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"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

COMPUTER NETWORKS

Submitted by

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in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019
JUN-2023 to SEP-2023

B. M. S. College of Engineering,
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CERTIFICATE

This is to certify that the Lab work entitled "COMPUTER NETWORKS" carried out by **GAGANDEEP KATTENNANAVAR (1BM21CS064),** who is a bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2023. The Lab report has been approved as it satisfies the academic requirements in respectof a **Computer Networks - (22CS4PCCON)** work prescribed for the said degree.

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WEEK 1

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

OBSERVATION:

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(8) Create a topology and simulate sending a simple 'pdu' from source to destination using switch and hub as connecting domain.

Aim → To create a topology and simulate sending a simple pdu from source to destination using switch and hub as connecting domain.

Topology:

Procedure:

1. Select 3 pc's and drag into into the logical workspace and also drag Hub and connect the Hub to three pc's with Copper straight through connection.
2. Again select 3 pc's and switch and drag into the logical workspace and connect switch to three pc's with copper straight through connection
3. Now, wait till all connection turns green.
4. Now try passing pdu from one pc to another pc within the Hub & switch networks
5. Now connect hub and switch with copper cross-over connection.
6. Now, wait till that connection turns green.

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(7) After that try passing the 'pdu' from one of the PC's in the Hub connection network to one of the PC's in the switch connection network.

(8) observe the 'pdu' transfer in the logical workspace in simulation box.

→ Observation: Pinging 10.0.0.6 with 32 bytes of data:
Reply from 10.0.0.6: bytes=32 time=6ms
Reply from 10.0.0.6: bytes=32 time=6ms TTL=128
Reply from 10.0.0.6: bytes=32 time=6ms TTL=128
Reply from 10.0.0.6: bytes=32 time=6ms TTL=128

Ping statistics for 10.0.0.6:
Packets: Sent=4, Received=4, Lost=0 (0% loss)
Approximate round trip times in milliseconds:
Minimum=6ms, Maximum=6ms, Average=6ms.

→ Conclusion: We connected two PC's through a Cisco-switch and verified the packet transfer by pinging PC.
We concluded that Hub transmits data to all devices on a network regardless of whether the data packet contains an mac address or not whereas switch transmits data to the devices on a network by checking the mac addresses.

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Switch :

port-2 Fast ethernet 0	Ip address 10.0.0.3/8	PC-1
Port-1 Fast ethernet 0	Ip address 10.0.0.2/8	PC-2
port-0 Fast ethernet 0	Ip address 10.0.0.1/8	PC-3

15/6/2023

TOPOLOGY:

OUTPUT:

PC3
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 192.160.1.5
Pinging 192.160.1.5 with 32 bytes of data:
Reply from 192.160.1.5: bytes=32 time=1ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Ping statistics for 192.160.1.5:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>

WEEK 2

Configure IP address to routers (one and three) in packet tracer. Explore the following messages: ping responses, destination unreachable, request timed out, reply.

OBSERVATION:

2/6/23 LAB - 2

Program - 2.1

AIM -
Configure IP address to a single router. Explore the following messages ; ping message, destination unreachable request timed out, reply.

TOPOLOGY

Procedure :-
1. Select One Generic router and 2 generic PC's. Connect the PC's to router using copper cross-over cable.
2. Set the IP address of both PC's by clicking on PC and Config tab. Along with IP address set gateway in the settings option on config tab
3. To set the IP addresses of router, click on it & go to CLI tab and type the following commands

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Page _____

Step 1: type NO & press enter
Step 2: type enable & press enter
Step 3: type config T & press enter
Step 4: type interface fastEthernet 0/0 & press enter
Step 5: type IP address 10.0.0.10 255.00.0 & press enter
Step 6: type NO shut & press Enter
Step 7: type EXIT
Step 8: type interface fast Ethernet 1/0 & press enter
Step 9: type IP address 20.0.0.10 25.0.0.0 & press enter
Step 10: type NO shut & press enter
Step 11: type Exit
Step 12: type Exit.
Step 13: type Show IP route [for seeing the connection status]

- Close the tab1 & Click on PC to go to command prompt. Type ping 20.0.0.1 to send packets across.
- Atlast send packets in simulation mode to get a successful transmission

PING Output

Packet tracer PC Command Line 1.0
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 = 0ms TTL = 127
Reply from 20.0.0.1 : bytes = 32 time = 0ms TTL = 127
Reply from 20.0.0.1 : bytes = 32 time = 10ms 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 = 10ms, Average = 3ms.

PROGRAM - 2.2

AIM -

Configure IP address to three routers in packet tracer. Explore the following messages: ping response, destination unreachable, request timed out, reply.

TOPOLOGY :-

PROCEDURE -

1. Connect 2 PC's & 3 routers using copper cross over cable for PC to router and Serial DCE cable to connect the routers to routers.
2. Set the IP address of both PC's and gateway numbers.
3. Now for setting IP address & gateway number to routers select one router and perform the following commands
   Step 1 - type NO & press enter
   Step 2 - type Enable & press enter
   Step 3 - type config T & press

Step4: type interface fast Ethernet 0/0 & press enter
Step5: type IP address 10.0.0.10 255.0.0.0 & press enter
Step6: type NO Shut & press enter.
Step7: type Exit
Step 8: type interface se 2/0 & press enter.
Step 9: type IP address 20.0.0.10 255.0.0.0 & press Enter
Step 10: type NO Shut & press Enter.
Step 11: type Exit.
Step 12: type Exit.

- Repeat these commands for the other two routers with respective IP/gateway address.
- Now to introduce the other two IP addresses to the first router we type the following commands.

Step1: type Config T & press enter
Step 2: type IP route 30.0.0. 255.0.0.0 20.0.0.20
Step 3: type IP route 40.0.0 255.0.0 20.0.0.20
Step4: Exit
Step 5: Exit
Step 6: type Show IP route

- Repeat these steps for other two routers with appropriate addresses
- Go to Command Prompt by Clicking on PC & config tab. Type Ping message to send packets to the destination address.

