

LAB PROGRAM – 3

Q) Configure default route, static route to the Router

Procedure :

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COMPASS
Date: 13/07/23

Experiment - 3

Aim: Configure default route, static route to the Router

Topology:

Procedure:

Step 1: Create a network by selecting 3 generic routers and 2 PC's (end device). Connect the end devices to the Routers using copper - (cross) wires and connect the routers using serial DCE wires, In your logical workspace.

Step 2: Set up IP Address and gateway of the end devices (PC0, PC1) by clicking configure -> fastethernet -> IP Address for IP and Config -> setting -> options for gateway.

PC0 -> 10.0.0.1
PC1 -> 40.0.0.1

Step 3: Configure the Routers using CLI

M T W T F S S
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Router 1:

- 3a) ~~enable~~ Router > enable
- 3b) Router# Config t
- 3c) interface fastethernet 0/0
- 3d) ip Address 10.0.0.10 255.0.0.0
- 3e) No shut
- 3f) exit
- 3g) Router(Config)# interface serial 2/0
- 3h) Router(Config-if)# ip address 20.0.0.1 255.0.0.0
- 3i) Router(Config-if)# no shut
- 3j) Router(Config-if)# exit
- 3k) Router(Config)# exit
- 3l) finally use the show ip route to view the routing table

(Configure Router 2, Router 3 similarly)

Step 1: ping the different gateways and observe the output. Now Configure the router such that the routers have data (knowledge about the other networks, add the network in clt

(Router 1) (Default routing)

ip route 0.0.0.0 0.0.0.0 20.0.0.2

(Router 3) (Static routing)

ip route 10.0.0.0 255.0.0.0 20.0.0.4

ip route 40.0.0.0 255.0.0.0 30.0.0.2

(Router 2) (Default routing)

ip route 0.0.0.0 0.0.0.0 30.0.0.1

Result:

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 = 20ms TTL = 125

Reply from 10.0.0.1: bytes = 32 time = 20ms TTL = 125

Reply from 10.0.0.1: bytes = 32 time = 20ms TTL = 125

Reply from 10.0.0.1: bytes = 32 time = 20ms 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:

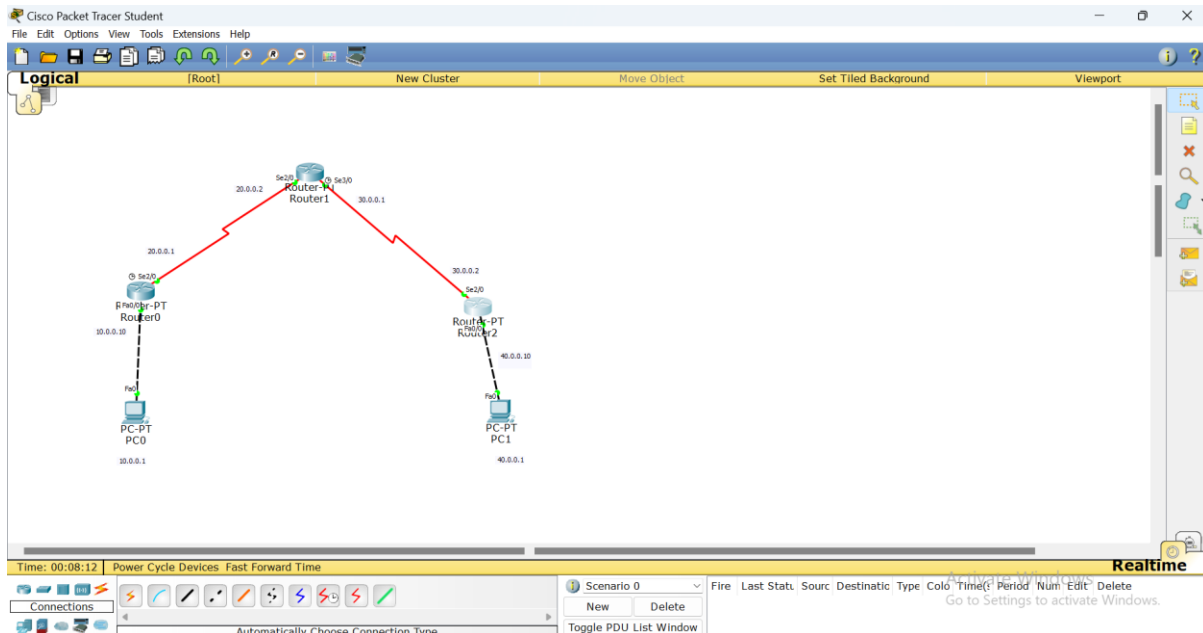
Minimum = 7ms, Maximum = 20ms, Average = 13ms

Observation:

Default route: Is that route that take effect when no other route is available for an IP destination address. A default route identifies the gateway IP address to which the router sends all IP packets that it does not have a learned route for. It establishes a forwarding rule for packets when no specific address of a next-hop host is available from the routing table or other routing mechanisms.

