

## NETWORKS LAB ASSIGNMENT 5

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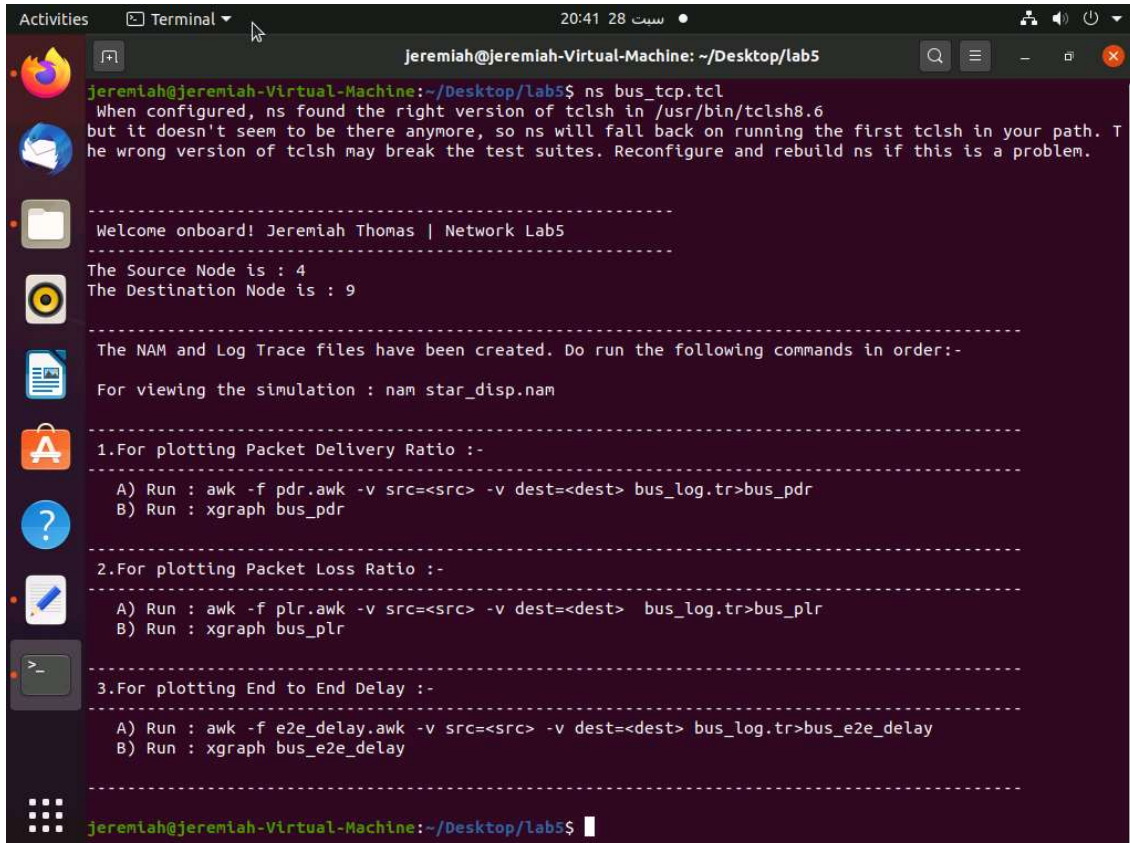
CSE-A

Week 5(24-09-2021)

1. Compare the performance of TCP(FTP Traffic) and UDP(CBR Traffic) in grid topology (25 nodes) and bus topology (10 nodes). Measure and plot the graphs for the following metrics in different simulation time interval
  - (i) Throughput
  - (ii) End-to-end delay
  - (iii) Packet drop ratio
  - (iv) Bandwidth utilization

