



**BITS Pilani**  
Dubai Campus

# Router Configuration and Static Routing

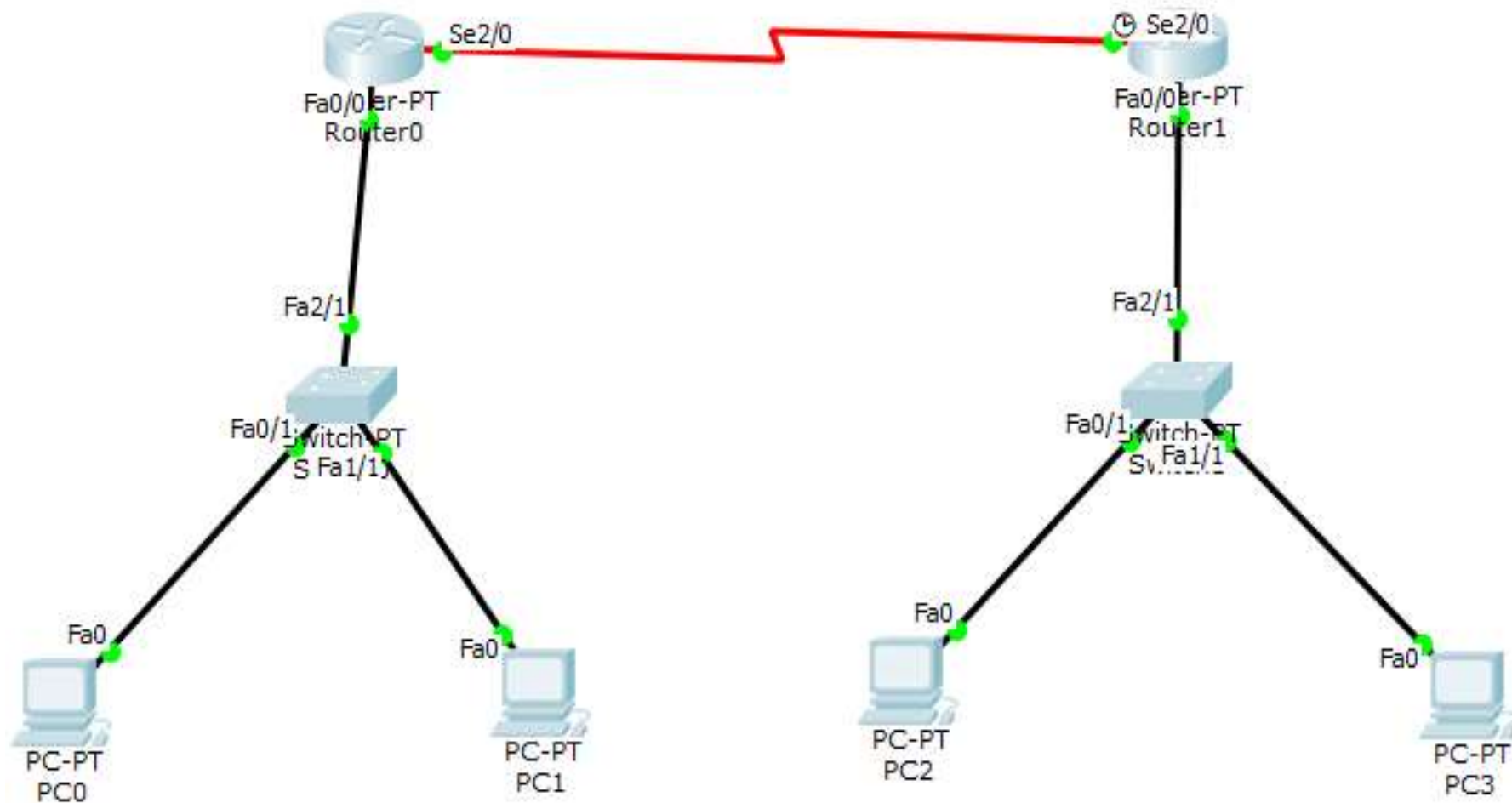
## CS F303

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- Packet Tracer is a program used to illustrate how computer networks work.
- Packet Tracer has two different views
  - Logical Workspace
  - Physical Workspace
- Packet Tracer also has two modes of operation
  - Realtime Mode
  - Simulation Mode

