



Exp-1: Basic Configuration of Cisco Packet Tracer, Static Routing

Military Institute of Science and Technology **Department of CSE** **CSE-310 (Networking Sessional)**

Router:

A router is an electronic device and/or software that connect at least two networks and forwards packets among them according to the information in the packet headers and routing tables. Routers perform the traffic directing functions on the Internet. A data packet is typically forwarded from one router to another router through the networks that constitute an internetwork until it reaches its destination node.

A network consists of two or more computers, and typically other devices as well (such as printers and external hard drives), that are linked together so that they can communicate with each other and thereby share files and the devices. Examples of the networks connected by a router can be two LANs (local area networks) or WANs (wide area networks) or a LAN and its ISP's (Internet service provider's) network.

Routing, which is the moving of packets across networks using the most appropriate paths, occurs at the **network layer** of the OSI seven-layer model.

Three-types of Port:

1. Console port
2. Auxiliary port
3. vty port

Console port: Every Cisco **router** or a switch has a **console port** (also known as the management **port**) on its back side. A special type of cable, known as roll over cable is used to connect the **Serial/COM port** of the computer to the **router** or switch **console port**

Auxiliary port: **Auxiliary (AUX)** inputs are simple audio connections that look like headphone sockets. Paired with an **AUX-IN** cable they will allow you to **input** sound from any media device with a normal headphone socket. They are one of the easiest ways to play music, audiobooks or podcasts in your car.

VTY port: **VTY** ports are virtual TTY ports, used to Telnet or SSH into the router over the network. You can use them to connect to the router to make configuration changes or check the status. Most routers have five **VTY** ports, numbered 0 to 4.

WIC-2T: The dual-serial port WAN interface cards (WICs)

NM-ESW-161: One 16-port EtherSwitch Network Module



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Two-types of mode:

1. Monitoring mode [**Router#**]
2. Configuration mode [**Router(config)#**]

Switch:

A switch is used in a **wired** network to connect Ethernet cables from a number of devices together. The switch allows each device to talk to the others. A **network switch** (also called **switching hub**, **bridging hub**, officially **MAC bridge**) is a computer networking device that connects devices together on a computer network by using packet switching to receive, process, and forward data to the destination device.

Switch vs Router:

Switches create a network.

Switch Layer: Data Link Layer.

Routers connect networks.

Router Layer: Network Layer (Layer 3 devices)

Connections:

- **Copper Straight through:** Connect different standard device.
Example: Router-Switch, PC-Switch [slot/port numbers (f0/0)]
- **Copper Crossover:** Connect same standard device.
Example: PC-PC, Router-Router. [slot/port numbers (f0/0)]
- **Serial Connection:** Mainly used for long distance connection.
Example: Router-Router [card/slot/port numbers (Serial 0/0/0)]

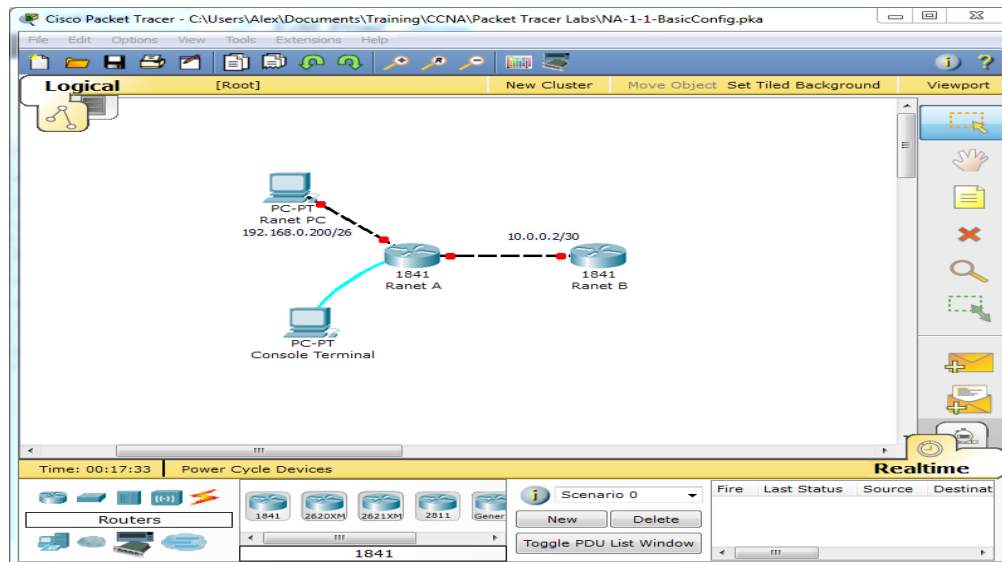
DTE vs. DCE:

DTE stands for Data Terminal Equipment, and DCE stands for Data Communications Equipment. DTE is typically either a dumb terminal or the serial port on a computer/workstation. DCE is typically a modem, DSU/CSU, or other piece of data communications equipment, hence the names. The most important difference between these types of devices is that the DCE device supplies the clock signal that paces the communications on the bus.



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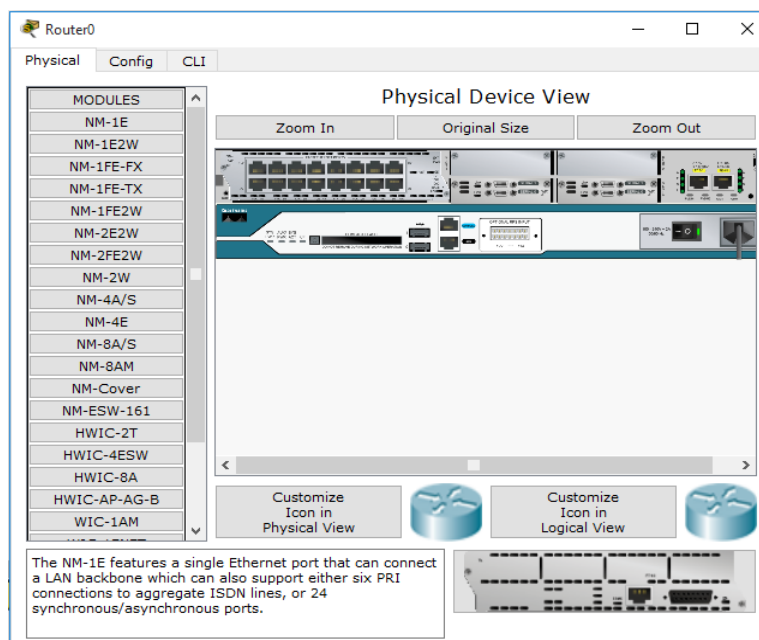
1st Network



❖ Double Click on a Router then we can see three Tab:

1. Physical
2. Config
3. CLI (Command Line Interface)

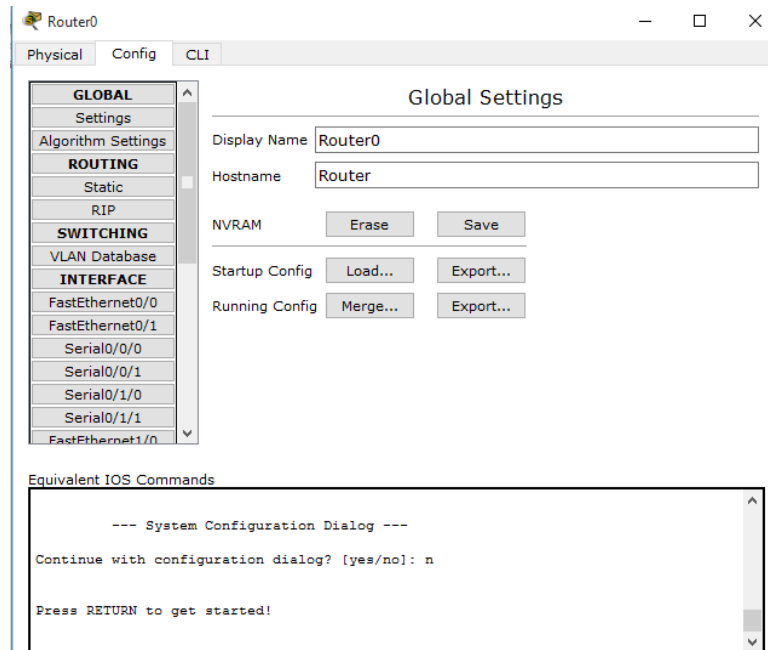
➤ In “Physical” Tab there are physical views of the router. Here we can customize the Router.



