging 192.168.12.10 with 32 bytes of data:

Reply from 192.168.12.10: bytes=32 time<1ms TTL=127
Reply from 192.168.12.10: bytes=32 time<1ms TTL=127
Reply from 192.168.12.10: bytes=32 time<1ms TTL=127
Reply from 192.168.12.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.12.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.12.20

Pinging 192.168.12.20 with 32 bytes of data:

Reply from 192.168.12.20: bytes=32 time<1ms TTL=127
Reply from 192.168.12.20: bytes=32 time<1ms TTL=127
Reply from 192.168.12.20: bytes=32 time<1ms TTL=127
Reply from 192.168.12.20: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.12.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.12.30

Pinging 192.168.12.30 with 32 bytes of data:

Reply from 192.168.12.30: bytes=32 time<1ms TTL=127
Reply from 192.168.12.30: bytes=32 time<1ms TTL=127
Reply from 192.168.12.30: bytes=32 time<1ms TTL=127
Reply from 192.168.12.30: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.12.30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

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

Questions (Answer to the point):

Q1. Write the command to check the status of all interfaces in a router.

Ans: show IP interface brief

Q2. Why do we use switches and not hubs?

Ans: Switches can operate at full duplex or half duplex, using all available bandwidth, creating faster and more efficient networks. Hubs operate at half duplex, making them slower and forcing devices to share bandwidth equally.

Q3. How do you make all the configuration changes in a cisco device persistent? What would happen if you don't do this?

Ans: Use the **copy running-config startup-config** command.

This command stores the new configuration in flash memory and loads it if the switch is restarted. If this is not done then all the saved changes will be lost once it's restarted.

Q4. What are the interfaces of the router? Why are they necessary?

Ans: Router interfaces include Ethernet, Serial, FastEthernet, GigabitEthernet, etc. They connect the router to different network segments and enable the router to forward data packets between the connected networks.

Q5. Why is default gateway necessary?

Ans: Without a default gateway, a computer can't communicate with devices on other networks, including the internet. For example, if a computer requests a web page, the request goes through the default gateway before leaving the local network to reach the internet

Challenges (if any):

In this lab, it was confusing to understand all the steps and how they correlate to each other. Also, the logic behind assigning the IP addresses and the default gateways were hard to understand at first.