# Topology



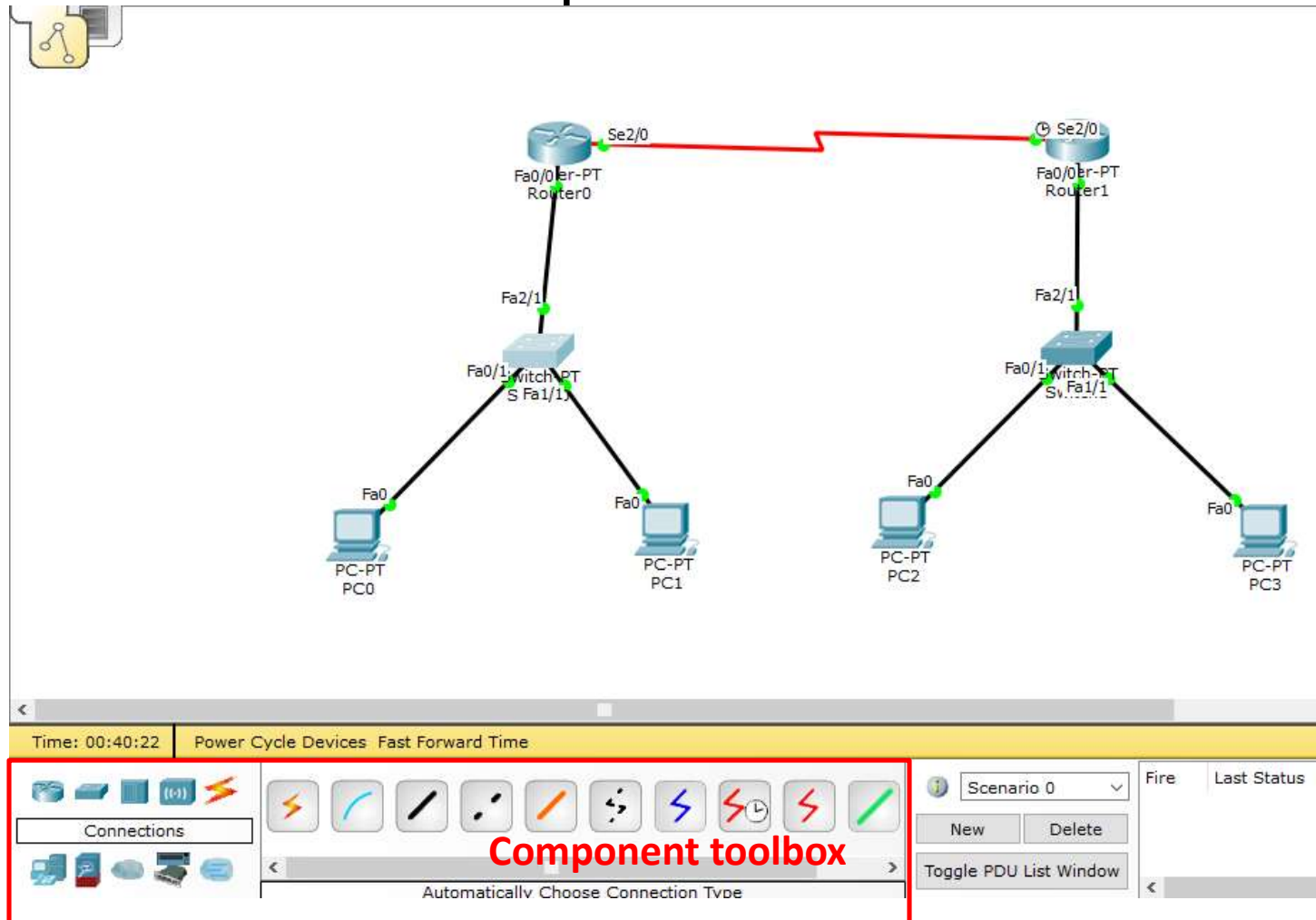
# Create Network

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- Drag and drop the required components from the Packet Tracer component toolbox



# Assign addresses to Connections

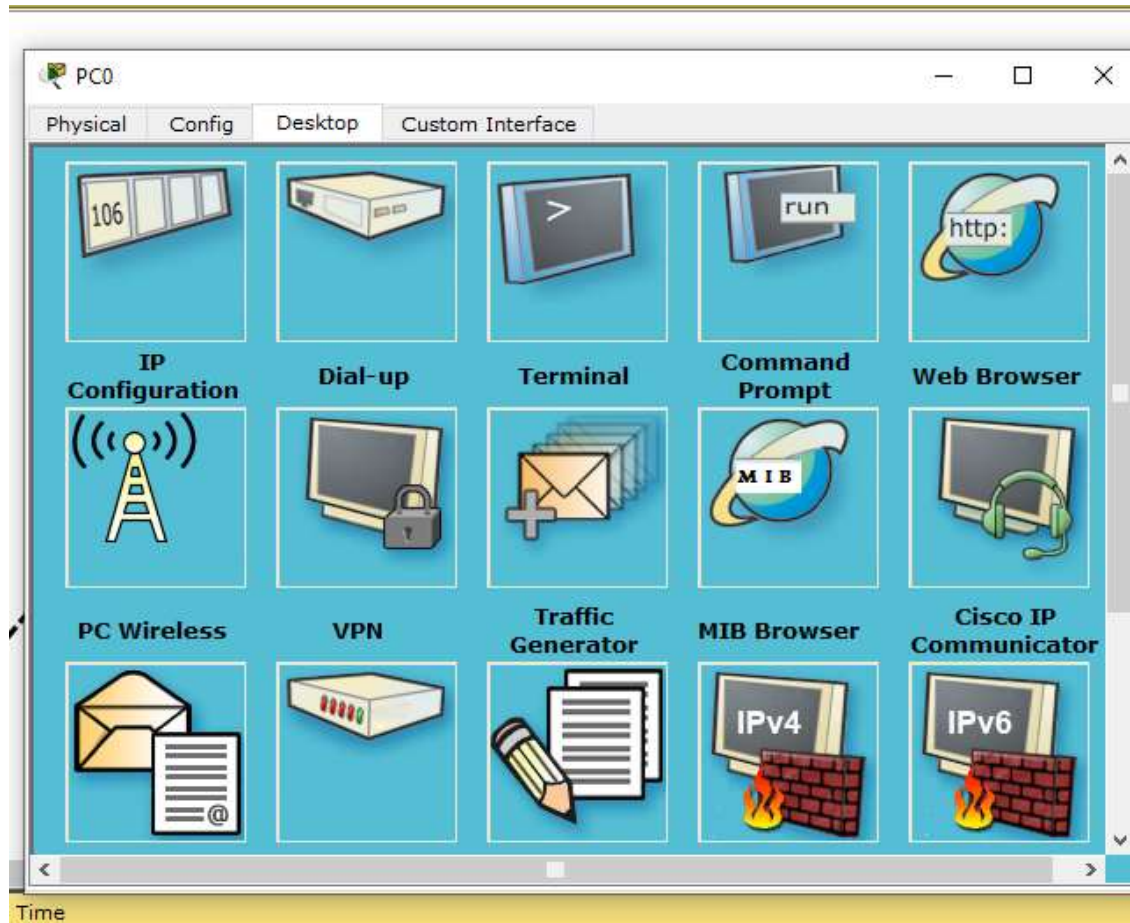


Device	Connected from	Connected to	IP Address
PC0	FastEthernet 0	Switch0 FastEthernet 0/1	10.0.0.2
PC1	FastEthernet 0	Switch0 FastEthernet 1/1	10.0.0.3
Router0 (Gateway)	Switch0 FastEthernet 2/1	Router0's FastEthernet 0/1	10.0.0.1
Router0	Serial 2/0	Router1's Serial 2/0	192.168.0.253
Router1	Serial 2/0	Router0's Serial 2/0	192.168.0.254
Router1 (Gateway)	Switch1 FastEthernet 2/1	Router1's FastEthernet 0/1	20.0.0.1
PC2	FastEthernet 0	Switch1 FastEthernet 0/1	20.0.0.2
PC3	FastEthernet 0	Switch1 FastEthernet 1/1	20.0.0.3

# Assign IP Address PC (1)



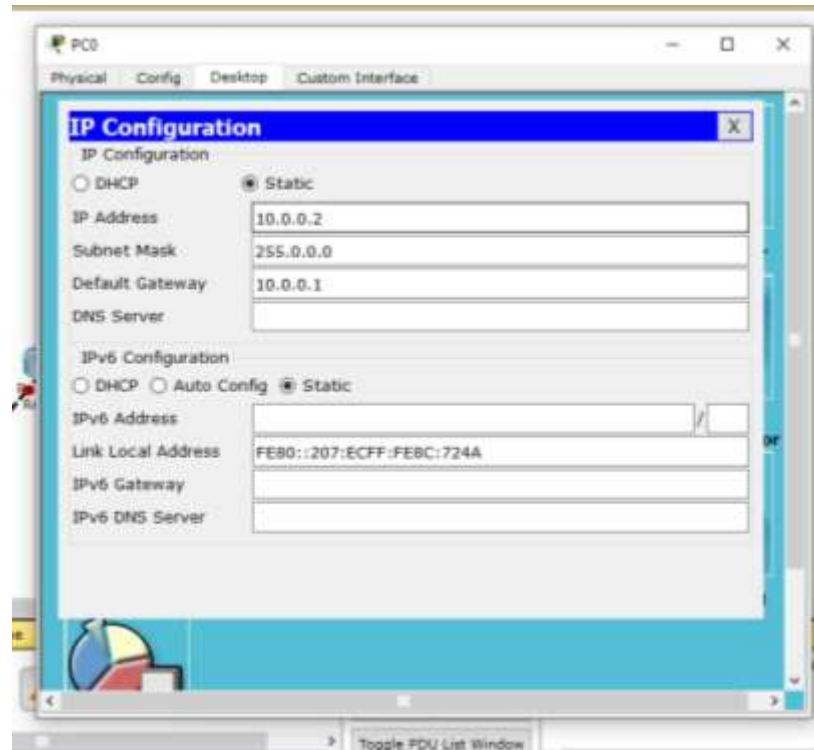
- Assign IP address to PC0.
  - Step 1: Click on PC0, we will get following window.