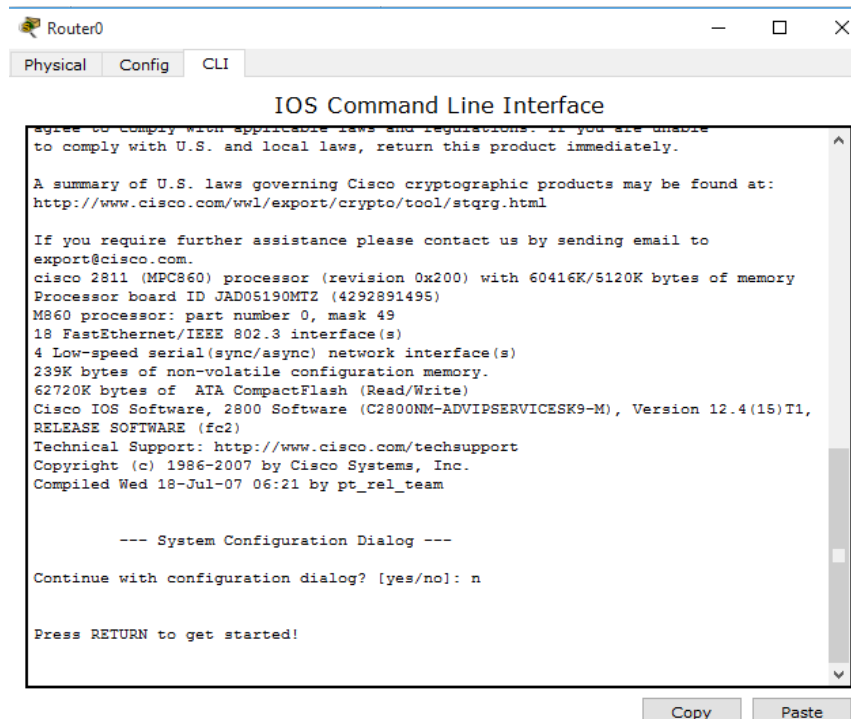


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- In “Config” Tab we can configure the FastEthernet and Serial Connections manually.



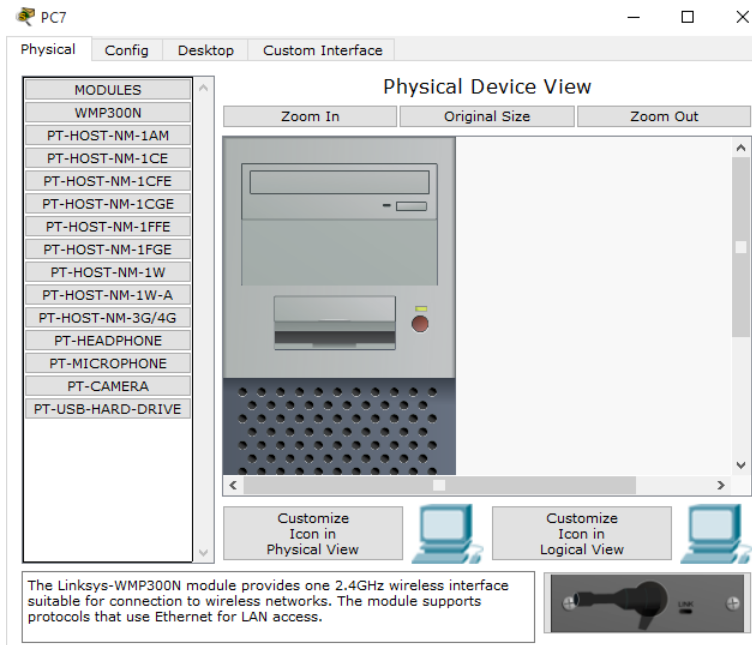
- From “CLI” (Command Line Interface) Tab we can configure the FastEthernet and Serial Connections using some commands.



