

22/5/23

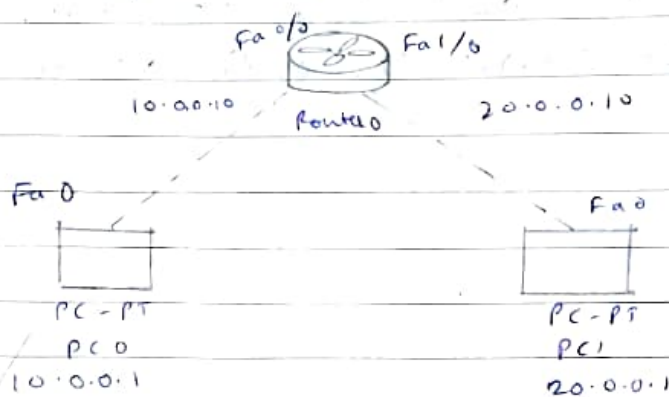
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## Experiment-2

Aim: configure IP address to routers in packet tracer. Explore the following messages: ping responses, destination unreachable, request timed out, reply

Topology:- (single router)



Procedure:

- i) select the PC's, set its ip address & then set the particular gateway.
- ii) select the router & place it, connect the PC's to it through the copper cross over cable.
- iii) select the router, go to CLI. Run the following commands

Router>enable

Router# config terminal

Enter configuration commands, one per line.

End with CTRL/Z

Router(config)# interface fast ethernet 0/0

Router(config-if)# ip address 10.0.0.10 255.0.0.0

Router(config-if)# no shut

Router(config-if)#

% LINK - S - CHANGED: Interface Fast Ethernet 0/0, changed state to up

% LINEPROTO - S - UPDOWN: Line protocol on Interface Fast Ethernet 0/0, changed state to up

Router(config-if)# exit

Router(config)# interface fast ethernet 1/0

Router(config-if)# ip address 20.0.0.10 255.0.0.0

Router(config-if)# no shut

Router(config-if)#

% LINK - S - CHANGED: Interface Fast Ethernet 1/0, changed state to up

% LINEPROTO - S - UPDOWN: Line protocol on Interface Fast Ethernet 1/0, changed state to up

Router(config-if)# exit

Router(config)# exit

Router#

% SYS - S - CONFIG-I: configured from console key console

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 - ~~un~~<sup>user</sup> static route, 0 - 000
- P - periodic downloaded static route

Gateway of last resort is not set

C 10.0.0.0/8 is directly connected, FastEthernet 0/0

C 20.0.0.0/8 is directly connected, FastEthernet 1/0  
Route#

~~Result~~

- go to the PC from where the message has to be ~~set~~ sent, click on desktop & go to command prompt. here P00

Result:

P C > ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data:

Request timed out

Reply from 20.0.0.1: bytes=32 time=1ms TTL=127

Reply from 20.0.0.1: bytes=32 time=1ms TTL=127

Reply from 20.0.0.1: bytes=32 time=1ms TTL=127

Reply from 20.0.0.1: bytes=32 time=1ms TTL=127

Ping statistics for 20.0.0.1:

Packets: sent=4, Received=3, Lost=1 (25% loss),

Approximate round trip times in milli-seconds:

Minimum=0ms, Maximum=12ms, Average=4ms

P C > 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=127  
Reply from 20.0.0.1: bytes=32 time=1ms TTL=127  
Reply from 20.0.0.1: bytes=32 time=1ms TTL=127  
Reply from 20.0.0.1: bytes=32 time=1ms TTL=127

Ping statistics for 20.0.0.1:

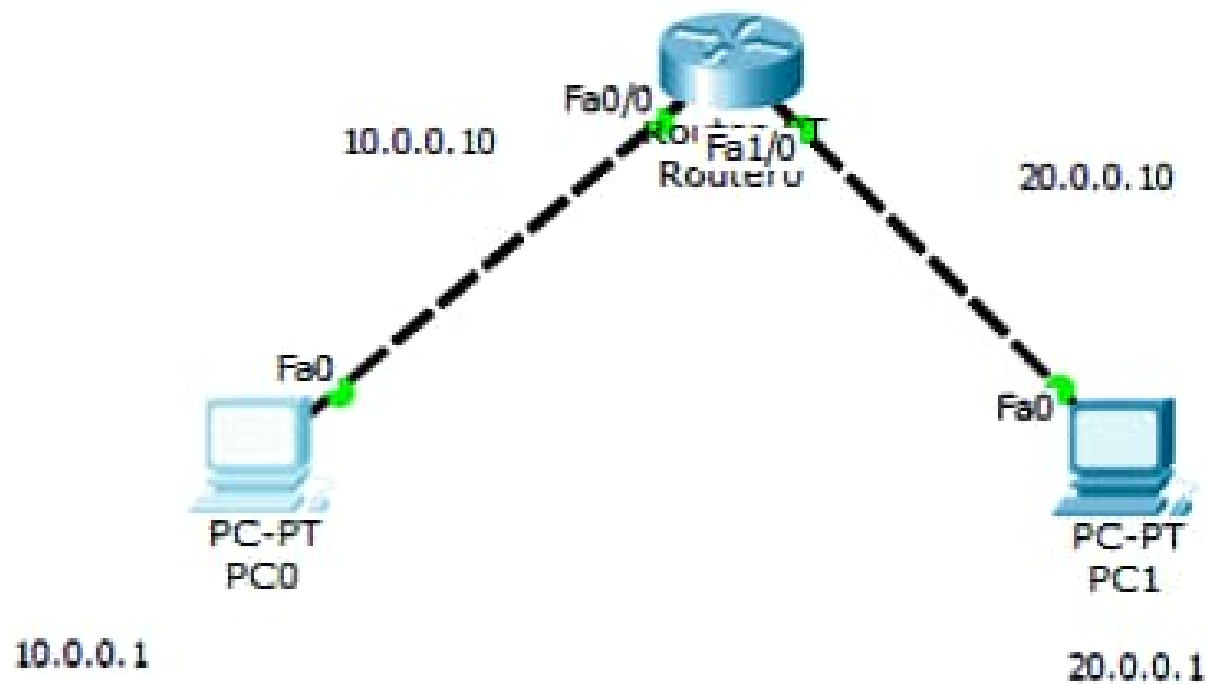
Packets: sent = 4, received = 4, lost = 0 (0% loss),

Approximate round trip times in milliseconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms.

Observation:

- At first ping, there is a request timeout and loss of data.
- This means Firewall is blocking connectivity.
- The second ping leads to full transmission without any loss.





Press RETURN to get started!

```
Router>enable
Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fastethernet0/0
Router(config-if)#ip address 10.0.0.10 255.0.0.0
Router(config-if)#no shut

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
exit
Router(config)#how ip route
      ^
% Invalid input detected at '^' marker.

Router(config)#show ip route
      ^
% Invalid input detected at '^' marker.

Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
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
Router#
```

```
Router#enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet1/0
Router(config-if)#ip address 20.0.0.10 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
exit
Router(config)#show ip route

% Invalid input detected at '^' marker.

Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
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
C    20.0.0.0/8 is directly connected, FastEthernet1/0
Router#
```

## Command Prompt

```
PC>ping 20.0.0.1
```

```
Pinging 20.0.0.1 with 32 bytes of data:
```

```
Request timed out.
```

```
Reply from 20.0.0.1: bytes=32 time=1ms TTL=127
```

```
Reply from 20.0.0.1: bytes=32 time=12ms TTL=127
```

```
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
```

```
Ping statistics for 20.0.0.1:
```

```
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 12ms, Average = 4ms
```

```
PC>ping 20.0.0.1
```

```
Pinging 20.0.0.1 with 32 bytes of data:
```

```
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
```

```
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
```

```
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
```

```
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
```

```
Ping statistics for 20.0.0.1:
```