### ANSWER:-

- Case of Bus:-



```
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab5
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab5$ ns bus_tcp.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.

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Welcome onboard! Jeremiah Thomas | Network Labs
-----
The Source Node is : 4
The Destination Node is : 9

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

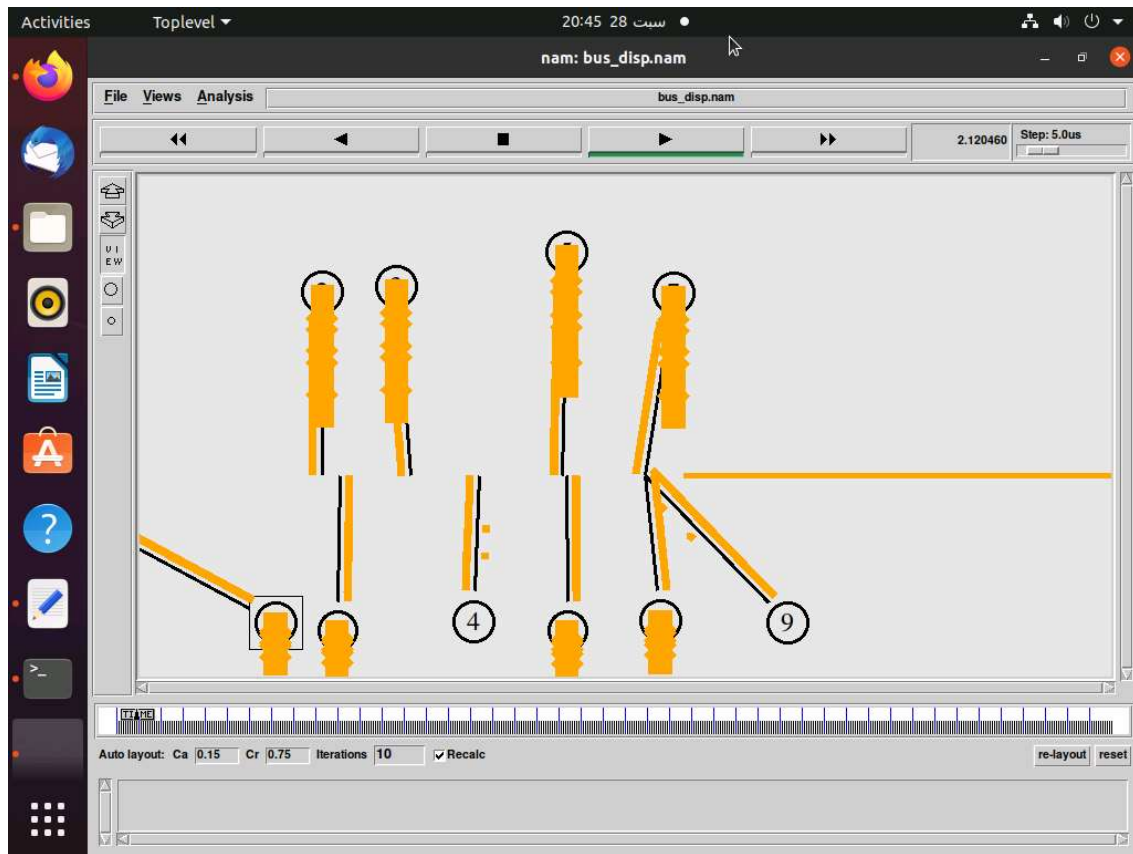
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1.For plotting Packet Delivery Ratio :-
A) Run : awk -f pdr.awk -v src=<src> -v dest=<dest> bus_log.tr>bus_pdr
B) Run : xgraph bus_pdr

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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

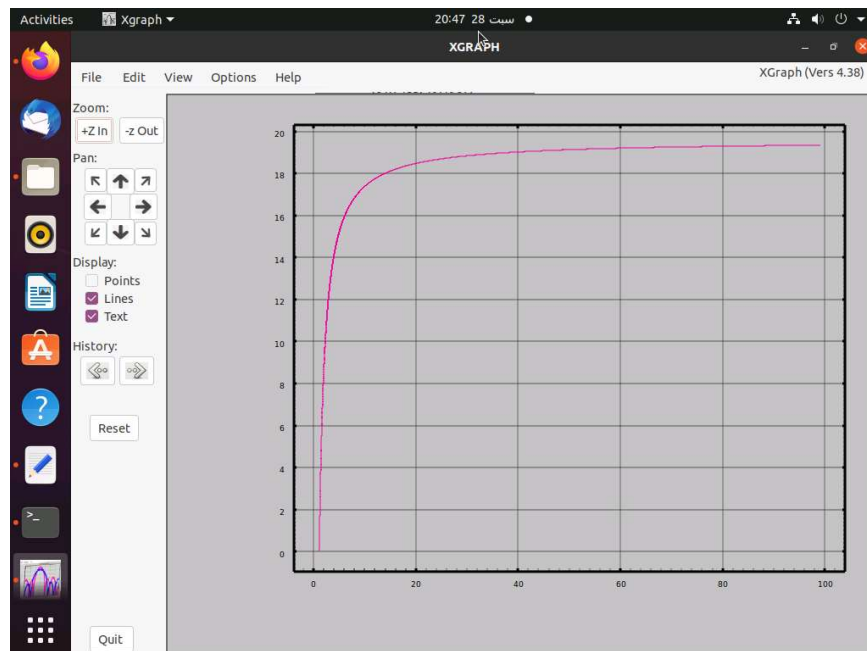
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3.For plotting End to End Delay :-
A) Run : awk -f e2e_delay.awk -v src=<src> -v dest=<dest> bus_log.tr>bus_e2e_delay
B) Run : xgraph bus_e2e_delay

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jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab5$
```

