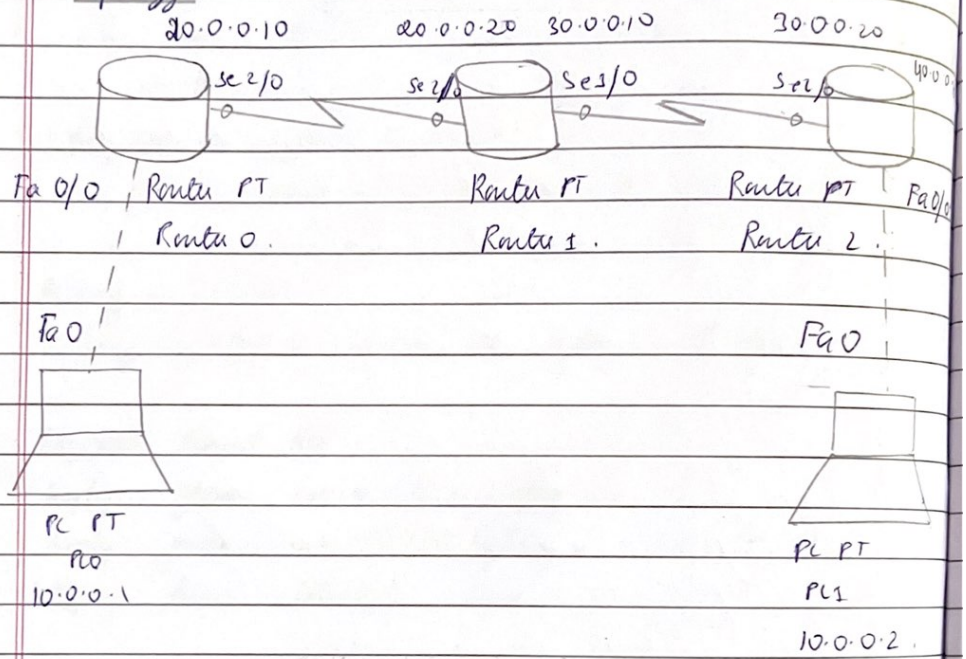
Experiment-3

19/11/22

Title : Configuring default route to the router

Aim : To configure default route to to a router using minimum commands.

Topology :



procedure :-

* Place 3 generic routers and two generic PCs in the workspace.
* Place a note for each device (PC and router) and specify the IP address.
* Connect the router and pc using copper straight.
* Connect the routers using serial DCE.
* Click on each PC, go to the config tab set the IP address and the subnet mask in fastethernet 0.
* Next click on settings in the config tab and

Set the gateway address. It should belong to the same network.

For connecting router and PC.

* Since IP address of PC0 is already configured go to the router.
* Open CLI for router 0, enter the following -
  - → no
  - → enable
  - → config t
  - → interface fastethernet 0/0
  - → ip address 10.0.0.10 255.0.0.0
  - → no shut.
* The red light turns green meaning that the network is ready for communication.

For connecting two routers.

* Click on router 0, click CLI, enter the following commands -
  - → no
  - → enable
  - → config t
  - → interface serial 2/0
  - → ip address 20.0.0.10 255.0.0.0
  - → no shut
  - → end.
* Click on router 1, click on CLI, enter the following commands -
  - → no
  - → enable

→ config t
→ interface serial 2/0
→ ip address 20.0.0.20 255.0.0.0
→ no shut
→ exit.

* The red lights between the two routers will now turn green, indicating that they are now ready for communication

Teaching router 0 of network 30 and 40.

→ no
→ enable
→ config t
→ interface serial 2/0
→ ip route 0.0.0.0 0.0.0.0 20.0.0.20
→ exit
→ show ip route.

Teaching router 1 of network 10 n 40.

→ no
→ enable
→ config t.
→ interface serial 2/0
→ ip route 0.0.0.0 0.0.0.0 20.0.0.10
→ exit
→ interface serial 3/0
→ ip route 0.0.0.0 0.0.0.0 30.0.0.20

Teaching router 2 of network. 10 and 20

→ no
→ enable.

→ config t
→ interface serial 2/0
→ ip route 0.0.0.0 0.0.0.0 20.0.0.10
→ exit
→ show ip route.