Static route: Process, in which we have to manually add routes to the routing table. It is a pre-determined pathway that a packet must travel to reach a specific host or Network. It performs routing decisions with preconfigured routes in the routing table. It is implemented when route selections are limited or only a single default route is available. static Routing is handled by internet protocol.

Topology :



Router Configuration :

- Configuring Individual Routers

R0 :

```
Router0
Physical Config CLI
IOS Command Line Interface

c3845K bytes of ATA CompactFlash (Read/Write)

--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet 0/0
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)#interface serial 2/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
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
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#
```

R1 :

```
Router1
Physical Config CLI
IOS Command Line Interface

--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: no

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 20.0.0.2 255.0.0.0
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
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#no shut

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

R2 :

```
Router2
Physical Config CLI
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 30.0.0.2 255.0.0.0
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 fastethernet 0/0
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)#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 30.0.0.0/8 is directly connected, Serial2/0
C 40.0.0.0/8 is directly connected, FastEthernet0/0
.....#
```

- Configure the routers gain knowledge about

R0 : (Default Routing)

```
Router0
Physical Config CLI
IOS Command Line Interface

Press RETURN to get started.

Router>config t
Router#
% Invalid input detected at '^' marker.

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 20.0.0.2
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 20.0.0.2 to network 0.0.0.0

C    10.0.0.0/8 is directly connected, FastEthernet0/0
C    20.0.0.0/8 is directly connected, Serial2/0
S*   0.0.0.0/0 [1/0] via 20.0.0.2
Router#
```

Activate Window

R1 : (Static Routing)

```
Router1
Physical Config CLI
IOS Command Line Interface

Router con0 is now available

Press RETURN to get started.

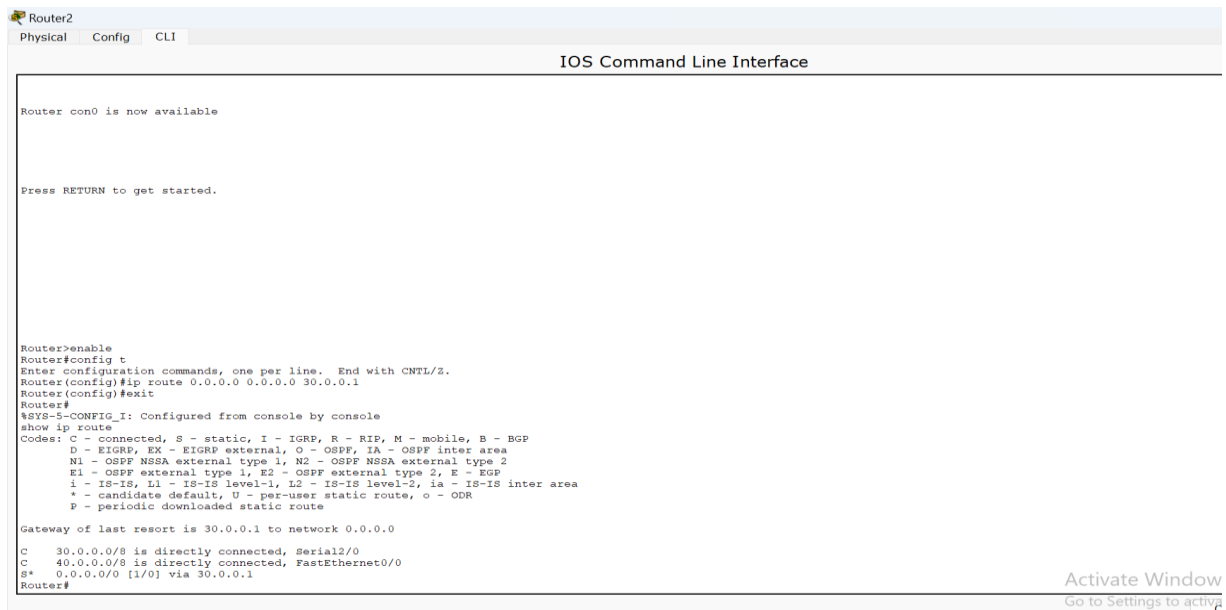
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.1
Router(config)#ip route 40.0.0.0 255.0.0.0 30.0.0.2
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, 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

