Subject:	**Networking Lab (ITL401)**		
Class:	**SE IT / Semester – IV (CBCGS) / Academic year: 2017-18**		
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Roll No:	**28**	**Date of performance (DOP) :**	
Experiment No:	**08**	**Date of checking (DOC) :**	
Title: Comparative analysis of routing protocols with respect to QOS parameters using Xgraph/gnuplot for different load conditions.			
Marks:		**Teacher's Signature:**	

1. Aim: **Comparative analysis of routing protocols with respect to QOS parameters using Xgraph/gnuplot for different load conditions.**

2. Prerequisites:

Knowledge of

1. Defining the network nodes, links, queues and topology as well.
2. Defining the agents and their applications
3. Network traffic and parameters

3. Hardware Requirements:

1. PC with minimum 2GB RAM

4. Software Requirements:

1. Linux (Ubuntu 10.04)
2. ns-2.34 package
3. Text editor

5. Learning Objectives:

1. To Demonstrate and measure different network scenarios and their performance behavior.
2. Be exposed to more diverse traffic generators.
3. To learn the basics on how to post process a simulation to get useful information.

6. Course Objectives Applicable: LO 3

7. Program Outcomes Applicable: PO2, PO4

8. Program Education Objectives Applicable: 1

Steps to create and execute tcl script:
Step 1: Open any text editor (vi, nano)
Step 2: Write the program using ns2 tcl script and save with extension as filename.tcl
Step 3: Execute tcl script as "ns filename.tcl"
Step 4: Observe the output.

