

Computer Networks: Lab Record

Week: 3

Experiment 3: Two Routers Configuration and Messages

Configure IP address to routers in packet tracer.

Explore the following messages: ping responses, destination unreachable, request timed out, reply.

Observation:

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Aim: Configure IP Address to routers in Cisco Packet Tracer.
Explore the following messages:
① ping responses. ② Destination unreachable
③ request timed out & reply.

Topology:-

IPAddr: 10.0.0.2
Router-0
Router 0

IPAddr: 20.0.0.2
Router-1
Router 1

PC-PT
PC0

PC-PT
PC1

IPAddr: 10.0.0.1
Subnet mask: 255.0.0.0
Gateway: 10.0.0.2

IPAddr: 20.0.0.1
Subnet Mask: 255.0.0.0
Gateway: 20.0.0.2

Routers:

Router 0: Interface Ea 2/0 connected to PC 0 : 10.0.0.2
Interface se 2/0 connected to Router 1: 30.0.0.1
connected to Router 1 & PC0.

Router 1: Interface Se 2/0 : 30.0.0.2

Interface Fa 2/0 : 20.0.0.2

Connected to PC1 via Fa 0/0.

End Devices :

PC0 :

- IP address : 10.0.0.1

→ Gateway : 10.0.0.2

→ Subnet mask : 255.0.0.0

→ connected to Router 0 through Fa 0/0.

PC1 :-

- IP address : 20.0.0.1

→ Gateway : 20.0.0.2

→ Subnet mask : 255.0.0.0

→ Connected to Router 1 through Fa 0/0.

Procedure :

1. Connect the 2 PCs as mentioned in the topology.

2. Initialize the IP addresses of each device as shown in the figure.

3. Open CLI in the router 1 and execute the following commands :

> enable

> config terminal

> interface fastEthernet 0/0

> ip address 10.0.0.2 255.0.0.0

- > no shut
> exit
3. Repeat the steps to connect to the other PC to Router.
4. Open CLI again. Run the following commands to connect the routers together:
- ```
> interface serial 2/0
> ip address 30.0.0.1 255.0.0.0
> no shut
> exit
```
5. Repeat the same for others

#### # Observation:

Two routers are connected successfully but the packets are unable to transfer from one PC to the other PC of different router. When pinged, we encountered issues saying request timed out or host unreachable.

#### # Output:

```
> show ip route
```

C 10.0.0.0/8 is directly connected, FastEthernet0/0  
C 30.0.0.0/8 is directly connected, serial 2/0.

Experiment 2(b) continued from 2(a) :

Configure default route, static route to the router.

# Aim: Successful transmission of packets from one PC to other of different routers.

Topology: Two PCs are connected to two different routers using copper cross over wires and those two routers are connected to each other ~~are~~ using serial DCE.

# Procedure:

1. After successful configuration of the two routers. Open CLI of one router and follow the commands to configure static routing.

```
> ip route 20.0.0.0 255.0.0.0 30.0.0.2
```

2. Open the CLI of other router.

```
> ip route 10.0.0.0 255.0.0.0 30.0.0.1
```



### # Observation :-

After configuration of static routing, the two PCs of two different router networks are able to transfer/transmit the packets using the ping command.

### # Output :-

> show ip route;

