

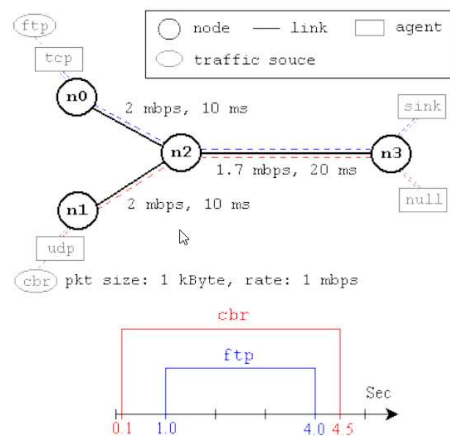
NETWORKS LAB 4

106119055 | JEREMIAH THOMAS

CSE -A

OUTPUTS

Q1. Simulate the following Network. Find the total number of packets transmitted and received.



- **Number of Packets Sent & No of Packets Received :-**

Running pktflowdata.awk script on the trace file, q1log.tr

```
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab4
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$ ns q1.tcl
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.

-----
Welcome onboard! Jeremiah Thomas | Network Lab4 | Q1
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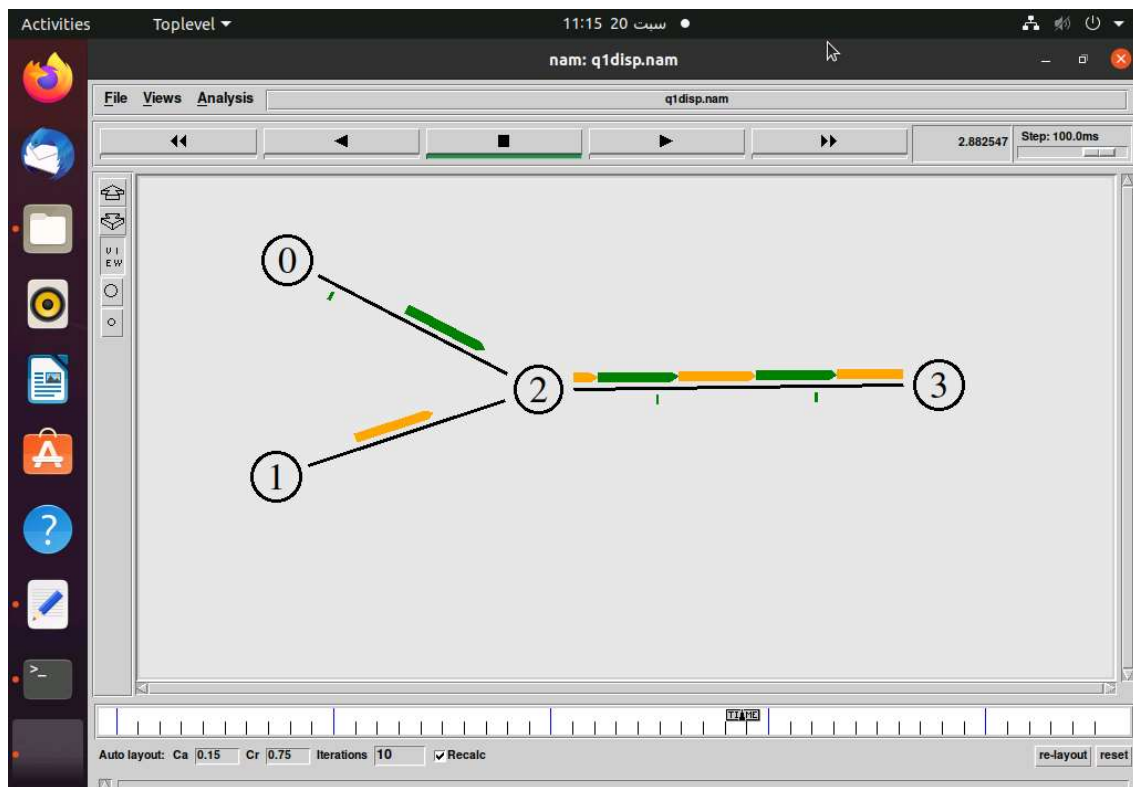
The NAM and Log Trace files have been created. Do run the following commands in this order:-

1. For viewing the simulation : nam q1disp.nam
2. For calculating no of packets received and transmitted : awk -f pktflowdata.awk q1log.tr

jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$ awk -f pktflowdata.awk q1log.tr
No of Packets sent by sources : 827
No of Packets received by destination : 827
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$
```

Simulation Rendering:-

- Green : TCP Flow from Node 0 -> Node 3
- Orange: UDP Flow from Node 1 -> Node 3



Q2. Attached Below:-

2. Construct the following wired network topologies and display these topologies in NAM.

- Linear topology with 10 nodes
- Grid topology with 25 nodes
- Ring topology with 6 nodes
- Star topology with 6 nodes
- Bus topology with 10 nodes

Total simulation time is 50sec. Initiate 2 different transmissions (either CBR or FTP) between randomly selected source and destination. Data transfer is started at 1sec and stopped at 49sec. Measure PDR, PLR and end-to-end delay at equal time interval (10sec, 20, 30, 40 and 50sec) and plot the measured value.

