Practical-7

AIM: Understanding of Network Name Space

Tools required:

1. Desktop Computer
2. Ubuntu Operating System

Note:

1. While applying IP address, student need to allocate IP address as per his/her student ID. For Example, if student ID is 20ce005 then IP address allocation for first network should start with 5.0.0.0. For subsequent network, it should start with ID+1 i.e. 6.0.0.0, 7.0.0.0. and so on.

2. Give your friend or family member name as interface

Submission: After writing answer into this word document, Student need to change name to his ID followed by practical number. Ex 20ce005_Pr1.docx. Upload on assignment segment.
Rubrics: Nicely drafted document with clarity in answers leads to full marks. Otherwise, submission carries proportional mark. Same day submission will be evaluated from 10 marks otherwise submission will be evaluated from 7 marks.

References

1. Iperf3: https://iperf.fr/iperf-doc.php
2. Wireshark Videos:
   - Edit Windows
   - Canvas Window
   - Capturing Data
   - Interpreting data in Wireshark
   - Ethernet Frame
   - IP Frame
   - Throughput
   - Flow diagram

Understanding Require

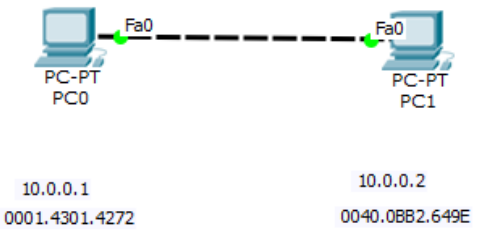
- IP Address
- URL
- Finding IP address from URL
- Finding location from IP Address

Name Space

Install following packages

sudo apt install iperf iperf3 netperf tcpdump wireshark

Experiment-1: Emulate point-to-point topology and note the values of parameters.



Common Code

sudo su

ip netns del red

ip netns del blue

ip netns add red

ip netns add blue

ip link add eth-red type veth peer name eth-blue

ip link set eth-red netns red

ip link set eth-blue netns blue

ip netns exec red ip link set lo up

ip netns exec red ip link set eth-red up

ip netns exec blue ip link set lo up

ip netns exec blue ip link set eth-blue up

ip netns exec red ip address add 10.0.0.1/24 dev eth-red

ip netns exec blue ip address add 10.0.0.2/24 dev eth-blue

#######Red###############

Open New Terminal

sudo su

ip netns exec red bash

iperf -s

#######Blue###############

Open New Terminal

sudo su

ip netns exec blue bash

iperf -c 10.0.0.1

Start Server

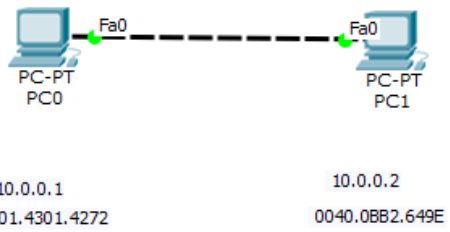
```
root@ritesh-VirtualBox:/home/ritesh# iperf -s
------------------------------------------------------------
Server listening on TCP port 5001
TCP window size:  128 KByte (default)
------------------------------------------------------------
[  4] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 41234
[ ID] Interval       Transfer     Bandwidth
[  4]  0.0-10.0 sec  40.1 GBytes  34.4 Gbits/sec
```

Start Client

```
root@ritesh-VirtualBox:/home/ritesh# iperf -c 10.0.0.2
------------------------------------------------------------
Client connecting to 10.0.0.2, TCP port 5001
TCP window size: 85.0 KByte (default)
------------------------------------------------------------
[  3] local 10.0.0.1 port 41234 connected with 10.0.0.2 port 5001
[ ID] Interval       Transfer     Bandwidth
[  3]  0.0-10.0 sec  40.1 GBytes  34.4 Gbits/sec
```

Particulars	**Answer**
Server IP Address	
Client IP address	
Bandwidth between server and client	
Default port on which server listens data	
Default port on which client sends data	

Experiment-2: Capturing packet in point-to-point topology and records the parameters.