Simulation mode - Add a simple PDU by selecting the PC and click on the arrow from right pannel.

Real time mode - Select the PC PC0 and go to its command prompt and specify the destination address [ping 10.0.0.10].
Once the message has been successfully delivered to router 0., Repeat the same for router 1 and router 2.
Finally ~~see~~ Ping PC-2 and send the message via the routers.

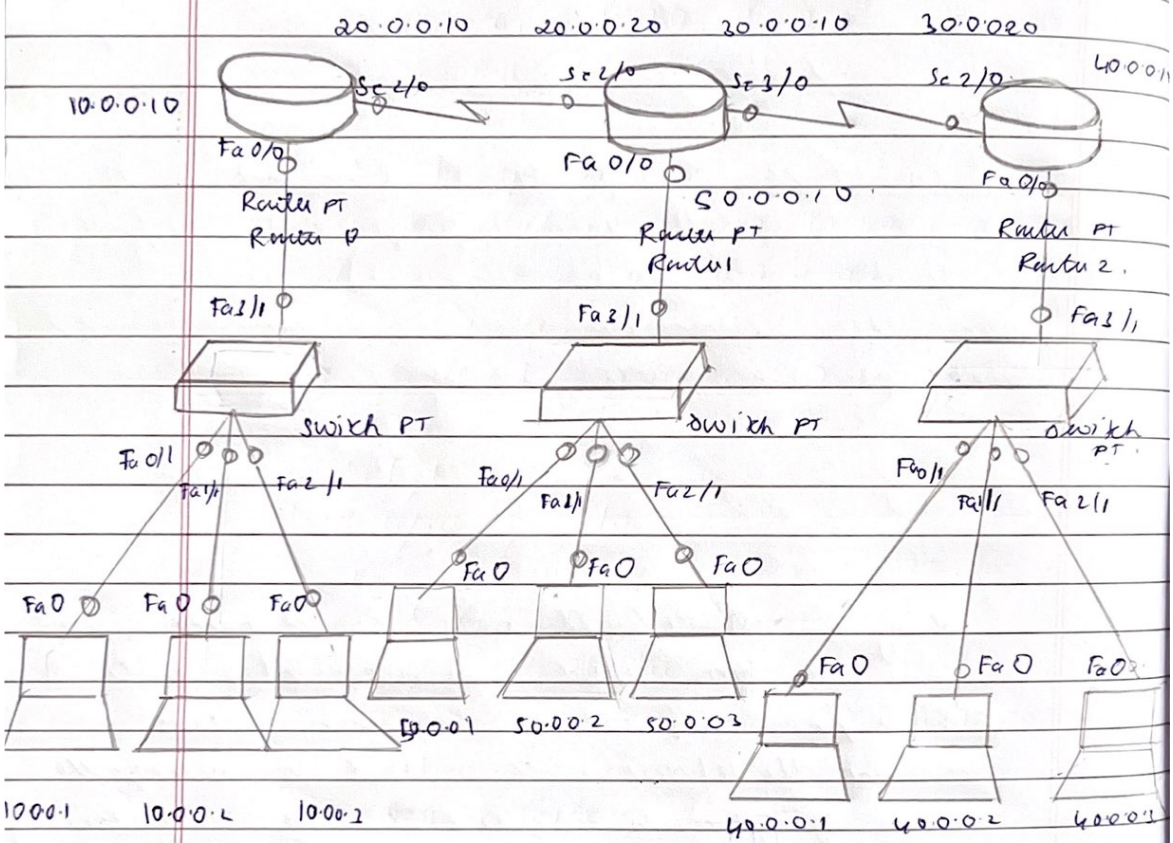
Learning - A default route is the route that takes effect when no other route is available for an IP address destination address.
We use the default route method to minize the number of commands required to track all routers of all networks. Here we use only 4 commands to track the 3 routers of the networks.

Experiment-3

28/11/22 Configuring different routes to the router via switches.

Aim: To configure different routes to a router via switches using minimum commands.

Topology:



procedure:

→ place 2 generic routers, 3 generic switches & 9 generic PCs in the work space.

