***Experiment No: 3***

*Aim:* Implement an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination.

***Program:***

```
set ns [new Simulator]
set tf [open pgm7.tr w]
$ns trace-all $tf
set nf [open pgm7.nam w]
$ns namtrace-all $nf

set n0 [$ns node]
$n0 color "magenta"
$n0 label "src1"
set n1 [$ns node]
set n2 [$ns node]
$n2 color "magenta"
$n2 label "src2"
set n3 [$ns node]
$n3 color "blue"
$n3 label "dest2"
set n4 [$ns node]
set n5 [$ns node]
$n5 color "blue"
$n5 label "dest1"

$ns make-lan "$n0 $n1 $n2 $n3 $n4" 100Mb 100ms LL Queue/ DropTail Mac/802_3  # should come in single line
$ns duplex-link $n4 $n5 1Mb 1ms DropTail

set tcp0 [new Agent/TCP]
$ns attach-agent $n0 $tcp0
set ftp0 [new Application/FTP]
$ftp0 attach-agent $tcp0
$ftp0 set packetSize_ 500
$ftp0 set interval_ 0.0001
set sink5 [new Agent/TCPSink]
$ns attach-agent $n5 $sink5

$ns connect $tcp0 $sink5

set tcp2 [new Agent/TCP]
$ns attach-agent $n2 $tcp2
set ftp2 [new Application/FTP]
$ftp2 attach-agent $tcp2
$ftp2 set packetSize_ 600
$ftp2 set interval_ 0.001
```

```
set sink3 [new Agent/TCPSink]
$ns attach-agent $n3 $sink3

$ns connect $tcp2 $sink3

set file1 [open file1.tr w]
$tcp0 attach $file1
set file2 [open file2.tr w]
$tcp2 attach $file2

$tcp0 trace cwnd_  # must put underscore ( _ ) after cwnd and no space between them
$tcp2 trace cwnd_

proc finish { } {
global ns nf tf
$ns flush-trace
close $tf
close $nf
exec nam pgm7.nam &
exit 0
}

$ns at 0.1 "$ftp0 start"
$ns at 5 "$ftp0 stop"
$ns at 7 "$ftp0 start"
$ns at 0.2 "$ftp2 start"
$ns at 8 "$ftp2 stop"
$ns at 14 "$ftp0 stop"
$ns at 10 "$ftp2 start"
$ns at 15 "$ftp2 stop"
$ns at 16 "finish"
$ns run
```

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

**cwnd:- means congestion window**

```
BEGIN {

}

{

if($6= ="cwnd_")  # don't leave space after writing cwnd_

printf("%f\t%f\t\n",$1,$7); # you must put \n in printf

}

END {

}
```

**Steps for execution (When using gedit as editor):**

1) *Open gedit editor and type program. Program name should have the extension " **.tcl** "*

   ***[root@localhost ~]# gedit lab3.tcl***

2) *Open vi editor and type **awk** program. Program name should have the extension "**.awk** "*

   ***[root@localhost ~]# gedit lab3.awk***

3) *Run the simulation program*

   ***[root@localhost~]# ns lab3.tcl***

4) *After simulation is completed run **awk file** to see the output ,*

   i. ***[root@localhost~]# awk –f lab3.awk file1.tr > a1***

   ii. ***[root@localhost~]# awk –f lab3.awk file2.tr > a2***

   iii. ***[root@localhost~]# xgraph a1 a2***

5) *Here we are using the congestion window trace files i.e. **file1.tr** and **file2.tr** and we are redirecting the contents of those files to new files say **a1** and **a2** using **output redirection operator (>)**.*

6) *To see the trace file contents open the file as ,*

   ***[root@localhost~]# gedit lab3.tr***

**Steps for execution (When using vi as editor):**

7) *Open vi editor and type program. Program name should have the extension " **.tcl** "*

   ***[root@localhost ~]# vi lab7.tcl***

8) *Save the program by pressing **"ESC key"** first, followed by **"Shift and :"** keys simultaneously and type **"wq"** and press **Enter key**.*

9) *Open vi editor and type **awk** program. Program name should have the extension ".**awk** "*

   ***[root@localhost ~]# vi lab7.awk***

10) *Save the program by pressing **"ESC key"** first, followed by **"Shift and :"** keys simultaneously and type **"wq"** and press **Enter key**.*

11) *Run the simulation program*

    ***[root@localhost~]# ns lab7.tcl***

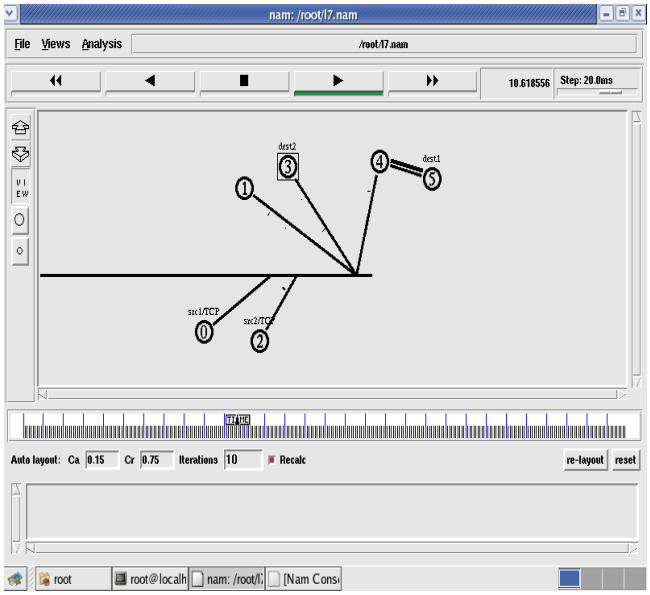
12) *After simulation is completed run **awk file** to see the output ,*

    i. ***[root@localhost~]# awk –f lab7.awk file1.tr > a1***
    ii. ***[root@localhost~]# awk –f lab7.awk file2.tr > a2***
    iii. ***[root@localhost~]# xgraph a1 a2***

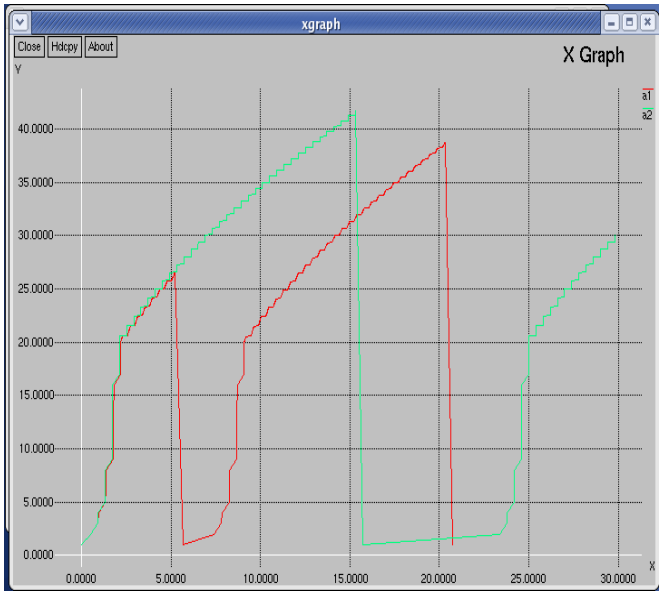
13) *Here we are using the congestion window trace files i.e. **file1.tr** and **file2.tr** and we are redirecting the contents of those files to new files say **a1** and **a2** using **output redirection operator (>)**.*

14) *To see the trace file contents open the file as ,*

    ***[root@localhost~]# vi lab7.tr***




**Output**




**Graph**