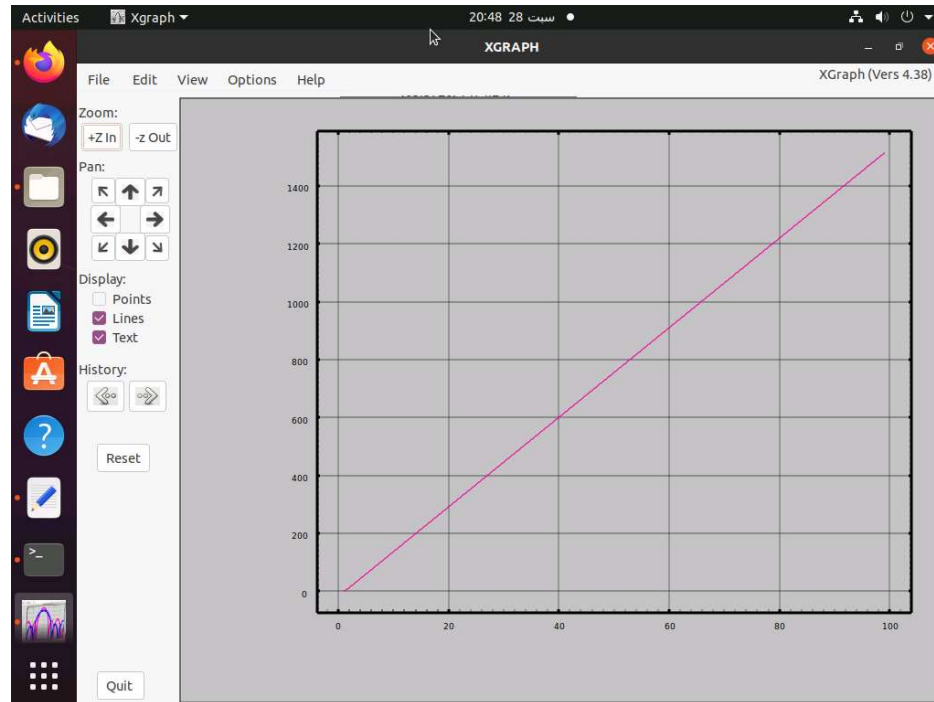
## Nam Simulation:-



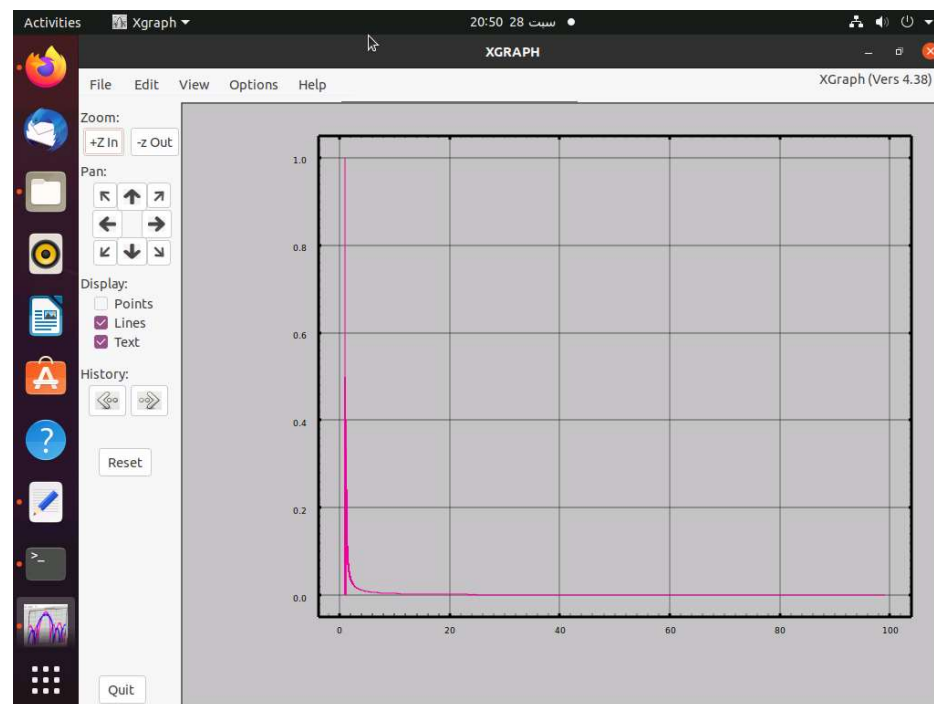
### 1. Throughput



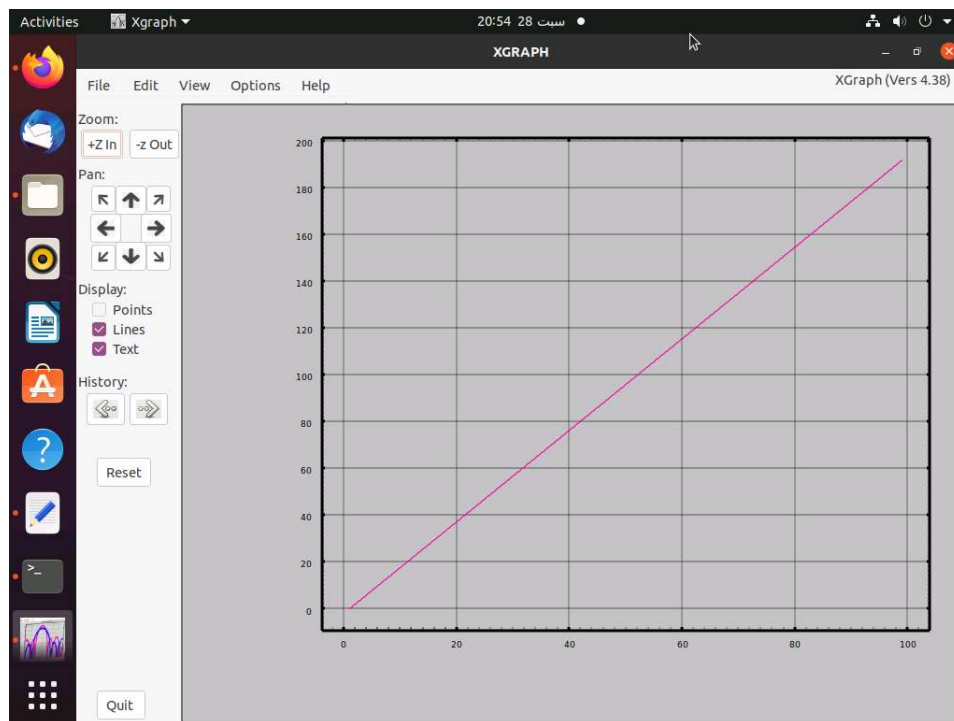
## 2. End to End Delay:-



## 3. Packet Drop Ratio



#### 4. Bandwidth Utilization



#### • Case of Grid:-

```
Activities Terminal 20:55 28 سبت
Jeremiah@Jeremiah-Virtual-Machine: ~/Desktop/lab5
couldn't read file "grid.tcl": no such file or directory
Jeremiah@Jeremiah-Virtual-Machine:~/Desktop/lab5$ ns grid_udp.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 Lab5
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The Source Node is : 23