Star Topology

- A source and destination are randomly chosen, following TCP Connection. In this case, 5 is the Source Node while 1 is the destination Node.
- 3 has been taken as the center for this simulation.

```
Activities Terminal 11:40 20 سبت
Jeremiah@Jeremiah-Virtual-Machine: ~/Desktop/lab4

jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$ ns star.tcl
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.

-----
Welcome onboard! Jeremiah Thomas | Network Lab4 | Q2 | Star
-----
The Source Node is : 5
The Destination Node is : 1

-----
The NAM and Log Trace files have been created. Do run the following commands in order:-
For viewing the simulation : nam star_disp.nam

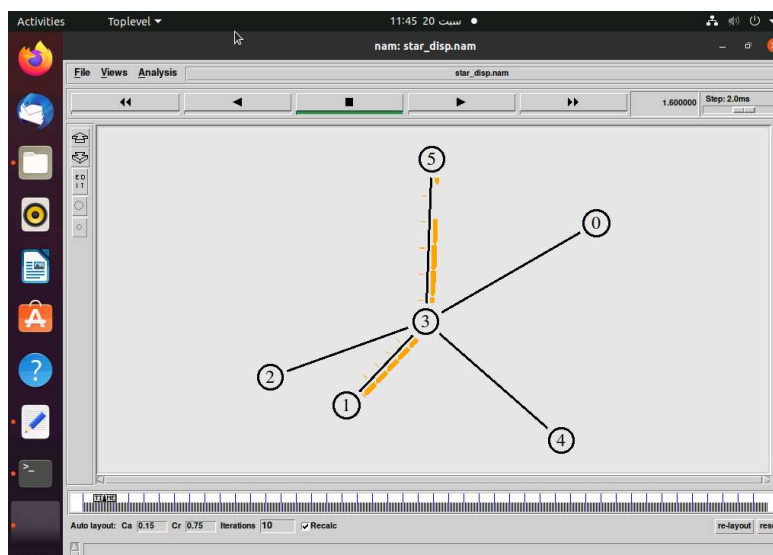
-----
1.For plotting Packet Delivery Ratio :-
A) Run : awk -f pdr.awk -v src=<src> -v dest=<dest> star_log.tr>star_pdr
B) Run : xgraph star_pdr

-----
2.For plotting Packet Loss Ratio :-
A) Run : awk -f plr.awk -v src=<src> -v dest=<dest> star_log.tr>star_plr
B) Run : xgraph star_plr

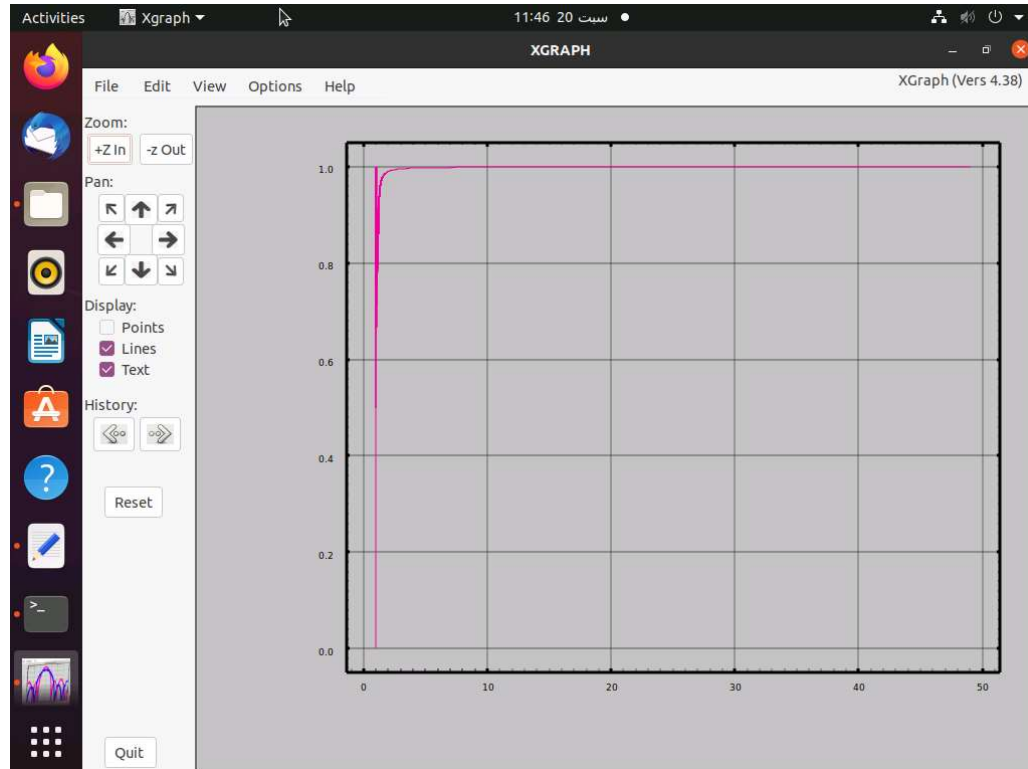
-----
3.For plotting End to End Delay :-
A) Run : awk -f e2e_delay.awk -v src=<src> -v dest=<dest> star_log.tr>star_e2e_delay
B) Run : xgraph star_e2e_delay

-----
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$
```