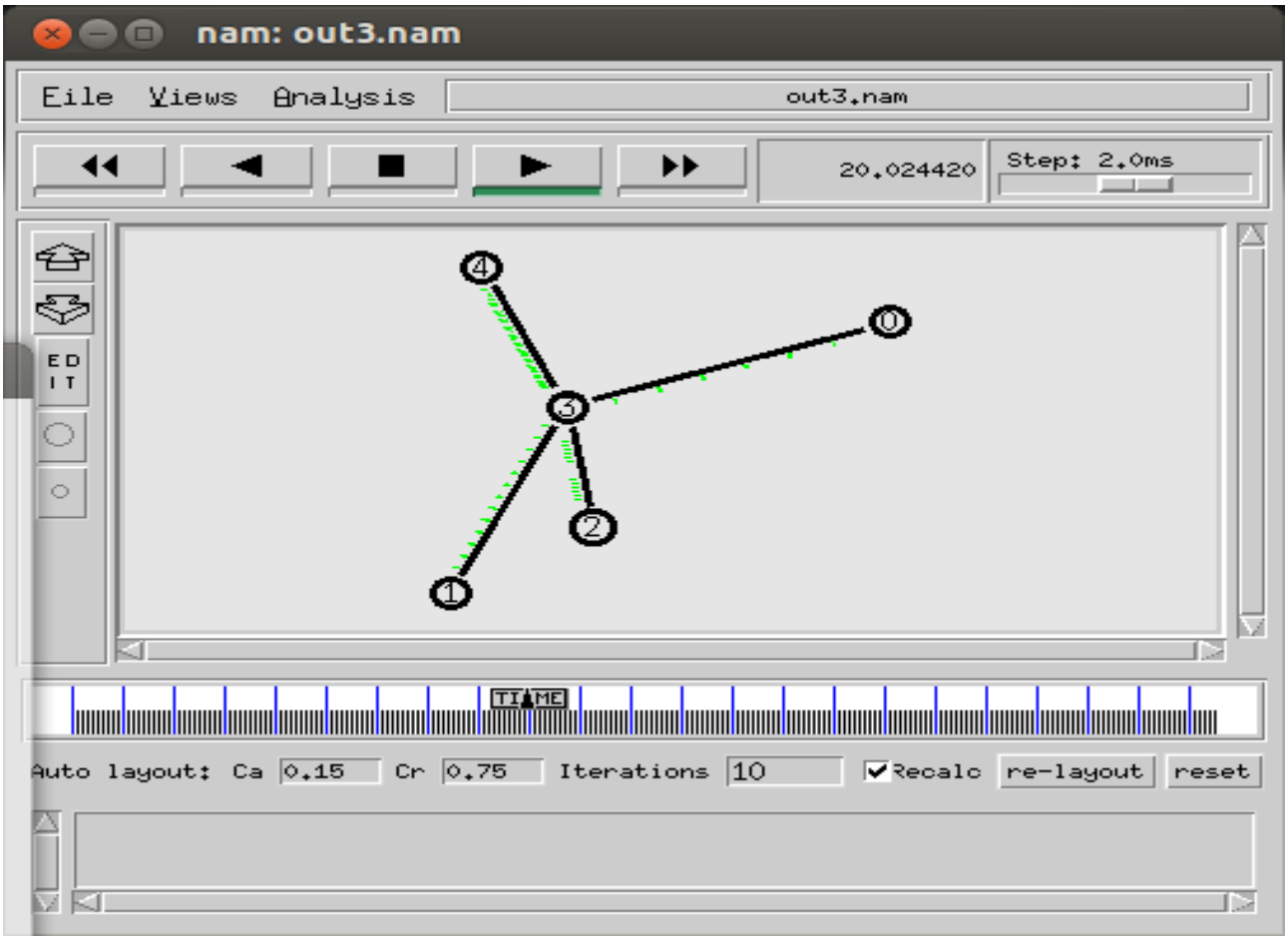
Source Code:-

```
set ns [new Simulator]
$ns color 0 green
set f0 [open out0.tr w]
set f1 [open out1.tr w]
set f2 [open out2.tr w]
set f3 [open out3.nam w]
$ns namtrace-all $f3
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
$ns duplex-link $n0 $n3 1Mb 100ms DropTail
$ns duplex-link $n1 $n3 1Mb 100ms DropTail
$ns duplex-link $n2 $n3 1Mb 100ms DropTail
$ns duplex-link $n3 $n4 1Mb 100ms DropTail
proc finish {} {
global ns f0 f1 f2 f3
$ns flush-trace
close $f0
close $f1
close $f2
close $f3
exec nam out3.nam &
exec xgraph out0.tr out1.tr out2.tr -geometry 800x400 &
exit 0
}
proc attach-expoo-traffic { node sink size burst idle rate } {
set ns [Simulator instance]
set source [new Agent/UDP]
$ns attach-agent $node $source
set traffic [new Application/Traffic/Exponential]
$traffic set packetSize_ $size
$traffic set burst_time_ $burst
$traffic set idle_time_ $idle
$traffic set rate_ $rate
$traffic attach-agent $source
$ns connect $source $sink
return $traffic
}
proc record {} {
global sink0 sink1 sink2 f0 f1 f2
set ns [Simulator instance]
set time 0.5
set bw0 [$sink0 set bytes_]
set bw1 [$sink1 set bytes_]
set bw2 [$sink2 set bytes_]
set now [$ns now]
puts $f0 "$now [expr $bw0/$time*8/1000000]"
puts $f1 "$now [expr $bw1/$time*8/1000000]"
```

```
puts $f2 "$now [expr $bw2/$time*8/1000000]"
$sink0 set bytes_ 0
$sink1 set bytes_ 0
$sink2 set bytes_ 0
$ns at [expr $now+$time] "record"
}
set sink0 [new Agent/LossMonitor]
set sink1 [new Agent/LossMonitor]
set sink2 [new Agent/LossMonitor]
$ns attach-agent $n4 $sink0
$ns attach-agent $n4 $sink1
$ns attach-agent $n4 $sink2
set source0 [attach-expoo-traffic $n0 $sink0 200 2s 1s 100k]
set source1 [attach-expoo-traffic $n1 $sink1 200 2s 1s 200k]
set source2 [attach-expoo-traffic $n2 $sink2 200 2s 1s 300k]
$ns at 0.0 "record"
$ns at 10.0 "$source0 start"
$ns at 10.0 "$source1 start"
$ns at 10.0 "$source2 start"
$ns at 50.0 "$source0 stop"
$ns at 50.0 "$source1 stop"
$ns at 50.0 "$source2 stop"
$ns at 60.0 "finish"
$ns run
```

Output:-

NAM file:-



The bursts of the first flow peak at 0.1Mbit/s, the second at 0.2Mbit/s and the third at 0.3Mbit/s. Now you can try to modify the 'time' value in the 'record' procedure. Set it to '0.1' and see what happens, and then try '1.0'. It is very important to find a good 'time' value for each simulation scenario.

13. Experiment/Assignment Evaluation

SR	Parameters	Weight	Excellent	Good	Average	Poor	Not as per requirement
		Scale Factor ->	5	4	3	2	0
1	Technical Understanding	25					
2	Performance / Execution	25					
3	Question Answers	20					
4	Punctuality	20					
5	Presentation	10					
	Total out of 100 --> #(to be converted as per term-work evaluation applicable to the subject)		**∑ (Weight * Scale Factor)/5 = _____**				

References:

1. https://www.isi.edu/nsnam/ns/tutorial/nsscript4.html
2. http://www.nsnam.com/2011/08/xgraph.html

Viva Questions

1. What is Xgraph
2. What is the use of Xgraph?