The Destination Node is : 8

Instead of grid, replace with : grid_udp

The NAM and Log Trace files have been created. Do run the following commands in order:-

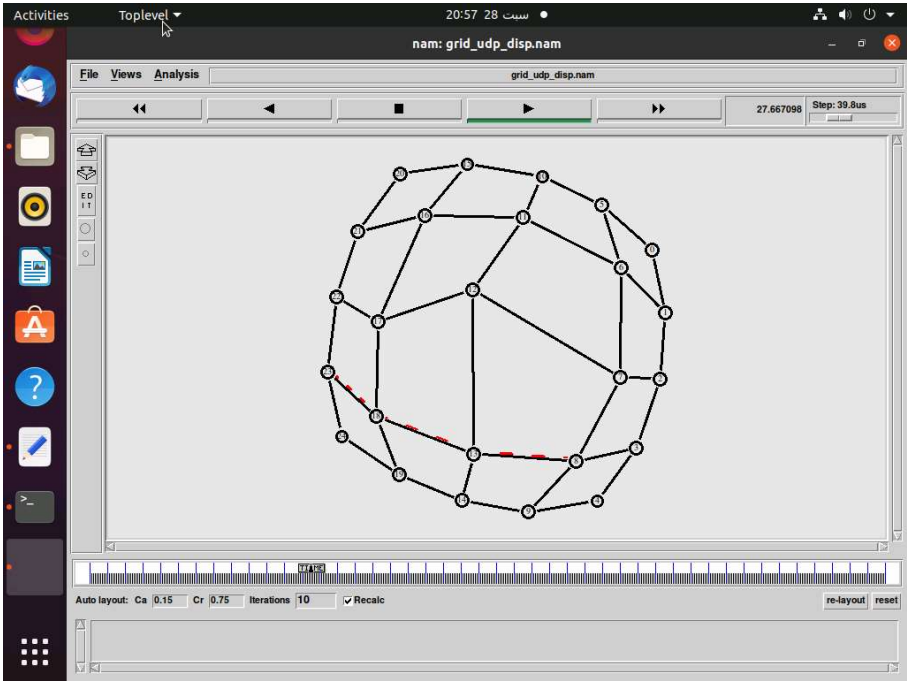
For viewing the simulation : nam grid_disp.nam

-----
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

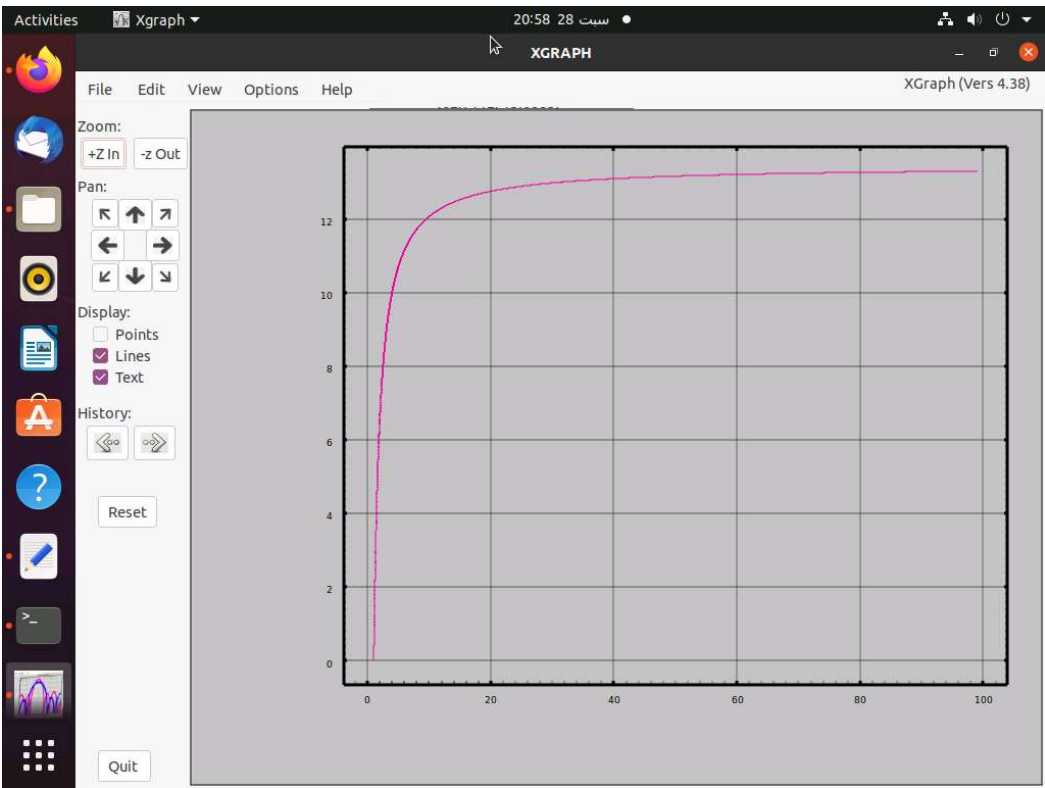
-----
2.For plotting Packet Loss Ratio :-
A) Run : awk -f plr.awk -v src=<src> -v dest=<dest> grid_log.tr>grid_plr
B) Run : xgraph grid_plr

-----
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
```