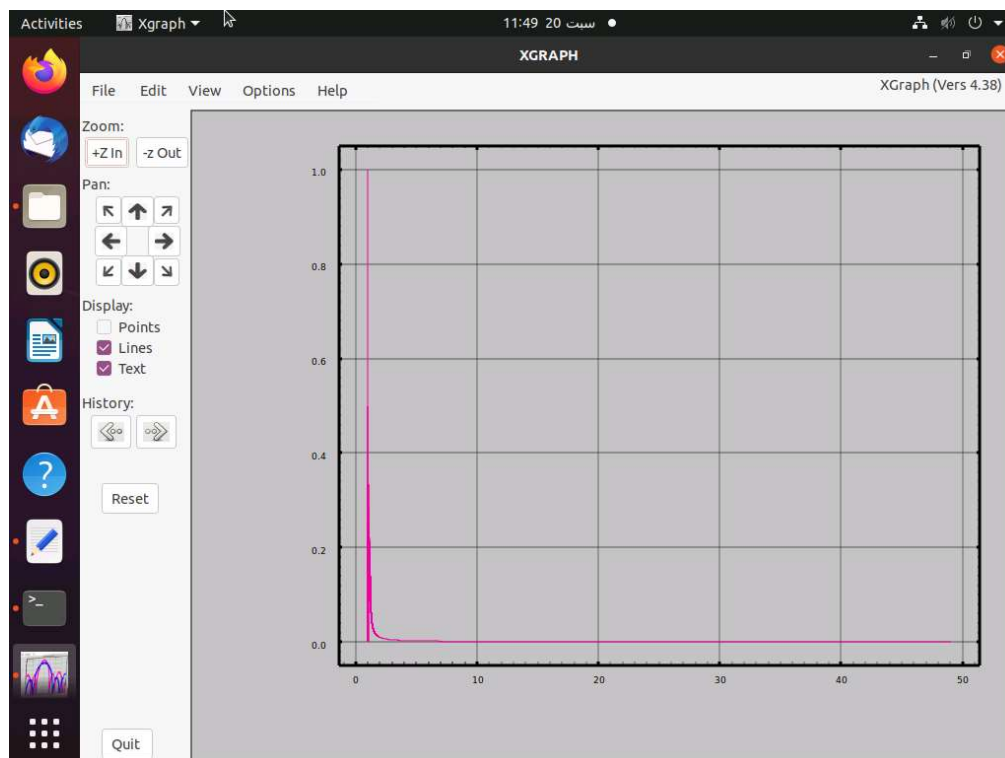
Simulation on NAM:-



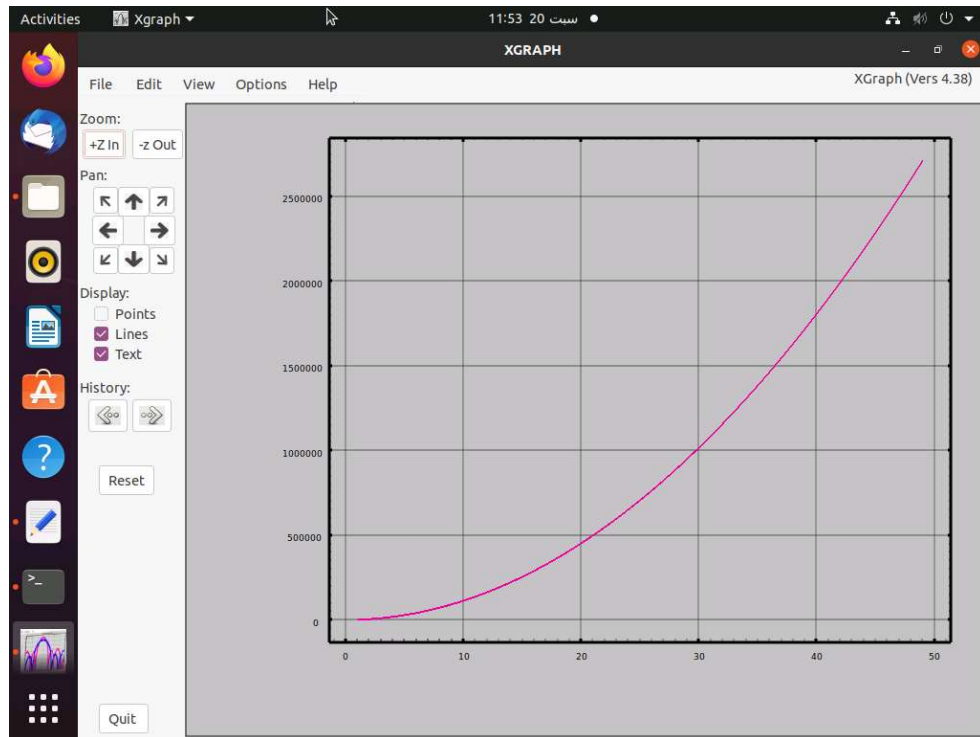
1. Packet Delivery Ratio:-



2. Packet Loss Rate:-



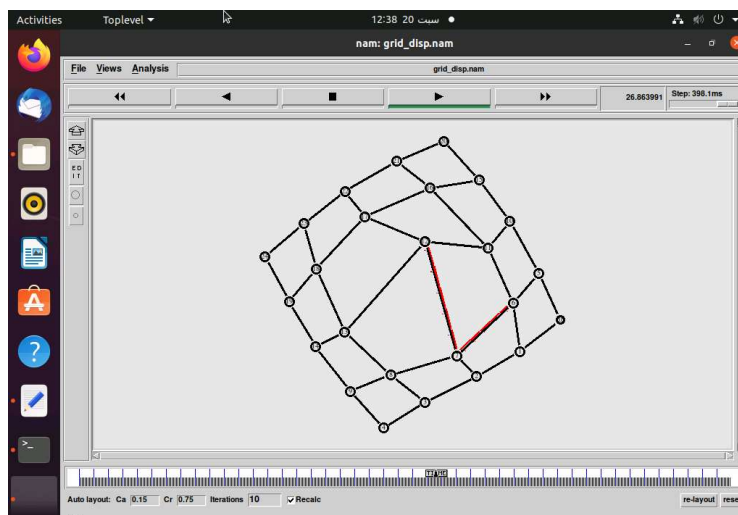
3. End to End Delay:-



Grid Topology:-

- A source and destination are randomly chosen, following TCP Connection. In this case, 12 is the Source Node while 6 is the destination Node.
- Here, the corner and edge nodes are connected to 2 fellow nodes and the middle nodes are connected to over 4 other nodes.

Simulation on NAM:-



Running the tcl file:-

```
Activities Terminal 12:37 20 سبت
Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab4
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$ ns.grid.tcl
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.

-----
Welcome onboard! Jeremiah Thomas | Network Lab4 | Q2 | GRID
-----
The Source Node is : 12
The Destination Node is : 6

-----
The NAM and Log Trace files have been created. Do run the following commands in order:-
For viewing the simulation : nam grid_disp.nam

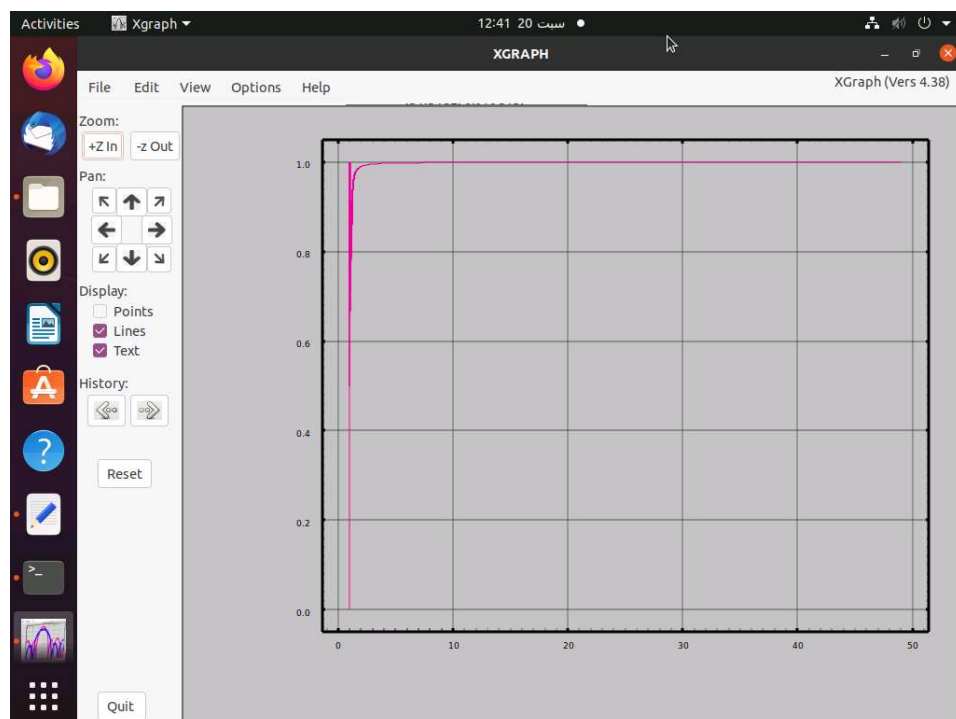
-----
1.For plotting Packet Delivery Ratio :-
A) Run : awk -f pdr.awk -v src=<src> -v dest=<dest> grid_log.tr>grid_pdr
B) Run : xgraph grid_pdr

-----
2.For plotting Packet Loss Ratio :-
A) Run : awk -f plr.awk -v src=<src> -v dest=<dest> grid_log.tr>grid_plr
B) Run : xgraph grid_plr

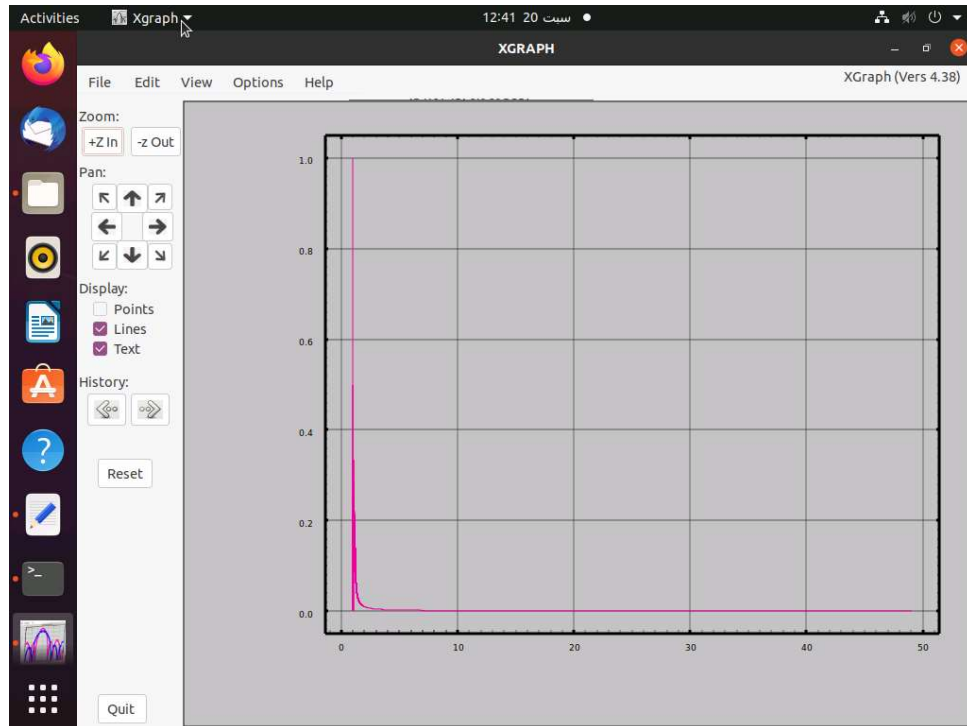
-----
3.For plotting End to End Delay :-
A) Run : awk -f e2e_delay.awk -v src=<src> -v dest=<dest> grid_log.tr>grid_e2e_delay
B) Run : xgraph grid_e2e_delay

-----
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$
```