# Assign IP Address PC (2)



- Assign IP address to PC0.
  - Step 2: Click on IP configuration and set the IP address, subnet mask and gateway address.

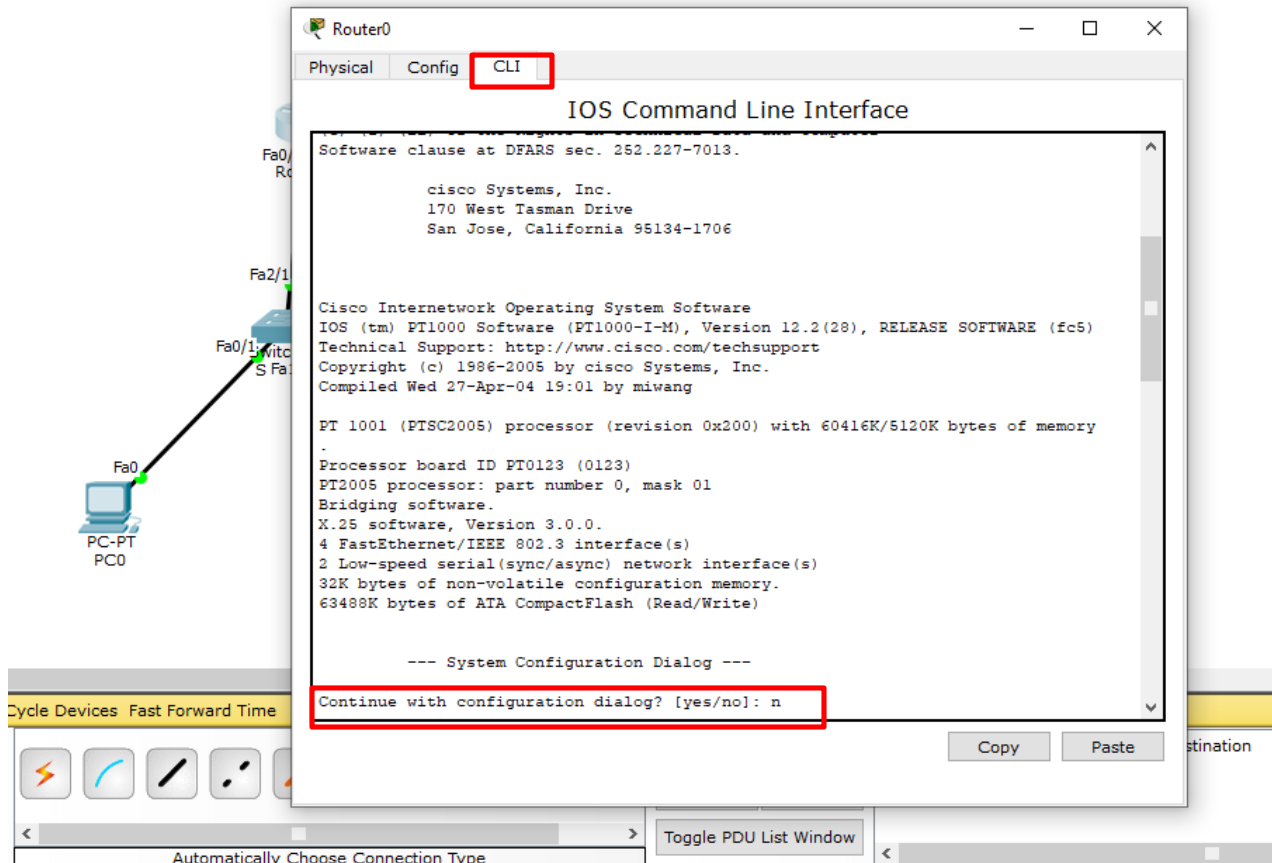


- Assign IP address to PC1, PC2, and PC3 in same way.

# Configuring Router 0 (1)



- Step1: Double click Router0 and click CLI and press Enter key to access the command prompt of Router0.