→ connect the PCs to the switches using copper straight through

→ connect the switches to routers also using copper straight through

→ Connect the routers with one another using serial DCE
→ set the IP address of each pc and subnet mask in fast ethernet 0.
→ set the default gateway for each pc using settings.
→ click on the router & enter the following commands to establish connection with the switch:
  → enable
  → configt
  → interface fastethernet 0/0
  → ip address 10.0.0.10 255.0.0.0
  → no shut.
→ After some time the light which was amber for the switch will turn green indicating the switch and router are ready for communication.
→ Repeat the same for the other two routers.
→ click on the router to now establish connection with the neighbouring router.
→ enter the following commands. for router 0 -
  → enable
  → config t
  → interface serial 2/0
  → ip address 20.0.0.10 255.0.0.0
  → noshut.

→ click on router 1
  → enable
  → configt
  → interface serial 2/0
  → ip address 20.0.0.20 255.0.0.0
  → no shut
→ the red light between the two routers will

turn green indicating they are ready for communication.

→ Teaching router 0 about network 30, 40 & 50.

→ Click on router 0, open CLI -

→ enable
→ config t
→ interface serial 2/0
→ ip route 0.0.0.0 0.0.0.0 20.0.0.20
→ ~~no shut~~
→ exit
→ show ip route.

it will show that networks 30, 40 & 50 are connected via gateway 20.0.0.20.

Teaching router 1 of network 10 & 40.

→ enable
→ config t
→ interface serial 2/0
→ ip route 0.0.0.0 0.0.0.0 20.0.0.10
→ exit
→ interface serial 3/0
→ ip route 0.0.0.0 0.0.0.0 30.0.0.20
→ exit
→ show ip route.

Teaching router 2 of network 10, 20 & 50

→ enable
→ config t
→ interface serial 2/0
→ ip route 0.0.0.0 0.0.0.0 30.0.0.10
→ exit
→ show ip route.

Simulation mode - Add a simple PDU by selecting the PCs and click on the auto capture from right panel.

Real time mode - Selut the PC PC0 and go to its command prompt and ping a PC in network 50.
At first it will show request timed out as 1 one packet will be lost during transmission.
But on executing the command once more, the PC will now have learnt the network and the message will be successfully sent to the PC in network 50 without any loses.
Finally ping a PC in network 40 and repeat the same. We will observe that the message will be sent sucessfully.

Result:

PC > Ping 50.0.0.1
Pinging 50.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 50.0.0.1 : bytes = 32 time = 14ms TTL = 126
Reply from 50.0.0.1 : bytes = 32 time = 12ms TTL = 124
Reply from 50.0.0.1 : bytes = 32 time = 3ms TTL = 124

Ping statistics for 50.0.0.1 :
Packets: sent = 4, recieved = 3, lost = 1 (25% loss)

PC > Ping 50.0.0.1
pinging 50.0.0.1 with 32 bytes of data:

Reply from 50.0.0.1 : bytes = 32 time = 2ms TTL = 125
Reply from 50.0.0.1 : bytes = 32 time = 2ms TTL = 124
Reply from 50.0.0.1 : bytes = 32 time = 11ms TTL = 124
Reply from 50.0.0.1 : bytes = 32 time = 2ms TTL = 124

Ping statistics for 50.0.0.1 :
Packets : sent = 4, recieved = 4, lost = 4 (0% loss)

PC> Ping 40.0.0.1
pinging 40.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 40.0.0.1 : bytes = 32 time = 2ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 3 ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 10ms TTL = 125

Ping statistics for 40.0.0.1 :
Packets : sent = 4, recieved = 3, lost = 1 (25% loss)

PC> Ping 40.0.0.1
pinging 40.0.0.1 with 32 bytes of data

Reply from 40.0.0.1 : bytes = 32 time = 23ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 18 ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 14ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 3ms TTL = 125

Ping statistics for 40.0.0.1 :
Packets : sent = 4, recived = 4, lost = 0 (0% loss)

Learnings : In this network router R_2 does not have a default router, because R_1 & R_3 cannot become a default router simultaneously. and if any one of R_1 and R_2 is default then the packets that are supposed to enter R_2, and go to R_3 / R_1 as they are default