🚀 Lecture 7 – Cisco Packet Tracer Overview

Cisco Packet Tracer is a **network simulation software** used to design, configure, test, and troubleshoot networks without physical devices.

It allows students and engineers to practice networking skills using **virtual routers, switches, PCs, cables, servers, firewalls**, etc.

🟦 1. How to Download Cisco Packet Tracer

1. Go to the official **Cisco Networking Academy (NetAcad)** website.
2. Create a free account / login.
3. Go to "Resources → Download Packet Tracer".
4. Download for Windows/Mac/Linux.
5. Install and login to start using it.

👉 **Reason:** NetAcad provides the latest stable version only to registered users.

🟦 2. LAN Ports Types

LAN ports are used to connect devices like PCs, switches, routers.

Port Type	Speed	Meaning
Ethernet (Eth)	10 Mbps	Old, very slow
Fast Ethernet (Fa)	100 Mbps	Common in old networks
Gigabit Ethernet (Gig)	1000 Mbps (1 Gbps)	Standard in modern networks
10 Gig Ethernet	10,000 Mbps (10 Gbps)	Used in data centers

✓ Why different speeds?

- High-traffic networks need faster ports
- Servers and routers use Gig & 10-Gig
- Home PCs commonly use Gigabit ports

✓ **Daily life example:**

Your home WiFi router likely has **4 LAN Gigabit ports** for connecting PC, smart TV, or camera.

🟦 3. Console Port

A **console port** is used to access a router or switch locally for configuration.

- You connect a **console cable** to the device
- Use applications like **PuTTY, TeraTerm, SecureCRT**
- It gives CLI access to configure the device even if network is down

✓ **Why needed?**

If router has no IP or you forgot the password → console is the only way to enter the device.

✓ **Real life:**

When a new router arrives at a company, the engineer configures it using the **console port** first.

🟦 4. Using Cisco Packet Tracer (Step by Step)

Step 1: Add Devices

Left side → bottom → "Devices" section
Go to “Network Devices” → select the round icon = **Router**

Example commonly used: **Cisco 2911 Router**

Drag it to the workspace.

Step 2: Opening Router CLI

Double-click router →
Go to **CLI tab**

When CLI opens, it asks:

Would you like to enter the initial configuration dialog? [yes/no]:

Choose **NO**

Reason:
Initial configuration dialog automatically sets unnecessary default settings.
We need manual configuration in networking labs.

Press ENTER → ENTER → You reach:

Router>

This is **User Execution Mode**.

🟦 5. Basic Router Commands (Initial)

✓ enable or en

Moves you to **Privileged EXEC Mode**

Prompt changes:
Router> → Router#

✓ exit

Takes you one level back (to User mode).

✓ ?

Shows available commands.
Very useful for learning commands quickly.

🟦 6. Important Show Commands

✓ show flash

Displays:

- System files
- Flash memory
- IOS (Internetwork Operating System) stored in flash

Flash = similar to “Hard Disk” of router.

✓ show startup-config

Shows router configuration stored in **NVRAM**.

If blank (on new router), it shows:

startup-config not present

✓ show running-config

Shows current live configuration from **RAM**.

This displays:

- VLAN information
- Interface settings
- Routing protocols
- Hostname
- Passwords
- IP addresses

✓ show version

Shows:

- IOS version
- System up-time
- Device model
- Serial number

Useful when you need to check software compatibility.

✓ show environment

Shows:

- Fan speed
- Fan direction
- Temperature
- Power supply status

This is used for **hardware troubleshooting**.

✓ show ip interface brief

Displays:

- All interfaces
- Assigned IP address
- Status (up/down)

Reason:
Easy way to check if interfaces are enabled.

🟦 7. Router Interface Shutdown Concept

All router interfaces (Ethernet, Serial) are **shutdown by default**.

To turn on:

conf t

interface gigabitEthernet 0/0

no shutdown

Reason:
To prevent automatically connecting to networks before configuration is complete.

🟦 8. Saving Configuration

✓ Save running config to startup config:

copy running-config startup-config

Shortcut:

do write

Reason:
So that config is not lost when router restarts.

🟦 9. Restarting Router

Command:

reload

Before reload:
Save VLAN database in NVRAM because VLAN.dat is stored on flash.

🟦 10. Default Gateway Concept

On PCs, the **default gateway = router's IP address**.

Reason:
Default gateway lets a machine send packets outside its own network.

✓ Real life example:

Your home PC uses something like:

- IP: 192.168.1.20
- Gateway: 192.168.1.1

192.168.1.1 is your WiFi router → it forwards your traffic to the internet.

🟦 11. Modes of a Cisco Router

Routers operate in **3 main modes**:

1️⃣ User EXEC Mode

Symbol: >
Example:
Router>

Features:

- Basic commands
- Cannot configure device
- Used for monitoring & basic troubleshooting

Common commands:

ping

traceroute

ssh

telnet

2️⃣ Privileged EXEC Mode

Symbol: #
Example:
Router#

How to enter:

enable

Features:

- Can run all show commands
- Can view the full router configuration
- Cannot make major configuration changes

3️⃣ Global Configuration Mode

Example:
Router(config)#

How to enter:

configure terminal

or

conf t

Features:

- Used for major configurations like:
    - Setting hostname
    - Setting passwords
    - Configuring interfaces
    - Assigning IP addresses
    - Enabling routing protocols

🟦 12. Real Life Example of Modes

Imagine you are the network engineer:

User EXEC Mode

You check if the router is online using **ping**.

Privileged Mode

You check the configuration using **show** commands.

Global Configuration Mode

You configure:

- IP addresses
- Routing protocols
- VLANs
- Security passwords

🟩 FINAL SUMMARY (For Quick Revision)

✓ Packet Tracer = Network Simulation Tool

✓ LAN ports = Eth, FastEth, GigEth, 10Gig

✓ Console port used for accessing router locally

✓ Show commands = check configs, flash, version, environment

✓ Interfaces = shutdown by default

✓ Save config → copy run start

✓ Reload router → reload

✓ 3 Modes → User, Privileged, Global