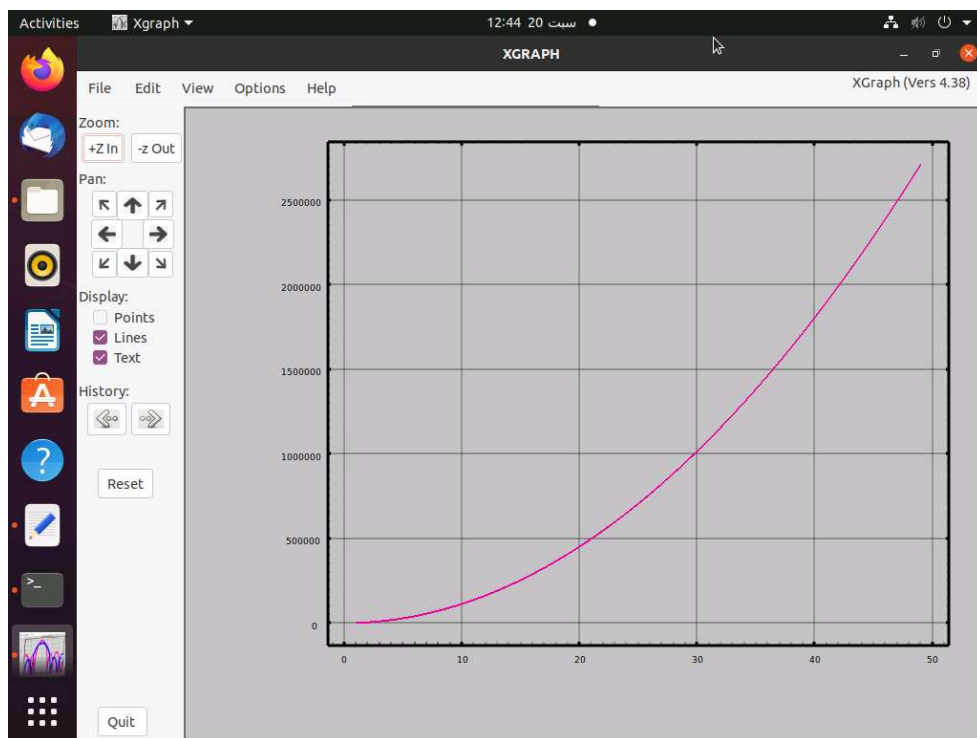
1. Packet Delivery Ratio:-



2. Packet Loss Rate:-



3. End To End Delay:-



Ring Topology

A source and destination are randomly chosen, following TCP Connection. In this case, 2 is the Source Node while 4 is the destination Node.

```
Activities Terminal 12:49 20 سبت
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab4

jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$ ns ring.tcl
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. If
the wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.

-----
Welcome onboard! Jeremiah Thomas | Network Lab4 | Q2 | RING
-----
The Source Node is : 2
The Destination Node is : 4

-----
The NAM and Log Trace files have been created. Do run the following commands in order:-
For viewing the simulation : nam ring_disp.nam

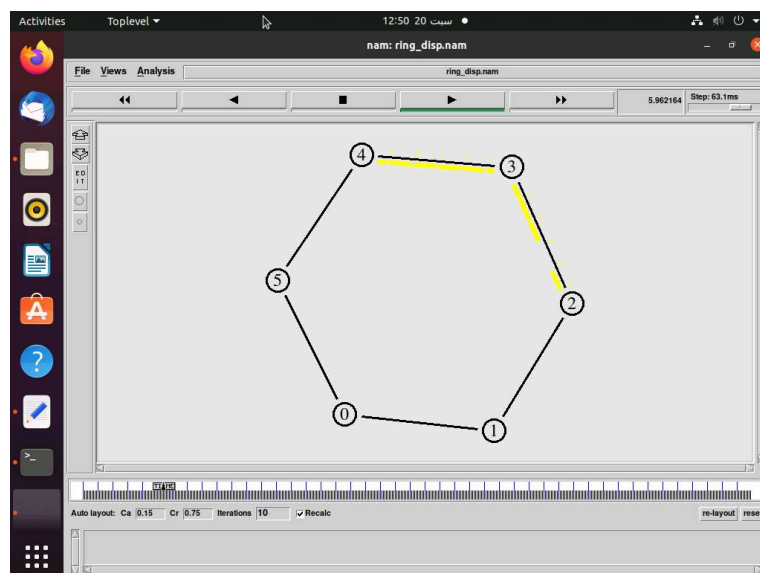
-----
1.For plotting Packet Delivery Ratio :-
A) Run : awk -f pdr.awk -v src=<src> -v dest=<dest> ring_log.tr>ring_pdr
B) Run : xgraph ring_pdr

-----
2.For plotting Packet Loss Ratio :-
A) Run : awk -f plr.awk -v src=<src> -v dest=<dest> ring_log.tr>ring_plr
B) Run : xgraph ring_plr

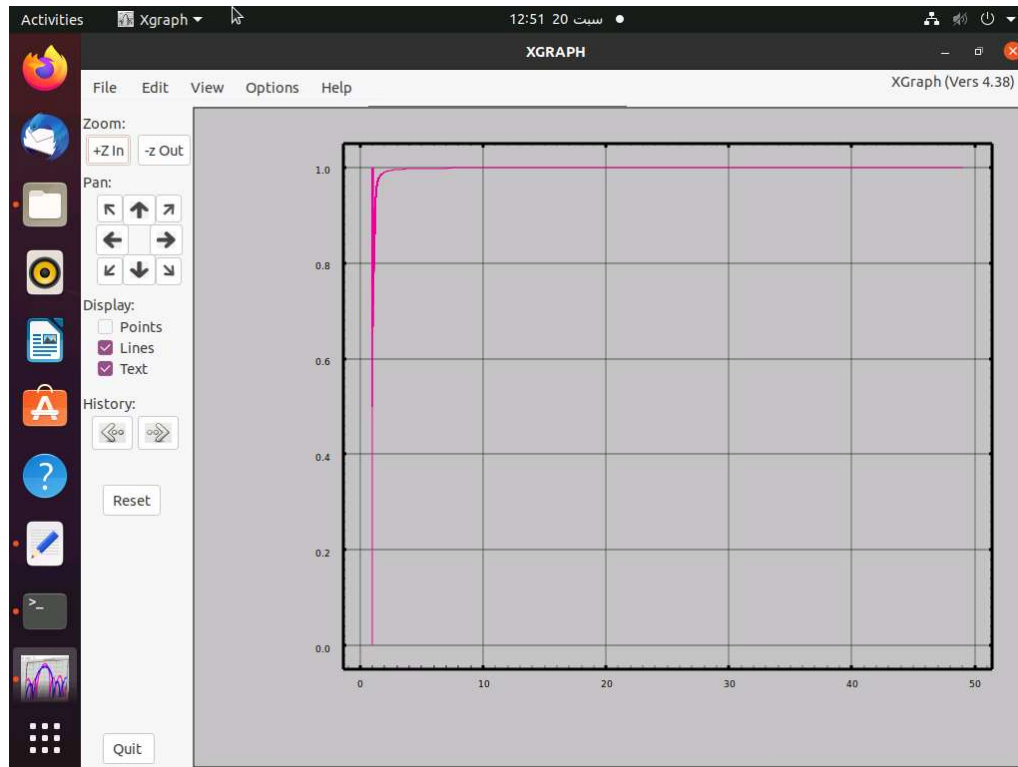
-----
3.For plotting End to End Delay :-
A) Run : awk -f e2e_delay.awk -v src=<src> -v dest=<dest> ring_log.tr>ring_e2e_delay
B) Run : xgraph ring_e2e_delay

-----
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$
```

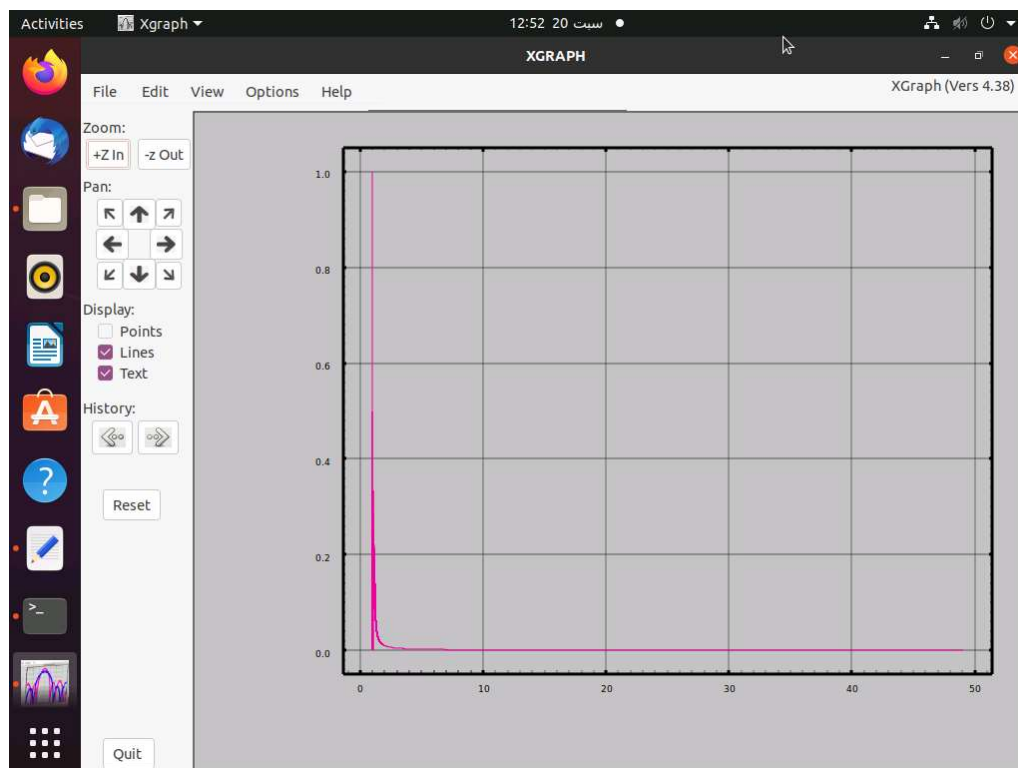
Simulation on NAM:-



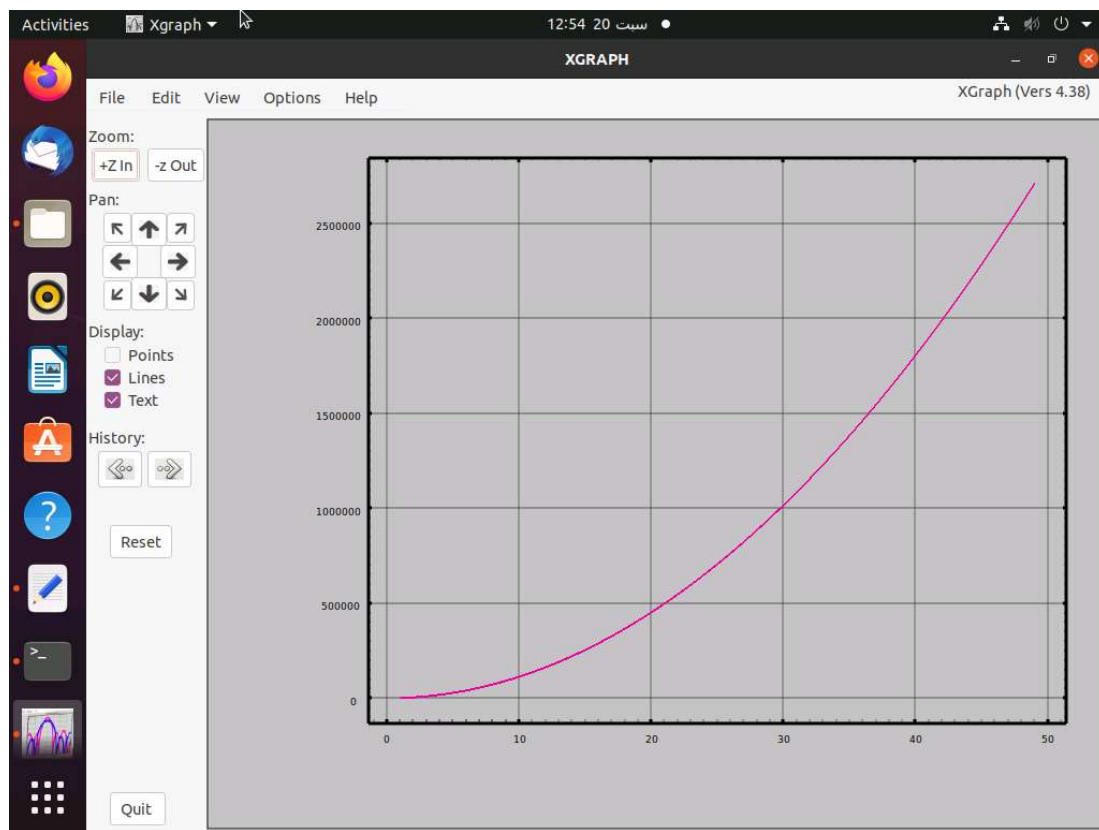
1. Packet Delivery Ratio:-



2. Packet Loss Rate:-



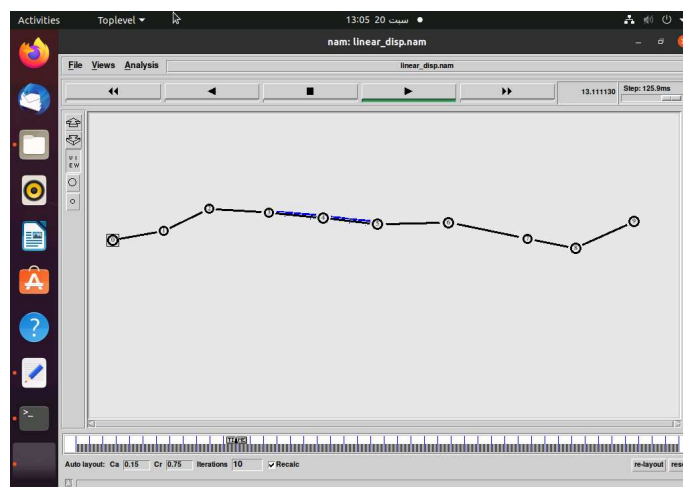
3. End To End Delay:-



Linear Topology

A source and destination are randomly chosen, following TCP Connection. In this case, 2 is the Source Node while 5 is the destination Node.

Simulation on NAM:-



```
Activities Terminal 13:00 20 سبت
Jeremiah@Jeremiah-Virtual-Machine: ~/Desktop/lab4

jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$ ns linear.tcl
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.

-----
Welcome onboard! Jeremiah Thomas | Network Lab4 | Q2 | LINEAR
-----
The Source Node is : 2
The Destination Node is : 5

-----