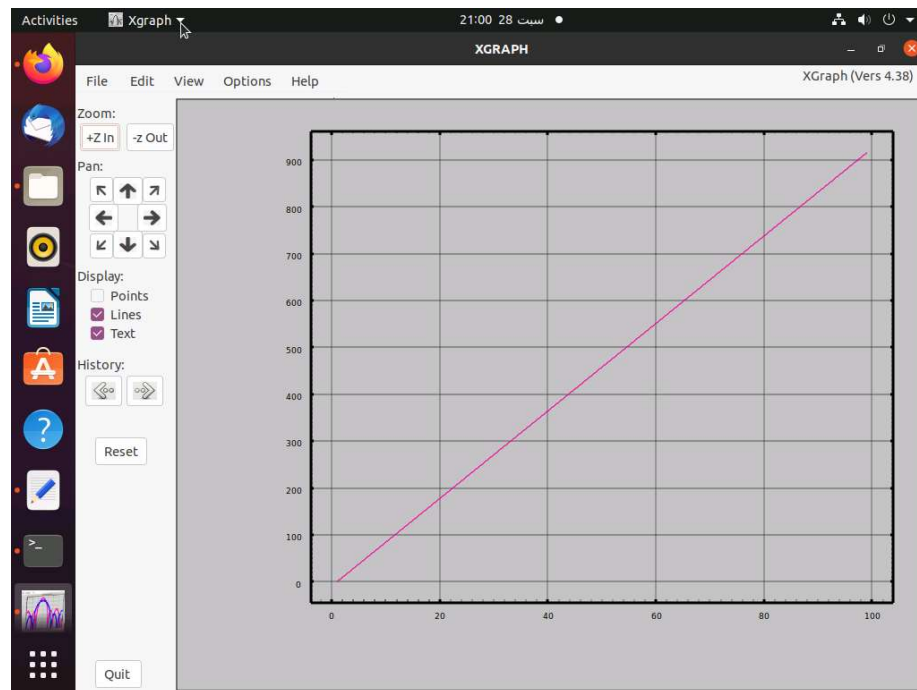
Nam Simulation:-



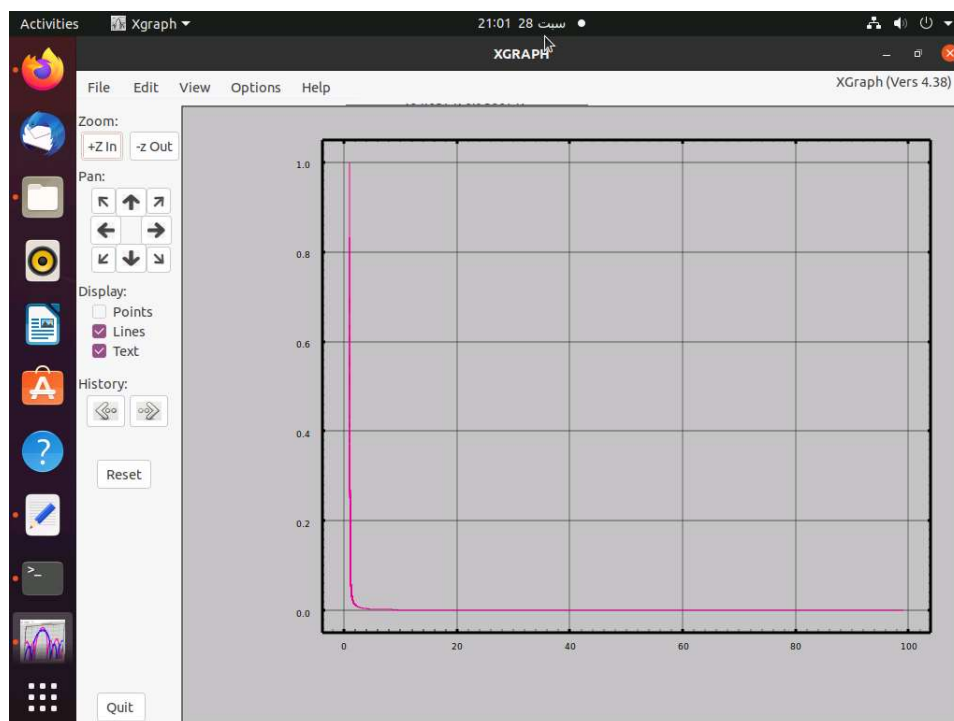
1. Throughput



## 2. End To End Delay:-

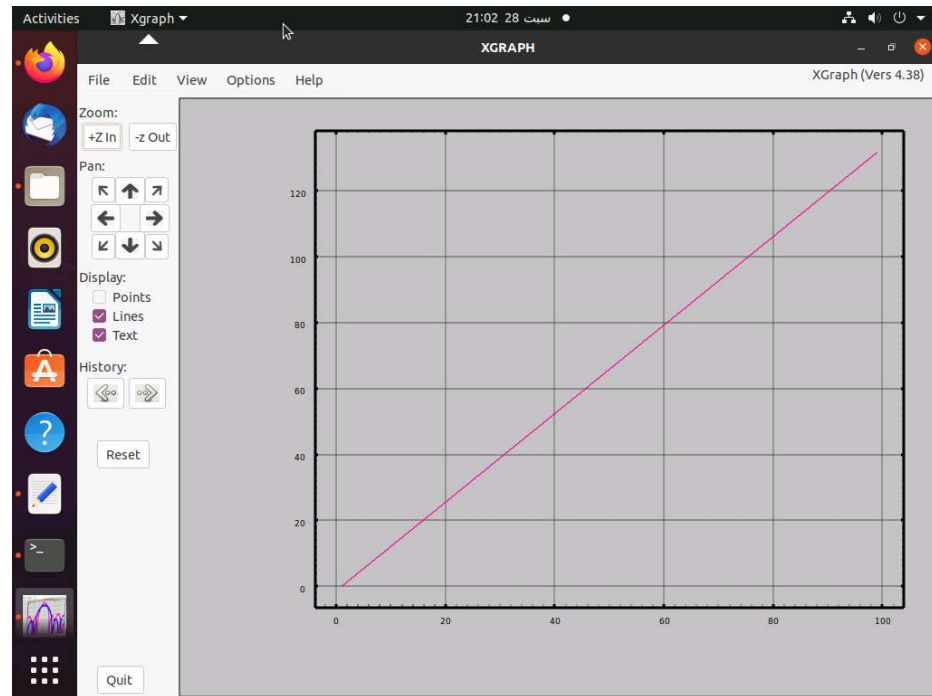


## 3. Packet Drop Rate





#### 4. Bandwidth Utilization:-



Q2]

2. Compare the performance of TCP Tahoe and TCP Reno protocols with 50 nodes under different network traffic (Low traffic: 5% of nodes transmit, Medium Traffic: 15% of nodes transmit; High Traffic: 25 % of nodes transmit). Simulation time is 50sec.