PING OUTPUT

Output - 1:

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

Request timed out
Ping statistics for 40.0.0.1:
Packets: sent = 4, Received = 0, lost = 4 (100% loss)

Output 2.
Packet Tracer PC Command Line 1.0
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 = 2ms TTL = 125
Reply from 10.0.0.1 : bytes = 32 time = 2ms TTL = 125
Reply from 10.0.0.1 : bytes = 32 time = 2ms TTL = 125
Reply from 10.0.0.1 : bytes = 32 time 2ms 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 = 2ms, Maximum = 8ms, Average = 3ms

OBSERVATION

- In program 2.1 when we ping the destination address we get allocated with 32 bytes. In this first 8 bytes are used to learn about the router & their addresses. Rest bytes are used for sending packets to destination address. Then again if we ping all bytes are used for message sending and there will be no timed-out message.

- In program 2.2 when the routers doesn't know about the remaining addresses, and we ping a message we get host unreachable message. Once the routers have access / knowledge about other adresses, message will be sent successfully.

TOPOLOGY:

PROGRAM 2.1

PROGRAM 2.2

OUTPUT:

PROGRAM 2.1

PROGRAM 2.2

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
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.
Request timed out.
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100%
loss),
PC>

PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
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=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=8ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms 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 = 2ms, Maximum = 8ms, Average = 3ms
PC>

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last De At Dev Type Info
28.315 -- Rout... CDP
28.316 Router5 PC0 CDP
28.316 Router5 Rout... CDP
45.862 -- Rout... CDP
45.862 -- Rout... CDP
Reset Simulation
Constant Delay
Captured to: 45.862 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Router1
Router5
Router2
PC-PC
20.0.0.20
30.0.0.10
30.0.0.20
40.0.0.10
20.0.0.10
Time: 01:54:00.015
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 PC1 IC... 0.000 N 0 (ed... (delete)

WEEK 3

Configure default route, static route to the Router.

OBSERVATION:

Date __/__/__
Page ____

Step 1: Enable
Step 2: Config T
Step 3: Interface fast ethernet 0/0
Step 4: IP Address 10.0.0.10 255.0.0.0
Step 5: No shut
Step 6: Exit
Step 7: Interface se 2/0
Step 8: IP Address 20.0.0.10 255.0.0.0
Step 9: No shut
Step 10: Exit
Step 10: Exit.

- Repeat these commands for other two router with their respective IP Addresses.
- For Router 1. set the IP ~~Address~~ route of other IP Addresses actually by using following steps.

Step 1: Config T
Step 2: IP route 10.0.0.0 255.0.0.0 20.0.0.10
Step 3: IP route 40.0.0.0 255.0.0.0 30.0.0.20
Step 4: Exit
Step 5: Exit
Step 6: Show IP route.

- For Router 0 & Router 2 we set default Route which means it can ~~route~~ access any IP address with any subnet mask
- But the default IP route by following these commands.

Step 1: Config T
Step 2: IP route 0.0.0.0 0.0.0.0 20.0.0.20
Step 3: IP route 0.0.0.0 0.0.0.0 30.0.0.10

- Step 2 is given for router 0 & step 3 command for router 1.
- Go to PC's command prompt and type ping message to send packets across.

PING Output

Packet Tracer PC command line 1.0
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 = 1ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 2ms TTL = 125

Ping statistics for 40.0.0.1 :
Packets : sent = 4 , Received = 3 lost = 1 (25% loss)
Approximate round trip times in milliseconds :
Minimum = 2ms , Maximum = 16ms , Average = 6ms.

OBSERVATION.

- A default route is the route which takes effect when no other route is available for an IP address destination
- If a packet is received, the device first checks the IP destination address, if the IP destination address is not local the device checks its routing Table.
- if the remote destination subnet is not listed then the packet is forwarded to the next hop toward the destination using the default route.
- The process repeats until the packet is delivered.

TOPOLOGY:

OUTPUT:

PC0

Physical | Config | Desktop | Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
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=16ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125

Ping statistics for 40.0.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 16ms, Average = 6ms

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=21ms TTL=125
Reply from 40.0.0.1: bytes=32 time=9ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=4ms TTL=125

Ping statistics for 40.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 21ms, Average = 9ms