The NAM and Log Trace files have been created. Do run the following commands in order:-
For viewing the simulation : nam linear_disp.nam

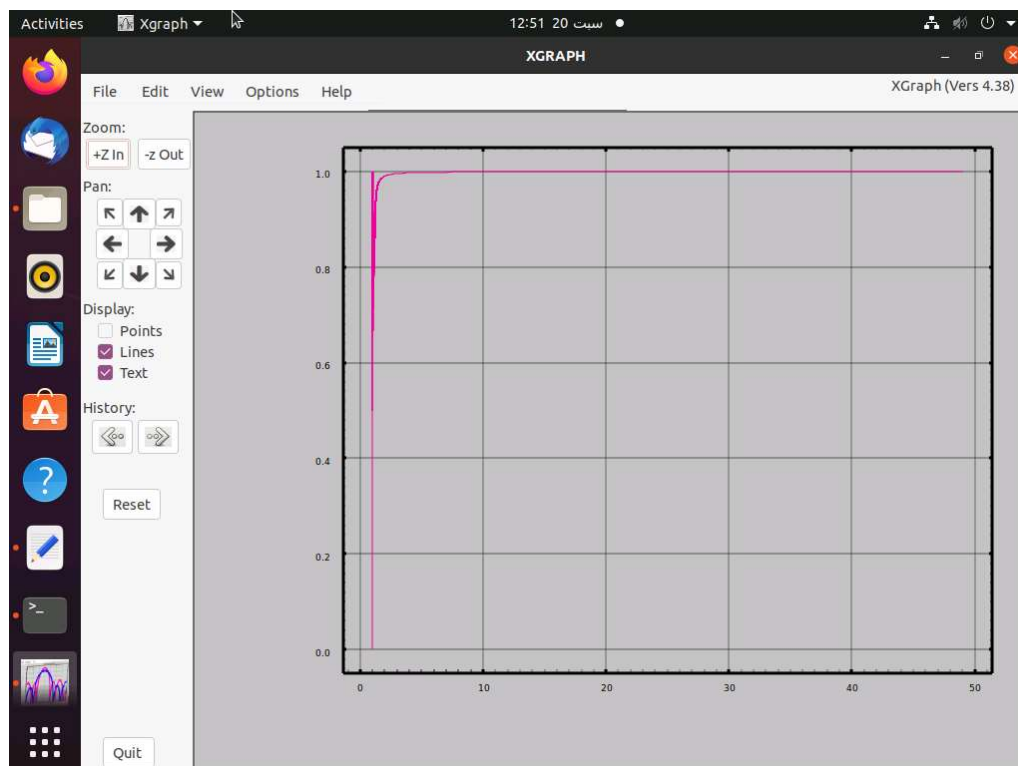
-----
1.For plotting Packet Delivery Ratio :-
A) Run : awk -f pdr.awk -v src=<src> -v dest=<dest> linear_log.tr>linear_pdr
B) Run : xgraph linear_pdr

-----
2.For plotting Packet Loss Ratio :-
A) Run : awk -f plr.awk -v src=<src> -v dest=<dest> linear_log.tr>linear_plr
B) Run : xgraph linear_plr

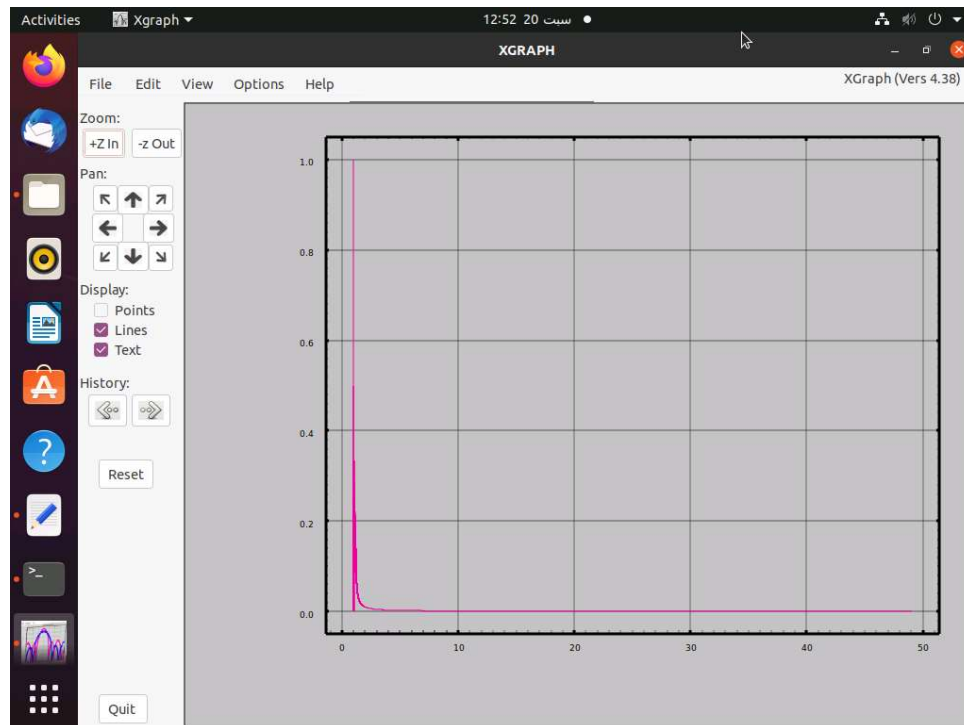
-----
3.For plotting End to End Delay :-
A) Run : awk -f e2e_delay.awk -v src=<src> -v dest=<dest> linear_log.tr>linear_e2e_delay
B) Run : xgraph linear_e2e_delay

-----
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$
```

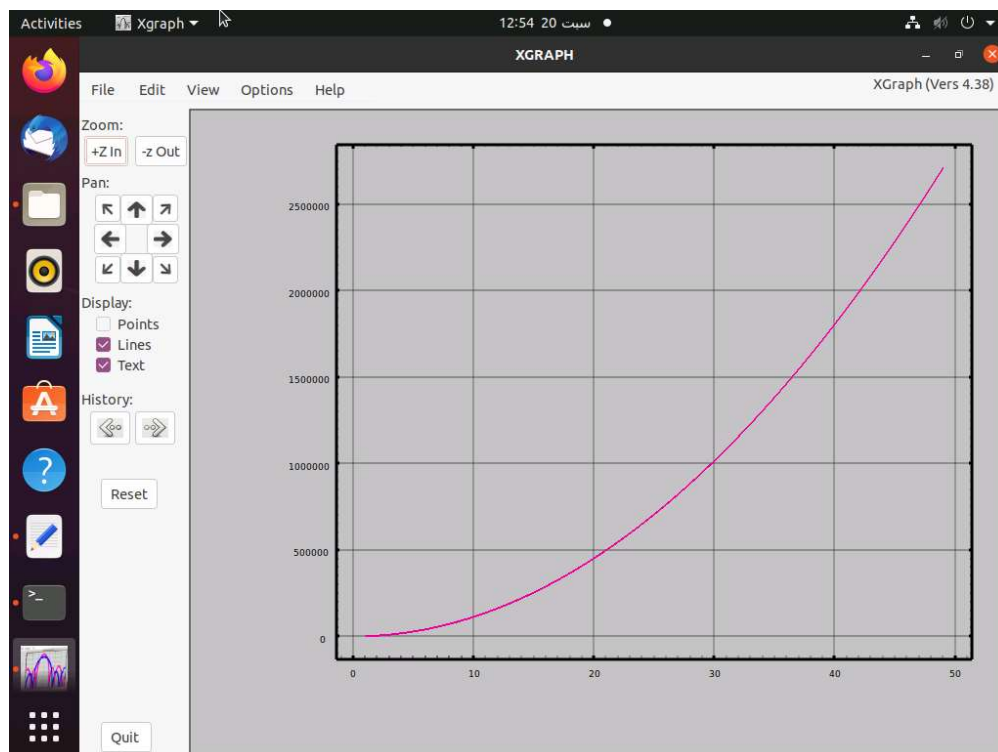
1. Packet Delivery Ratio:-



2. Packet Loss Rate:-



3. End To End Delay:-



Bus Topology

A source and destination are randomly chosen, following TCP Connection. In this case, 2 is the Source Node while 7 is the destination Node.

```
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab4
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$ ns bus.tcl
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. The
wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.

-----
Welcome onboard! Jeremiah Thomas | Network Lab4 | Q2 | BUS
-----
The Source Node is : 2
The Destination Node is : 7

-----
The NAM and Log Trace files have been created. Do run the following commands in order:-
For viewing the simulation : nam star_disp.nam

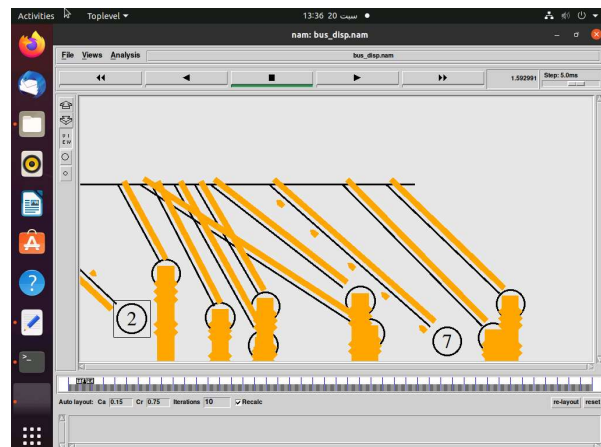
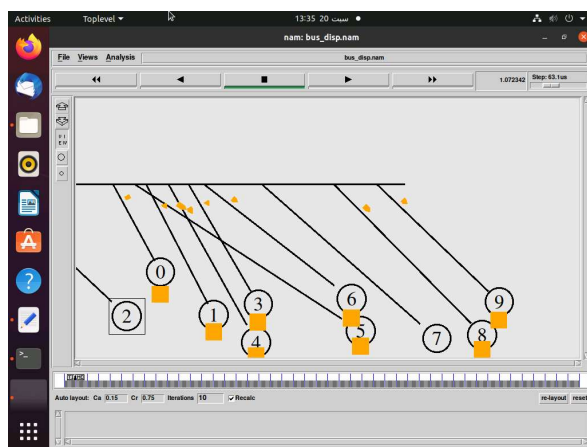
-----
1.For plotting Packet Delivery Ratio :-
A) Run : awk -f pdr.awk -v src=<src> -v dest=<dest> bus_log.tr>bus_pdr
B) Run : xgraph bus_pdr

-----
2.For plotting Packet Loss Ratio :-
A) Run : awk -f plr.awk -v src=<src> -v dest=<dest> bus_log.tr>bus_plr
B) Run : xgraph bus_plr

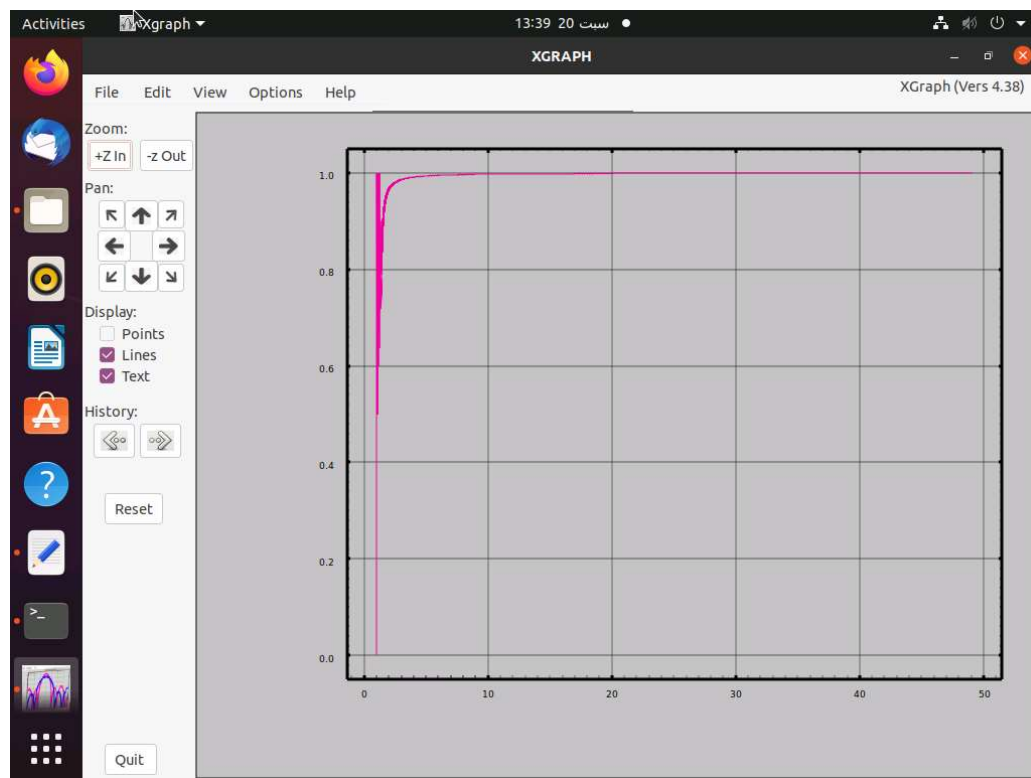
-----
3.For plotting End to End Delay :-
A) Run : awk -f e2e_delay.awk -v src=<src> -v dest=<dest> bus_log.tr>bus_e2e_delay
B) Run : xgraph bus_e2e_delay

-----
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$ nam bus_disp.nam
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab4$
```

