EXPERIMENT-17

Aim: Performance Evaluation of routing Protocol.

Routing Protocol:
This protocol is a set of rules used by the routers to communicate between the source and destination. Each protocol has its own algorithm to choose path.
There are two kinds of routing:

1) *Unicast Routing:* It is a type of information transfer and used when there is a participation of single sender and a single recipient.
2) *Multicast Routing:* It used in case of multiple senders and recipients.

Performance Analysis of routing Protocol:
The analysis of routing Protocol can be assessed by factors such as:

1) *Packet delivery Ratio:* It is measured as the ratio of number of packets delivered in total to the number of packets sent from the source node to destination node.
2) *Energy Consumptions:* Energy consumption is measured as the total energy used to perform the complete process.
3) *Throughput:* The number of packets transferred per unit time.
4) *Average Delay:* It is the delay per packet transfer from source node to the destination node.

All of the above factors and some others affect the performance of routing protocol and can be used to assess its performance.

Program Code:
The following program shows how an XGraph can be used to plot the bandwidth of two nodes connected through the duplex wired link (An XGraph program draws a graph on an x-display given data read from either data file or standard input):

```
#Create a simulator object
set ns [new Simulator]
#Open the output trace file
set f0 [open out0.tr w]
#Create 2 nodes
set n0 [$ns node]
set n1 [$ns node]
#Connect the nodes using duplex link
$ns duplex-link $n0 $n1 1Mb 100ms DropTail
#Define a 'finish' procedure
proc finish {} {
global f0
#Close the output files
close $f0
#Call xgraph to display the results
```

```
exec xgraph out0.tr -geometry 800x400 &
exit 0
}
#Define a procedure which periodically records the bandwidth received by the
proc record {} {
global sink0 f0
#Get an instance of the simulator
set ns [Simulator instance]
#Set the time after which the procedure should be called again
set time 0.5
#How many bytes have been received by the traffic sinks?
set bw0 [$sink0 set bytes_]
#Get the current time
set now [$ns now]
#Calculate the bandwidth (in MBit/s) and write it to the files
puts $f0 "$now [expr $bw0/$time*8/1000000]"
#Reset the bytes_ values on the traffic sinks
$sink0 set bytes_ 0
#Re-schedule the procedure
$ns at [expr $now+$time] "record"
}
#Create three traffic sinks and attach them to the node n4
set sink0 [new Agent/LossMonitor]
#Start logging the received bandwidth
$ns at 0.0 "record"
$ns at 60.0 "finish"
#Run the simulation
$ns run
```

Output: