Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

L3+L4

Principles of Computer Communication – ECE3030

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LAB TASKS

SPANNING TREE - I

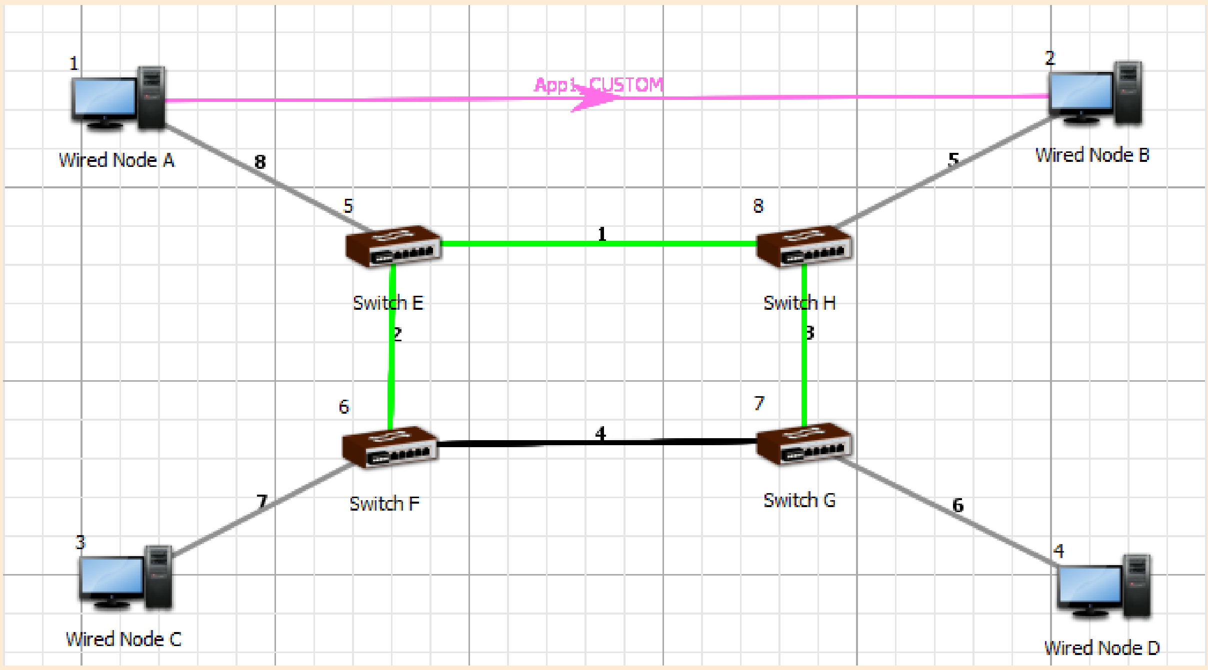
Aim

To simulate Networks using switch priorities in Netsim and compare their performance.

Tools Required

Netsim Software

Network Diagram – 1111



<u>Switch E</u>:

1. D560 – H
2. 1241 – F - Root Port
3. 1F41 – Node A

<u>Switch F</u>:

1. 62C2 – E
2. D67C – G
3. 3611 – Node C - Root Port

<u>Switch G</u>:

1. B4A1 – H
2. 1CB6 – F - Root port
3. FC01 – Node D

<u>Switch H</u>: **- Root switch**

1. 0140 – E - Root port
2. 28D9 – G
3. 8E99 – Node B

<u>Inference:</u>

Smallest MAC address of each switch shows their root port

And the smallest MAC address among the root ports, show the root switch

SPANNING TREE - 2

Aim

To simulate Networks using switch priorities in Netsim and compare their performance.

Tools Required

Netsim Software

Inference:

Smallest MAC address of each switch shows their root port

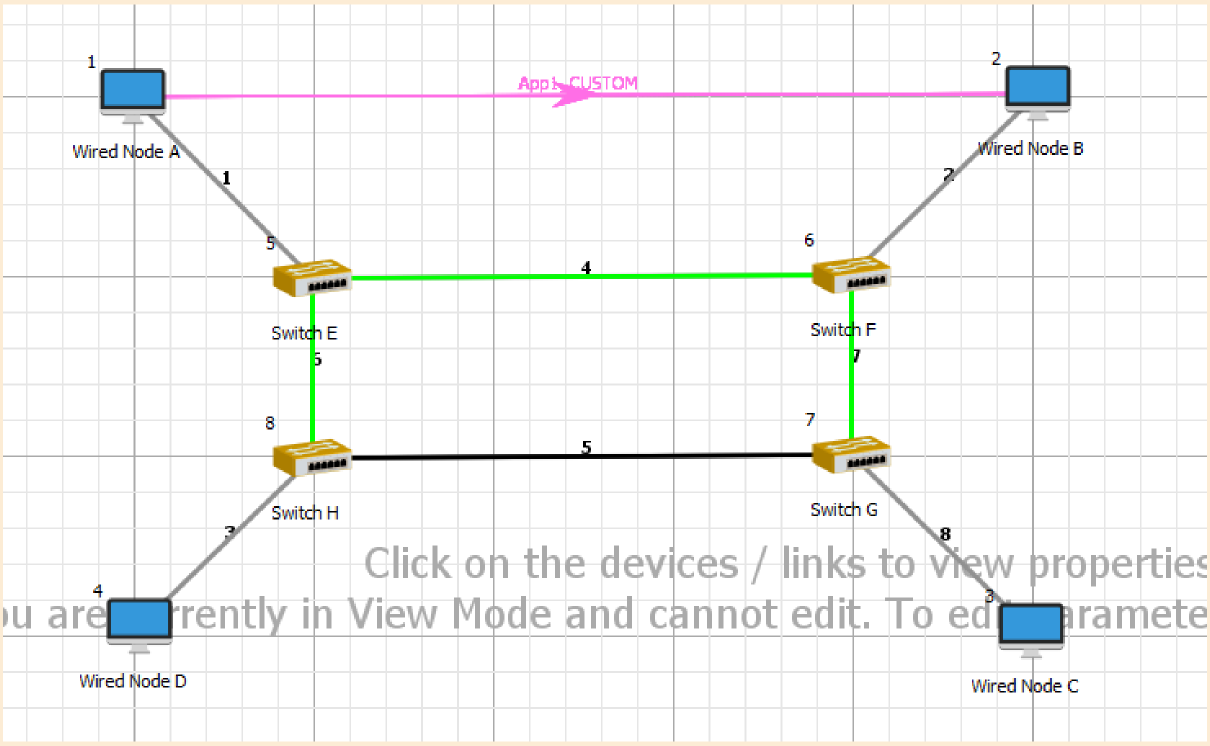
And the smallest MAC address among the root ports, show the root switch

The message packet is transferred usually through the ports which has the lowest MAC address for switches of **equal priority**, but since the priority of the switches have been changed manually – new routes of packet transmission is made automatically.

Hence, the following experiment has been observed with multiple sequences of priority arrangement among the switches. This changes the root switch, the root ports and the blocked ports.

So, "1234" means that switch 'E' has been given **1st** priority, 'F' got the **2nd** priority, 'G' got the **3rd** priority and 'H' got the **4th** priority. 4 different sequences have been listed below.

Network Diagram – 1234



Root switch: E

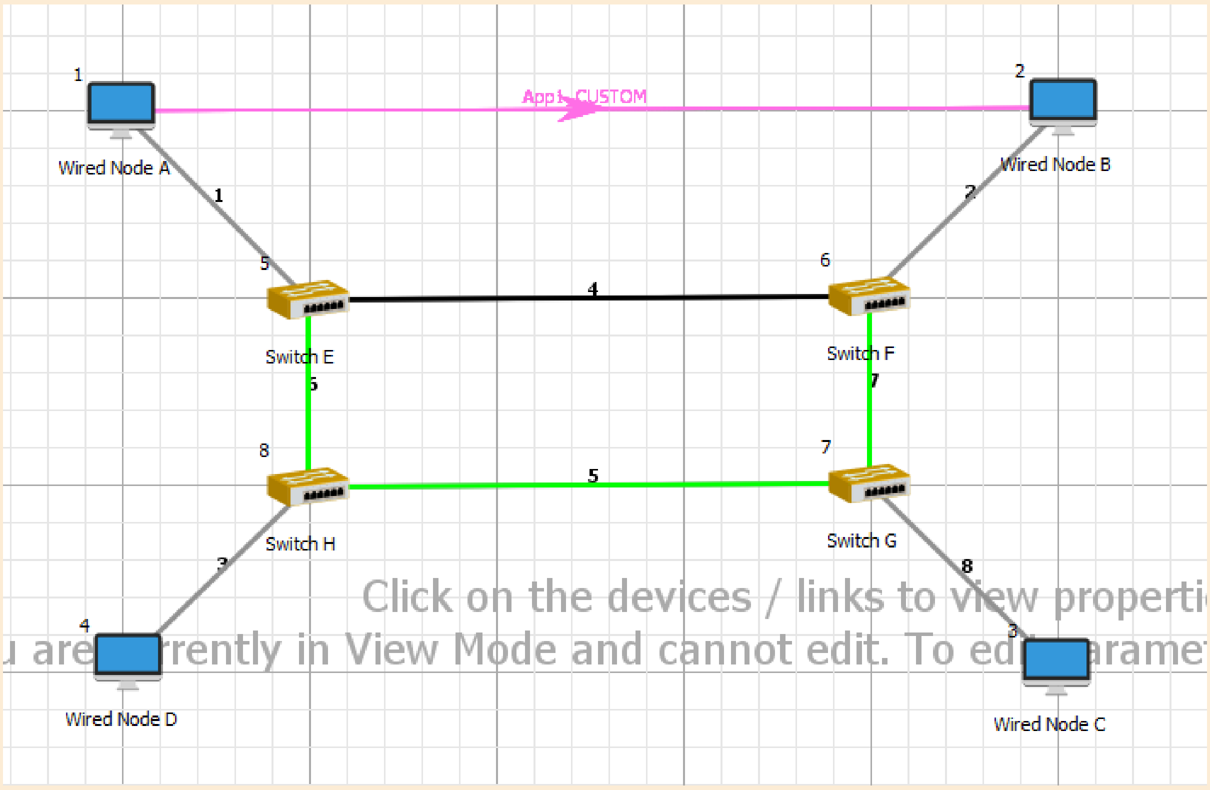
Root ports: G(7), F(4), H(6)

Designated ports: E(4), E(6), F(7)

Blocked ports: H(5), G(5)

Forward paths: 4, 6, 7

Network Diagram – 4312



Root switch: G

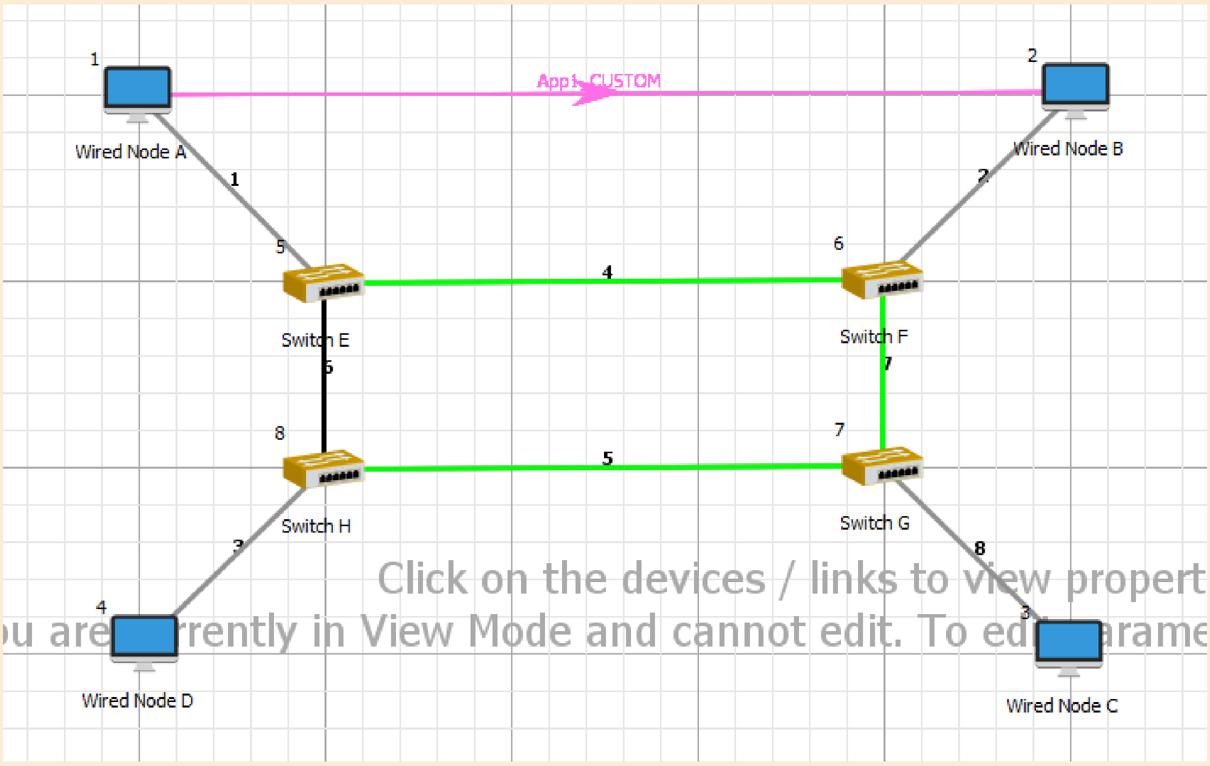
Root ports: F(7), H(5), E(6)

Designated ports: G(7), G(5), H(6)

Blocked ports: E(4), F(4)