PC>
```

WEEK 4

Configure DHCP within a LAN and outside LAN.

OBSERVATION:

LAB - 4

Program 4.1

AIM -

Configure DHCP within a LAN and outside LAN

Topology:

Switch-PT
Switch 0
Fa 1/0
Fa 3/0
Fa 0
Fa 0
Fa 0
Fa 0
PC-PT
PC0
PC-PT
PC-1
PC-PT
PC-2
Server PT
Server 0
10.0.0.1

PROCEDURE:

- Connect 3 PC's and 1 server to a switch using copper straight through cable.
- Click on server and go to services tab select DHCP and turn on the DHCP service
- Set the IP Address of the start IP address as 10.0.0.2 and click on save button.
- Before this, set the IP Address of server is config Tab under fastethernet as 10.0.0.1
- Next click on PC0 and go to desktop tab, here click on IP configuration. Select DHCP here. It will request for an IP Address and successfully get the DHCP request also sets the IP address

- Repeat this steps for other 2 PC's.
- To send a packet access PC's, go to PC's command prompt and type ping destination IP Address.

PING OUTPUT:

Packet tracer PC command Line 1.0
: 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 = 0ms TTL = 128
Reply from 10.0.0.3: bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.3: bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.3: bytes = 32 time = 0ms TTL = 128

- Ping statistics from 10.0.0.3:
  Packets: sent = 4 Received = 4, Lost = 0 (0% loss)
  Approximate round trip times in milliseconds:
  Minimum = 0ms, Maximum = 1ms, Average = 0ms

OBSERVATION :-

- DHCP is used to dynamically assign an IP address to any device or node.
- It is a client-server protocol in which servers manage a pool of unique IP address & also about client configuration parameters.
- DHCP-enabled clients send a request to DHCP server when they want to connect to a network.
- DHCP server responds to the client request by providing IP configuration information from address pools, previously specified by a network administrator.

PROGRAM - 4.2

AIM:

Configure DHCP within a LAN and outside LAN

TOPOLOGY:

PROCEDURE:

- Add a Router, a Switch and 2 PC's to the new program Network & connect the router to both switches.
- Set the server IP address of server and with the help of server set the first ~~server~~ 3 PC's IP Address using DHCP.
- Now set the Router IP address with the following commands statically

Step 1: NO
Step 2: Enable
Step 3: Config T
Step 4: Interface fastethernet 4/0
Step 5: IP address 10.0.0.20 255.0.0.0

Step 6 : No Shut
Step 7 : Exit.
Step 8 : interface fastethernet 0/0
Step 9 : IP address 20.0.0.20 255.0.0.0
Step 10 : No Shut.
Step 11 : Exit
Step 12 : Exit
Step 13 : Show IP route

- Go to server and set the gateway as 10.0.0.20
- Again go to router CLI and follow these commands
  Step 14 : Config T
  Step 15 : IP helper-address 10.0.0.1
  Step 16 : No shut
  Step 17 : Exit.
- Now go to server service and add one more pool name as server Pool 1, start IP address as 20.0.0.2 and default gateway as 20.0.0.20. Then click add & save
- Now set the other two PC's IP address by going to this Desktop → IP Configuration and selecting DHCP which will automatically generate its IP address.
- Now the network is complete and we can select packets from any PC to other by typing ping destination IP address in their respective command prompts.

PING OUTPUT.

Packet Tracer PC commands line 1.0
PC > ping 20.0.0.2
pinging 20.0.0.2 with 32 bytes of data

Request timed out.

Reply from 20.0.0.2: bytes=32 time=0ms TTL=
Reply from 20.0.0.2: bytes=32 time=0ms TTL=
Reply from 20.0.0.2: bytes=32 time=0ms TTL=

Ping statistics for 20.0.0.2.
Packets sent=4, Received=3, loss=1 (25%
Approximate round trip times in milliseconds
Minimum=0ms, Maximum=0ms, Average=0ms

OBSERVATION.

- DHCP is used to assign IP addresses dynamic to different devices.
- To assign continous IP address we create a server pool where we assign the starting IP address and a default gateway number. For PC's under different switches we create a diff server pool again and start.

This takes care of delivering the packets to correct destination IP addresses and also sends back the ACK to the initial device.

18/7/23

TOPOLOGY:

PROGRAM 4.1:

PROGRAM 4.2:

OUTPUT:

PROGRAM 4.1:

PROGRAM 4.2:

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Request timed out.
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Ping statistics for 20.0.0.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 20.0.0.3
Pinging 20.0.0.3 with 32 bytes of data:
Request timed out.
Reply from 20.0.0.3: bytes=32 time=0ms TTL=127
Reply from 20.0.0.3: bytes=32 time=0ms TTL=127
Reply from 20.0.0.3: bytes=32 time=0ms TTL=127
Ping statistics for 20.0.0.3:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>

Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab4.2.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router0
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Server-PT
Server0
PC-PT
PC3
PC-PT
PC4
Simulation Panel
Event List
Reset Simulation
Constant Delay
Capturing...
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Time: 00:32:11.943
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Scenario 0
New
Delete

WEEK 5

Configure Web Server, DNS within a LAN.

OBSERVATION:

20/7/23

Lab-5

AIM -

Configure Web server, DNS within a LAN.

TOPOLOGY -

Fa0/0 Fa1/0 Fa0/0 Fa0/0

PC-PT PC0 Server-PT Server-0

PROCEDURE:

- Connect a switch PC and a server to form a LAN.
- Fit PC's IP address by clicking on it and go to config tab. There in fast ethernet option set IP address as 10.0.0.1 and subnet mask.
- Set servers IP address as 10.0.0.2 and subnet mask respectively.
- Go to PC's Desktop and click on web browser. In the URL tab type 10.0.0.2. You will get a default display
- To make a cv here, we need to make changes in server services.
- Go to server → Services → HTTP → index.HTML. Here create the cv and click on save
- Again go to PC - Desktop → Webbrowser and type 10.0.0.2

you will the CV a content that is changed.

- Next goto server → services → DNS and switch on the services. Now add a Domain name and type the IP address 10.0.0.2 then add & save it.
- Again Go back to PC → Desktop → webbrowser and type the given domain name. then you can see the CV which had been created with

OUTPUT:

Web browser

[<] [>] URL [http://gagandeep] [Go] [Stop]

CV

Gagandeep.K
USN : 1BM21CS064
Language : C/C++/java

Image:

Observation:

- If you wanted to go to a certain website you would open web browser and type domain name of that website or else you can also type the IP address instead if you know that website IP address.
- Since we can't remember IP addresses of all websites DNS server will search through its cache to find a matching IP address for that Domain name & when it finds it will resolve that Domain name to IP address of website. once that is done. then computer is able to communicate with a webserver & retrieve the

TOPOLOGY:

OUTPUT:

WEEK 6

Configure RIP routing Protocol in Routers.

OBSERVATION:

LAB - 6

AIM -

Configure RIP routing protocol in Routers

Topology :-

PROCEDURE :

- Create a Network using 3 routers and 2PC's. Connect routers using serial DCE cable and PC to router using copper - cross over cable
- Set the IP address and gateway no for both PC's as
  10.0.0.1 - IP 10.0.0.10 - gateway - PC0
  40.0.0.1 - IP 40.0.0.10 - gateway - PC1 respectively
- Go to Router → CLI mode and execute the following Commands
  Step1 : NO
  Step 2 : Enable
  Step 3 : Config T

Step 4 - Interface Fastethernet 0/0
Step 5 - IP address 10.0.0.10 255.0.0.0
Step 6 - No shut
Step 7 - Exit
Step 8 - interface se 2/0
Step 9 - IP address 20.0.0.10 255.0.0.0
Step 10 - Encapsulation PPP //
Step 11 - Clock rate 64000
Step 12 - No shut

- Here for Router with Fastethernet execute using only till step 9 and type No shut.
- Only for Router to Router connection executes all steps & also execute the step 11 only for the router connection which has a clock symbol at start. Repeat which has a clock symbol at start for all routers.
- Again go to Router 0 ⟶ CLI mode and type these steps:

Step 1 : Config T
Step 2 : router rip
Step 3: Network 10.0.0.0
Step 4: Network 20.0.0.0
Step 5: Exit.

- Repeat these steps for all routers.
- Atlast now go to each router and type show IP route. Here the IP addresses associated with that router will be labelled as C and other IP addresses are labelled as R.
- Lastly go to PC0 and ping a message to PC1 using ping destination IP address command

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PING OUTPUT.

Packet tracer PC command line 1.0

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 times: 8ms TTL = 125

Reply from 40.0.0.1: bytes = 32 times: 5ms TTL = 125

Reply from 40.0.0.1: bytes = 32 times: 10ms TTL = 125

Ping statistics for 40.0.0.1:

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

Approximate round trip times in milliseconds

minimum = 5ms, Maximum = 10ms, Average = 7ms

OBSERVATION.

- Routing information protocol (RIP) is a dynamic routing protocol that uses hop count as a routing metrix to find the best path between source and destination. It is a distance vector routing protocol.
- Hop count is the no. of routers coming in between source and destination. The path with least hop count is selected
- Updates of the Network are exchanged periodically.
- Updates of routing information are always broadcast
- Full routing tables are sent in updates.
- Routers always trust routing information received from neighbour routers.

TOPOLOGY:

OUTPUT:

Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab6.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
20.0.0.20
30.0.0.10
Se2/0
Se3/0
Router-PT
Router1
10.0.0.10
Se2/0
Fa0/0
20.0.0.10
Router-PT
Router0
Se3/0
30.0.0.20
40.0.0.10
Fa0/0
Router-PT
Router2
Fa0
PC-PT
PC0
10.0.0.1
Fa0
PC-PT
PC1
40.0.0.1
Simulation Panel
Event List
Vis. Time(sec) Last De At Dev Type Info
0.006 Router2 Rout... ICMP
0.007 Router1 Rout... ICMP
0.008 Router0 PC0 ICMP
12.790 -- Rout... RIPv1
12.790 -- Rout... RIPv1
Reset Simulation
Constant Delay
Captured to: 12.790 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:01:22.953
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Routers
Scenario 0
New
Delete
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 PC1 IC... 0.000 N 0 (ed... (delete)

WEEK 7

Configure OSPF routing protocol.

OBSERVATION:

27/7/23

LAB - 7

Aim:
Configure OSPF routing Protocol.

PROCEDURE

- Config the PCs with the IP Address & gateway Address.
- Config each of the routers according to IP Address given in the topology
- ~~Using Encapsulation PPP and clock rate need to be set as done in RIP protocol experiment~~

In Router R1

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

In Router R2