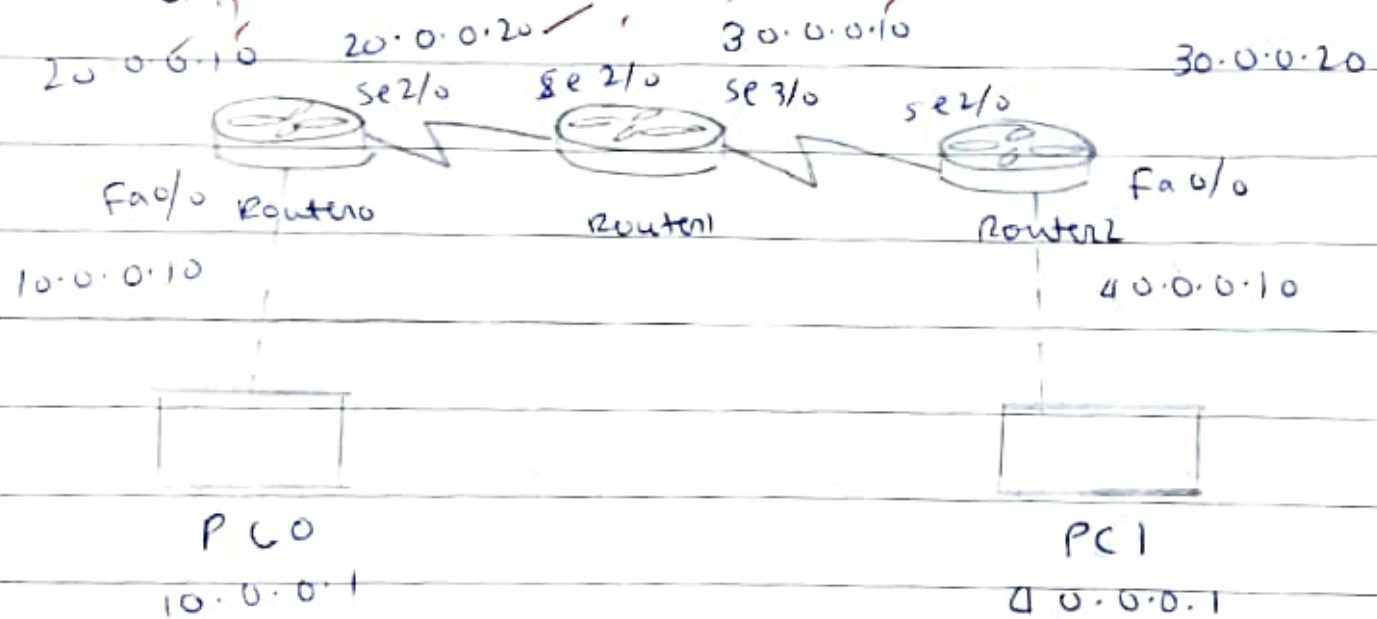
```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```



## Topology:- (three routers)



## Procedure:-

- Select the PC's, set its ip address of their particular gateway
- Select 3 routers, place them, connect 2 to the PC's using copper cross over cable & connect the routers to each other using serial DTE.

iii) select the routers one by one and run the following commands on their CLI  
(Router 0)

Router > enable

Router# config t

Enter configuration commands, one per line

End with CNTRL/Z

Router(config)# interface fastEthernet 0/0

Router(config-if)# ip address 20.0.0.10 255.0.0.0

Router(config-if)# no shut

Router(config-if)#

! LINK-S-CHANGED: Interface FastEthernet0/0, changed state to up

! LINE PROTO-S - UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)# exit

Router(config)# interface serial 2/0

Router(config-if)# ip address 20.0.0.10 255.0.0.0

Router(config-if)# no shut

! LINK-S-CHANGED: Interface serial2/0, changed state to down

Router(config-if)# exit

Router(config)# exit

Router#

! SYS-S-CONFIG-I: configured from console by console

Router# show ip route

codes: C - Connected, S - Static, E - EIGRP, 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, O - 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

(Router 1)

Router > enable

Router#config t

Enter configuration commands, one per line.

End with CNTL/Z.

Router(config)# interface serial 2/0

Router(config-if)# ip address 20.0.0.20 255.0.0.0

Router(config-if)# no shut

Router(config-if)#

% LINK-5-CHANGED: Interface serial2/0, changed  
state to up

% LINEPROTO-5-UPDOWN: line protocol on  
Interface serial2/0, Changed state to up

Router(config-if)# exit

Router(config)# interface serial 3/0

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Router(config-if)# ip address 30.0.0.10 255.0.0.0  
Router(config-if)# no shut

%LINK-S-CHANGED: Interface Serial3/0,  
changed state to down

Router(config-if)# exit

Router(config)# exit

(Router2)

Router>enable

Router# config t

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

Router(config)# interface Serial2/0

Router(config-if)# ip address 30.0.0.20 255.0.0.0

Router(config-if)# ~~ip address 2~~ no shut

Router(config-if)#

%LINK-S-CHANGED: Interface Serial2/0, changed  
state to up

%LINEPROTO-S-UPDOWN: Line protocol on Interface  
Serial2/0, changed state to up

Router(config-if)# exit

Router(config)# interface fast ethernet 0/0

Router(config-if)# ip address 40.0.0.10 255.0.0.0

Router(config-if)# no shut

Router(config-if)#

%LINK-S-CHANGED: Interface FastEthernet0/0,  
changed state to up

%LINEPROTO-S-UPDOWN: Line protocol on  
Interface Fast Ethernet0/0, changed state to up



Router(config-if)#exit

Result:

PC>ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

Reply from 10.0.0.10: Destination host unreachable

Reply from 10.0.0.10: Destination host unreachable

Reply from 10.0.0.10: Destination host unreachable

Reply from 10.0.0.10: Destination host unreachable

Ping statistics for 40.0.0.1:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>

Procedure

iv) Now since the destinations are unreachable, go back to the CLI's to connect the routers

(Router#0)

Router#config t

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

Router(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.20

Router(config)#ip route 40.0.0.0 255.0.0.0 20.0.0.20

Router(config)#exit

Router#

%SYS-S-CONFIG-I: Configured from console by console

Router#show ip route

codes:

Gateway of last resort is not set

C 10.0.0.0/8 is directly connected, FastEthernet0/0



C 20.0.0.0/8 is directly connected, serial 2/0  
 S 30.0.0.0/8 [1/0] via 20.0.0.20  
 S 40.0.0.0/8 [1/0] via 20.0.0.20

(Router 1)

Router # config t

~~Router (config) # exit~~

Router (config) # ip route 10.0.0.0 255.0.0.0 20.0.0.10

Router (config) # ip route 40.0.0.0 255.0.0.0 30.0.0.10

Router (config) # exit

Router # show ip route

Codes:

Gateway of last resort is not set

S 10.0.0.0/8 [1/0] via 20.0.0.10

C 20.0.0.0/8 is directly connected, serial 2/0

C 30.0.0.0/8 is directly connected, serial 3/0

S 40.0.0.0/8 [1/0] via 30.0.0.20

Router #

(Router 2)

Router # config t

Router (config) # ip route 10.0.0.0 255.0.0.0 30.0.0.10

Router (config) # ip route 20.0.0.0 255.0.0.0 30.0.0.10

Router #

Router # show ip route

Codes:

Gateway of last resort is not set

S 10.0.0.0/8 [1/0] via 30.0.0.10

S 20.0.0.0/8 [1/0] via 30.0.0.10

C 30.0.0.0/8 is directly connected, serial 2/0

C 40.0.0.0/8 is directly connected, ~~serial~~ FastEthernet 0/0

Router #

Result (from PC1)

PC > 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=128

Reply from 10.0.0.1 bytes=32 time=1ms TTL=128

Reply from 10.0.0.1 bytes=32 time=1ms TTL=128

Reply from 10.0.0.1 bytes=32 time=1ms TTL=128

Ping statistics for 10.0.0.1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip time in milliseconds:

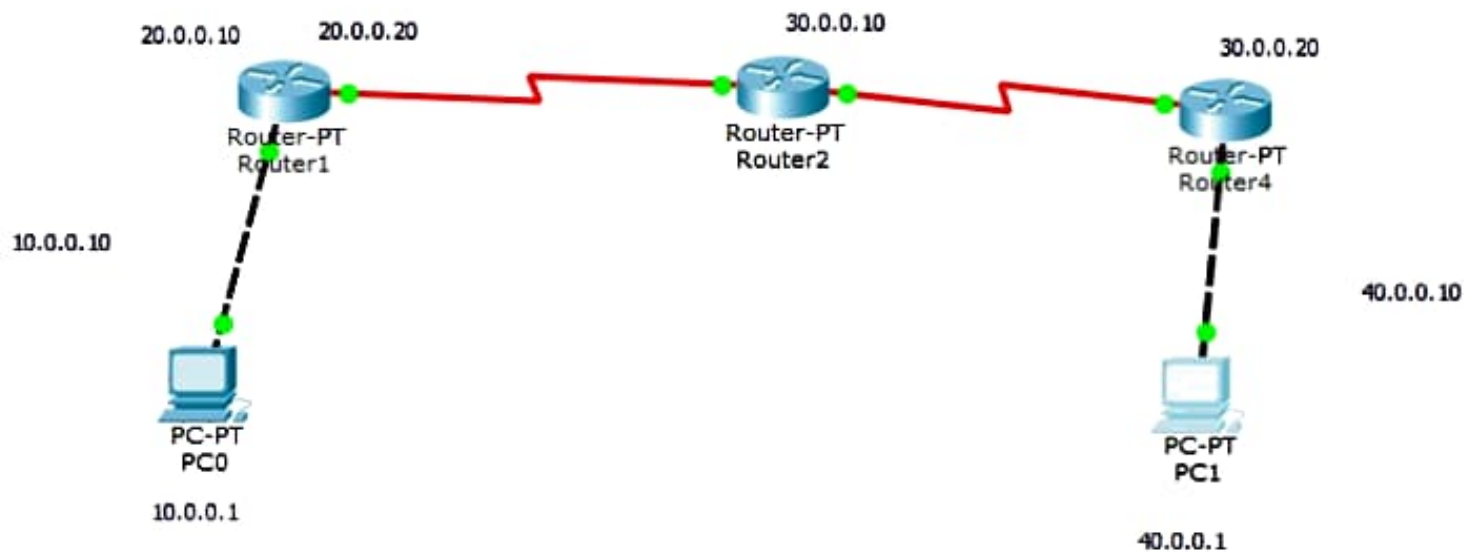
Minimum = 1 ms, Maximum = 10 ms, Average = 0 ms.

PC >

Observation:

After setting the route, the host becomes reachable & the message is sent without any loss.

10/0



## IOS Command Line Interface

Press RETURN to get started!

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet0/0
Router(config-if)#ip address 10.0.0.10 255.0.0.0
Router(config-if)#no shut

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)#interface serial 2/0
Router(config-if)#ip address 20.0.0.10 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

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
Router#
```

