Date : 24-11-22
Experiment No. 5

5) Simulate a four node point-to-point network with the links connected as follows: n0-n2, n1-n2 and n2-n3. Apply TCP agent b/w n0-n3 and UDP between n1-n3. Apply relevant application over TCP and UDP agents changing the parameter and determine the number of packets sent by TCP/UDP. And also plot the throughput graph for both TCP and UDP traffic

Program:

```
lab5.tcl
set ns [new Simulator]
set ntrace [open lab5.tr w]
$ns trace-all $ntrace
set file3 [open lab5.nam w]
$ns namtrace-all $file3
proc finish {} {
global ns ntrace
$ns flush-trace
close $ntrace
exec nam lab5.nam &
exit 0
}
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
$ns duplex-link $n0 $n2 10Mb 1ms DropTail
$ns duplex-link $n2 $n3 10Mb 1ms DropTail
$ns duplex-link $n2 $n1 10Mb 1ms DropTail
$ns queue-limit $n0 $n2 10
$ns queue-limit $n1 $n2 10
```

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```
set tcp 0 [new Agent/TCP]
$ns attach-agent $n0 $tcp0
set sink0 [new Agent/TCPSink]
$ns attach-agent $n3 $sink0
set ftp0 [new Application/FTP]
$ftp0 attach-agent $tcp0
set udp0 [new Agent/UDP]
$ns attach-agent $n1 $udp0
set null0 [new Agent/Null]
$ns attach-agent $n3 $null0
set cbr0 [new Application/Traffic/CBR]
$cbr0 attach-agent $udp0
$ns connect $tcp0 $sink0
$ns connect $udp0 $null0
$ns at 0.0 "$ftp0 start"
$ns at 0.2 "$ftcbr0 start"
$ns at 0.8 "finish"
$ns run.
```

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AWK file:

lab5.awk

```
BEGIN {
d=0;
tcp=0;
udp=0;
pkt_t=0;
time_t=0;
pkt_u=0;
time_u=0;
}
{
if ((($1=="r" && $3=="0" && $4=="2" && $5=="tcp") || ($1=="r" && $3=="2" && $4=="3" && $5=="tcp"))
{ pkt_t=pkt_t+$6;
  time_t=$2;
printf ("%f %f\n", pkt_t, time_t);
}
if ((($1=="r" && $3=="1" && $4=="2" && $5=="cbr") || ($1=="r" && $3=="2" && $4=="3" && $5=="cbr"))
{ pkt_u=pkt_u+$6;
  time_u=$2;
  printf ("%f %f\n", pkt_u, time_u);
}
}
}
END {
```

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```
printf("Throughput of TCP: %f Mbps\n", ((pkt_t/time_t)*(8/1000000)));
printf("Throughput of UDP : %f Mbps\n", ((pkt_u/time_u)*(8/1000000)));
}
```

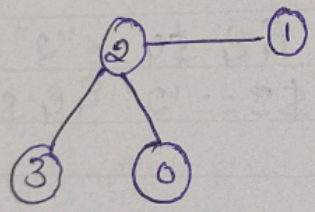
OUTPUT :-

```
gedit 5.tcl
ns 5.tcl
gedit 5.awk

awk -f 5.awk 5.tr
vi 5.tr
```

Throughput of TCP : 9.211216 Mbps

Throughput of UDP : 0.660053 Mbps



= 5.tcl