```
R2(config)# router ospf 1
R2(config-router)# router-id 2.2.2.2
                  # network 20.0.0.0 0.255.255.255 area 1
                  # network 30.0.0.0 0.255.255.255 area 0
                  # exit.
```

In Router R3

```
R3(config)# 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.
```

```
R1(config-if)# interface loopback 0
             # ip add 172.16.1.252.255.255.0.0
             # no shutdown

R2(config-if)# interface loopback 0
             # ip add 172.16.1.253.255.255.0.0
             # no shutdown

R3(config-if)# interface loopback 0
             # ip add 172.16.1.254.255.255.0.0
             # no shutdown.
```

In Router R1.

```
R1(config)# router ospf 1
R1(config-router)# area 1 virtual-link 2.2.2.2
R1(config-router)#
```

In Router R2
R2 (config)# router ospf 1
R2 (config-router)# area 1 virtual-link 1.1.1.1
" # exit

R2 (config) #

Checking the routing table, show ip route
Lastly ping messages from PC to PC

PING OUTPUT
Packet Tracer PC - Command line 1.0
PC> ping 40.0.0.10
pinging 40.0.0.10 with 32 bytes of data
Request timed out
Reply from 40.0.0.10 : bytes = 32 times = 11ms TTL = 125
Reply from 40.0.0.10 : bytes = 32 times = 16ms TTL = 125
Reply from 40.0.0.10 : bytes = 32 times = 8ms TTL = 125

Ping statistics for 40.0.0.10
Packets sent = 4 Received = 3, lost = 1 (25% loss),
Approximate round trip times in milli seconds
Minimum = 8ms, Maximum = 11ms Average = 10ms

OBSERVATION.
- OSPF is a link-state routing protocol that is used to find the best path between source & destination router using its own SPF algorithm.
- This networks is divided into 4 areas, where area 0 is the backbone
- After we make the virtual-link between the area which is not connected to the backbone area, we can ping messages successfully

TOPOLOGY:

OUTPUT:

Cisco Packet Tracer Student - C:\Users\Admin\Desktop\1BM21CS047\ospf.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
AREA 1
AREA 0
AREA 3
AREA 2
20.0.0.2
Se2/0
30.0.0.1
Se3/0
Router-PT
Router1
10.0.0.1
Router-PT
Router0
20.0.0.1
30.0.0.2
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
PC-PT
PC1
40.0.0.10
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
20.002 -- Router1 OSPF
20.003 Router1 Router2 OSPF
22.376 -- Router0 OSPF
22.377 Router0 Router1 OSPF
22.378 -- Router0 OSPF
22.379 Router0 PC0 OSPF
22.380 -- Router2 OSPF
22.381 Router2 PC1 OSPF
22.383 -- Router1 OSPF
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Time: 00:05:30.703
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Routers
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC1 ICMP 0.000 N 0 (edit) (delete)
(Select a Device to Drag and Drop to the Workspace)
22°C
Mostly cloudy
Search
ENG
IN
11:03
27-07-2023

WEEK 8

To construct a simple LAN and understand the concept and operation of Address Resolution Protocol (ARP).

OBSERVATION:

3/08/22

LAB-8

AIM:

To construct single LAN and understand the concept and operation of Address Resolution Protocol (ARP)

TOPOLOGY :-

PROCEDURE

- Create a topology of 3PC's & a server.
- Assign a IP address to all PC's and server.
- Connect them through the switch.
- Use the inspect tool to click on a PC to su ARP table.
- Command in cmd for the same is arp-a.
- Initially ARP table is empty.
- Also in CLI of switch, the command - show mac address-table can be given on every transaction to see how the switch learns from transitions & build the address table.

- Use the capture button in the simulation panel to go step by step so that the changes in ARP can be clearly noted.

PING OUTPUT

PC> ping 10.0.0.4.

Pinging 10.0.0.4 with 32 bytes of data.

Reply from 10.0.0.4 : bytes = 32 time = 0ms TTL = 128

Reply from 10.0.0.4 : bytes = 32 time = 0ms TTL = 128

Reply from 10.0.0.4 : bytes = 32 time = 0ms TTL = 128

Ping statistics for 10.0.0.4 :

Packets : sent = 4 Received = 4 lost = 0 (0% loss)

Approximate round trip times in milliseconds.

minimum = 0ms ; maximum = 0ms , Average = 0ms

PC> arp -a

Internet address	physical Address	Type
10.0.0.4	0060.2fa0.324d	dynamic

OBSERVATION

- When we ping PC and server the address of server is known to PC & vice versa.
- When we ping between other two PC's simultaneously the address of each other are known.
- Every time a host requests a MAC address in order to send a packet to another host in the LAN, it checks its ARP cache to see if the IP to MAC address translation address already exists. if the translation doesn't exist it perform ARP.

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TOPOLOGY:

OUTPUT:

Logical
ARP Table for Server0
IP Address Hardware Address Interface
10.0.0.2 00D0.D35A.5B4A FastEthernet0
ARP Table for PC0
IP Address Hardware Address Interface
10.0.0.1 0001.C904.5457 FastEthernet0
ARP Table for PC2
IP Address Hardware Address Interface
10.0.0.3 0009.7C19.7260 FastEthernet0
ARP Table for PC1
IP Address Hardware Address Interface
10.0.0.4 0001.64A0.8ECB FastEthernet0
Switch1
Physical Config CLI
IOS Command Line Interface
Copy Paste
Simulation

WEEK 9

To construct a VLAN and make a pc communicate among VLAN.

OBSERVATION:

LAB-9

AIM:

To extend a VLAN and make a PC communicate among VLAN

TOPOLOGY

Procedure:

- Create a topology as shown above choose 1841 router and 2960-24TT switch here.
- Set up the ip address of the router and 4 PC's respectively we use class C type address also set gateways
- In switch, go to config tab and select VLAN Database, Give any VLAN no. like 2 and name as VLAN
- Select the interface fastethernet 4/1 and make it trunk

- Next select the switches under 2nd interface which has interface 0/3 & 0/4 : click on each of them set VLAN number 2
- Go to router -> config tab and select VLAN database and enter the name VLAN & no. 2 created
- Go to router -> CLI and type the following commands

Step 1 : Config T
Step 2 : interface fa 0/0
Step 3 : IP address 192.168.1.1 255.255.255.0
Step 4 : No shut
Step 5 : Exit
Step 6 : Config T
Step 7 : Interface fa 0/0.1
Step 8 : encapsulation dot1q
Step 9 : IP address 192.168.20.7 255.255.255.0
Step 10 : No shut
Step 11 : Exit.

- Ping message from PC to another VLAN PC

PING - OUTPUT

Packet trace PC command line 1.0
PC> ping 192.168.20.3.
pinging 192.168.20.3 with 32 bytes of data:
Request timed out
Reply from 192.168.20.3 : bytes=32 time=0ms TTL=127
Reply from 192.168.20.3 bytes=32 time=0ms TTL=127
Reply from 192.168.20.3 bytes=32 time=0ms TTL=127
Ping statistics for 192.168.20.3
Packets : Sent=4 Received=3 Lost=1 (25% loss),
Approximate round trip times in milliseconds :
Minimum=0ms, Maximum=0ms, Average=0ms

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OBSERVATION

- We can have one device on one VLAN & another on another VLAN connected to the same switch. They will only hear other broadcast traffic from within their VLANS doesn't use ip address instead deal with subnets/ class C type addresses
- Inter-VLAN routing gives a flexible tool to logically subdivide their network that has potential to enhance security & performance

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TOPOLOGY:

OUTPUT:

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.3: bytes=32 time=0ms TTL=127
Reply from 192.168.20.3: bytes=32 time=5ms TTL=127
Reply from 192.168.20.3: bytes=32 time=0ms TTL=127
Ping statistics for 192.168.20.3:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 5ms, Average = 1ms
PC>

Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\vlan.pkt
Logical
192.168.1.1
192.168.20.1
PC-PT PC0
192.168.1.2
PC-PT PC1
192.168.1.3
PC-PT PC2
192.168.20.2
PC-PT PC3
192.168.20.3
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Simulation

WEEK 10