Execute the Common Code

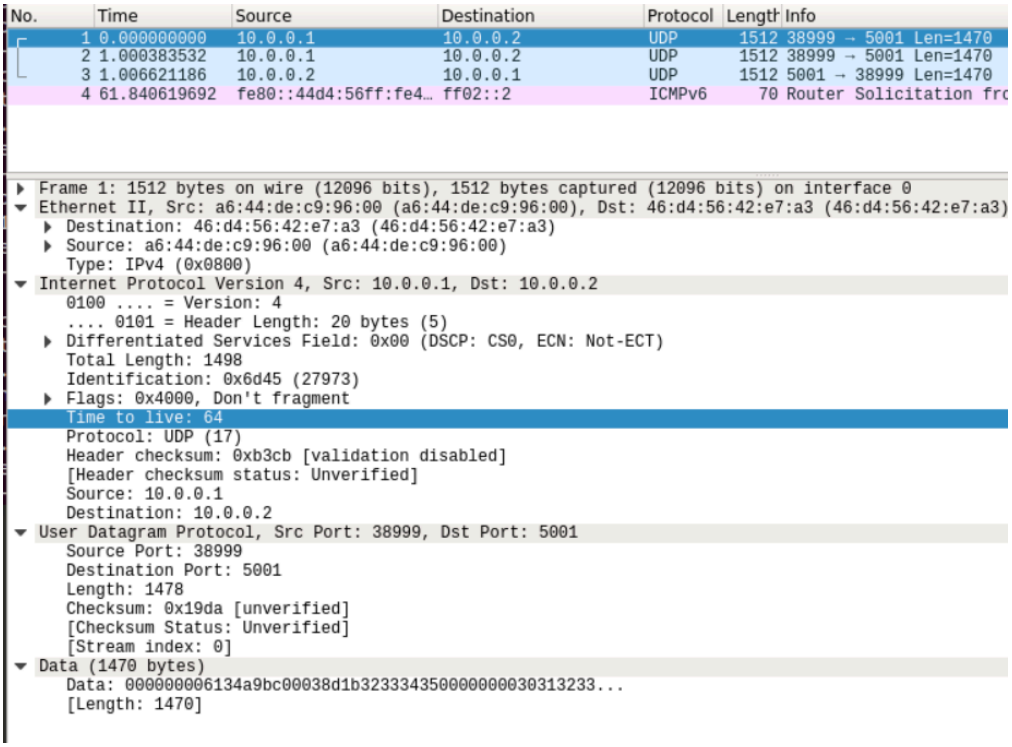
#######Red###############

Open New Terminal
sudo su
ip netns exec red bash
sudo wireshark &
##Start Capturing data
iperf -s

#######Blue###############
Open New Terminal
sudo su
ip netns exec blue bash
iperf -c 10.0.0.1 -n 1 -b 1

Fill following table for any one packet

<<insert Captured packet image here>>



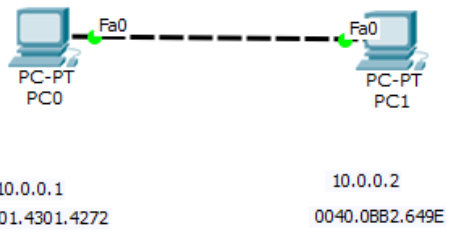
Header fields of Ethernet

Header field Name	**Header field Value (Hex Value)**
Destination MAC Address	
Source MAC Address	
Type	

Header fields of Network

Header field Name	**Header field Value (Hex Value)**
Version	
IHL	

Experiment-3: Capturing packet in point-to-point topology and records the parameters.



Execute the Common Code

#######Red###############

Open New Terminal
sudo su
ip netns exec red bash
sudo wireshark &
##Start Capturing data
iperf -s -u

#######Blue###############
Open New Terminal
sudo su
ip netns exec blue bash
iperf -c 10.0.0.1 -n 1 -b 1 -u

Fill following table for any one packet

<<insert Captured packet image here>>

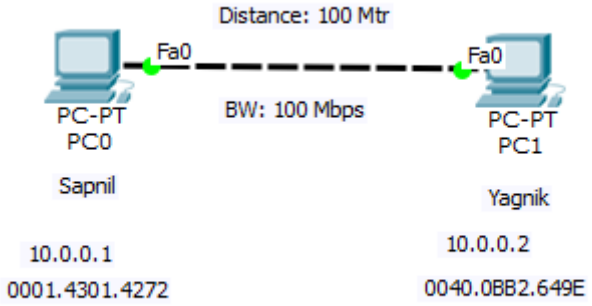
Header fields of Network

Header field Name	Header field Value (Hex Value)
Version	
IHL	

Header fields of Transport Layer: TCP/UDP

Header field Name	Header field Value (Hex Value)

Experiment-4: Emulate point-to-point topology as per the parameters given in following topology.



