Department of Computer Science and Engineering

Islamic University of Technology (IUT)

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Lab Report 01

CSE 4512 : Computer Networks Lab

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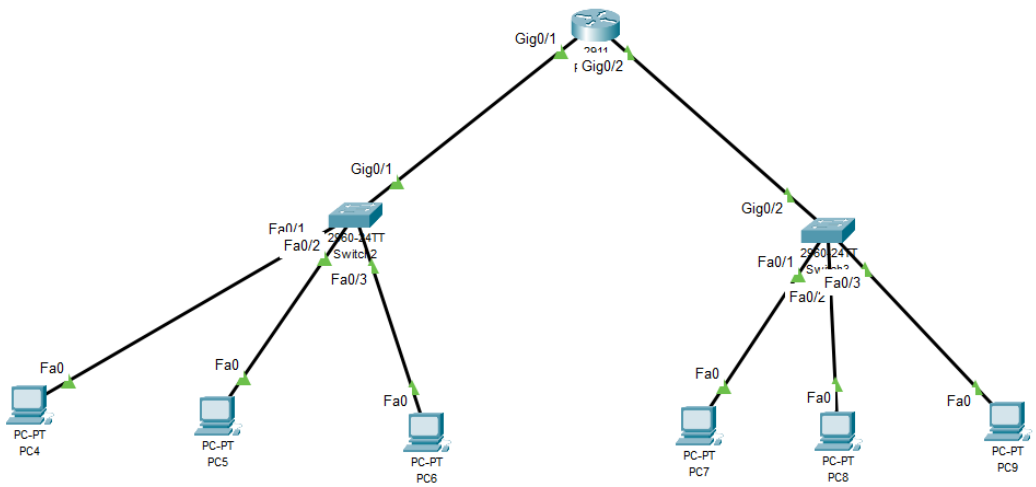
Title: Configure router using static routing to connect multiple networks in Cisco Packet Tracer

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.)

1. Access CLI of Router: -
-Access the CLI (Command Line Interface) of the router in Cisco Packet Tracer.

2. Enter Global Configuration Mode: -

-Type `**enable**` to enter privileged mode.

- Type `**configure terminal**` to enter global configuration mode.

3. Configure GigabitEthernet 0/1 Interface: -

-Type `**interface GigabitEthernet 0/1**` to enter interface configuration mode.
- Type `**ip address 192.168.45.1 255.255.255.0**` to set the IP address and subnet mask.
- Type `**no shutdown**` to enable the interface.
- Type `**exit**` to exit the interface configuration mode.

4. Configure GigabitEthernet 0/2 Interface: -

-Type `**interface GigabitEthernet 0/2**` to enter interface configuration mode.
- Type `**ip address 192.168.55.1 255.255.255.0**` to set the IP address and subnet mask.
- Type `**no shutdown**` to enable the interface.
- Type `**exit**` to exit the interface configuration mode.

5. Configure GigabitEthernet 0/2 Interface: -

-Type `**interface GigabitEthernet 0/2**` to enter interface configuration mode.
- Type `**ip address 192.168.55.1 255.255.255.0**` to set the IP address and subnet mask.
- Type `**no shutdown**` to enable the interface.
- Type `**exit**` to exit the interface configuration mode.

6. Change HostName: -
- Type `**hostname 145**` to change the hostname to '**145**'. .

7. Save Configuration:
- Type `copy running-config startup-config` to save the configuration.

Configure PCs and Verify Connectivity ⟹

1. **Configure PC IP Address and Default Gateway**:

-Go to **ip configuration** of each pc and set their **IP address** and **default gateway**.

2. Check Interface Status: -

-In router CLI, use commands such as `show interfaces` to check the status of configured interfaces.

- Ensure all interfaces are in an 'up' state.

3. Verify Connectivity: - Use the `ping` command from each PC to check if it can reach the router's interfaces.

For example:-

-Go to **Command Prompt** of **PC4** which has **IP address:- 192.168.45.2** , now try to ***ping*** **PC7** which has **ip address:- 192.168.55.2**.

```
C:\>ping 192.168.55.2

Pinging 192.168.55.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.55.2: bytes=32 time<1ms TTL=127
Reply from 192.168.55.2: bytes=32 time<1ms TTL=127
Reply from 192.168.55.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.55.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

The first packet was lost to find the path to PC7.

Questions (Answer to the point):

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

Ans: 145# show ip interface brief

Q2. Why do we use switches and not hubs?

Ans:

1. Collision and Broadcast Domains:

- Switches create separate collision domains for each port, reducing collisions.
- Hubs have a single collision domain, leading to potential collisions.

2. Segmentation and Isolation:

- Switches segment networks into isolated collision domains for better performance.
- Hubs lack segmentation, causing decreased performance with more devices.

3. Full-Duplex Operation:
- Switches support simultaneous data transmission and reception (full-duplex).
- Hubs typically operate in half-duplex mode, limiting efficiency.

4. Intelligent Forwarding:
- Switches use MAC addresses to forward data selectively.
- Hubs broadcast data to all devices, causing unnecessary traffic.

5. Bandwidth Efficiency:
- Switches support higher bandwidths due to independent port operation.
- Hubs share bandwidth among devices, resulting in slower speeds.

Q3. How do you make all the configuration changes in a cisco device persistent? What would happen if you don't do this?
Ans: To make configuration changes persistent in a Cisco device,
use: ***copy running-config startup-config***

Consequences of not saving:

-Loss of changes on reboot.
-Reversion to the last saved configuration.
-Inconsistency in network settings.
-Operational disruptions may occur.
-Security implications due to lost changes

Q4. What are the interfaces of the router? Why are they necessary?
Ans:
Router Interfaces:
- Types: Include Ethernet (FastEthernet, GigabitEthernet), Serial, and VLAN interfaces.
– Functions: Facilitate connectivity, routing, and segmentation in a network.
- Significance: Physically or logically separate networks, allowing diverse connection types and VLAN segmentation.
- Linkage: Connect to devices like switches, forming the network infrastructure backbone.
- IP Assignment: Each interface has an assigned IP address for identification and communication.
- Routing Protocols: Operate on interfaces for dynamic routing decisions.

Importance: Router interfaces are essential for connecting, routing data, and segmenting networks. They play a key role in managing data flow, ensuring efficient network functionality.

Q5. Why is default gateway necessary?
Ans:
- Exit Point for External Traffic:
- The default gateway is the exit point for traffic leaving a local network.
- Routing Decisions:
- Devices use the default gateway to reach destinations outside their local network.
- Internet Access:
- Essential for accessing resources on the internet.
- Centralized Routing:
- Simplifies routing decisions by providing a single exit point for outgoing traffic.
- Identification:
- The default gateway, often a router's IP address, serves as the gateway to other networks

Challenges (if any):

Didn’t face any yet! ☺