Demonstrate the TTL/ Life of a Packet.

OBSERVATION:

OUTPUT

0	4	8	16	19	31
		DSCP	TL: 28		
ID: 0X6			0X	0X0	
TTL: 255		PRO: 0X1	CHKSUM		
SRC IP : 10.0.0.1					
DST IP : 40.0.0.1					
OPT : 0X0				0X0	
DATA (VARIABLE LENGTH)					

Observations:

- The no. of hops the packet before being discarded as TTL
- Datagrams TTL field is set by the sender & reduced by each router along the path to its destination.
- The router reduces TTL values by one while forwarding the packets
- When the TTL value is 0, the router discards it sends an ICMP message.

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TOPOLOGY:

OUTPUT:

Logical
AREA 1
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
AREA 3
Fa0
PC-PT
PC0
10.0.0.10
40.0.0.1
AREA 2
Fa0
PC-PT
PC1
40.0.0.10
PDU Information at Device: Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
PPP
IP
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Play Controls
Time: 00:00:57.256
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Routers
Scenario 0
New
Delete
In Progress
PC0
PC1
ICMP

Logical
AREA 1
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
AREA 3
Fa0
PC-PT
PC0
10.0.0.10
40.0.0.1
AREA 2
Fa0
PC-PT
PC1
40.0.0.10
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
PPP
IP
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Play Controls
Time: 00:00:57.257
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Routers
Scenario 0
New
Delete
In Progress
PC0
PC1
ICMP

Logical
AREA 1
20.0.0.2
Se2/0
Se2/0
10.0.0.1
Fa0/0
20.0.0.1
AREA 3
Fa0
PC-PT
PC0
10.0.0.10
40.0.0.1
AREA 2
Fa0
PC-PT
PC1
40.0.0.10
PDU Information at Device: PC1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 0060.4789.AB50
SRC MAC: 0009.7C28.C636
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
DSCP: 0x0
TL: 28
ID: 0x3
TTL: 252
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.10
DST IP: 40.0.0.10
OPT: 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Play Controls
Simulation

WEEK 11

To construct a WLAN and make the nodes communicate wirelessly

OBSERVATION:

LAB-11

AIM:
To construct a WLAN and make the nodes communicate wirelessly.

Topology:-

Procedure:
- Construct the above topology
- Configure PC & router 0 as normally done
- Configure Access point 1 - port 1 - SSID Name - WLAN
- Set DHCP & give any 10 digit key - 1234567890
- Configure PC1 & laptop with wireless & Standards
- Switch off the device Drag the existing PT-Host NM-1AM to the component listed in 2Hs. Drag WMP300N wireless interface to the empty port. switch on the devices.

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- In the config Tab a new wireless interface would have been added. Now configure SSID, WPA key IP address and gateway to the device.
- Ping from ~~my~~ every to every other device.

PING OUTPUT

Packet Tracer PC command line 10
PC > ping 10.0.0.3
pinging 10.0.0.3 with 32 bytes of data
Request timed out.
Reply from 10.0.0.3 : bytes = 32 time = 0ms TTL = 127
Reply from 10.0.0.3 : bytes = 32 time 0ms TTL = 127
Reply from 10.0.0.3 : bytes = 32 time = 2ms TTL = 127
ping statistics for 10.0.0.3
packets : sent = 4 , Received = 3 , lost = 1 (25% loss)
Approximate round trip times in milliseconds
minimum = 0ms , maximum = 1ms , Average = 0ms

OBSERVATIONS

- A WHAN is a group of wireless devices that form a network based on radio transmissions.
- Data sent in packets contain layers with labels of instructions. MAC address to endpoints for routing
- The access point is the base station that serve as a hub to which other stations connect.
- 19/8/2025 with one access point we can connect to multiple devices wirelessly & transmit data.

TOPOLOGY:

Logical
10.0.0.1
Fa0/0
Router-PT
Router0
Fa1/1
Fa2/1
Switch0
Access Point-PT
Access Point0
Fa0
PC-PT
PC0
10.0.0.2
PC-PT
PC2
10.0.0.3
Laptop-PT
10.0.0.4
Realtime

PC1
Physical
Config
Desktop
Custom Interface
MODULES
WMP300N
PT-HOST-NM-1AM
PT-HOST-NM-1CE
PT-HOST-NM-1CFE
PT-HOST-NM-1CGE
PT-HOST-NM-1FFE
PT-HOST-NM-1FGE
PT-HOST-NM-1W
PT-HOST-NM-1W-A
PT-HOST-NM-3G/4G
PT-HEADPHONE
PT-MICROPHONE
PT-CAMERA
PT-USB-HARD-DRIVE
Physical Device View
Zoom In
Original Size
Zoom Out
Customize Icon in Physical View
Customize Icon in Logical View
The Linksys-WMP300N module provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.

Laptop0
Physical
Config
Desktop
Custom Interface
MODULES
WPC300N
PT-LAPTOP-NM-1AM
PT-LAPTOP-NM-1CE
PT-LAPTOP-NM-1CFE
PT-LAPTOP-NM-1CGE
PT-LAPTOP-NM-1FFE
PT-LAPTOP-NM-1FGE
PT-LAPTOP-NM-1W
PT-LAPTOP-NM-1W-A
PT-LAPTOP-NM-3G/4G
PT-HEADPHONE
PT-MICROPHONE
PT-CAMERA
PT-USB-HARD-DRIVE
Physical Device View
Zoom In
Original Size
Zoom Out
Customize Icon in Physical View
Customize Icon in Logical View
The Linksys-WPC300N module provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.

OUTPUT:

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
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
Reply from 10.0.0.3: bytes=32 time=7ms TTL=128
Reply from 10.0.0.3: bytes=32 time=9ms TTL=128
Reply from 10.0.0.3: bytes=32 time=10ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 7ms, Maximum = 21ms, Average = 11ms
PC>

WEEK 12

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

OBSERVATION:

LAB-12

AIM:
To understand the operation of TELNET by [illegible] the route in server room from a PC in IT [illegible]

Topology:

Procedure:
- Create a topology as shown above.
- Configure the IP address & gateway for PC0
- Configure the router by executing the following commands.

Step1: enable
Step2: Config T
Step3: hostname R1
Step4: enable secret PT
Step5: interface fastethernet 0/0
Step6: ip address 10.0.0.1 255.0.0.0
Step7: No shut
Step8: line vty 05
Step9: login

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Step 10: password pro
Step 11: Exit ; Exit
Step 12: WR

- Ping message to router
  Password for user. Access verification is pw
  password for enable is P1
  Accessing Router CLI from PC
  show IP route.

Device output:
Packet tracer PC command line 1.0
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=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255

Ping statistics for 10.0.0.1:
Packet sent=4, Received, lost=0 (0% loss)
Approximate round trip times in milliseconds
Minimum = 0ms, Maximum = 0ms Average = 0ms

PC> telnet 10.0.0.1
Trying 10.0.0.1 ... open
User Access verification
password: P0
1> enable
password: P1
R1# show ip route
C 10.0.0.0/8 is directly connected, FastEthernet

OBSERVATION

- TELNET stands for Teletype Network. It is a type of protocol that enables one computer to connect to the local computer.
- It is used as a standard TCP/IP protocol for virtual terminal service provided by ISO
- During TELNET operation, whatever is being performed on the remote computer will be displayed by the local computer. Telnet operates on a client server principle.

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TOPOLOGY:

OUTPUT:

PC0

Physical | Config | Desktop | Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
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=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255

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

PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open


User Access Verification

Password:
% Password:  timeout expired!

[Connection to 10.0.0.1 closed by foreign host]
PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open


User Access Verification

Password:
Password:
Password:

[Connection to 10.0.0.1 closed by foreign host]
PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open


User Access Verification

Password:
r1>enable
Password:
r1#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
r1#
```