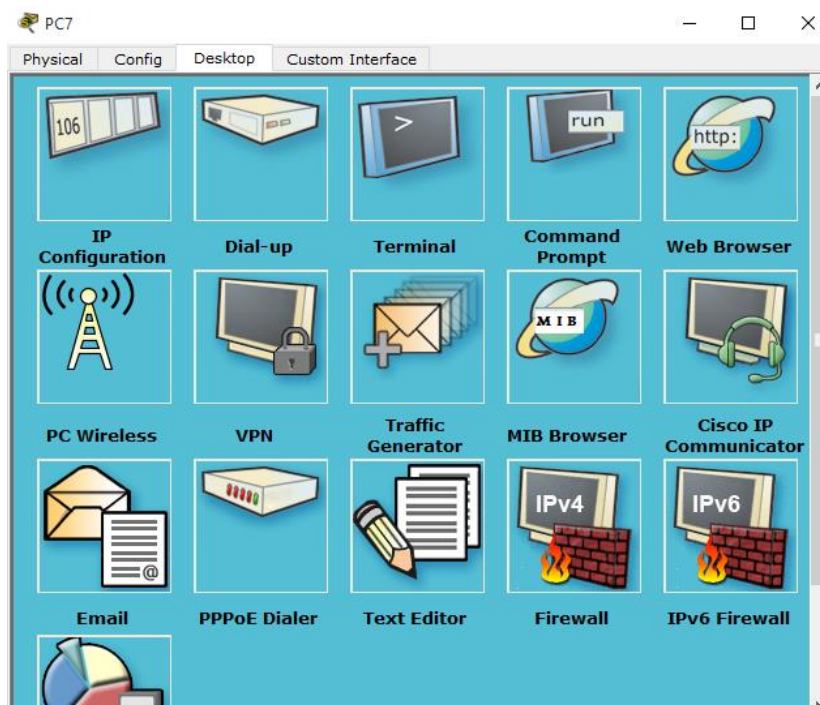


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- ❖ Double Click on a “PC” then we can see the following Tabs:



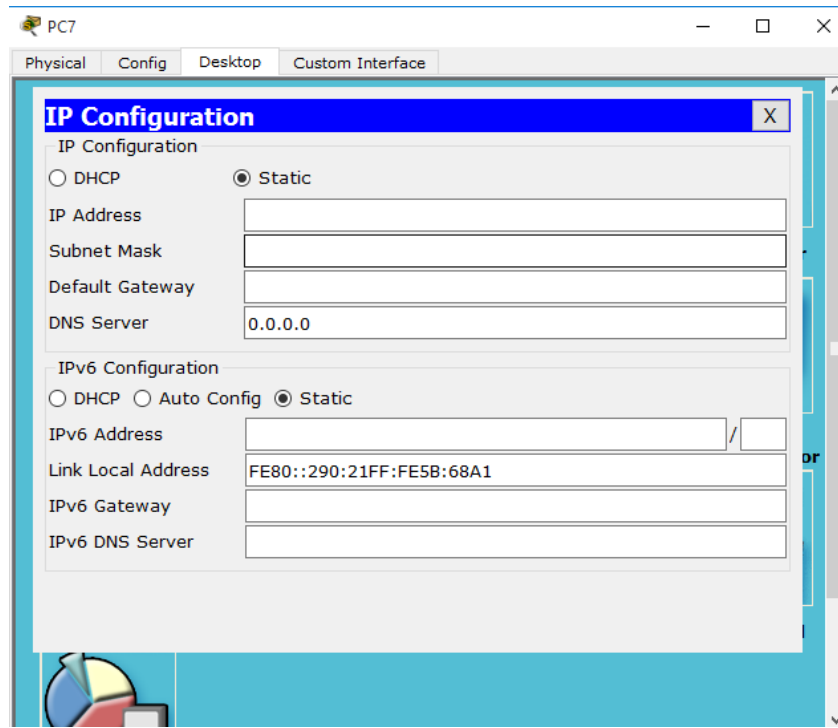
- From “Desktop” Tab we can see the following.



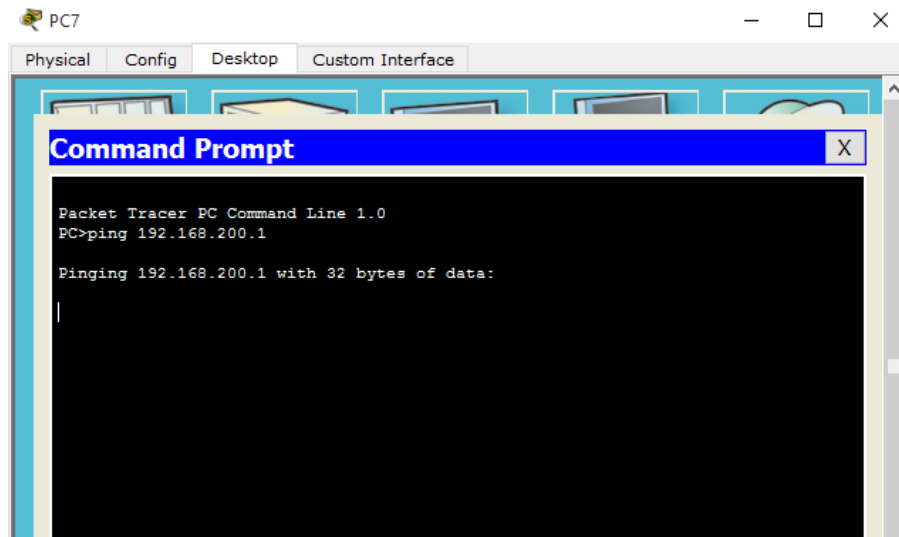


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- Here from “IP Configuration” we can set the IP address, subnet Mask, Default Gateway. We can configure the IPs either statically or dynamically.