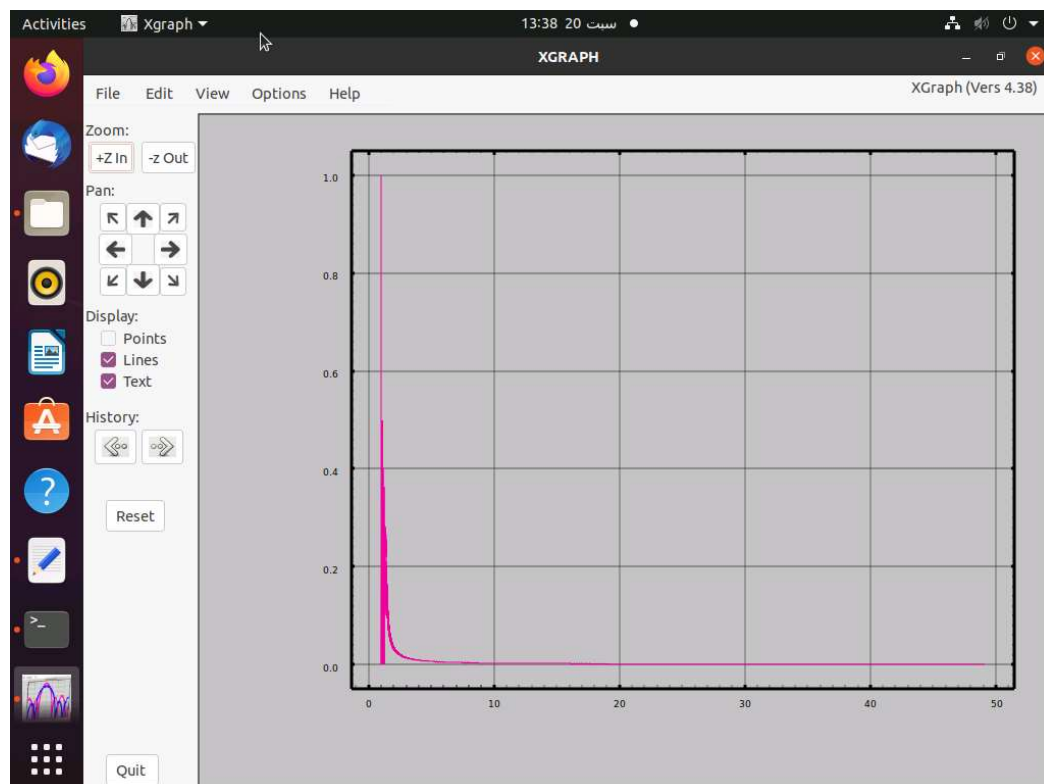
Simulation on NAM:-



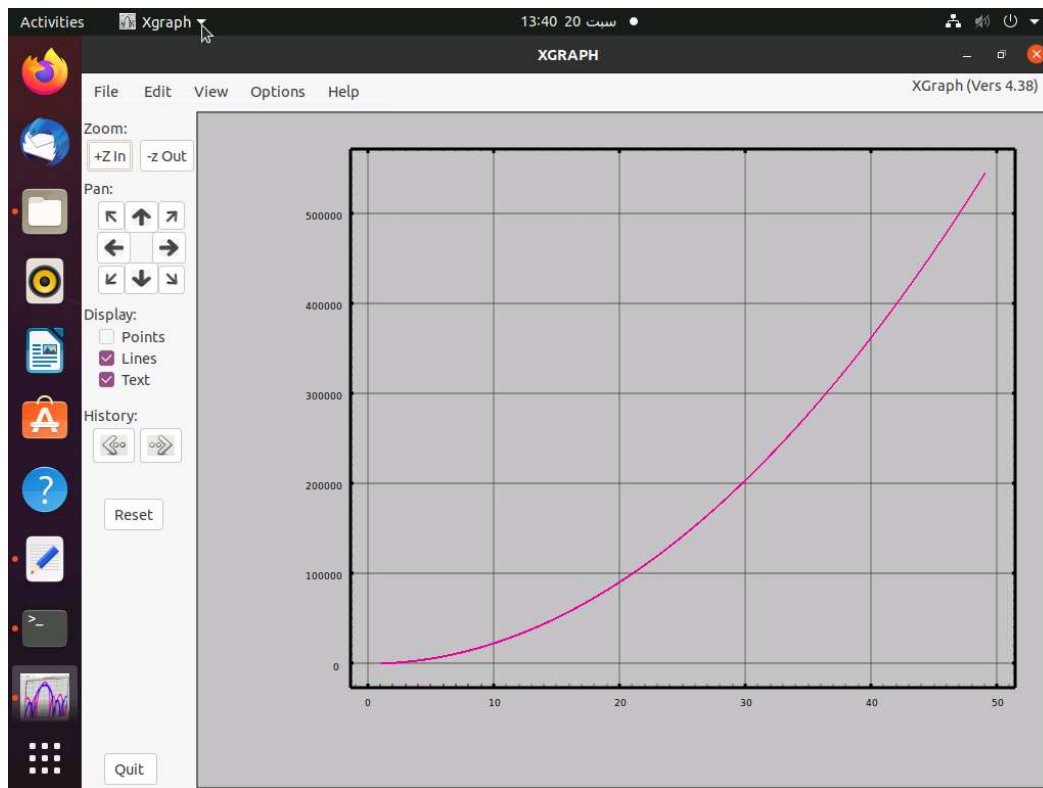
1. Packet Delivery Ratio:-



2. Packet Loss Rate:-



3. End To End Delay:-



DO NOTE:-

- All the relevant Tcl programs, awk scripts and xgraph tables have been attached as a zip folder to this output report.
- In addition, do ensure that the commands are run in the right directory where the files are present

THANK YOU