<<Student Topology with IP address and MAC address as label>>

#######Red###############

Open New Terminal

sudo su

ip netns exec red bash

tc qdisc show dev eth-red

tc qdisc add dev eth-red root netem delay 5ms rate 100mbit

iperf -s

#######Blue###############

Open New Terminal

sudo su

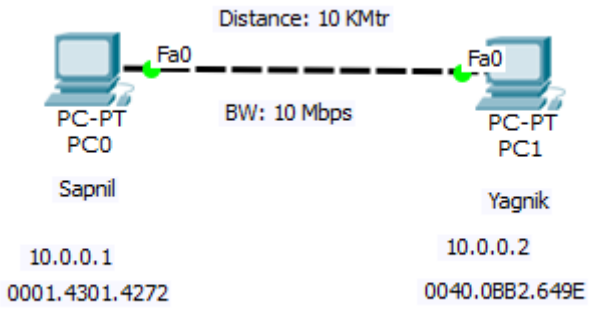
ip netns exec blue bash

tc qdisc show dev eth-blue

tc qdisc add dev eth-blue root netem delay 5ms rate 100mbit

iperf -c 10.0.0.1 -n 1 -b 1

Experiment-5: Emulate point-to-point topology as per the parameters given in following topology and write the code below topology.

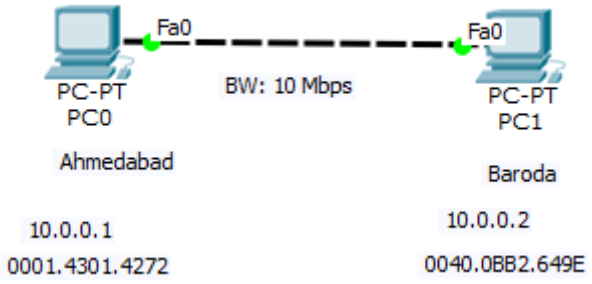


#######Red###############

Open New Terminal

#######Blue###############

Open New Terminal

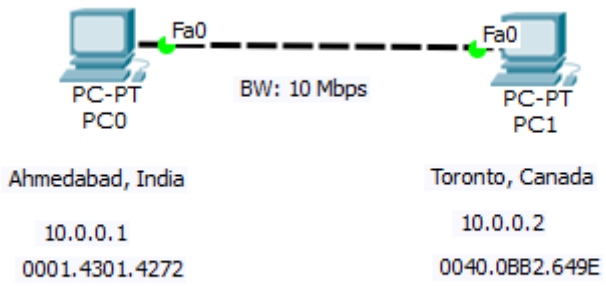


#######Red###############

Open New Terminal

#######Blue###############

Open New Terminal



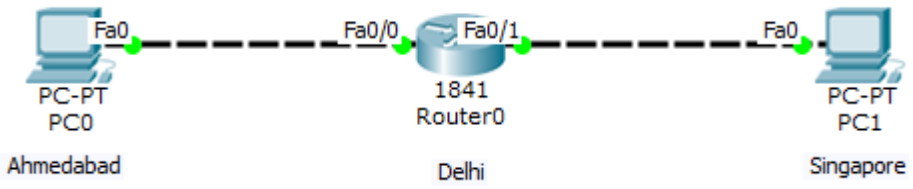
#######Red###############

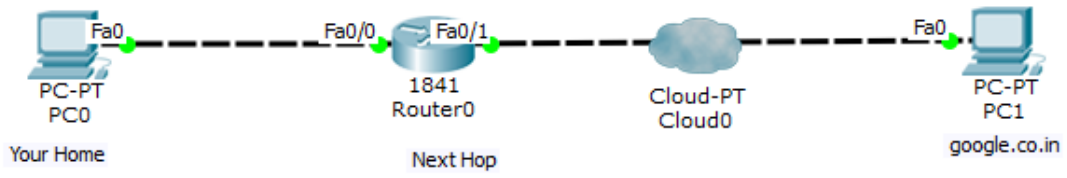
Open New Terminal

#######Blue###############

Open New Terminal

Experiment-6: Emulate point-to-point topology as per the parameters given in following topology and write the code below topology.





Questions:

1. What do you mean by server and client?
2. When your computer becomes Server?
3. When your computer becomes Client?