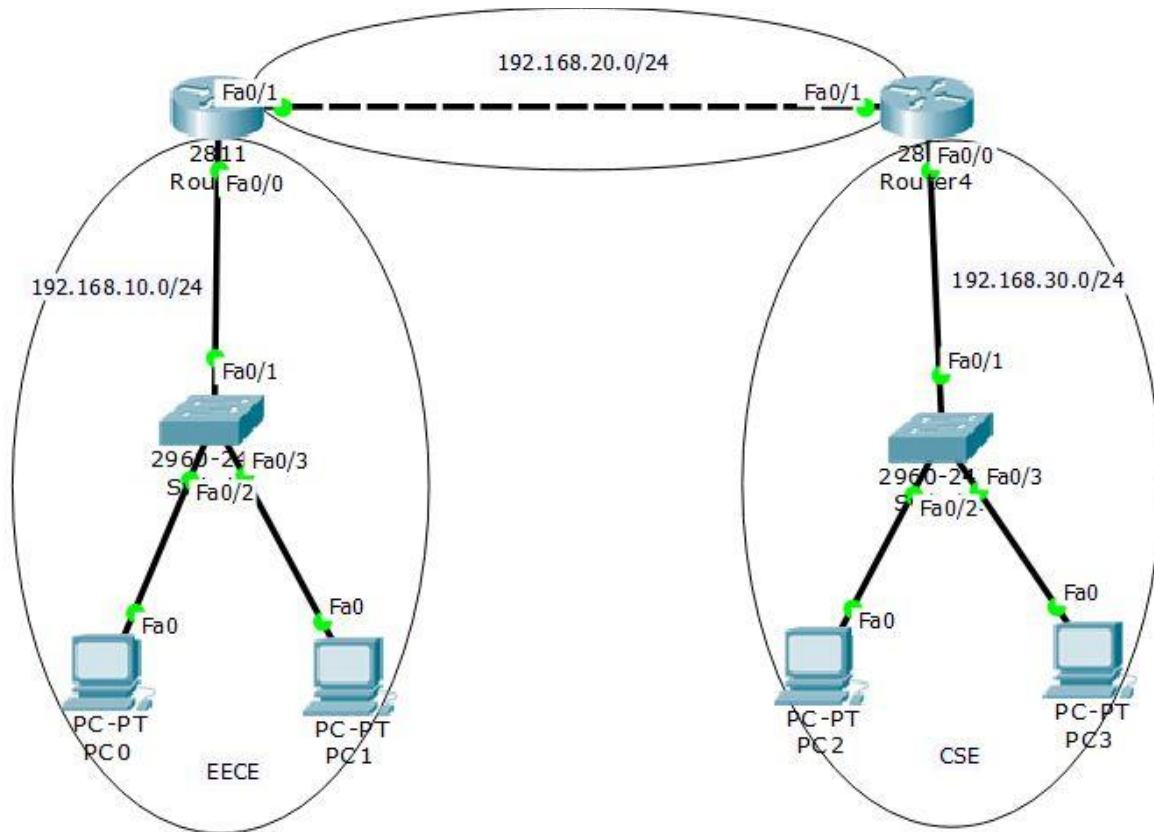


- From “Command Prompt” we can ping the other PCs.





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Configure Router1:

Rename and set password to router (optional):

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname EECE
EECE(config)#line con 0
EECE(config-line)#pass eece
EECE(config-line)#login
EECE(config-line)#exit
EECE(config)#exit
```

Delete Password:

```
R1(config)#line con 0
R1(config-if)#no password
R1(config-if)#exit
```



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Router1 configuration commands (after necessary connections....)

```
EECE>enable
EECE#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
EECE(config)#int f0/0
EECE(config-if)#ip address 192.168.10.1 255.255.255.0
EECE(config-if)#no shutdown
EECE(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
EECE(config-if)#exit
EECE(config)#int f0/1
EECE(config-if)#ip address 192.168.20.1 255.255.255.0
EECE(config-if)#no shutdown
EECE(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
EECE(config-if)#exit
EECE(config)#
```

Router2 configuration commands

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int f0/0
Router(config-if)#ip address 192.168.30.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#int f0/1
Router(config-if)#ip address 192.168.20.2 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#
```




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Static routing:

Static routing is very secure routing from all other routing. But you should know why it's different from dynamic routing, it's because in dynamic routing packet chooses best path to reach the destination and it changes if there is any convergence in network. But in static admin have to manually configure it, means admin packet will go from which gateway to reach the destination. Static routing is feasible because maintaining routing table is full time job. In small network, you can easily set up static routing.

Router1:

```
EECE(config)#ip route 192.168.30.0 255.255.255.0 192.168.20.2  
EECE(config)#do copy running-config startup-config
```

Router2:

```
Router(config)#ip route 192.168.10.0 255.255.255.0 192.168.20.1  
Router(config)#do copy running-config startup-config
```