**Module-5**

**NS2 Simulator**

**Exp 1: THREE NODE POINT TO POINT NETWORK**

**Aim:** 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.

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

set tf [open PA1.tr w] # tf trace filename

$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

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

AWK file: (Open a new editor using “vi command” and write awk file and save with “.awk”

# extension) AWK Scripts for NS2 to process data from Trace Files

#immediately after BEGIN should open braces {

BEGIN{ c=0;}

{

if($1= ="d")

{c++;

printf("%s\t%s\n",$5,$11);

}

}

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

**Steps for execution**

 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

 Save the program by pressing “ESC key” first, followed by “Shift and :” keys simultaneously and type “wq” and press Enter key.

 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 lab1.tr

 To see the trace file contents open the file as ,

[root@localhost~]# vi lab1.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



**Exp 2: TRANSMISSION OF PING MESSAGE**

**Aim:** Simulate the transmission of ping messages over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.

set ns [ new Simulator ]

set nf [ open lab4.nam w ]

$ns namtrace-all $nf

set tf [ open lab4.tr w ]

$ns trace-all $tf

set n0 [$ns node]

set n1 [$ns node]

set n2 [$ns node]

set n3 [$ns node]

set n4 [$ns node]

set n5 [$ns node]

$ns duplex-link $n0 $n4 1005Mb 1ms DropTail

$ns duplex-link $n1 $n4 50Mb 1ms DropTail

$ns duplex-link $n2 $n4 2000Mb 1ms DropTail

$ns duplex-link $n3 $n4 200Mb 1ms DropTail

$ns duplex-link $n4 $n5 1Mb 1ms DropTail

set p1 [new Agent/Ping] # letters A and P should be capital

$ns attach-agent $n0 $p1

$p1 set packetSize\_ 50000

$p1 set interval\_ 0.0001

set p2 [new Agent/Ping] # letters A and P should be capital

$ns attach-agent $n1 $p2

set p3 [new Agent/Ping] # letters A and P should be capital

$ns attach-agent $n2 $p3

$p3 set packetSize\_ 30000

$p3 set interval\_ 0.00001

set p4 [new Agent/Ping] # letters A and P should be capital

$ns attach-agent $n3 $p4

set p5 [new Agent/Ping] # letters A and P should be capital

$ns attach-agent $n5 $p5

$ns queue-limit $n0 $n4 5

$ns queue-limit $n2 $n4 3

$ns queue-limit $n4 $n5 2

Agent/Ping instproc recv {from rtt} {

$self instvar node\_

puts "node [$node\_ id]received answer from $from with round trip time $rtt msec" }

# please provide space between $node\_ and id. No space between $ and from. No space between and $ and rtt \*/

$ns connect $p1 $p5

$ns connect $p3 $p4

proc finish { } {

global ns nf tf

$ns flush-trace

close $nf

close $tf

exec nam lab4.nam &

exit 0

}

$ns at 0.1 "$p1 send"

$ns at 0.2 "$p1 send"

$ns at 0.3 "$p1 send"

$ns at 0.4 "$p1 send"

$ns at 0.5 "$p1 send"

$ns at 0.6 "$p1 send"

$ns at 0.7 "$p1 send"

$ns at 0.8 "$p1 send"

$ns at 0.9 "$p1 send"

$ns at 1.0 "$p1 send"

$ns at 1.1 "$p1 send"

$ns at 1.2 "$p1 send"

$ns at 1.3 "$p1 send"

$ns at 1.4 "$p1 send"

$ns at 1.5 "$p1 send"

$ns at 1.6 "$p1 send"

$ns at 1.7 "$p1 send"

$ns at 1.8 "$p1 send"

$ns at 1.9 "$p1 send"

$ns at 2.0 "$p1 send"

$ns at 2.1 "$p1 send"

$ns at 2.2 "$p1 send"

$ns at 2.3 "$p1 send"

$ns at 2.4 "$p1 send"

$ns at 2.5 "$p1 send"

$ns at 2.6 "$p1 send"

$ns at 2.7 "$p1 send"

$ns at 2.8 "$p1 send"

$ns at 2.9 "$p1 send"

$ns at 0.1 "$p3 send"

$ns at 0.2 "$p3 send"

$ns at 0.3 "$p3 send"

$ns at 0.4 "$p3 send"

$ns at 0.5 "$p3 send"

$ns at 0.6 "$p3 send"

$ns at 0.7 "$p3 send"

$ns at 0.8 "$p3 send"

$ns at 0.9 "$p3 send"

$ns at 1.0 "$p3 send"

$ns at 1.1 "$p3 send"

$ns at 1.2 "$p3 send"

$ns at 1.3 "$p3 send"

$ns at 1.4 "$p3 send"

$ns at 1.5 "$p3 send"

$ns at 1.6 "$p3 send"

$ns at 1.7 "$p3 send"

$ns at 1.8 "$p3 send"

$ns at 1.9 "$p3 send"

$ns at 2.0 "$p3 send"

$ns at 2.1 "$p3 send"

$ns at 2.2 "$p3 send"

$ns at 2.3 "$p3 send"

$ns at 2.4 "$p3 send"

$ns at 2.5 "$p3 send"

$ns at 2.6 "$p3 send"

$ns at 2.7 "$p3 send"

$ns at 2.8 "$p3 send"

$ns at 2.9 "$p3 send"

$ns at 3.0 "finish"

$ns run

AWK file: (Open a new editor using “vi command” and write awk file and save with “.awk” extension)

BEGIN{

drop=0;

}

{

if($1= ="d" )

{

drop++;

}

}

END{

printf("Total number of %s packets dropped due to congestion =%d\n",$5,drop);

}

**Steps for execution:**

1) Open vi editor and type program. Program name should have the extension “ .tcl ”

[root@localhost ~]# vi lab4.tcl

2) Save the program by pressing “ESC key” first, followed by “Shift and :” keys simultaneously and type “wq” and press Enter key.

3) Open vi editor and type awk program. Program name should have the extension “.awk ”

[root@localhost ~]# vi lab4.awk

4) Save the program by pressing “ESC key” first, followed by “Shift and :” keys simultaneously and type “wq” and press Enter key.

5) Run the simulation program

[root@localhost~]# ns lab4.tcl

i) Here “ns” indicates network simulator. We get the topology shown in the snapshot.

ii) Now press the play button in the simulation window and the simulation will begins.

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

[root@localhost~]# awk –f lab4.awk lab4.tr

7) To see the trace file contents open the file as ,

[root@localhost~]# vi lab4.tr