- Press N in **Continue with configuration dialog? [yes/no]:**



# Configuring Router (2)



- Step 2: Use following commands to configure Router 0, FastEthernet 0/0 interface.

```
Router>enable
```

```
Router#configure terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#interface FastEthernet 0/0
```

```
Router(config-if)#ip address 10.0.0.1 255.0.0.0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
```

```
Router(config)#exit
```

```
Router#
```

# Configuring Router 0 (2)



Step 2: Use following commands to configure Router 0, Serial 2/0 interface.

```
Router#configure terminal
```

```
Router(config)#interface Serial2/0
```

```
Router(config-if)#ip address 192.168.0.253 255.255.255.0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
```

```
Router(config)#exit
```

```
Router#
```

# Configuring Router 1



- In same way, Configure Serial 2/0 and FastEthernet 0/0 interface.

```
Router>enable
```

```
Router#configure terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#interface FastEthernet0/0
```

```
Router(config-if)#ip address 20.0.0.1 255.0.0.0
```

```
Router(config-if)#exit
```

```
Router(config)#interface FastEthernet0/0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
```

```
Router(config)#interface Serial2/0
```

```
Router(config-if)#ip address 192.168.0.254 255.255.255.0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
```

```
Router(config)#exit
```

```
Router#
```

# Configure Routing (1)



- For Router 0: Instructs router that when you receive a packet for 20.0.0.0 network give it to 192.168.0.254.

```
Router>enable
```

```
Router#config terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#ip route 20.0.0.0 255.0.0.0 192.168.0.254
```

```
Router(config)#exit
```

```
Router#
```

# Configure Routing (2)



- For Router 1: Instructs router that when you receive a packet for 10.0.0.0 network give it to 192.168.0.253.

Router>**enable**

Router#**configure terminal**

Enter configuration commands, one per line. End with  
CNTL/Z.