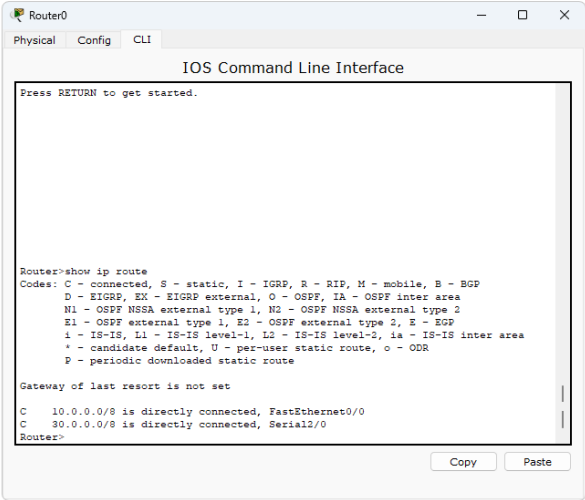
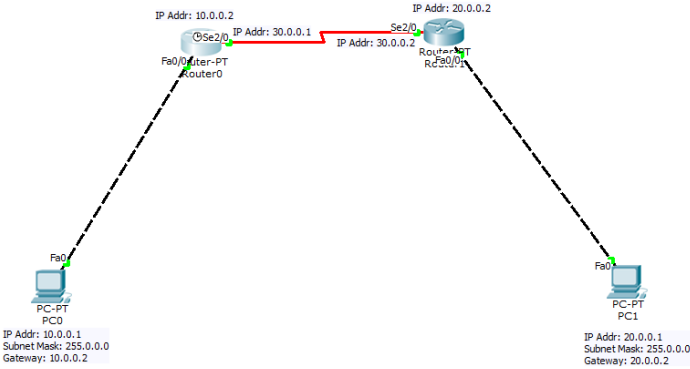
C 10.0.0.0/8 is directly connected,  
Fast Ethernet 0/0.

S 20.0.0.0/8 [1/0] via 30.0.0.2

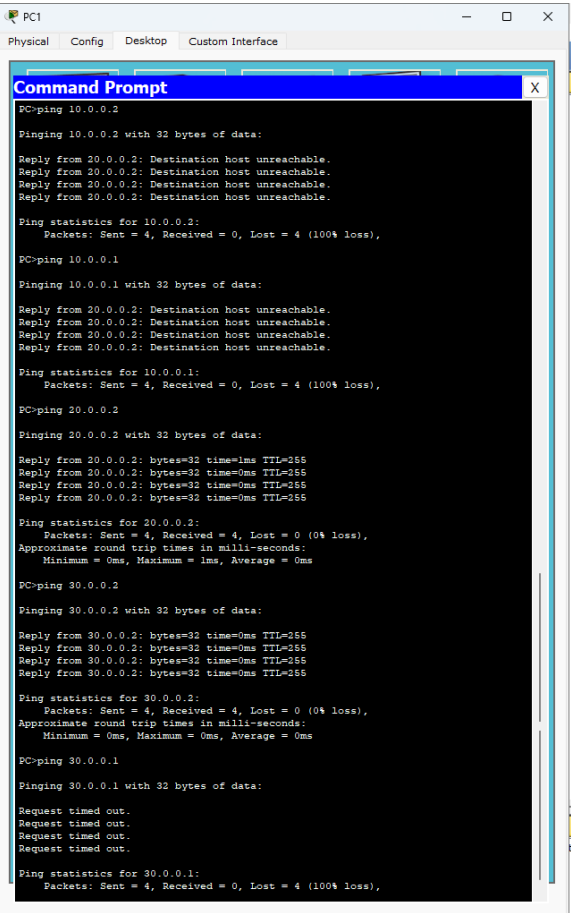
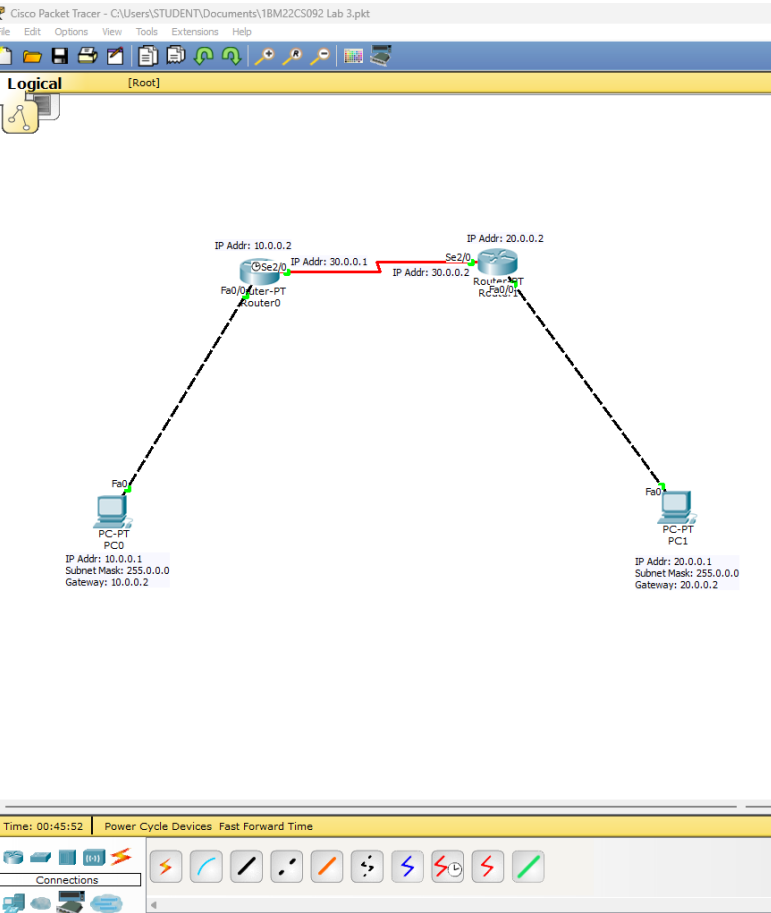
C 30.0.0.0/8 is directly connected,  
Serial 2/0.