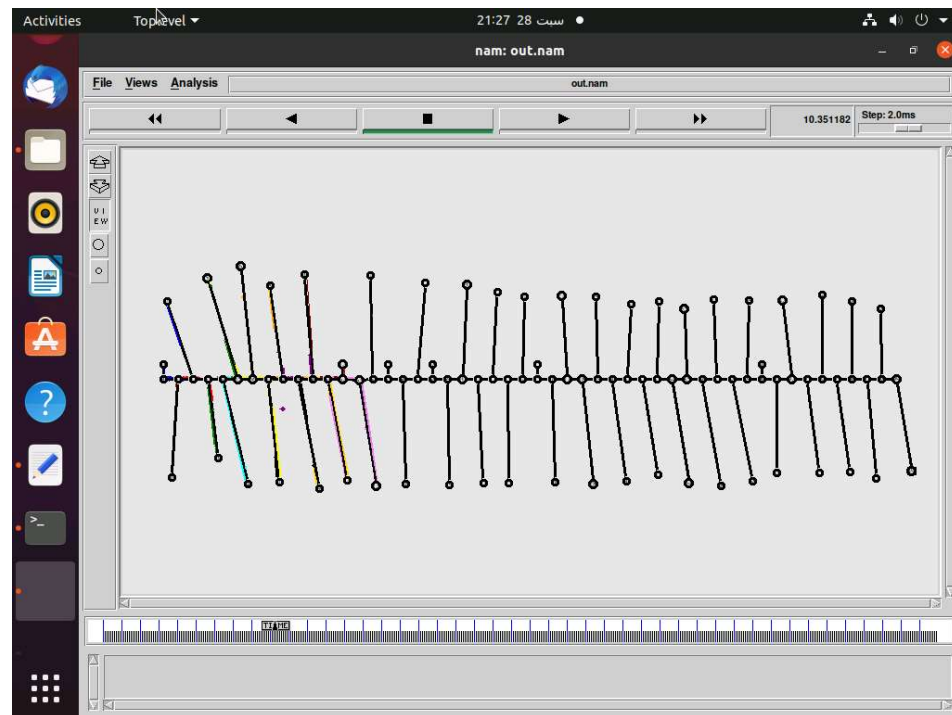
Measure and plot the graphs for the following metrics under different traffic

- (i) PDR Vs Simulation time interval (10sec, 20,30,40 and 50sec)
- (ii) Control Overhead Vs Simulation time interval
- (iii) Congestion rate Vs Simulation time interval

**(DO SCROLL DOWN)**

A typical Nam Simulation for Q2:-

Utilizing Bus Topology:-

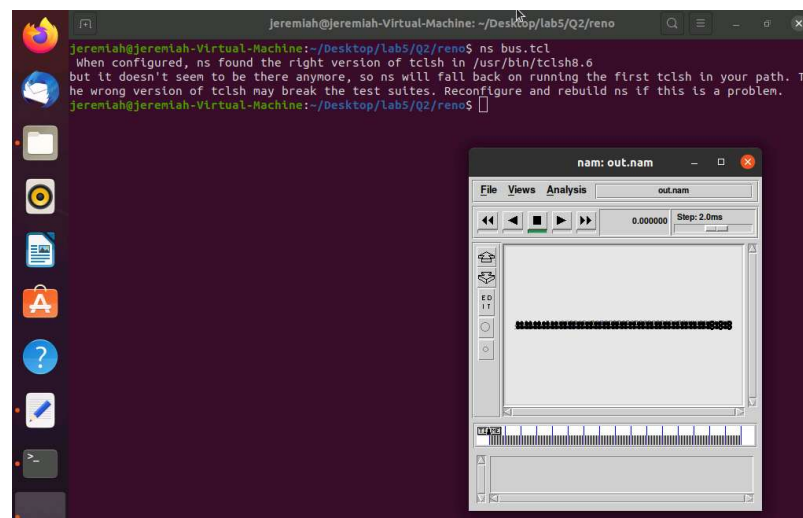


Do note: Color Key For Graphs:-

- **Pink:** congestion vs time
- **Green:** pdr vs time
- **Orange:** overhead vs time