Router(config)#**ip route 10.0.0.0 255.0.0.0 192.168.0.253**

Router(config)#**exit**

Router#

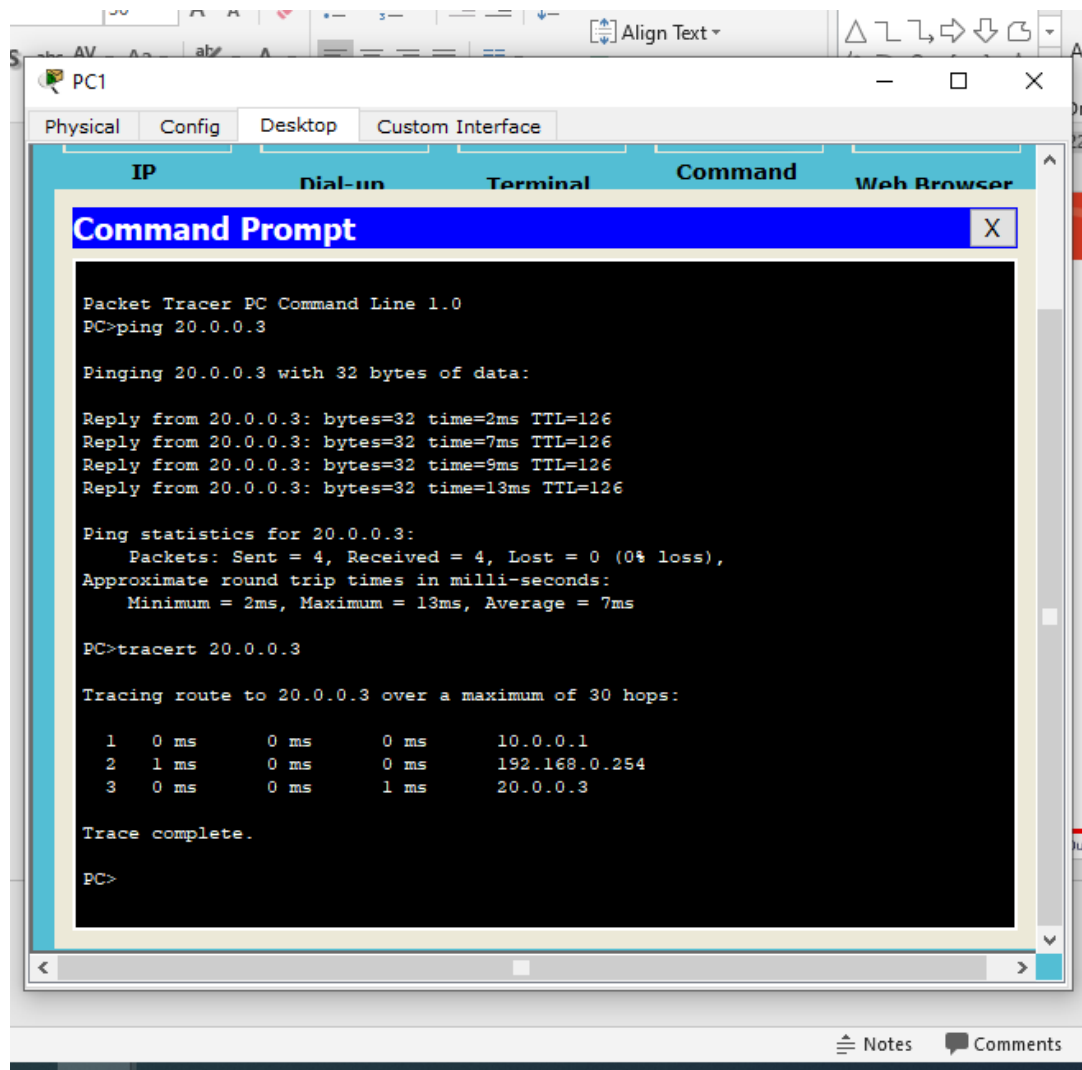
# Communication from PC1 to PC3

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- Ping and tracert from PC1 to PC3



The screenshot shows the Packet Tracer interface with PC1 selected. The 'Command' tab is active, displaying a Command Prompt window. The prompt shows the results of a ping and a tracert command from PC1 to PC3 (20.0.0.3).

```
Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.3

Pinging 20.0.0.3 with 32 bytes of data:

Reply from 20.0.0.3: bytes=32 time=2ms TTL=126
Reply from 20.0.0.3: bytes=32 time=7ms TTL=126
Reply from 20.0.0.3: bytes=32 time=9ms TTL=126
Reply from 20.0.0.3: bytes=32 time=13ms TTL=126

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 13ms, Average = 7ms

PC>tracert 20.0.0.3

Tracing route to 20.0.0.3 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    10.0.0.1
  2  1 ms    0 ms    0 ms    192.168.0.254
  3  0 ms    0 ms    1 ms    20.0.0.3

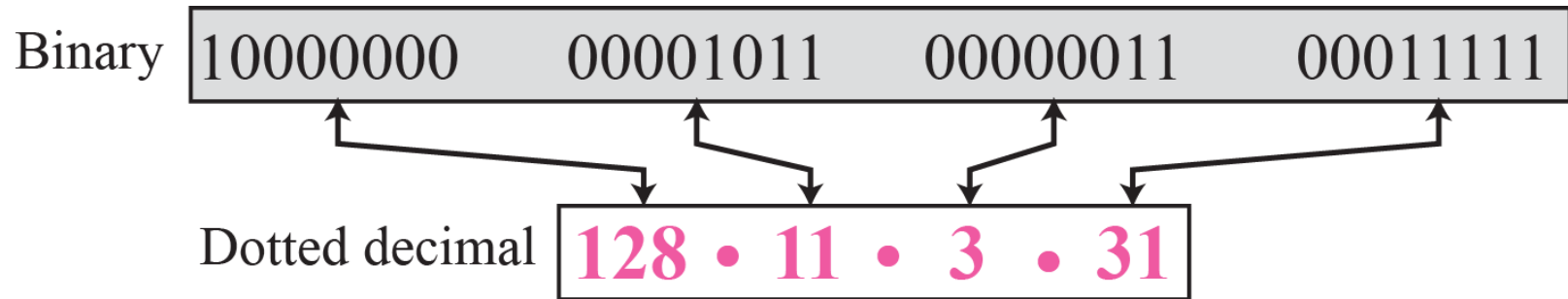
Trace complete.

PC>
```

# Appendix (1)



- IPv4 Address



- Classes of IPv4 Address

	Octet 1	Octet 2	Octet 3	Octet 4
Class A	0.....			
Class B	10.....			
Class C	110.....			
Class D	1110....			
Class E	1111....			

