Week - 01 >

26/09/2024

Create a topology and simulate sending a simple PDU form source to demonstrate using hub and Switch as connecting devices and demonstrate Pingmessage

20.20.20.1

20.20.20.2

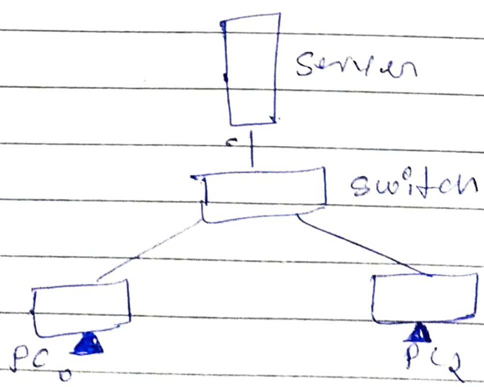
PC0
Desktop
IP configuration

PC1
Desktop
IP configuration.

Command Prompt
→ ipconfig.
→ ip config/all
→ ping 20.20.20.2

→ ip config.
→ ip config /all
→ Ping 20.20.20.1

Q =>



Server → Service → DHCP → Service on
→ Default Gateway : 20.20.20.1
→ DNS Server : 0.0.0.0
→ Start IP Address . $\boxed{172}$ $\boxed{6}$ $\boxed{168}$ $\boxed{10}$ $\boxed{0}$
→ Subnet Mask :

creating first network

(1) add devices Generic PC & Generic Server

(2) connect devices and see whether lights are green (or) not using copper cross over and copper straight through cable.

(3) configure PC → change IP address 192.168.0.110
change DNS Server 192.168.0.105

(4) configure Server → change name to web Server
set IP address to 192.168.0.105

2. Sending simple test message in Real time Mode

(1) open the previous file

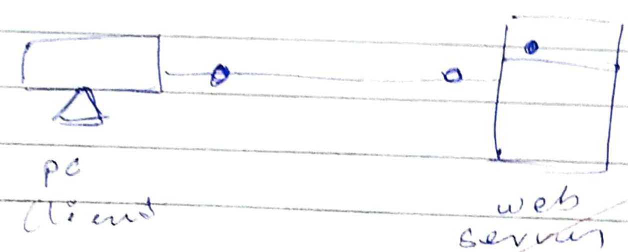
(2) Add simple PDU to send ping to the server

(3) Toggle the PDU List window to view the message

(4) Label the scenario

(5) create a new Scenario

(6) Manage Scenarios (Delete)



LAB- 02

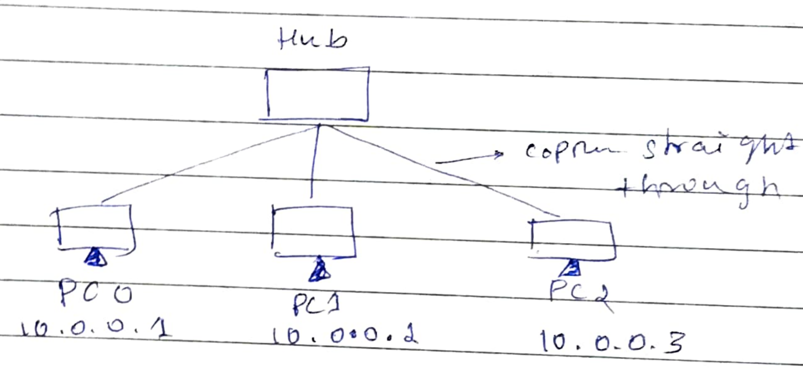
3/10/2024

Title :- packet tracer using hub and switch topology

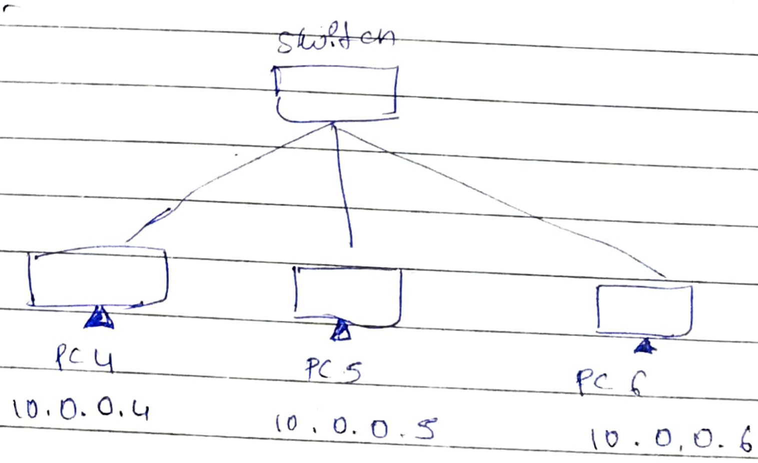
Aim :- Create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate ping message.

Topology :-

Hub :-



switch :-



Hub :-

procedure :-

1. Select the end device and change change their IP address suitably
2. Select hub as connecting devices
3. select copper-straight-through as the connecting wire b/w end devices & hubs

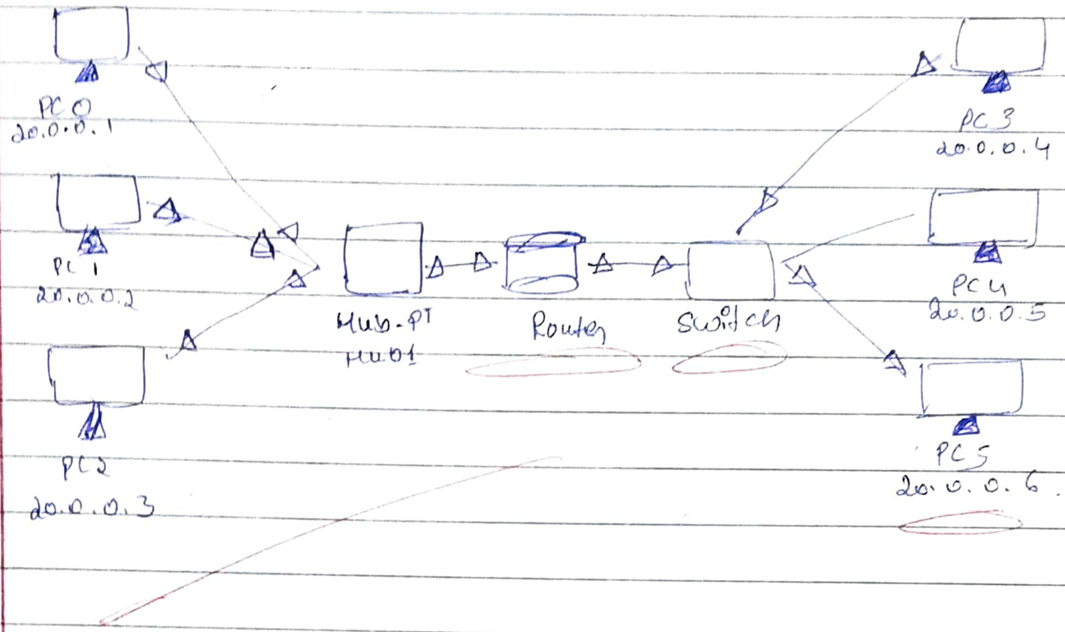
(4) Connect the fast thernet to hub Port
(5) select the message & first click on source device and destination device
(6) observe ~~devi~~ the packet transmission and acknowladgment receiving procedure

Procedure for switch :-

(1) select the end device change IP configu
(2) Select switch as connecting device
(3) select copper stright through as the connecting wire between end devices & hub
(4) select the message & first click on source device and then destination device.
(6) observe the packet transmition and acknowledgment receving procedure

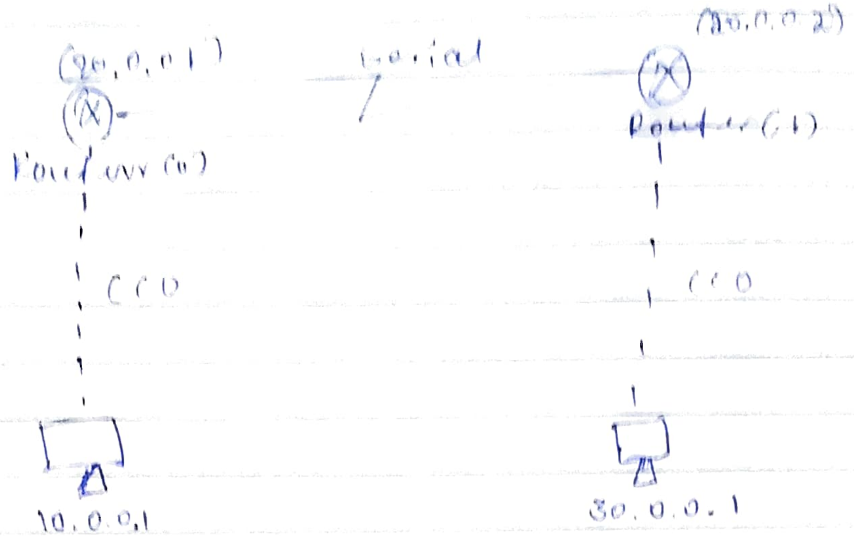
Procedure to add router :-

(1) Select the router
(2) select copper stright
(3) set the ip configuration
(4) send message hub pc to switch pc.
(5) observe the packet transsions and acknowoledgement receving procedure


PC 0
20.0.0.1
PC 1
20.0.0.2
PC 2
20.0.0.3
Hub-PT
Hub1
Router
Switch
PC 3
20.0.0.4
PC 4
20.0.0.5
PC 5
20.0.0.6

LAB 3 24/10/2024

- Configuring Route and PC's :- (2 Router Connection)



Procedure :-

Router 1 :-

> Select a generic router
> Go to config.
> configure the fastethernet o/o by assigning IP address as 10.0.0.2. & subnet mask as 255.0.0.0 & then on the port status
> configure the serial o/o by assigning IP address as 20.0.0.1 & subnet mask as 255.0.0.0 & turn on the port status

Router 2 :-

> Select a generic router
> Go to config
> configure the fastethernet o/o by assigning IP address as 30.0.0.2 & subnet mask as 255.0.0.0 & turn on port

> Configure the Serial 0/0 by assigning IP address as 20.0.0.2 & subnet mask as 255.0.0.0 & turn on the port study

PCA :-

select a PC-PT type PC
select PCA & go to fastethero in the config & assign on IP address & subnet mask for PCA as 255.0.0.0 set the default gateway as 20.0.0.2

PCB :-

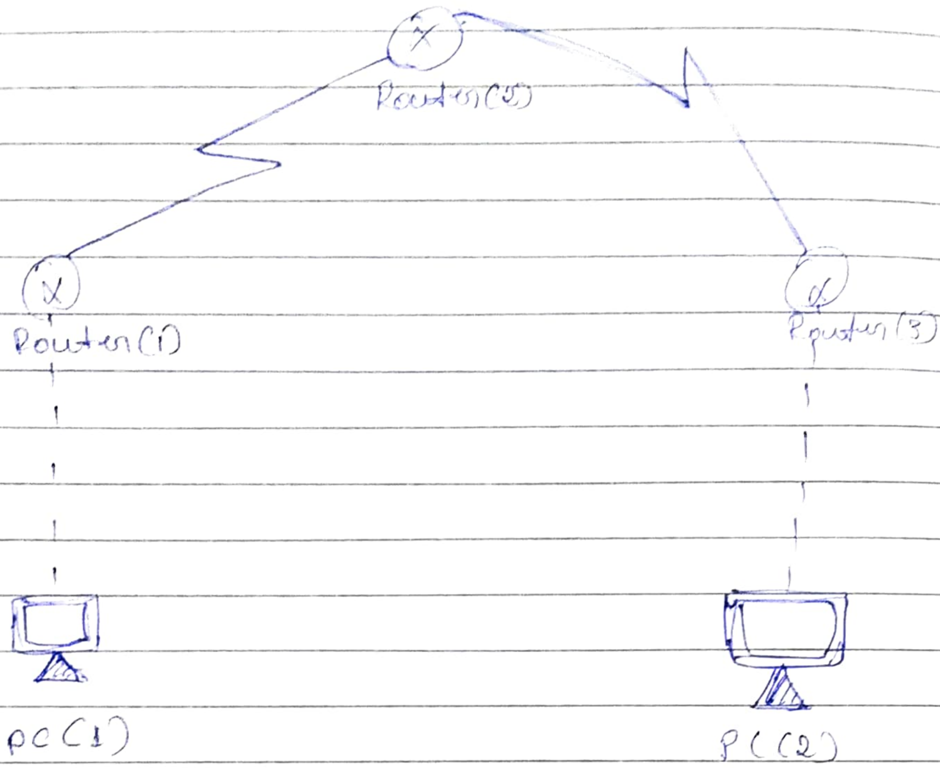
select a PC-PT type PC
select. PCB & go to fastethern 0 in the config & assign on IP address & subnet mask for PCB as 255.0.0.0 set the default gateway 192.168.2.1

Making connections :-

connect the PCA to Router 1 using the copper cross over. connection & similaraly for connecting PCB & Router 2 again using copper cross over connection and the for connecting Router 1 & Router we used ~~the~~ connection Serial port to connect

LAB - 07 24/10/2024

Configuring 3 Routers and 2 PC's



Procedure :-

Router 1 :

> select a Generic Router
> Go to config
> configure the fastEthernet 0/0 by assigning IP address as 30.0.0.1 & sub subset mask as
> ip router 30.0.0.0 255.0.0.0 20.0.0.2
ip route 40.0.0.0 255.0.0.0 20.0.0.2

Router 2

> enable
> config

interface serial 0/0
ip route 10.0.0.0 255.0.0.1 . 20.0.0.1
> ~~interface~~ .

Router 3 :-
> select a genetic router
> Go to config
> configure the fast ethernet 0/1 by assigning mask as 255.0.0.0 & turn ON port
> configure the serial 0/1 by assigning mask as 10.0.0.1 & 10.0.0.2 & subnet mask as 255.0.0.0 & 255.0.0.0 respectively & turn ON the port status

PC (1) :-
> Select a PC-PT type PC
> select PC 1 & go to fast ethernet 0 in the config & assign an IP address 20.0.0.1 & subnet mask for PC1 as 255.0.0.0 set the default gateway as 20.0.0.1

PC (2) :-
> Select a PC-PT type PC
> select PC2 & go to fast ethernet 1 in the config & assign an IP address 20.0.0.2 & subnet mask for PC2 as 255.0.0.0 set the default gateway as 20.0.0.2

CLI :- Router 1
~~# show ip route~~
~~# enable~~
config t

interface serial 2/0
ip route 30.0.0.0 255.0.0.0 20.0.0.2
ip route 40.0.0.0 255.0.0.0 20.0.0.2

CLI : Router 2
enable
config t
interface serial 2/0
ip route 10.0.0.0 255.0.0.0 20.0.0.1
exit
interface serial 3/0
ip route 40.0.0.0 255.0.0.0 30.0.0.2
exit

Router 3 :-
enable
config t
interface serial 3/0
ip route 20.0.0.0 255.0.0.0 30.0.0.1
ip route 10.0.0.0 255.0.0.0 30.0.0.1
exit

Prompt & PC0 :-
Pinging 40.0.0.1 with 32 bytes of data
Request time out
Reply from 40.0.0.1 bytes=32
time = [illegible] TTL = 126
Reply from 40.0.0.1 bytes=32
time = [illegible] TTL = 126
Reply from 40.0.0.1 bytes=32
time [illegible] TTL = 126

Ping statistics for 20.0.0.1
packets : sent-4, Recieved = 3. Lost = 1
(25 % loss).
Approx round triptime in ms min: 1ms,
max : 18 ms, Avg : 8ms.

→ observations:-

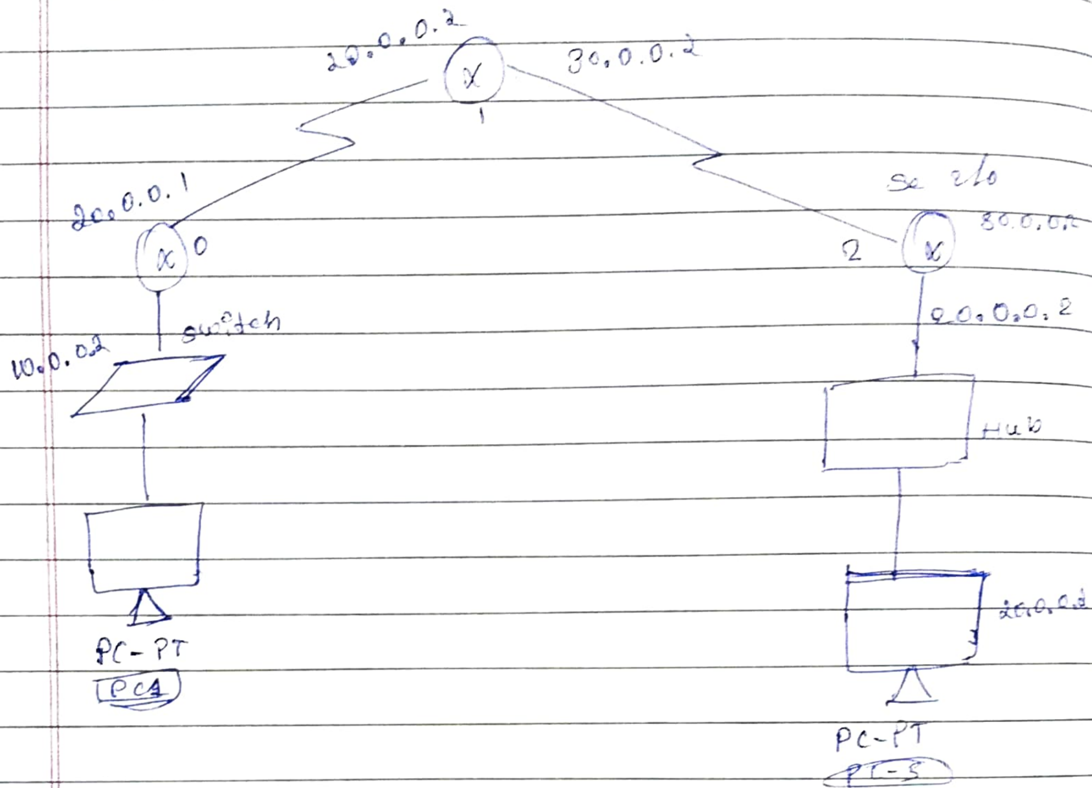
- PC(1) sends to packets to PC(2) where is connected to Router 1 is directly connected to network to network 10.0.0.0 & 20.0.0.0 its connected to 30.0.0.0 & 20.0.0.1 via serial 2/0 indirectly by 20.0.0.2 using ip route

- Router(2) is directly connected to 20.0.0.0 and 30.0.0.0 via serial 2/0 through 20.0.0.1 & 40.0.0.0. through 30.0.0.2 using ip route.

Router(3) is directly connected to 10.0.0.0 and 20.0.0.0 network through 30.0.0.1 using ip route.

Now PC(1) can send to PC(2) successfully

Configuring 3 Routers { Default } :-



Procedure :-

Take 2PC : PC1 ⇒ ip address 10.0.0.1

PC2 ⇒ ip address 20.0.0.2

1 switch, 1 hub, 3 route to config.

Take router 0 ⇒ Fa 0/0 ⇒ 10.0.0.2

Se 2/0 ⇒ 20.0.0.1

router 1 → Se 2/0 ⇒ 20.0.0.2

Se 3/0 ⇒ 30.0.0.1

router 2 → Se 2/0 ⇒ 30.0.0.2

Fa 0/0 ⇒ 20.0.0.1

* Add gate address to PC1 & PC2 as

10.0.0.2 & 20.0.0.1

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Date: Page:

Router 1 → ip route 0.0.0.0 0.0.0.0 20.0.0.1

ip route 0.0.0.0 0.0.0.0 30.0.0.2

Router 2 → ip route 0.0.0.0 0.0.0.0 30.0.0.1

Router 0 → ip route 0.0.0.0 0.0.0.0 20.0.0.2

→ Go to cmd of PC 11

Ping 20.0.0.2 with 32 bytes of data

Reply from 20.0.0.1 bytes = 32 time = 2ms TTL = 125

Reply from 20.0.0.1 bytes = 32 time = 2ms TTL = 125

Reply from 20.0.0.1 bytes = 32 time = 2ms TTL = 125

Reply from 20.0.01 bytes = 32 time = 2ms TTL = 125

Ping statistics for 20.0.0.2:

Packet : Sent = 4, Received = 4, Lost = 0

Approx round trip time in milli sec

min = 2ms max = 11ms Avg = 5

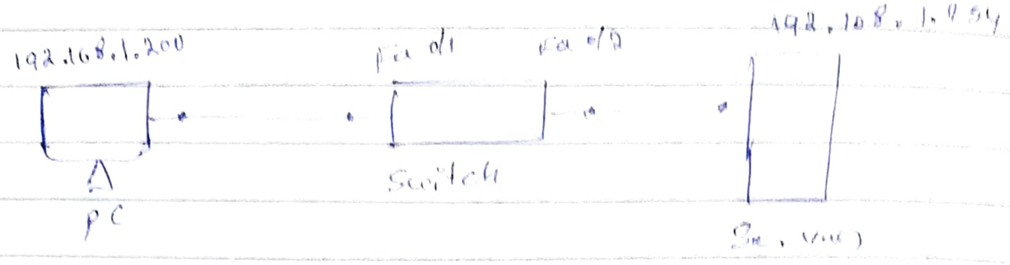
→ Observations:

in the static route method we have to route the routers using network address

16-11

Week 5 / 07/11/2024

Demonstrating web server and DNS using packet tracer.



Steps :-

(1) connect server, switch with copper straight through cable. connect switch & PC. PT with copper straight through cable.

Server → 192.168.1.254

PC → 192.168.1.200

and cmd prompt PC. PT

pinging. IPaddress: PC. PT

ping 192.168.1.254

pinging 192.168.1.254 with 32 bytes of data:

Reply from 192.168.1.254: bytes=32 time=178ms TTL=128

time=4ms

time=4ms

time=9ms

Ping statistics for 192.168.1.254:

packets: Sent=4, Recieved=4, Lost=0

Max=4ms, min=178m, Avg: 48ms.

→ In Server goto Service click on HTTP

→ create a new file and add the html cod & save with html extension

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Date: Page:

→ To test our web browser click on PC & click on web browser box

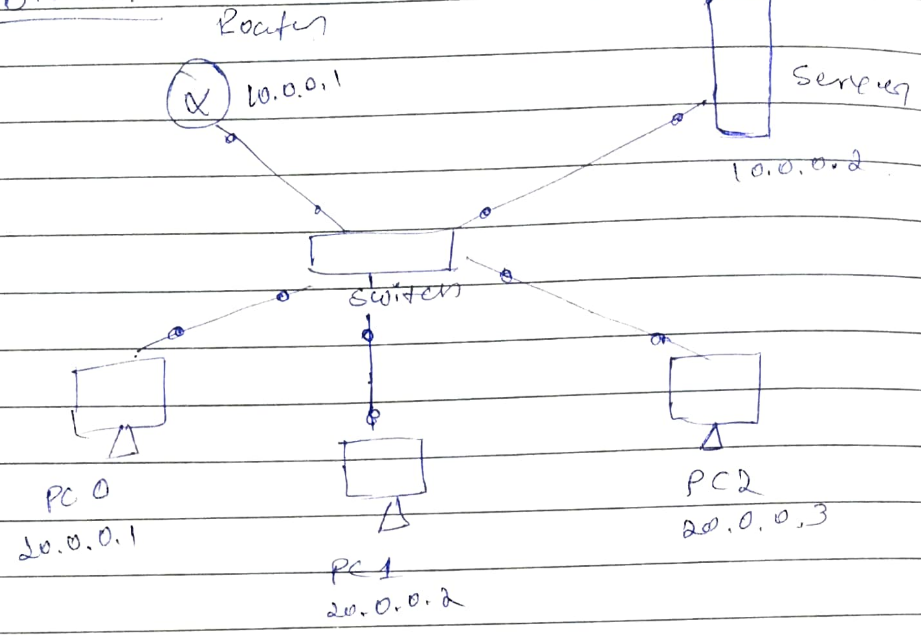
→ Type the ip address server in the URL browser we come see the webpage we saved in server.

Observation :-

upon typing the server IP address in the web browser box

→ URL box between ~~web~~ server will be visible on the PC. All the html pages on server can be accessed using PC

② DHCP:-



Router ip → 10.0.0.1

→ Server → Gateway → 10.0.0.1

ip address → 10.0.0.2

submask → 255.0.0.0

→ click on DHCP in server, you can see the default path

→ default gateway = 10.0.0.1

DNS server → ip of server ⇒ 10.0.0.2

⇒ edt start ip address = 10.0.0.10

⇒ max no of user = 500

⇒ AVG TFTP server ip address → server ip → 10.0.0.2

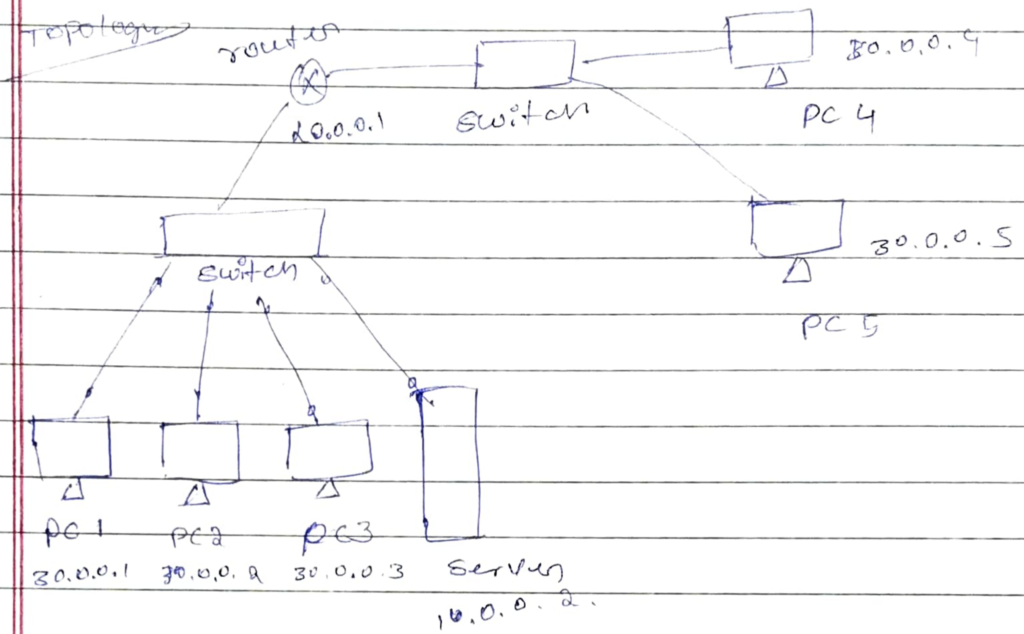
→ Now, click on PC → desktop → ip config → choose Prio

observation:-

When a device connects of a network, it automatically requests an ip address from a DHCP server & the server & the server will dynamically assign it

② Aim:- Get IP from DHCP that is present in some other network using ip helper address

Topology



for Router
interface fastethernet 0/1
ip adress 20.0.0.1 , 255.0.0.0
no shutdown
exit

click server → config → DHCP
add pool 20 network
default gateway → 20.0.0.1
DNS Server → 10.0.0.2
IP address :- 20.0.0.10
Subnet mask → 255.0.0.0
no. of user → 560
TFTP server → 10.0.0.2

to connect to outer LAN
Router # interface fast ethernet 0/1
ip helper - address 20.0.0.2
exit

Click on PC → Desktop → IP config →
choose DHCP

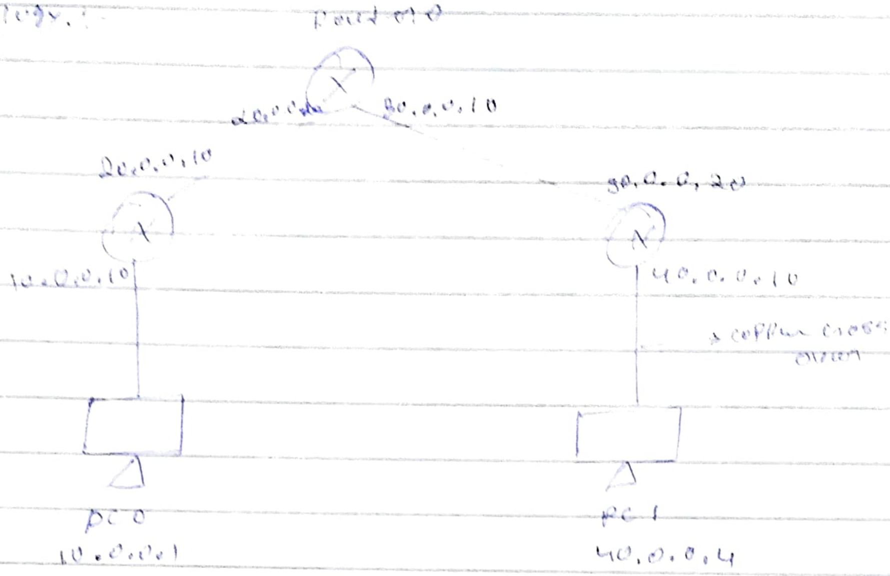
observation:-
As we added the ip helper address to the ~~the~~ router, the DHCP server can assign the ip address dynamically to the PC's which is in another network (not the same as the server)

LAB - 9

14/11/2024

Aim :- Configuring RIP routing protocol in system of 3 Routers

Topology :



Procedure :-

1) Select two PCs and 3 routers connect the PCs to two routers using copper cross over wires and connect the router to another router with serial DCE with timer

2) Set the IP address of both the PCs as 10.0.0.1 & 40.0.0.1 respectively and their gateway as 10.0.0.10 & 40.0.0.10 respectively

3) Router 1 configuration :-

```
> enable
> config t
# interface fastethernet 0/0
# ip address 10.0.0.10 255.0.0.0
# no shut
# exit
# interface Serial 2/0
# ip address 20.0.0.10 255.0.0.0
# encapsulation ppp
# clock rate 64000
# no shut
# exit
```

Router 2 configuration

>enable
>config t
interface fastethernet 0/0
ip address 40.0.0.10 255.0.0.0
no shut
exit
interface serial 3/0
ip address 30.0.0.20 255.0.0.0
encapsulation app
no shut
exit

Router 0 :-

> enable
>config t
interface serial 2/0
ip address 20.0.0.20 255.0.0.0
encapsulation ppp
no shut
exit
interface serial 3/0
ip address 30.0.0.10 255.0.0.0
encapsulation app
clockrate 64000
no shut
exit

(4) Now network router configuration for Routing Information Protocol (RIP) is done as follows

Router 1

router rip
network 10.0.0.0
network 20.0.0.0
exit

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Date: Page:

Router 2:-
router-rip
network 30.0.0.0
network 40.0.0.0
exit

Router 3:-
router-rip
network 20.0.0.0
network 30.0.0.0
exit

(5) After RIP configuration of all router we check the routing table of all by giving
For router 0:-
show ip route
R 10.0.0.0/8 via 20.0.0.10, 00:00:13 serial 2/0
20.0.0.0/8 is variably subnetted, 2 subnets
2 masks

C 30.0.0.0/8 is directly connected serial 3/0
C 30.0.0.0/32 is directly connected serial 3/0
R 40.0.0.0/8 via 30.0.0.20, 00:00:12, serial 3/0

(6) Now, ping 10.0.0.1 from the command prompt of 40.0.0.1 and vice versa

Result
from 10.0.0.1 > Ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:

Request timed out
Reply from 10.0.0.1: bytes: 32 time=2ms TTL=12
" " time=2ms "
" " time=2ms "

Ping statistics for 10.0.0.1:
packets : sent = 4, Received = 3, 0 01
Approximate round trip time in milli-seconds
minimum = 2ms, maximum = 12 ms, Average = 2ms

from 10.0.0.1 > Ping 40.0.0.1
pinging 40.0.0.1 with 32 bytes of data:
Reply from 40.0.0.1: bytes = 32 time = 2ms TTL = 120
" TTL = 168
" TTL = 128
" TTL = 128

Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0
Approximate round trip time in milli seconds:
minimum = 2ms, maximum = 8 ms, Average = 2ms

Observation :-

After pinging 10.0.0.1 from 40.0.0.1 ip router was succesfull and the message was passed from one PC to other PC

If gateway is not configured then ping may fail & none of the packets will be received.
RIP configuration of all router should be verified from routing table.

LAB - 07

21/11/2024

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CRC implementation

write a program for error detecting code using CRC-CCITT

C-code :-

```
#include <stdio.h>
#include <string.h>
~~#include <~~
#define N strlen(poly)

char data[30];
char check.value[30];
char poly[10];
int data length, i, j;

void XOR {
    for (j=1; j<N; j++){
        checkvalue[j] = ((check value[j] == play[j])?
                                    '0' : '1');
}

void receiver() {
    printf("Enter the received data: ");
    scanf("%s", data);
    printf("Data received: %s", data);
    crc();
    for(i=0; (i<N-1) && (check_value[i]!='1'; i++);
    if (i<N-1)
            printf("\n Error detected \n");
    else
        printf("\n No error detected \n");
}
```

```
void crc(){
    for(i=0; i<N; i++)
        check value[i]= data[i];
    do{
        if(check value[0] == '1')
            XOR();
        for(j=0; j<N-1; j++)
            check_value[j]= check_value[j+1];
        check_value[j]= data[i++];
    }while(i<= data_length+N+1);
}

int main(){
    Printf("\n Enter data to be transmitted:");
    scanf("%s", data);
    printf("\n Enter the divisor polynomial:");
    scanf("%s", poly);
    data_length = strlen(data);
    for(i= data_length; i< datalength+N-1; i++)
        data[i]= '0';
    Printf("\n Data padded with n-1 zeroes: %s",
                data);
    crc();
    Print("\n CRC value is %s", check_value);
    for(i= data_length; i< data_length+N-1; i++)
        data[i]= check_value[i- data_length];
    Printf("\n final dataword to be sent: %s", data);
    receiver();
    return 0;
}
```

Output :

Enter data to be transmitted 101010
Enter the divisor polynomial : 1011

Data padded with n-1 zeroes : 101010000
CRC value is : 001
Final codeword to be sent : 101010001

Enter the received data : 10001000
Error detected

Enter data to be transmitted : 10100
Enter the divisor polynomial : 1001

Data padded with n-1 zeroes : 10110000
CRC value is : 001
Final codeword to be sent : 10110001

Enter the received data : 10110001
No error detected.

21-11

write a program for congestion control using
Leaky Bucket algorithm

C-code:-

```
#include <stdio.h>

int main() {
  int incoming, outgoing, buck_size, n, store=0;
  printf("Enter bucket size: ");
  scanf("%d", &buck_size);
  printf("Enter outgoing size: ");
  scanf("%d", &outgoing);
  printf("Enter number of inputs: ");
  scanf("%d", &n);

  while(n!=0){
    printf("Enter the incoming bucket size:");
    scanf("%d", & incoming);
    if(incoming <=(buck_size-store)){
      store += incoming;
      printf("Bucket buffer size %d out of %d\n",
             store, buck_size);
    }else {
      printf("Dropped %d no of Packets \n",
             incoming-(buck_size-store));
      printf("Bucket buffer size %d out of
             %d \n", store, buck_size);
      store = buck_size;
    }
    store = Store-outgoing;
    printf("After outgoing %d packets left out of
```

```
%d in buffer \n", store, buck_size);
  n--;
 }
}
```

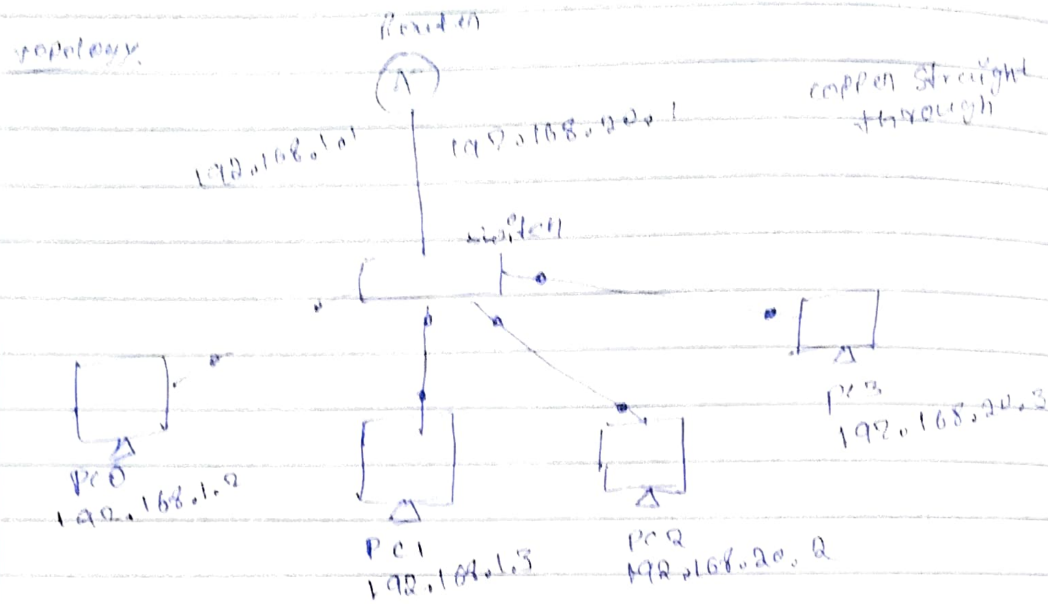
Output :-

Enter bucket size : 5000
Enter outgoing rate : 2000
Enter number of inputs : 2
Enter the incoming packet size : 3000
Bucket buffer size 3000 out of 5000
After outgoing 1000 packets left out of 5000 in buffer
Enter the incoming packets size : 1000
Bucket buffer size 2000 out of 5000
After outgoing 0 packets left out of 5000 in buffer

LAB - 8 | VLAN | 28/11/2024

Aim: To construct a VLAN and make the PC's communicate among a VLAN

Topology:



Procedure :-

1. Set up the topology as shown above use 1841 router
2. Add an extra router port to the switch as as needed
3. use copper straight through wire set the IP address & gateway
4. In switch → config → VLAN Database, give any VLAN numbers here 20 and, VLAN name here → VLAN
5. select add, select the interface (here - fastethernet 4/1), (nearest to the switch from router) and make it trunk
6. Look into fastethernet 2/1 & 3/1 and change VLAN 1 to 20 : VLAN
7. In Router select VLAN DATABASE, enter the number and name of the VLAN created

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Date: Page:

In CLI of router
Router(vlan)# exit
Apply completed
Exiting...
Router# config t
Router(config)# interface fastethernet 0/0
Router(config-if)# ip address 192.168.1.1 255.255.255.0
Router(config-if)# no shut

Router(config)# interface fastethernet 0/0.1
Router(config-subif)# encapsulation dot1q 20
Router(config-subif)# ip address 192.168.20.1 255.255.255.0
Router(config-subif)# no shut
Router(config-subif)# exit

Result
(in PC0)
PC> ping 192.168.20.3

Pinging 192.168.20.3 with 32 bytes of data

Replay from 192.168.20.3: bytes=32 time=1ms TTL=128
Replay from 192.168.20.3: bytes=32 time=1ms TTL=128
Replay from 192.168.20.3: bytes=32 time=0ms TTL=128
Replay from 192.168.20.3: bytes=32 time=0ms TTL=128

ping statistics for 192.168.20.3
packets: Sent=4, Received=4, Lost=0
Approximate round trip time in milliseconds
minimum=0ms, maximum=1ms, Average=0ms

Observation :-

(1) VLAN's - virtual local area network is any broadcast domain that is partitioned and isolated in a computer network at the data link layer

(2) It is a virtualised connection that connects multiple devices and network nodes from different LANs into one logical network

LAB - 9 !

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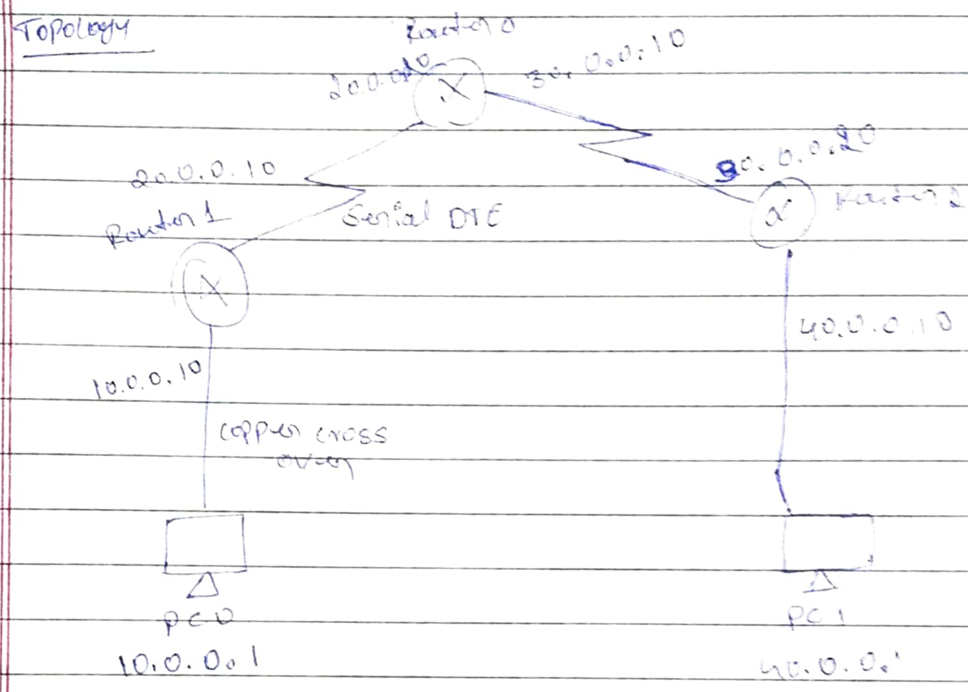
Date: Page:

Aim - To demonstrate the TTL / life of a packet.

Topology



Procedure :-

① create a 2 PC and 3 router configuration as shown in the topology

② use serial DTE between routers and copper cross over between router and PC

③ Configure the IP address and gateway of PC and configure all the routers

For router 0

```
> enable
# config t
# interface serial 2/0
# ip address 20.0.0.20 255.0.0.0
# no shut
# exit
```

ip route 30.0.0.0 255.0.0.0 20.0.0.20
ip route 10.0.0.0 255.0.0.0 20.0.0.20
exit

For router 1
> enable
config t
interface serial 2/0
ip address 20.0.0.20 255.0.0.0
no shut
exit
interface serial 3/0
ip address 30.0.0.10 255.0.0.0
no shut
exit
~~# ip address interface serial 3/0~~
~~# ip address 30.0.0.10 255.0.0.0~~
ip route 10.0.0.0 255.0.0.0 20.0.0.10
ip route 40.0.0.0 255.0.0.0 30.0.0.20
exit

For router 2
> enable
config t
interface serial 2/0
ip address 30.0.0.20 255.0.0.0
no shut
exit
interface fastethernet 0/0
ip address 40.0.0.10 255.0.0.0
no shut
exit

ip route 10.0.0.0 255.0.0.0 30.0.0.10
ip route 20.0.0.0 255.0.0.0 30.0.0.10

(5) Select simulation mode, select simple PDU and acknowledgement from pc to router and router to pc

(6) click on PDU during every transfer to see the inbound and out bound PDU details observe the difference in the TTL

Result :-
PDU information at PC0
Outbound PDU details :
TTL = 255
PDU information at Router 0
Inbound PDU details :
TTL = 255
Outbound PDU details :
TTL = 254
PDU information at Router 1
Inbound PDU details
TTL = 254
Outbound PDU details :
TTL = 253
PDU information at Router 2
Inbound PDU details :
TTL = 253
Outbound PDU details :
TTL = 252.

Observation :

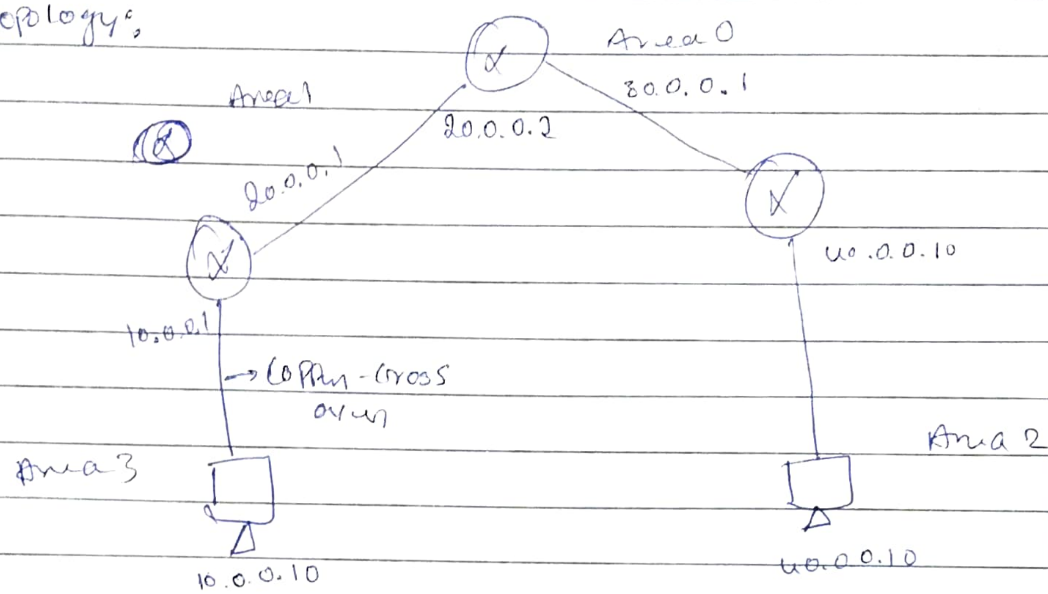
The TTL is reduced by 1 in every router. TTL is a mechanism which limits the number of hops between source and destination.

LAB - 10

19/12/24

Aim - configurating OSPF Protocol for a system of 3 routers.

Topology:



Procedure :-

① Select the two PC's and three routers and join the 2 PC's to the routers with copper cross over wires

② Join the 2 routers to the third router with clocked copper wire.

③ configure the PC's and gateways with IP's

④ configure the routers as per the topology above with the IP addresses

⑤ Encapsulation PPP and clock rate ~~and~~ need to be set as done in rip protocol experiment.

⑥ Configuring each router with OSPF Protocol

For router 0.

>enable
>config t

R1(config)# router ospf 1
R1(config)# router-id 1.1.1.1
R1(config)# network 10.0.0.0 0.255.255.255 area 3
R1(config)# network 20.0.0.0 0.255.255.255 area 3
R1(config)# exit

Router 0

>config t
router ospf 1
router-id 2.2.2.2
network 20.0.0.0 0.255.255.255 area ~~1~~ 3
network 30.0.0.0 0.255.255.255 area 0

Router 2

>config t
router ospf 1
router-id 3.3.3.3
network 30.0.0.0 0.255.255.255 area 0
network 40.0.0.0 0.255.255.255 area 2
exit

(7) configuring the interface

R1(config-if)# interface loopback 0
R1(config-if)# ip add 172.16.1.252 255.255.0.0
R1(config-if)# no shutdown

R2(config-if)# interface loopback 0
R2(config-if)# ip address 172.16.1.252 255.255.0.0
R2(config-if)# no shutdown

Bafna Gold
Date: Page:

R3 (config-if) # interface loopback 0
R3 ((config-if) # ip address 172.16.1.254 255.255.0.5
R3 (config-if) # no shutdown

R3# show ip route

C 40.0.0.0/8 is directly connected
C 30.0.0.0/8 is directly connected serial 8/0
30.0.0.0/32 is directly connected serial 8/0
C 40.0.0.1/32 is directly connected

8) In Router R1
R1 (config) # router ospf 1
R1 (config-router) # area 1 virtual-link 2.2.2.2
In Router R2,
R2 (config) # router ospf 1
R2 (config-router) # area 1 virtual-link 1.1.1.1
R2 (config-router) # exit

Now a virtual link is established between area 3 and area 0

9) Show ip route must be configured in all routers
for router 2
O IA 10.0.0.0/8 via 20.0.0.1, 00:00:01, Serial 2/0
20.0.0.0/8 is variably subnetted, 2 subnet 2 masks
C 20.0.0.0/8 is directly connected, Serial 2/0
C 20.0.0.1/32 is directly connected, serial 2/0
30.0.0.1/8 is directly connected, serial 2/0
2 masks

C 30.0.0.0/8 is directly connected, Serial 2/0
C 30.0.0.2/32 is directly connected, Serial 3/0
O IA 40.0.0.0/8 via 30.0.0.2, 00:06:40
Serial 3/0
C 172.16.0.0/16 is directly connected, loopback

Result

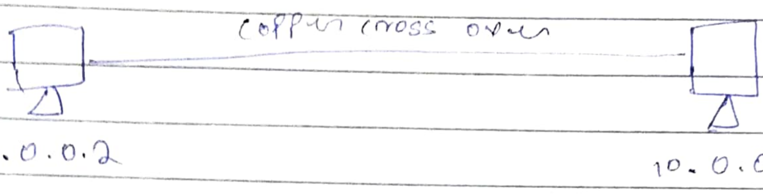
> Ping 40.0.0.10

Pinging 40.0.10 with 32 bytes of data:
Reply from 40.0.0.10: bytes=32 time=9ms TTL=125
" " "
" " "
" " "

Ping statistics for 40.0.0.10:
Packets: Sent=4, Received=4, Lost=0
Approximate round trip times in milliseconds:
Minimum=2ms, Maximum=12ms, Average=8ms

Aim : To understand the operation of TELNET by accessing the router in server room from PC in IT office.

Topology.



Procedure :-

① configure topology as above use copper cross over wire to connect both configure IP address and gateway and the router generally

② In router CLI

Router # ~~config t~~ enable
Router # config t
Router(config)# hostname r1
r1(config)# enable secret p1
r1(config)# interface fastethernet 0/0
r1(config)# ip address 10.0.0.1 255.0.0.0
r1(config-if)# no shut
r1(config-if)# line vty 0 5
r1(config-line)# login
% login disabled on line 132, until password set
——"—— 133 ——"——
——"—— 134 ——"——
——"—— 135 ——"——
——"—— 136 ——"——
——"—— 137 ——"——

r1 (config-line) # password p0
r1 (config-line) # exit
r1 # wr
Building configuration

Result

In PC0

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: 21ms TTL = 256
—— 11 —— time: 6ms —— 11 ——
—— 11 —— time = 6ms —— 11 ——
—— 11 —— time = 0ms —— 11 ——

Ping statistics from 10.0.0.1 :
Packet : Sent = 4, Received = 4, Lost = 0
Approximate roundtrip time in milliseconds:
minimum = 6 ms, maximum : 21 ms, Average = 12ms

PC > telnet 10.0.0.1
Trying 10.0.0.1 open
User access verification
password : (Typed p0)
r1 > enable
Password : (Typed p1)
r1 # show ip route
Code:
gateway of last resort is not set
C 10.0.0.0 /8 is directly connected fast ether - net 0/0.

r1 #

Bafna Gold

Date: Page:

Observation :-

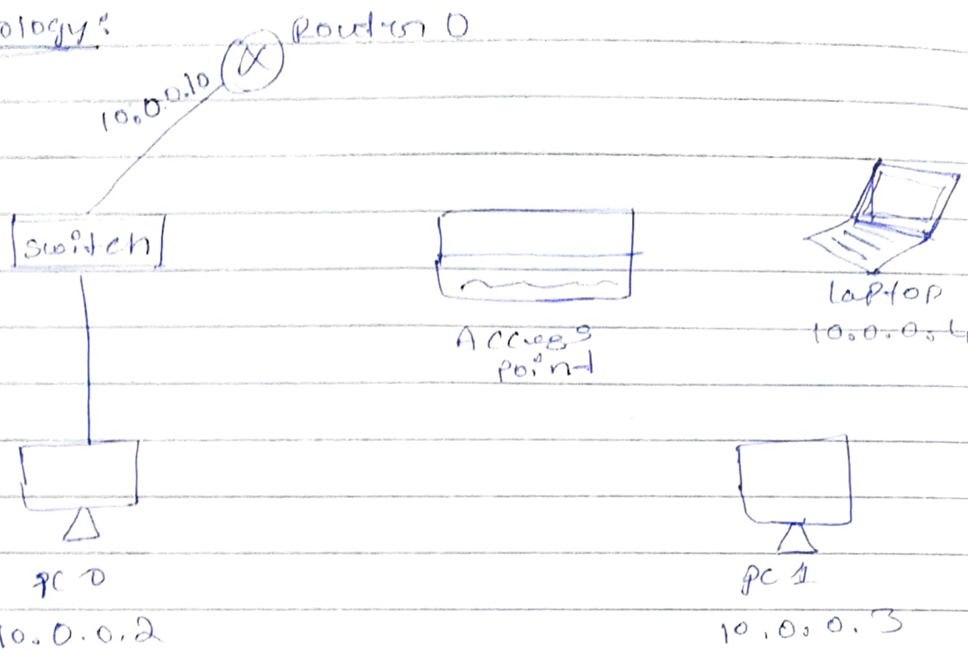
① TELNET is used by terminal emulation programs that allow you to log into a remote host

② we logged into 10.0.0.1 IP device through 10.0.0.2 IP device

③ The password typed is not visible

Aim: To construct a WLAN and make the nodes communicable wirelessly

Topology:



Procedure:

① Construct the above topology use access point connect it to router set the IP address of the PC connected with wire and configure router 1

② configure access. Point → Port 1 → SSID name → WLAN

Select WEP and give any 10 digit key (here 1234567890)

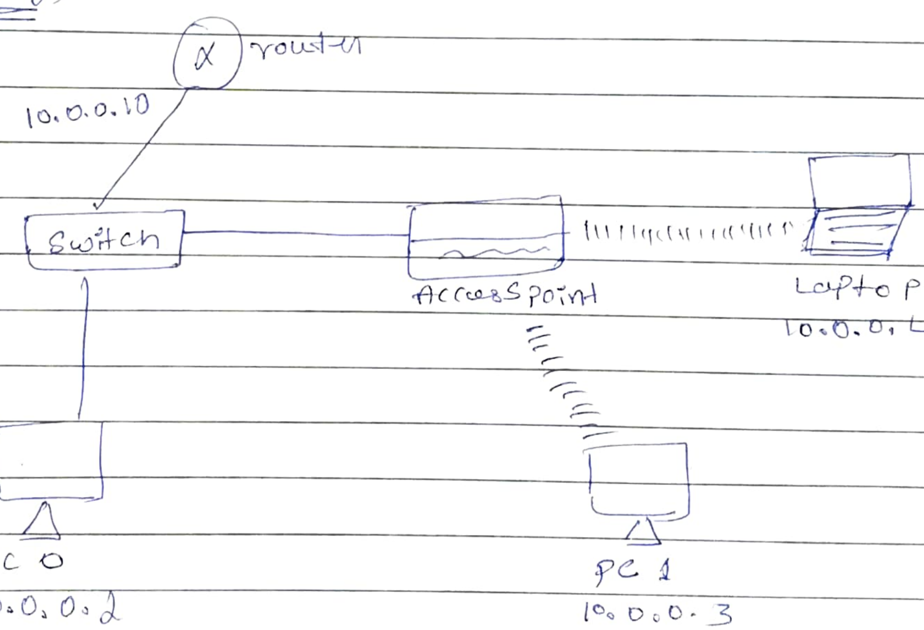
③ To configure PC 2 and laptop wirelessly switch off the device Drag the existing PT- HOST- NM- 1AM to the component listen in the LH3. Drag WMPS00N wirelessly interface to the empty port and switch on the device.

4) Now, in the config tab, a new wireless interface would have been added.
Configure SSID, WEP, WEP key, IP address & gateway to the device.

Router > enable
config t
interface fastethernet 0/0
ip address 10.0.0.10 255.0.0.0
no shut

Result

Topology



Result - in PC 0
PC > Ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes = 32 time = 21ms TTL = 128

—— " —— time = 13ms —"—

—— " —— time = 6ms —"—

—— " —— time = 0ms —"—

Ping statistics for 10.0.0.3

packets sent = 4, Received = 4, Lost = 0

Approximate roundtrip time in milliseconds

Minimum = 6ms, maximum = 21 ms, Average = 12ms

Observation :-

(1) wireless local area network WLAN is a group of alocated computers or other devices that form a network bassed on radio transmission rather than wired connections

(2) After the WLAN is setup, the lined connection appears in the topology from the access point.

LAB 11

26/12/2024

Bafna Gold

Date: Page:

Aim: using TCP/IP Sockets, write a client-Server

Python program :-

clientTCP.py

```
from socket import *
ServerName = '127.0.0.1'
serverPort = 12000
client Socket = socket(AF_INET, SOCK_STREAM)
client Socket. connect( Server Name, Server Port ])
sentence: input (" \n Enter the file name: "):
client Socket, Send(sentence. encode ())
file contents = client socket .recv(1024).decode()
Print (" \n From Server: \n")
Print (filecontents)
client Socket .close ()
```

ServerTCP.py

```
from socket import *
Server Name = '127.0.0.1'
Server Port = 12000
Server Socket : Socket ( AF_INET, SOCK_STREAM)
server Socket, bind (ServerName . ServerPort )
Server Socket. listen (1)

while 1 :
    Print (" The Server is ready to receive")
    Connection Socket. addr = Server Socket. accept()
```

```
Sentence = connectionSocket.recv(1024).decode()

file = open(sentence, "r")
l = file.read(1024)

connectionSocket.send(l.encode())
print("\nSent contents of " + sentence)
file.close()
connectionSocket.close()
```

Result :

Client window :
Enter the file name : ServerTCP.py
contents of the file are displayed

Server window
The server is ready to receive

Sent contents of ServerTCP.py
The server is ready to receive

Bafna Gold
Date: Page:

Aim: using UDP sockets, client-server program

Python program

Client UDP.PY

```
from Socket import *
serverName = '127.0.0.1'
Server Port = 12000
client Socket = Socket(AF_INET. SOCK_DGRAM)
Sentence = input ("\n Enter file name: ")
clientSocket. send to (bytes(Sentence; "utf-8") (
    Server Name, Server PORT))
file contents ServerAddress : client Socket .recv from(2048)
Print ("\n Reply from Server : \n")
Print (file contents. decode ("utf-8"))
# for i in file contents :
    # print (str (i), end = ' ')
client Socket. close ( )
```

Server UDP.PY

```
from socket import *
Server Port = 12000
Server Socket = Socket (AF_ INET, SOCK_DGRAM)
Server.Socket. bind( ("127.0.0.1", ServerPort))
Print ("the Server is ready to receive")

while 1 :
```

```
sentence, clientAddress = serverSocket.recvfrom(2048)
sentence = sentence.decode("utf-8")

file = open(sentence, "r")
con = file.read(2048)

serverSocket.sendto(bytes(con, "utf-8"),
        clientAddress)
print("insert contents of", end=' ')
print(sentence)
# for i in sentence:
    # print(str(i), end=' ')
file.close()
```

Result:

client window:

Enter the file name: serverTCP.py

contents of the file are displayed

Server window:

The server is ready to receive

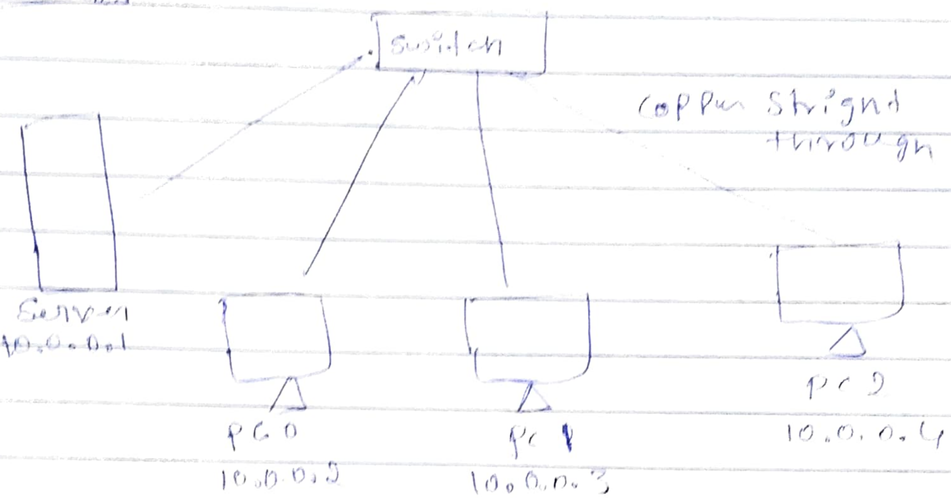
Sent contents of serverTCP.py

the server is ready to receive.

Bafna Gold
Date: Page:

Aim: To construct simple LAN and understand the concept and operation of Address Resolution protocol (ARP)

Topology:



Procedure

(1) Select a switch and 3 PC's and connect them to the switch as shown in the topology above.
(2) connect them with copper-straight through wire
(3) set the IP address of Switch and PCs as shown
(4) Select the inspect tool from the tool bar and open the ARP tables of all the devices
(5) Then, Ping the devices from the command prompt of other devices and click on capture in simulation mode to know the packet routing.

(6) with every ping the arp tables of devices get filled with MAC addresses of the corresponding devices.

(7) Even the switch learns about the MAC address of all devices during pinging process

(8) Once you have pinged all the devices, you can check the arp table of each device in command prompt of PC's

> arp - a

Internet address	Physical address	Type
10.0.0.1	0050.47a4.0043	Dynamic
10.0.0.2	0060.47e5.1424	Dynamic
10.0.0.3	0005.5eae.0b46	Dynamic

(9) In the switch → CLI, you can check the MAC address of the devices as follows

switch> show mac address - table

MAC address table

VLAN	MAC address	Type	Ports
1	0005.5eal.0b46	Dynamic	Fa 2/1
1	000c.8546.6aec	Dynamic	Fa 3/1
1	0060.47a4.a032	Dynamic	Fa 2/1
1	0060.47e5.1424	Dynamic	Fa 1/1

Observation

ARP protocol is communication protocol used for discovering the link layer address such as a MAC address. After pinging every device learns about the MAC

Bafna Gold
Date: Page:

address of the pinged devices and the switch stores there mac address in the ARP table for future pinging ARP learns about the MAC addresses by pinging all the devices and the right IP address responding with the acknowledgement.