- **Reno:-**

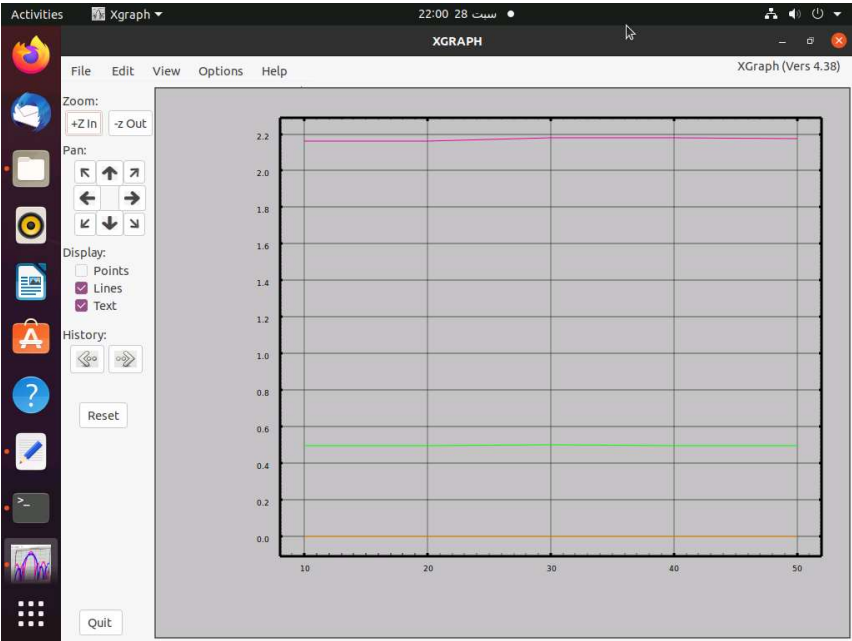
Terminal:-



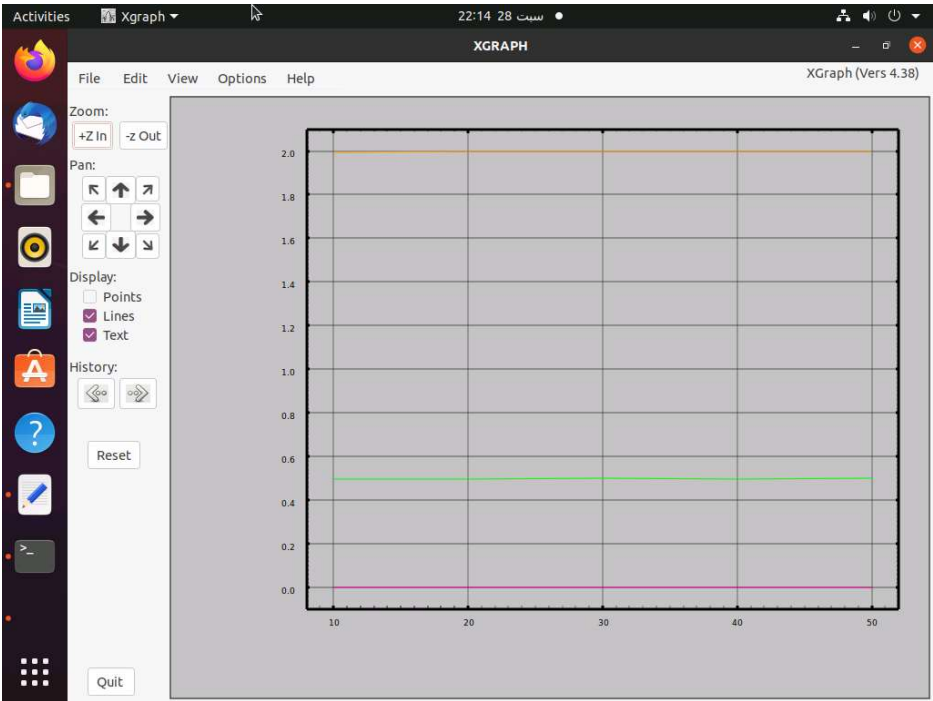
```
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab5/Q2/reno
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab5/Q2/reno$ ns bus.tcl
When configured, ns found the right version of tcsh in /usr/bin/tcsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tcsh in your path. T
he wrong version of tcsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab5/Q2/reno$
```



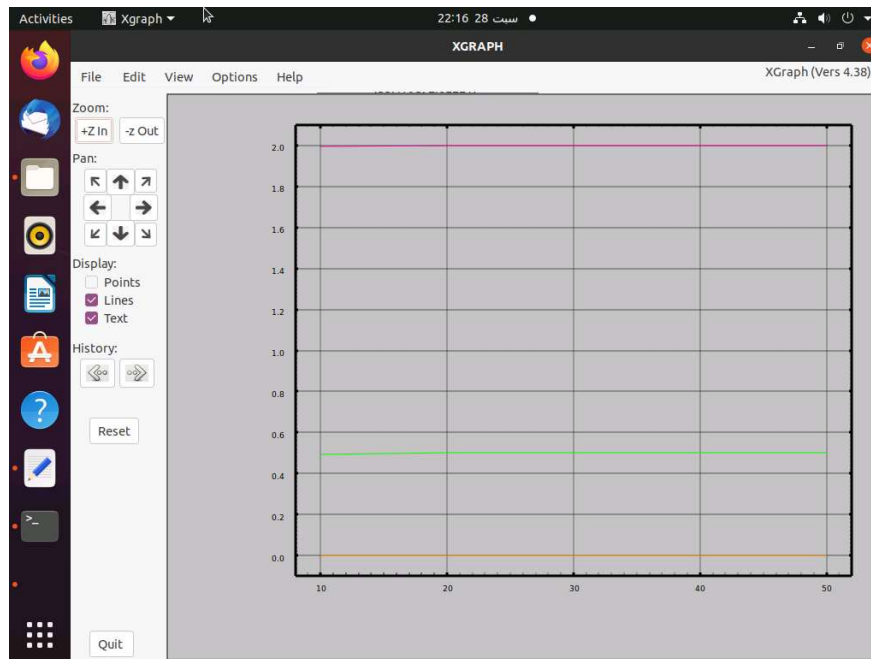
High Traffic:-



Medium Traffic:-



## Low Traffic:-



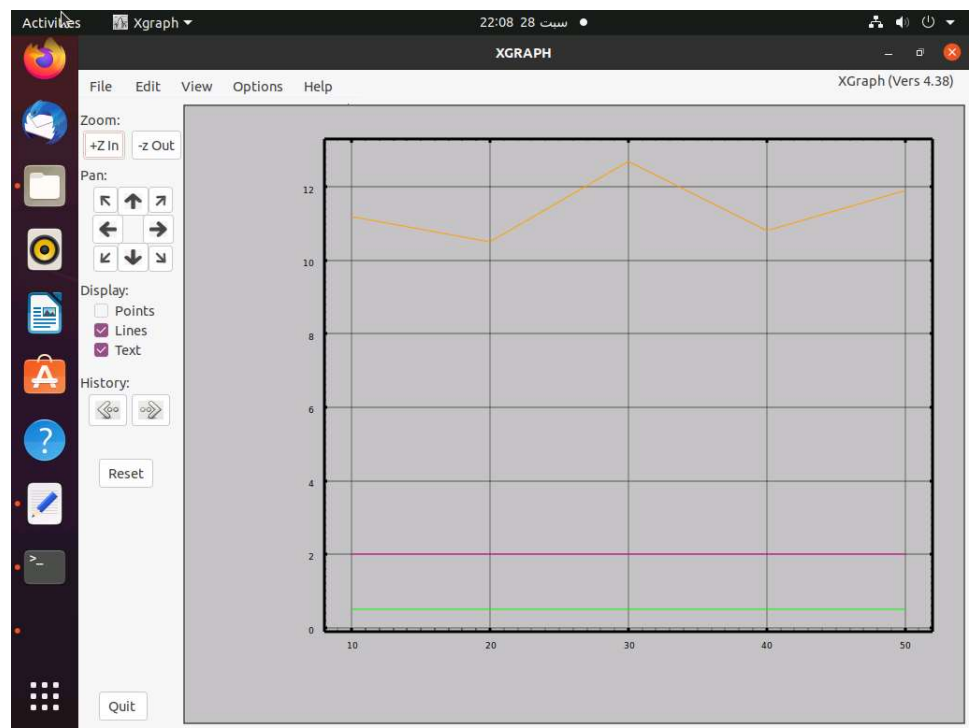
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## • Tahoe:-

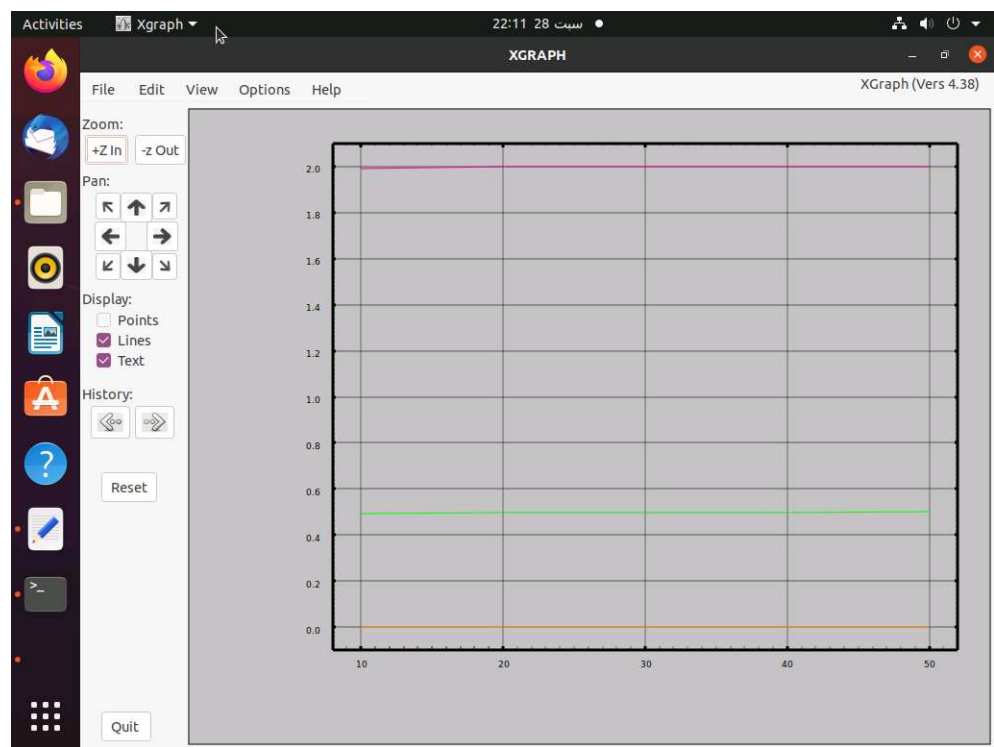
## Terminal:-

The terminal window shows the command `ns bus.tcl` being executed. The output indicates that 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 user is prompted to reconfigure and rebuild ns if this is a problem. The terminal window title is `Jeremiah@Jeremiah-Virtual-Machine: ~/Desktop/lab5/Q2/reno`. A window titled `nam: out.nam` is open, showing a plot with a single horizontal line at y=0.0. The window title bar includes File, Views, Analysis, and out.nam. The plot area shows a single horizontal line at y=0.0. The window also has a toolbar with navigation buttons and a status bar at the bottom.

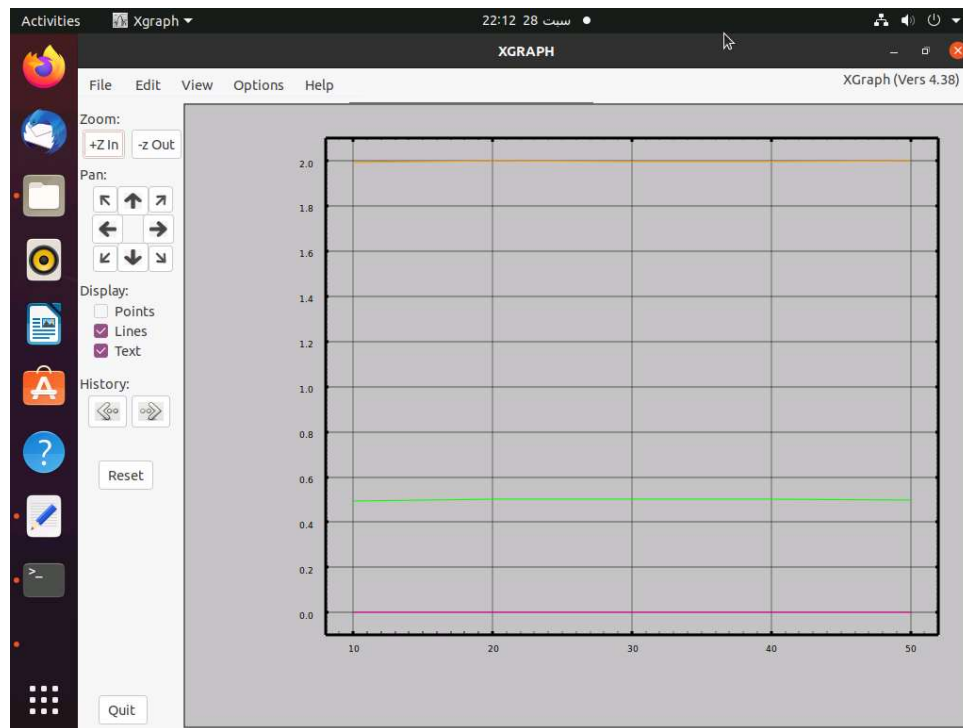
High Traffic:-



Medium Traffic:-



## Low Traffic:-



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## General Note:-

- Do cd into the right directory before calling the commands
- It is preferred to run the programs in a linux environment
- The code files and awk scripts have been attached as a zip alongside this report

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- To be honest, there doesn't seem to be much of a difference between Grid and Bus. However there is a distinct difference in Packet drop Rate for the utp transmissions as udp is connectionless.
  - With regard to Tahoe and Reno, a clear distinction is only visible at high traffic points with overhead being inconsistent and more with Tahoe than Reno.
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