Binary notation

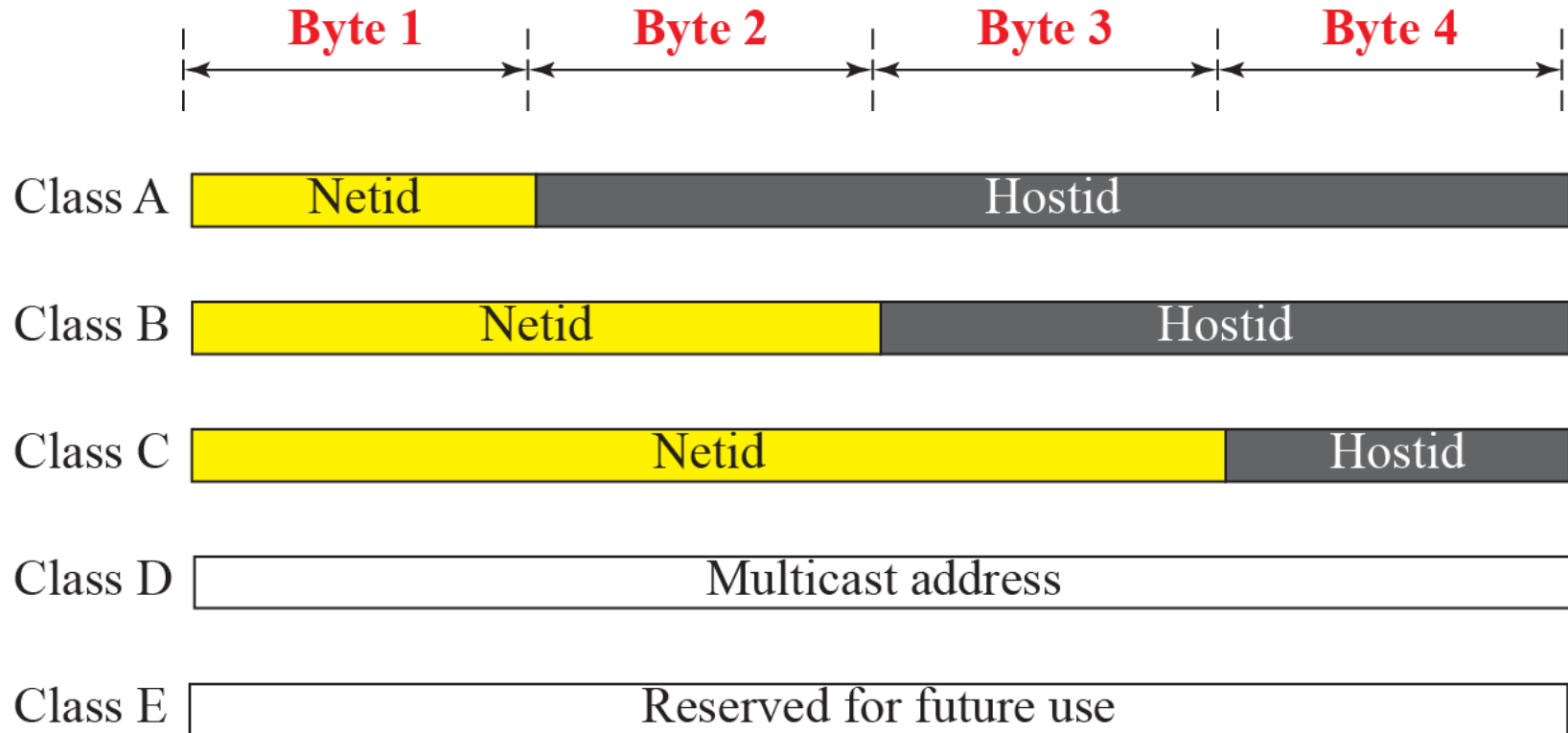
	Byte 1	Byte 2	Byte 3	Byte 4
Class A	0–127			
Class B	128–191			
Class C	192–223			
Class D	224–299			
Class E	240–255			