Screenshots:

Initial Setup



Setup Done but no interconnectivity



# Extra Configuration for Interconnectivity

The screenshot displays the Packet Tracer interface with two configuration windows open for Router0 and Router1. The network diagram shows two routers connected via their serial interfaces (Se0/0/0). Router0 is connected to PC0 (10.0.0.1) and Router1 is connected to PC1 (20.0.0.1). The configuration windows show the following commands:

```
Router0#enable
Router0#configure terminal
Router0(config)#ip route 20.0.0.0 255.0.0.0 30.0.0.1
Router0(config)#ip route 10.0.0.0 255.0.0.0 30.0.0.2
Router0(config)#exit
Router0#show ip route
Router0#exit
```

```
Router1#enable
Router1#configure terminal
Router1(config)#ip route 20.0.0.0 255.0.0.0 30.0.0.2
Router1(config)#ip route 10.0.0.0 255.0.0.0 30.0.0.1
Router1(config)#exit
Router1#show ip route
Router1#exit
```

The network diagram shows the following IP addresses and configurations:

- Router0: IP Address: 10.0.0.2, Subnet Mask: 255.0.0.0, Gateway: 10.0.0.2
- Router1: IP Address: 20.0.0.2, Subnet Mask: 255.0.0.0, Gateway: 20.0.0.2
- PC0: IP Address: 10.0.0.1, Subnet Mask: 255.0.0.0, Gateway: 10.0.0.2
- PC1: IP Address: 20.0.0.1, Subnet Mask: 255.0.0.0, Gateway: 20.0.0.2

The status bar at the bottom indicates "Time: 01:21:36" and "Power Cycle Devices: Fast Forward Time".

## Successful Interconnectivity with 0% Loss while pinging

The screenshot displays the Packet Tracer interface with two command prompt windows open for PC0 and PC1. The network diagram is visible in the background, showing the same setup as the previous screenshot.

**PC0 Command Prompt:**

```
PC0>ping 20.0.0.1
Pinging 20.0.0.1 with 32 bytes of data:
Reply from 20.0.0.1: bytes=32 time=1ms TTL=126
Reply from 20.0.0.1: bytes=32 time=3ms TTL=126
Reply from 20.0.0.1: bytes=32 time=4ms TTL=126
Reply from 20.0.0.1: bytes=32 time=4ms TTL=126

Ping statistics for 20.0.0.1:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 1ms, Maximum = 4ms, Average = 3ms

PC0>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Reply from 20.0.0.2: bytes=32 time=1ms TTL=254
Reply from 20.0.0.2: bytes=32 time=3ms TTL=254
Reply from 20.0.0.2: bytes=32 time=4ms TTL=254
Reply from 20.0.0.2: bytes=32 time=4ms TTL=254

Ping statistics for 20.0.0.2:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 1ms, Maximum = 4ms, Average = 2ms

PC0>ping 30.0.0.2
Pinging 30.0.0.2 with 32 bytes of data:
Reply from 30.0.0.2: bytes=32 time=5ms TTL=254
Reply from 30.0.0.2: bytes=32 time=4ms TTL=254
Reply from 30.0.0.2: bytes=32 time=4ms TTL=254
Reply from 30.0.0.2: bytes=32 time=5ms TTL=254

Ping statistics for 30.0.0.2:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 4ms, Maximum = 5ms, Average = 4ms

PC0>ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Reply from 30.0.0.1: bytes=32 time=0ms TTL=255
Reply from 30.0.0.1: bytes=32 time=0ms TTL=255
Reply from 30.0.0.1: bytes=32 time=0ms TTL=255
Reply from 30.0.0.1: bytes=32 time=0ms TTL=255

Ping statistics for 30.0.0.1:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 0ms, Maximum = 2ms, Average = 0ms

PC0>ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:
Reply from 10.0.0.2: bytes=32 time=0ms TTL=255
Reply from 10.0.0.2: bytes=32 time=0ms TTL=255
Reply from 10.0.0.2: bytes=32 time=0ms TTL=255
Reply from 10.0.0.2: bytes=32 time=0ms TTL=255
```