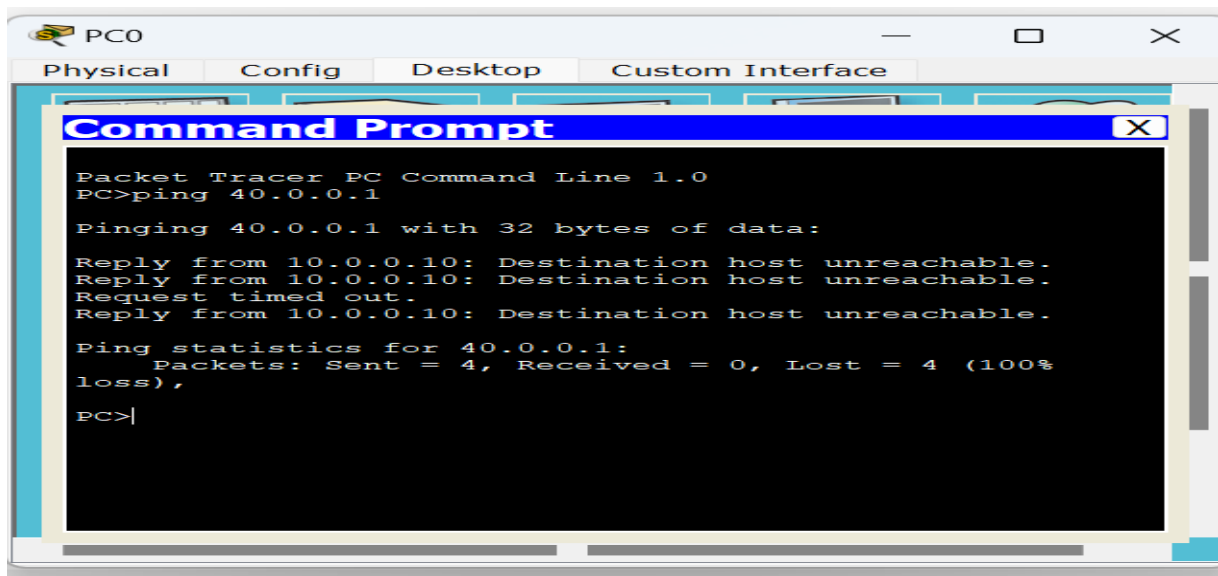
S    10.0.0.0/8 [1/0] via 20.0.0.1
C    20.0.0.0/8 is directly connected, Serial2/0
C    30.0.0.0/8 is directly connected, Serial3/0
S    40.0.0.0/8 [1/0] via 30.0.0.2
Router#
```

Activate Window

R2 : (Default Routing)

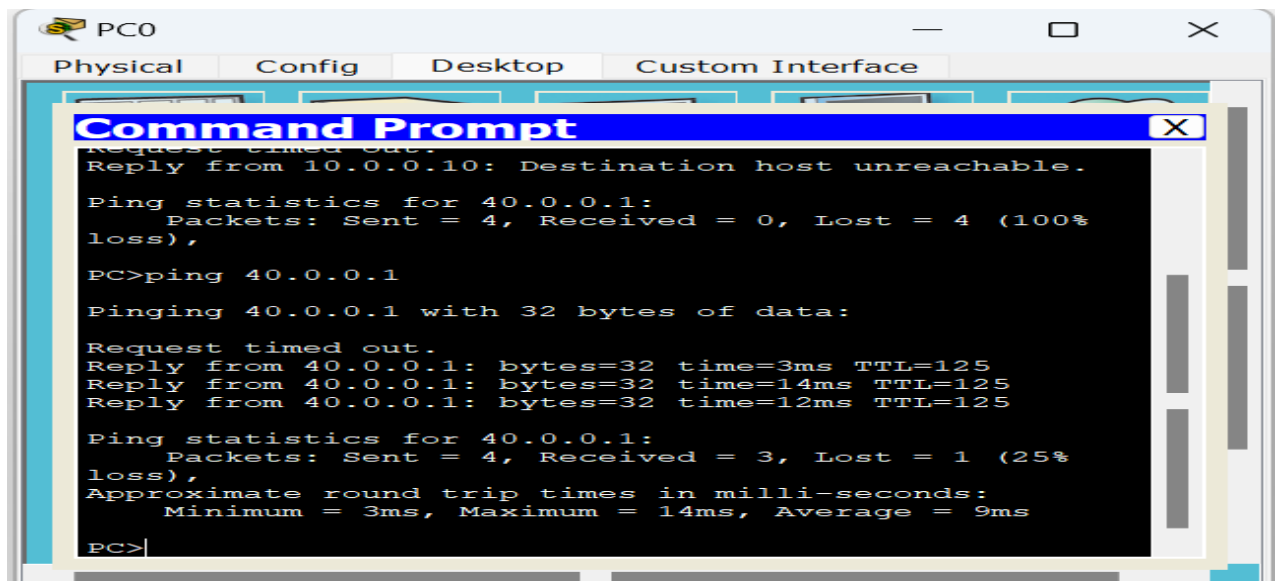


Ping Results(Before Routers gained Knowledge about other networks)



Ping Results(After Routers Have Knowledge About Other Networks)

- From PC-0 to PC-1



- From PC-1 to PC-0

