Part-A

Experiment No: 1

<u>Aim:</u> Simulate a three node point to point network with duplex links between them. Set queue size and vary the bandwidth and find number of packets dropped.

Program:

```
set ns [new Simulator]
                                                  # Letter S is capital
set nf [open PA1.nam w]
                                                  # open a nam trace file in write mode
$ns namtrace-all $nf
                                                  # nf nam filename
                                                  # tf_trace filename
set tf [open PA1.tr w]
$ns trace-all $tf
proc finish { } {
       global ns nf tf
       $ns flush-trace
                                                  # clears trace file contents
       close $nf
       close $tf
       exec nam PA1.nam &
       exit 0
}
set n0 [$ns node]
                                                  # creates 3 nodes
set n2 [$ns node]
set n3 [$ns node]
$ns duplex-link $n0 $n2 200Mb 10ms DropTail # establishing links
$ns duplex-link $n2 $n3 1Mb 1000ms DropTail
$ns queue-limit $n0 $n2 10
set udp0 [new Agent/UDP]
                                                  # attaching transport layer protocols
$ns attach-agent $n0 $udp0
set cbr0 [new Application/Traffic/CBR]
                                                  # attaching application layer protocols
$cbr0 set packetSize 500
$cbr0 set interval_ 0.005
$cbr0 attach-agent $udp0
                                                  # creating sink(destination) node
set null0 [new Agent/Null]
$ns attach-agent $n3 $null0
$ns connect $udp0 $null0
$ns at 0.1 "$cbr0 start"
$ns at 1.0 "finish"
$ns run
```

<u>AWK file:</u> (Open a new editor using "gedit or vi command" and write awk file and save with ".awk" extension)

#immediately after BEGIN should open braces '{'

END{ printf("The number of packets dropped = $%d\n",c$); }

Steps for execution (When using gedit as editor):

- Open gedit editor and type program. Program name should have the extension ".tcl" [root@localhost ~]# gedit lab1.tcl
- Open gedit editor and type awk program. Program name should have the extension ".awk" [root@localhost ~]# gedit lab1.awk
- > Run the simulation program

[root@localhost~]# ns lab1.tcl

- Here "ns" indicates network simulator. We get the topology shown in the snapshot.
- Now press the play button in the simulation window and the simulation will begins.
- After simulation is completed run **awk file** to see the output,

[root@localhost~]# awk -f lab1.awk PA1.tr

To see the trace file contents open the file as,

[root@localhost~]# gedit PA1.tr

Steps for execution (When using vi as editor):

and type "wq" and press Enter key.

- Open vi editor and type program. Program name should have the extension ".tcl" [root@localhost ~]# vi lab1.tcl
- Save the program by pressing "ESC key" first, followed by "Shift and:" keys simultaneously and type "wq" and press Enter key.
- ➢ Open vi editor and type awk program. Program name should have the extension ".awk" [root@localhost ~]# vi lab1.awk
- [root@localhost ~]# vi lab1.awk

 Save the program by pressing "ESC key" first, followed by "Shift and:" keys simultaneously
- > Run the simulation program

[root@localhost~]# ns lab1.tcl

- Here "ns" indicates network simulator. We get the topology shown in the snapshot.
- Now press the play button in the simulation window and the simulation will begins.
- After simulation is completed run **awk file** to see the output,

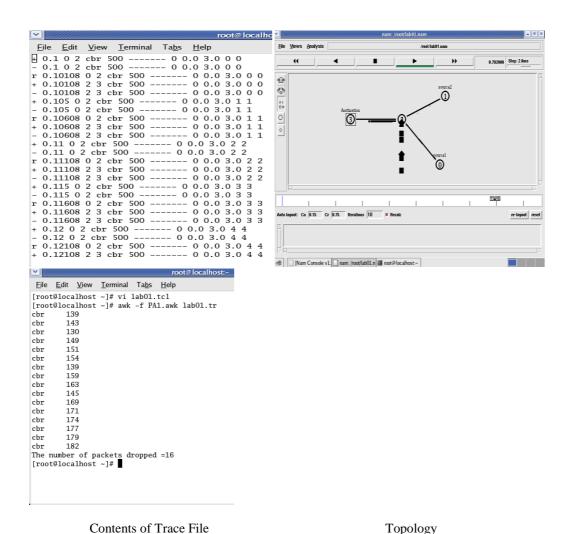
[root@localhost~]# awk -f lab1.awk PA1.tr

To see the trace file contents open the file as,

[root@localhost~]# vi PA1.tr

Trace file contains 12 columns:

Event type, Event time, From Node, To Node, Packet Type, Packet Size, Flags (indicated by -----), Flow ID, Source address, Destination address, Sequence ID, Packet ID



Output