**PC1 Command Prompt:**

```
PC1>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=1ms TTL=126
Reply from 10.0.0.1: bytes=32 time=3ms TTL=126
Reply from 10.0.0.1: bytes=32 time=4ms TTL=126
Reply from 10.0.0.1: bytes=32 time=4ms TTL=126

Ping statistics for 10.0.0.1:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 1ms, Maximum = 4ms, Average = 3ms

PC1>ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:
Reply from 10.0.0.2: bytes=32 time=7ms TTL=254
Reply from 10.0.0.2: bytes=32 time=4ms TTL=254
Reply from 10.0.0.2: bytes=32 time=4ms TTL=254
Reply from 10.0.0.2: bytes=32 time=4ms TTL=254

Ping statistics for 10.0.0.2:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 4ms, Maximum = 7ms, Average = 5ms

PC1>ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Reply from 30.0.0.1: bytes=32 time=4ms TTL=254
Reply from 30.0.0.1: bytes=32 time=4ms TTL=254
Reply from 30.0.0.1: bytes=32 time=4ms TTL=254
Reply from 30.0.0.1: bytes=32 time=4ms TTL=254

Ping statistics for 30.0.0.1:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 4ms, Maximum = 4ms, Average = 4ms

PC1>ping 30.0.0.2
Pinging 30.0.0.2 with 32 bytes of data:
Reply from 30.0.0.2: bytes=32 time=0ms TTL=255
Reply from 30.0.0.2: bytes=32 time=0ms TTL=255
Reply from 30.0.0.2: bytes=32 time=0ms TTL=255
Reply from 30.0.0.2: bytes=32 time=0ms TTL=255

Ping statistics for 30.0.0.2:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 0ms, Maximum = 2ms, Average = 0ms

PC1>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Reply from 20.0.0.2: bytes=32 time=0ms TTL=255
Reply from 20.0.0.2: bytes=32 time=0ms TTL=255
Reply from 20.0.0.2: bytes=32 time=0ms TTL=255
Reply from 20.0.0.2: bytes=32 time=0ms TTL=255
```

The status bar at the bottom indicates "Scenario 0" and "Toggle PDU List Window".

# Output for show IP Route

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

**Router0**

Physical Config CLI

IOS Command Line Interface

```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
 * - candidate default, U - per-user static route, o - ODR
 P - periodic downloaded static route

Gateway of last resort is not set

C 10.0.0.0/8 is directly connected, FastEthernet0/0
S 20.0.0.0/8 [1/0] via 30.0.0.2
C 30.0.0.0/8 is directly connected, Serial2/0
Router>
```

**Router1**

Physical Config CLI

IOS Command Line Interface

```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
 * - candidate default, U - per-user static route, o - ODR
 P - periodic downloaded static route

Gateway of last resort is not set

S 10.0.0.0/8 [1/0] via 30.0.0.1
C 20.0.0.0/8 is directly connected, FastEthernet0/0
C 30.0.0.0/8 is directly connected, Serial2/0
Router>
```

Time: 01:20:45 Power Cycle Devices Fast Forward Time Realtime

| Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete |
|------|-------------|--------|-------------|------|-------|------------|----------|-----|------|--------|
|------|-------------|--------|-------------|------|-------|------------|----------|-----|------|--------|