## IOS Command Line Interface

Press RETURN to get started!

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface serial 2/0
Router(config-if)#ip address 20.0.0.20 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config-if)#exit
Router(config)#interface serial 3/0
Router(config-if)#ip address 30.0.0.10 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial3/0, changed state to down
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

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    20.0.0.0/8 is directly connected, Serial2/0
Router#
```



## IOS Command Line Interface

```

Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface serial 2/0
Router(config-if)#ip address 30.0.0.20 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#exit
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config)#interface fastethernet0/0
Router(config-if)#ip address 40.0.0.10 255.0.0.0
Router(config-if)#no shut

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)#show ip route
~
% Invalid input detected at '^' marker.

Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

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    30.0.0.0/8 is directly connected, Serial2/0
C    40.0.0.0/8 is directly connected, FastEthernet0/0
Router#

```

PC0

Physical

Config

Desktop

Custom Interface

## Command Prompt

Open the PC command line

Packet Tracer PC Command Line 1.0

PC>ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

Reply from 10.0.0.10: Destination host unreachable.

Reply from 10.0.0.10: Destination host unreachable.

Reply from 10.0.0.10: Destination host unreachable.

Reply from 10.0.0.10: Destination host unreachable.

Ping statistics for 40.0.0.1:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>

```
Router>enable
```

```
Router#config t
```

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

```
Router(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.20
```

```
Router(config)#ip route 40.0.0.0 255.0.0.0 20.0.0.20
```

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

```
Router#
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

```
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  
C    20.0.0.0/8 is directly connected, Serial2/0  
S    30.0.0.0/8 [1/0] via 20.0.0.20  
S    40.0.0.0/8 [1/0] via 20.0.0.20
```

```
Router#
```

## Router 2

```
Router>enable
```

```
Router#config t
```

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

```
Router(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.0
```

```
Router(config)#ip route 40.0.0.0 255.0.0.0 30.0.0.20
```

```
Router(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.10
```

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

```
Router#
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

```
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 20.0.0.0  
      [1/0] via 20.0.0.10
```

```
C    20.0.0.0/8 is directly connected, Serial2/0
```

```
C    30.0.0.0/8 is directly connected, Serial3/0
```

```
S    40.0.0.0/8 [1/0] via 30.0.0.20
```

```
Router#
```



40.0.0.0/8 is directly connected, FastEthernet0/0

Router#config t *Router 4*

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

Router(config)#ip route 10.0.0.0 255.0.0.0 30.0.0.10

Router(config)#ip route 20.0.0.0 255.0.0.0 30.0.0.10

Router(config)#exit

Router#

%SYS-5-CONFIG\_I: Configured from console by console

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 30.0.0.10

S 20.0.0.0/8 [1/0] via 30.0.0.10

C 30.0.0.0/8 is directly connected, Serial2/0

C 40.0.0.0/8 is directly connected, FastEthernet0/0

Router#



PC1



Physical

Config

Desktop

Custom Interface

**Command Prompt**

Packet Tracer PC Command Line 1.0

PC&gt;ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=15ms TTL=125

Reply from 10.0.0.1: bytes=32 time=8ms TTL=125

Reply from 10.0.0.1: bytes=32 time=16ms TTL=125

Reply from 10.0.0.1: bytes=32 time=3ms TTL=125

Ping statistics for 10.0.0.1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 3ms, Maximum = 16ms, Average = 10ms

PC&gt;|