WEEK 13

Write a program for error detecting code using CRC- CCITT (16-bits).

CODE:

```
#include<stdio.h>
int arr[17];

void xor(int x[], int y[])
{
   int k=0;
   for(int i=1;i<16;i++)
   {
      if(x[i]==y[i])
         arr[k++]=0;
      else
         arr[i]=1;
   }
}

void main()
{
   int dd[17],div[33],ze[17],i,k;

   printf("Enter the dataword \n");
   for(i=0;i<17;i++)
      scanf("%d",&div[i]);

   for(i=i;i<33;i++)
      div[i]=0;

   for(i=0;i<17;i++)
      ze[i]=0;
   printf("Enter dividend \n");
```

```
for(i=0;i<17;i++)
    scanf("%d",&dd[i]);

i=0;
k=0;
    for(i=i;i<17;i++)
        arr[k++]=div[i];
while(i<33)
{
    if(arr[0]==0)
        xor(arr,ze);
    else
        xor(arr,dd);

    arr[16]=div[i++];

}
k=0;
for(i=17;i<33;i++)
    div[i]=arr[k++];
printf("Codeword: ");
    for(i=0;i<33;i++)
        printf("%d",div[i]);

for(i=0;i<17;i++)
    arr[i]=0;

printf("\nAt receiver end \n");

 k=0;
    for(i=i;i<17;i++)
        arr[k++]=div[i];
while(i<33)
{
```

```
        if(arr[0]==0)
            xor(arr,ze);
        else
            xor(arr,dd);

        arr[16]=div[i++];

    }
    k=0;
    for(i=17;i<33;i++)
        div[i]=arr[k++];

    printf("Codeword: ");
        for(i=0;i<33;i++)
            printf("%d",div[i]);
}
```

OUTPUT:

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CRC implementation

→ Write a program for error detecting code using CRC-CCITT

C-code

```
#include <stdio.h>
# include <strings.h>
# define N strlen (poly)
char data[30];
char check value[30];
char poly [10];
void xor
{
    for (j=1; j<n; i++)
        check value[j] = (check value [j] == poly[j] ?
                                    '0' : '1');
}
void receive ()
{
    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 (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 (checkvalue[0] == '1')
            XOR();
        for (j=0 ; j<N-1 ; j++)
            check_value[j] = check_value[j+1];
            check_value[j] = data[j+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 zeros : %s",
                                    data);
    Crc();
    printf("\n CRC value is %s", check_value);
    for (i=data_length ; i<data+N-1 ; i++)
        data[i] = checkvalue[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 zeros : 101010000
CRC value is : 001
final codeword to be sent : 101010001

Enter the received data : 10001000
Error detected.

Enter data to be transmitted : ~~10001000~~ 101100
Enter the divisor polynomial : 1001

Data padded with n-1 zeros : 101100000
CRC value is : 001
final codeword to be sent : 101100001

Enter the received data : 101100001
No error detected.

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WEEK 14

Write a program for congestion control using Leaky bucket algorithm.

CODE:

```
#include <stdio.h>
#include <stdlib.h> // Include this for the rand() function
int main()
{
   int buckets, outlets, k = 1, num, remaining;
   printf("Enter Bucket size and outstream size\n");
   scanf("%d %d", &buckets, &outlets);
   remaining = buckets;
   while (k)
   {
      num = rand() % 1000; // Generate a random number between 0 and 999
      if (num < remaining)
      {
         remaining = remaining - num;
         printf("Packet of %d bytes accepted\n", num); // Added missing variable
      }
      else
      {
         printf("Packet of %d bytes is discarded\n", num);
      }
      if (buckets - remaining > outlets)
      {
         remaining += outlets; // Fixed the calculation
      }
      else
         remaining = buckets;
      printf("Remaining bytes: %d \n", remaining);
      printf("If you want to stop input, press 0, otherwise, press 1\n");
      scanf("%d", &k);
```

```
    }
    while (remaining < buckets) // Fixed the condition
    {
        if (buckets - remaining > outlets)
        {
            remaining += outlets; // Fixed the calculation
        }
        else
            remaining = buckets;
        printf("Remaining bytes: %d \n", remaining);
    }
    return 0; // Added a return statement to indicate successful completion
}
```

OUTPUT:

```
PS D:\VS Code> cd "d:\VS Code\OS\" ; if ($?) { gcc bucket.c -o bucket } ; if ($?) { .\bucket }
Enter Bucket size and outstream size
2000
100
Packet of 41 bytes accepted
Remaining bytes: 2000
If you want to stop input, press 0, otherwise, press 1
1
Packet of 467 bytes accepted
Remaining bytes: 1633
If you want to stop input, press 0, otherwise, press 1
1
Packet of 334 bytes accepted
Remaining bytes: 1399
If you want to stop input, press 0, otherwise, press 1
1
Packet of 500 bytes accepted
Remaining bytes: 999
If you want to stop input, press 0, otherwise, press 1
1
Packet of 169 bytes accepted
Remaining bytes: 930
If you want to stop input, press 0, otherwise, press 1
1
Packet of 724 bytes accepted
Remaining bytes: 306
If you want to stop input, press 0, otherwise, press 1
1
Packet of 478 bytes is discarded
Remaining bytes: 406
If you want to stop input, press 0, otherwise, press 1
1
Packet of 358 bytes accepted
Remaining bytes: 148
If you want to stop input, press 0, otherwise, press 1
1
Packet of 962 bytes is discarded
Remaining bytes: 248
If you want to stop input, press 0, otherwise, press 1
0
Remaining bytes: 348
Remaining bytes: 448
Remaining bytes: 548
Remaining bytes: 648
Remaining bytes: 748
```

```
Remaining bytes: 348
Remaining bytes: 448
Remaining bytes: 548
Remaining bytes: 648
Remaining bytes: 748
Remaining bytes: 848
Remaining bytes: 948
Remaining bytes: 1048
Remaining bytes: 1148
Remaining bytes: 1248
Remaining bytes: 1348
Remaining bytes: 1448
Remaining bytes: 1548
Remaining bytes: 1648
Remaining bytes: 1748
Remaining bytes: 1848
Remaining bytes: 1948
Remaining bytes: 2000
PS D:\VS Code\OS>
```

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Write a program for congestion control using Leaky Bucket algorithm

C code:

```
#include <stdio.h>
int main()
{
    int incoming, outgoing, buksize, 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",
                                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 packet size : 1000
Bucket buffer size 2000 out of 5000 ~~in buffer~~.
After outgoing 0 packets left out of 5000 " ~~buffer~~

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WEEK 15

Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.