Dotted-decimal notation

# Appendix (2)



- Netid and hostid

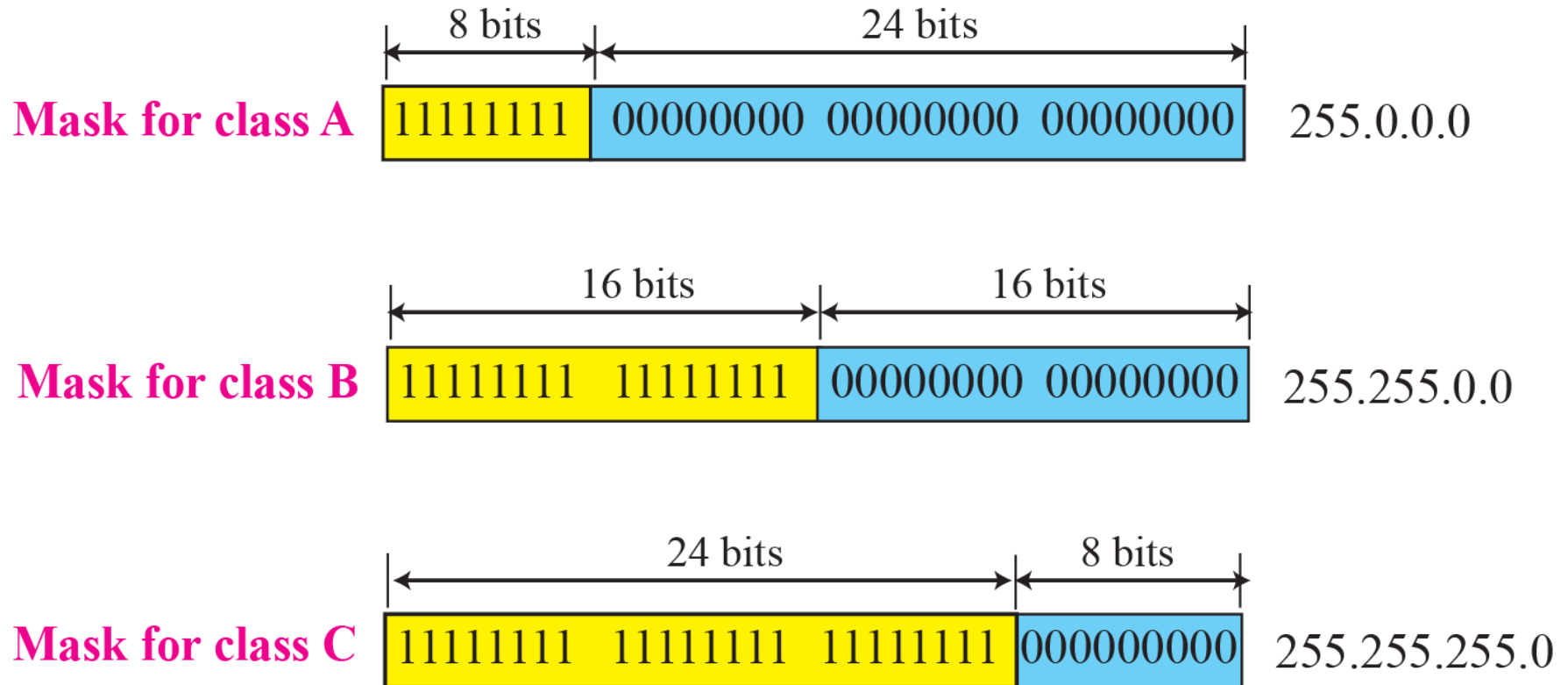




# Appendix (3)



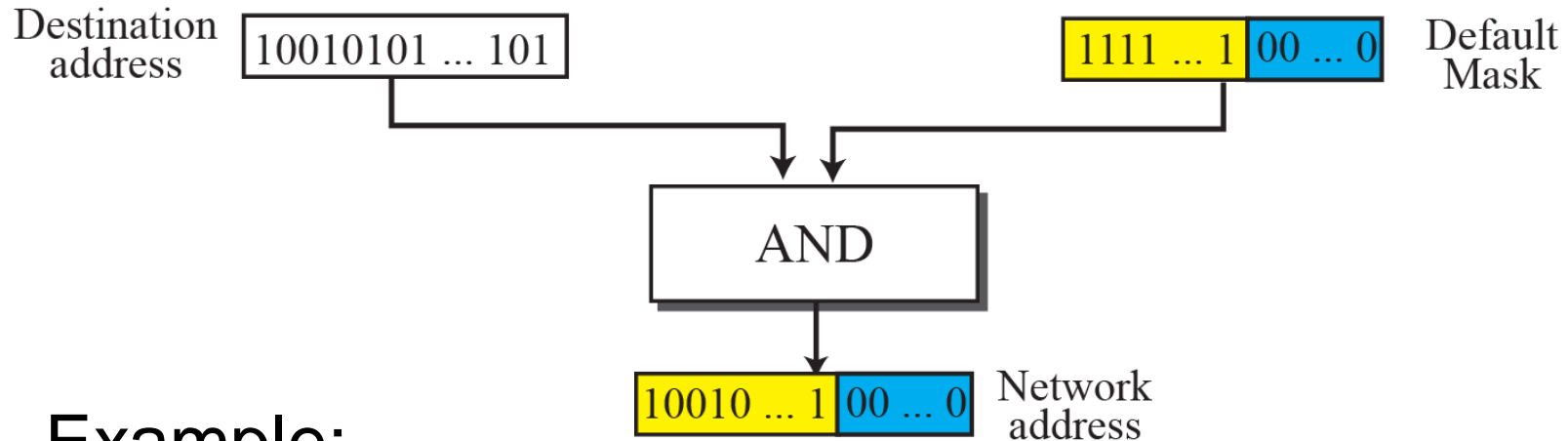
- Default Mask



# Appendix (4)



- Finding a network address using the default mask



- Example:

A router receives a packet with the destination address 201.24.67.32. Show how the router finds the network address of the packet.

## **Solution**

Since the class of the address is B, we assume that the router applies the default mask for class B, 255.255.0.0 to find the network address.

Destination address	→	201	.	24	.	67	.	32
Default mask	→	255	.	255	.	0	.	0
Network address	→	201	.	24	.	0	.	0



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**Thank You!**