Forward paths: 5, 6, 7

Network Diagram – 3124



Root switch: F

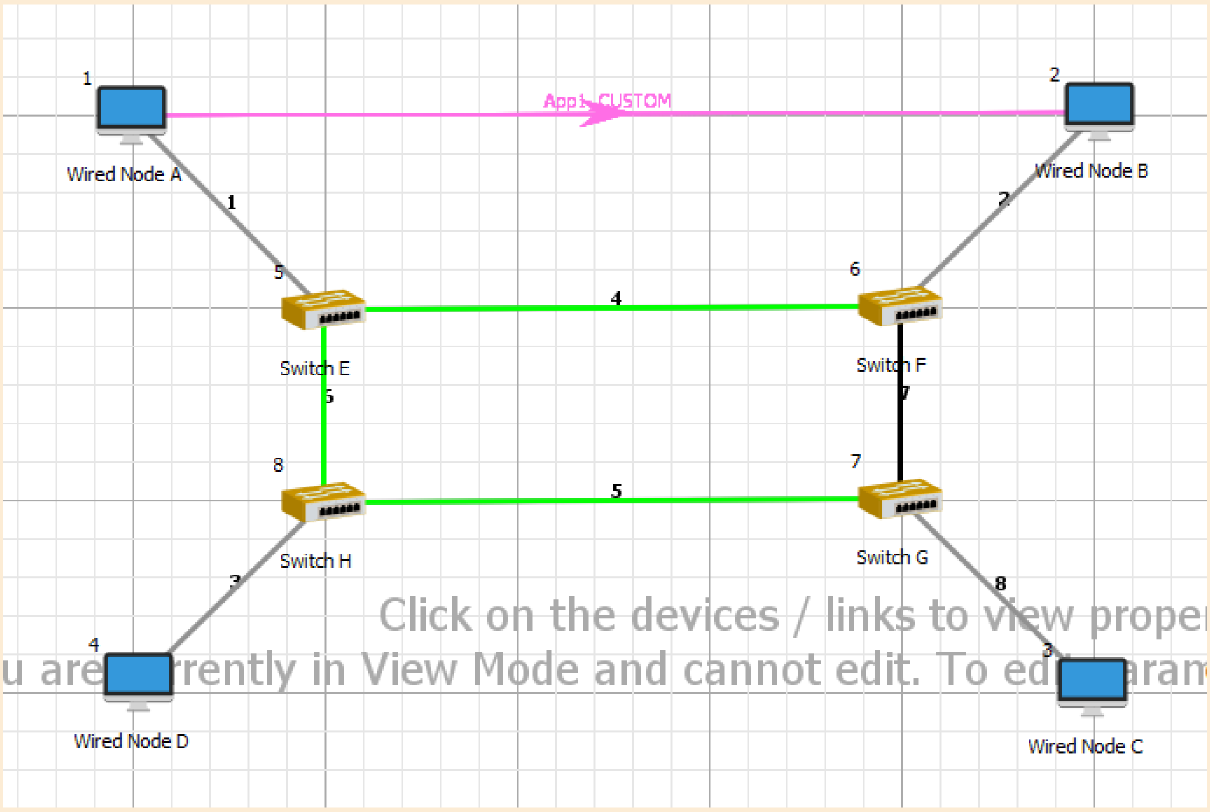
Root ports: E(4), H(5), G(7)

Designated ports: F(7), F(4), G(5)

Blocked ports: H(5), G(5)

Forward paths: 4, 5, 7

Network Diagram – 2431



Root switch: H

Root ports: E(6), G(5), F(4)

Designated ports: H(5), H(6), E(4)

Blocked ports: H(5), G(5)

Forward paths: 4, 5, 6

SIMPLE AND BUSY NETWORKS

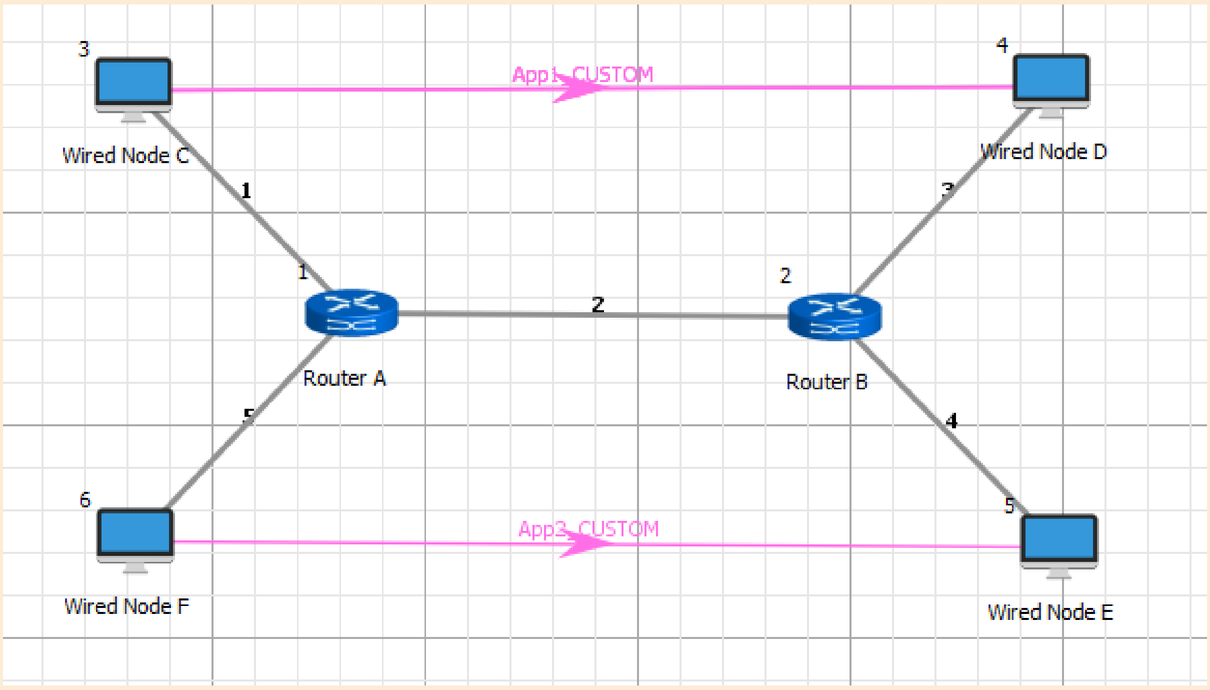
Aim

To study performance comparison between busy and simple networks

Tools Required

Netsim Software

Network Diagram



1:

Fast network: 100 Mbps

Throughput: 0.582832

Delay: 26737

2:

Simple network: 10 Mbps

Throughput: 0.582832

Delay: 32816

3:

Busy network: 1 Mbps

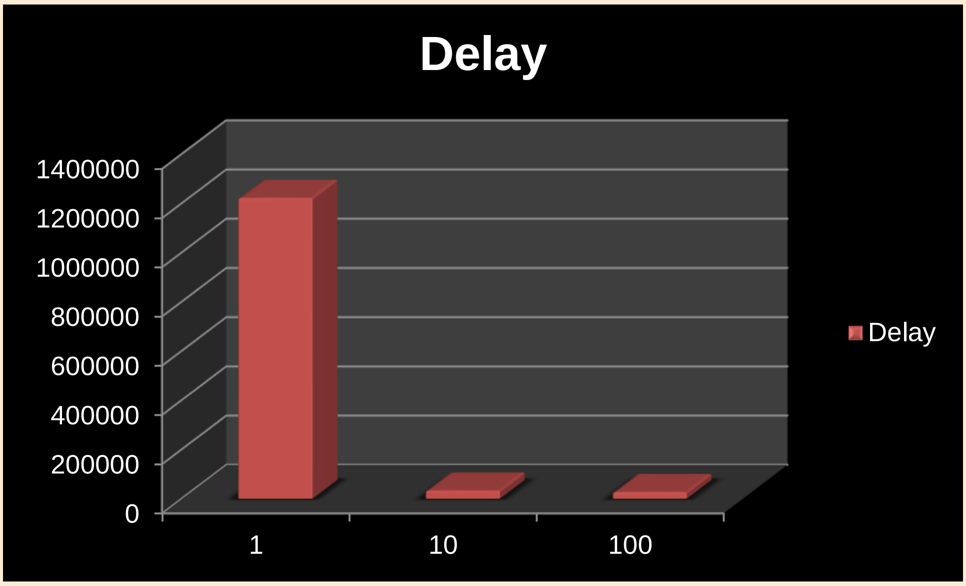
Throughput: 0.462528

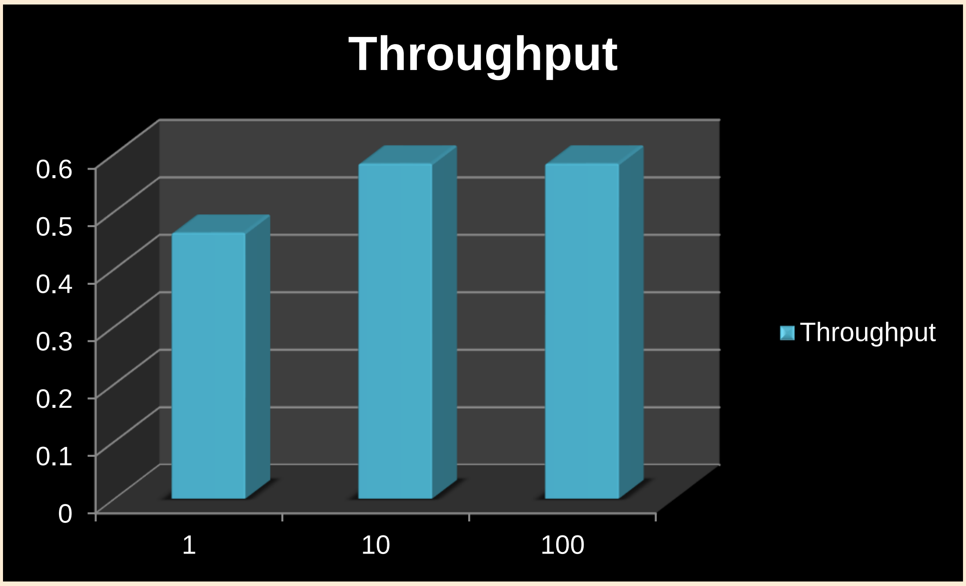
Delay: 1222234

Inference

From the given graphs, we understand the fact that the delay is very high for a busy network with a lower uplink and downlink speed. As an additional measure, I have also calculated the same for 100 Mbps and found nearly similar results to 10 Mbps, implying that the increase in speed results in a logarithmic decrease in the delay time.

Graphs


Delay
1400000
1200000
1000000
800000
600000
400000
200000
0
1
10
100
Delay


Throughput
0.6
0.5
0.4
0.3
0.2
0.1
0
1
10
100
Throughput

UDP & TCP

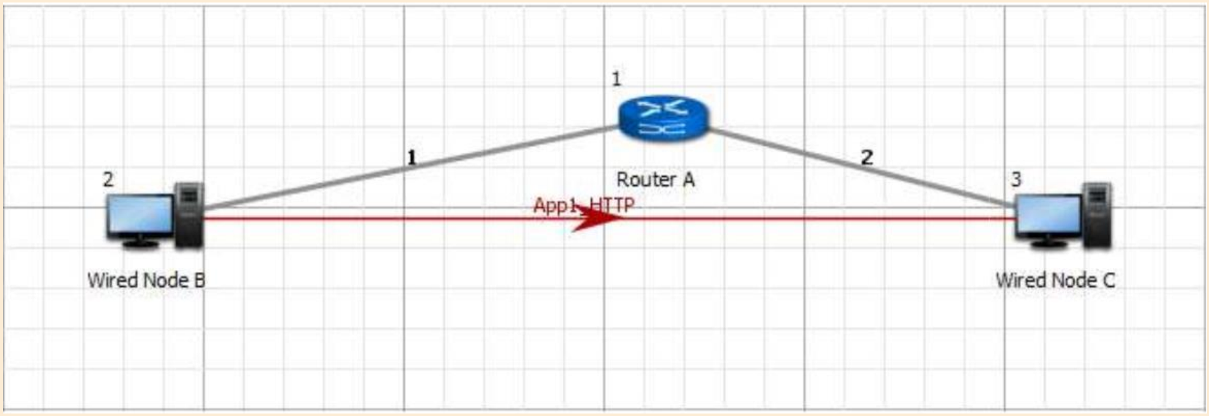
Aim

A study of performance between TCP and UDP busy and simple networks

Tools Required

Netsim Software

Network Diagram



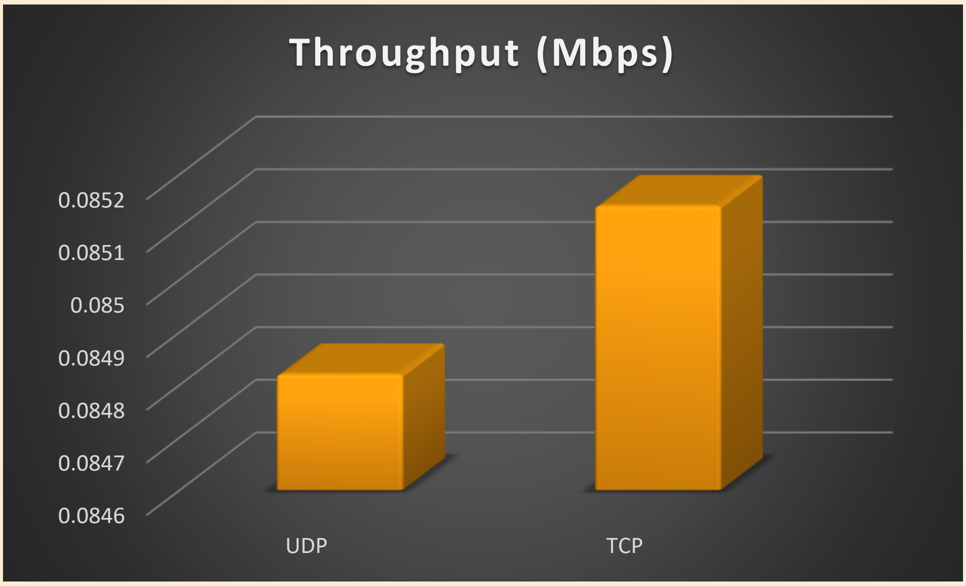
UDP:

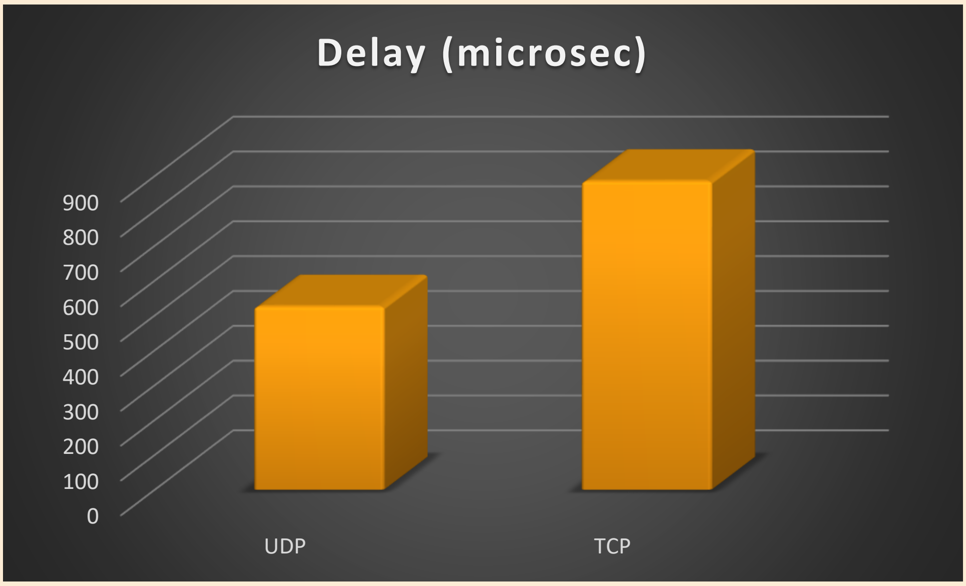
Packet Transmitted	Packet Received	Payload Transmitted	Payload Receiverd	Throughput (Mbps)	Delay (microsec)
1089	1085	1064250	1060250	0.08482	525.575742

TCP:

Packet Transmitted	Packet Received	Payload Transmitted	Payload Receiverd	Throughput (Mbps)	Delay (microsec)
1089	1085	1064250	1064250	0.08514	885.27056

Graphs





Inference:

TCP is a connection-oriented protocol while UDP is a connectionless protocol. So, the delay should be more in TCP as, it takes some extra time to establish connection. This can be inferred from the Delay graph above. On the other hand, even the throughput of TCP is greater, showing that the extra delay makes it more reliable. But the difference is very minute when comparing with UDP