CODE:

ClientTCP.py

```
from socket import *
serverName = “127.0.0.1”
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName,serverPort))
sentence = input(“\nEnter file name: “)
clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print (“\nFrom Server:\n”)
print(filecontents)
clientSocket.close()
```

ServerTCP.py

```
from socket import *
serverName=”127.0.0.1”
serverPort = 12000
serverSocket = socket(AF_INET,SOCK_STREAM)
serverSocket.bind((serverName,serverPort))
serverSocket.listen(1)
while 1:
print (“The server is ready to receive”)
connectionSocket, addr = serverSocket.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()

OUTPUT:

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CYCLE - 2

→ Using TCP/IP sockets, write a client-server program to make client sending file name and the server to send back the contents of the requested file if present.

Solution:

ClientTCP.py

```
from socket import *
serverName = '127.0.0.1'
Server port = 12000
clientSocket = socket (AF_INET, SOCK_STREAM)
ClientSocket.connect ((ServerName, Server Port))
sentence = input ("\n Enter file name:")
ClientSocket.send (sentence.encode())
file contents = ClientSocket.recv(1024).decode()
print ("\n From Server:\n")
print (filecontents)
ClientSocket.close()
```

ServerTCP.py

```
from socket import *
ServerName = "127.0.0.1"
Server port = 12000
ServerSocket = socket (AF_INET, SOCK_STREAM)
ServerSocket.bind ((ServerName, ServerPort))
serverSocket.listen (1)
while 1:
    print ("The server is ready to receive")
    ConnectionSocket, addr = ServerSocket.accept()
    sentence = ConnectionSocket.recv(1024).decode()
    file = open (sentence, "r")
    l = file.read (1024)
    connectionSocket.send (l.encode())
    print ("\n Sent contents of" + sentence)
```

file.close()
connectionSocket.close()

Output

Server side

The server is ready to receive

Client side

Enter file name: ServerTCP.py

~~[illegible]~~ Contents of ServerTCP are displayed here

Server side

The server is ready to receive

Sent contents of ServerTCP.py.

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WEEK 16

Using UDP sockets, write a client-server program to make the client send the file name and the server to send back the contents of the requested file if present.

CODE:

ClientUDP.py

```
from socket import *
serverName = “127.0.0.1”
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_DGRAM)
sentence = input(“\nEnter file name: “)
clientSocket.sendto(bytes(sentence,”utf-8”),(serverName, serverPort))
filecontents,serverAddress = clientSocket.recvfrom(2048)
print (“\nReply from Server:\n”)
print (filecontents.decode(“utf-8”))
# for i in filecontents:
# print(str(i), end = “ ”)
clientSocket.close()
clientSocket.close()
```

ServerUDP.py

```
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.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 (“\nSent contents of “, end = “ “)
print (sentence)
# for i in sentence:
# print (str(i), end = “ “)
file.close()
```

OUTPUT:

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Exp 13 (ii)

→ Using UDP sockets, write a client server program to make client sending the file name and the server to send back the contents of the requested file if present.

SOLUTION

ClientUDP.py

```
from socket import *
ServerName = "127.0.0.1"
ServerPort = 12000
ClientSocket = Socket(AF_INET, SOCK_DGRAM)
Sentence = input("\n Enter file name:")
ClientSocket.sendto(bytes(sentence, "utf-8"), (ServerName
                    , ServerPort))
filecontents, serverAddress = ClientServer.recvfrom(2048)
print("\n Reply from Server:\n")
print(fileconteents.decode("UTF-8"))
# for i in fileconteents:
    # print(str(i), end="")
    ClientSocket.close()
    ClientSocket.close()
```

ServerUDP.py

```
from socket import *
ServerPort = 12000
ServerSocket = Socket(AF_INET, SOCK_DGRAM)
ServerSocket.bind(("127.0.0.1", ServerPort));
print("The server is ready to receive")

while 1:
    Sentence, clientAddress = server socket.recvfrom(2048)
    Sentence = Sentence.decode("UTF-8")
    file = open(sentence, "r")
    con = file.read(2048)
    ServerSocket.sendto(bytes(con, "UTF-8"), clientAddress)
```

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```
print ("\n Set Contents of: end = ")
print (sentence)
    # for i in sentence
        # print (str(i), end = ")
    file.close()
```

Output

Client side

Enter file name :- Server UDP.Py

The contents of the file is displayed here:

Server side

- The server is ready to receive
- Set contents of Server UDP.Py

N.P
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WEEK 17

Tool Exploration -Wireshark

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31/8/23 Wireshark

What is Wireshark?

Wireshark is a network packet analyzer. A network packet analyzer presents captured packet data in as much detail as possible.

Wireshark is used to track the packets so that each one is filtered to meet our specific needs. It is commonly called as a sniffer, network protocol analyzer, and network analyzer. It is also used by network security engineers to examine security problems. Wireshark is a free to use application which is used to apprehend the data back and forth. It is often called as a free packet sniffer computer application. It puts the network card into its receptive mode, i.e to accept all the packets which it receives.

Uses of Wireshark

Wireshark can be used to the following ways:

1. It is used by network engineers to examine security problems.
2. It allows the user to watch all the traffic being passed over the network.
3. It is used by network engineers to troubleshoot network issues.
4. It also helps to troubleshoot latency issues and malicious activities on your network.
5. It can also analyze dropped packets.
6. It helps us to know how all devices like laptop, mobile in a local network.

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Functionality of Wireshark

Wireshark is similar to tcpdump in networking. TCP dump is a command packet analyzer which allows the user to display the packets and TCP/IP packets being transmitted & received over a network attached to the computer. It has a graphic end and some sorting & filtering functions. Wireshark allows can see all the traffic passing through the network. Wireshark can also monitor the unicast traffic which is not sent to the mac address interface. But, the switch doesnot pass all the traffic to the port. Hence, the switch doesnot pass all the traffic to the port.

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Features of wireshark

- It is a multi-platform software, i.e it can run on linux, osx, windows, FreeBSD etc
- It is a standard three-pane packet browser
- It performs dup inspection of the hundreds of protocols
- It often involves live analysis i.e from different types of the network like the ethernet, loopback etc
- It has sort of filter options which makes easy to the users to view the data.
- It is also useful in VOIP analysis & can capture USB traffic
- Various settings, like times & filters, can be used to filter output.