IP ADDRESSING

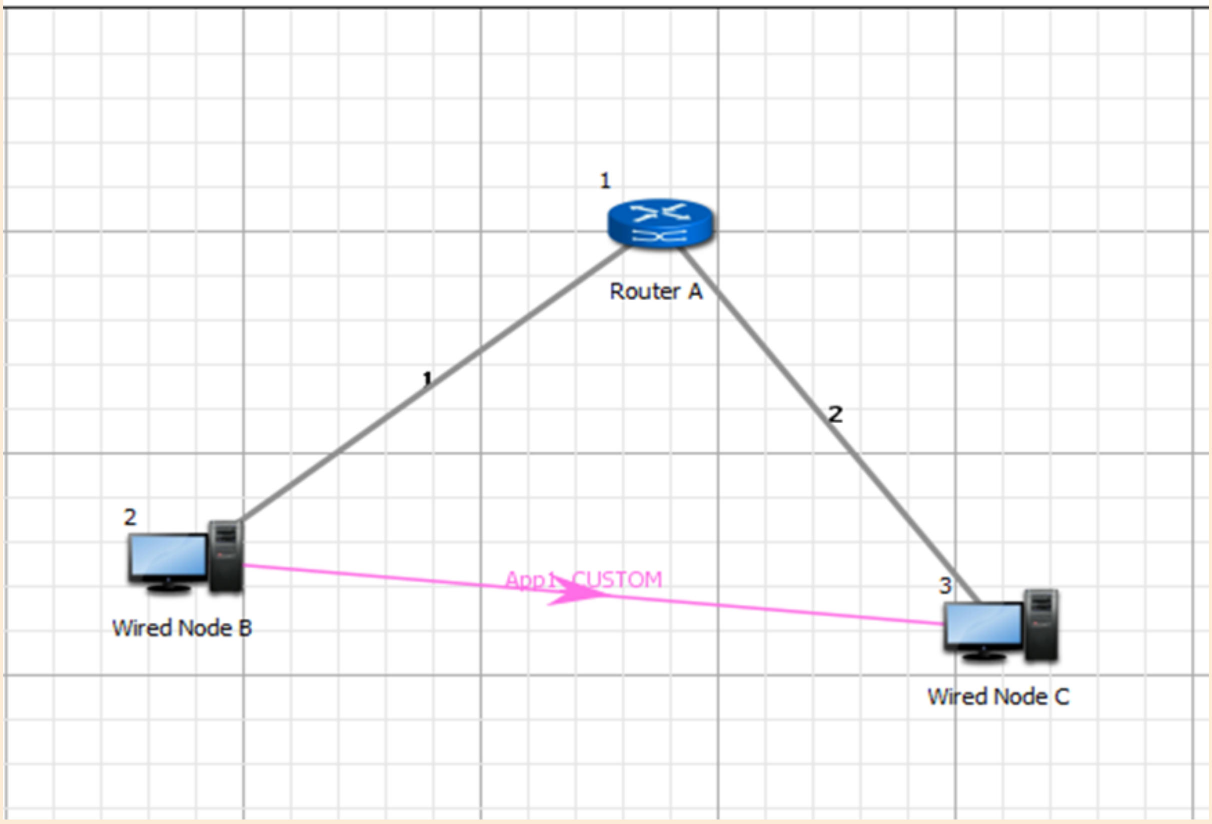
Aim

To understand IPv4Addressing with classes A and B

Tools Required

Netsim Software

Network Diagram



Observations

CLASS A WITH SUBNETTING

Router A:

IP Address: 11.1.1.1 (Interface with B), 11.2.1.1 (Interface with C)

Subnet Mask: 255.255.0.0

Wired Node B:

IP Address: 11.1.1.2

Subnet Mask: 255.255.0.0

Default Gateway: 11.1.1.1

Wired Node C:

IP Address: 11.2.1.2

Subnet Mask: 255.255.0.0

Default Gateway: 11.2.1.1

DeviceId	IP_Address	MAC_Address	Type
1	11.1.1.1	43522E199F12	STATIC
	11.2.1.1	890F23F5A261	STATIC
	192.2.1.2	24203B32BB36	STATIC
	11.2.1.2	3C09E34C40A6	STATIC
2	11.1.1.1	43522E199F12	STATIC
	11.2.1.1	890F23F5A261	STATIC
	192.2.1.2	24203B32BB36	STATIC
	11.2.1.2	3C09E34C40A6	STATIC
3	11.1.1.1	43522E199F12	STATIC
	11.2.1.1	890F23F5A261	STATIC
	192.2.1.2	24203B32BB36	STATIC
	11.2.1.2	3C09E34C40A6	STATIC

CLASS B WITH SUBNETTING

Router A:

IP Address: 190.1.1.1 (Interface with B),

190.2.1.1 (Interface with C)

Subnet Mask: 255.255.255.0

Wired Node B:

IP Address: 190.1.1.2

Subnet Mask: 255.255.255.0

Default Gateway: 190.1.1.1

Wired Node C:

IP Address: 190.2.1.2

Subnet Mask: 255.255.255.0

Default Gateway: 190.2.1.1

DeviceId	IP_Address	MAC_Address	Type
1	190.1.1.1	F683FEC92A83	STATIC
	190.2.1.1	49E615E9C226	STATIC
	190.1.1.2	D61B67CDD181	STATIC
	190.2.1.2	6A11FFA324BC	STATIC
2	190.1.1.1	F683FEC92A83	STATIC
	190.2.1.1	49E615E9C226	STATIC
	190.1.1.2	D61B67CDD181	STATIC
	190.2.1.2	6A11FFA324BC	STATIC
3	190.1.1.1	F683FEC92A83	STATIC
	190.2.1.1	49E615E9C226	STATIC
	190.1.1.2	D61B67CDD181	STATIC
	190.2.1.2	6A11FFA324BC	STATIC

Results:

Case 1: Throughput and Delay are more than zero

Case 2: Throughput and Delay are zero

Case 3: Throughput and Delay are more than zero

Inference:

Networks in which the IP address of the nodes are of the same class, have an established connection as seen by the positive values of throughput and delay. When the class of one of the nodes is changed, by changing its IP address, there is no established connection or the server crashes, as seen by the zero value of the throughput or delay