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DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING

Report on Open Ended Experiment

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Semester/Section	5B
Course Code	18CSL57
Course Name	Computer Network Laboratory
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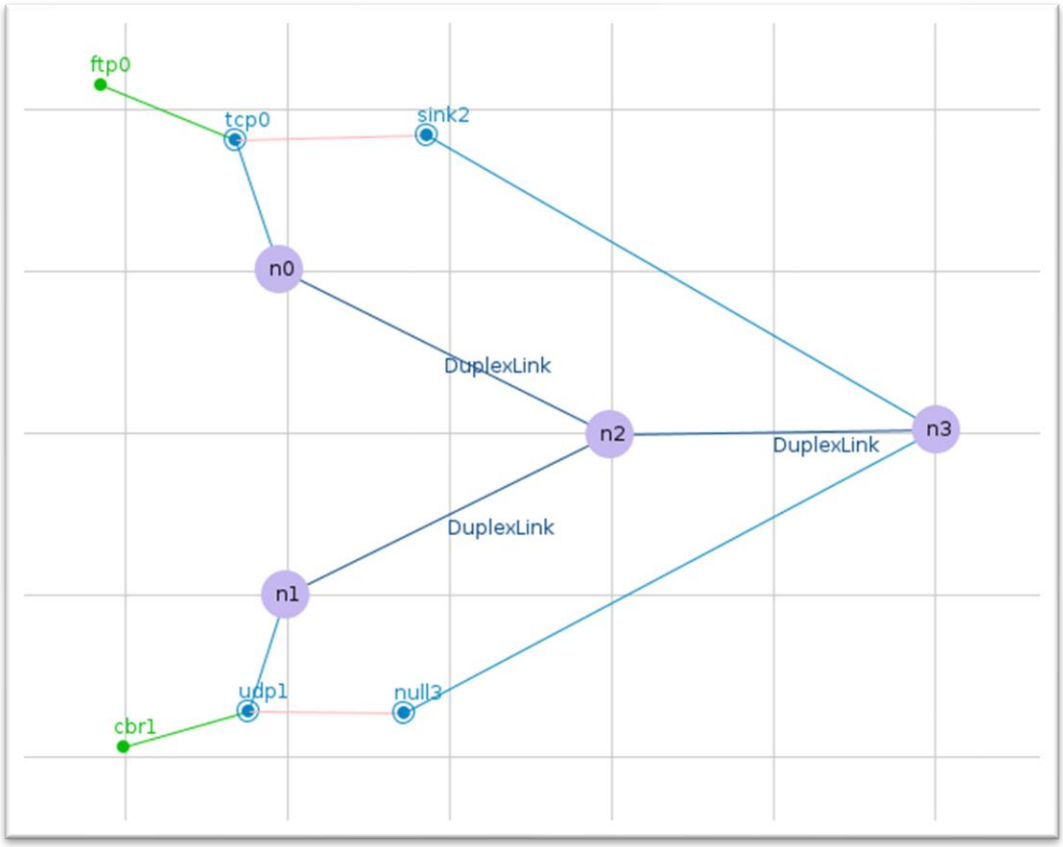
Title	Simulation of 4 node point-to-point network
Date	31-12-2020

Signature of a Student **Signature of a Faculty**

Aim:

Simulate a four-node point-to-point network with the links connected as follows:
a) n0 – n2, n1 – n2 and n2 – n3. Apply TCP agent between n0-n3 and UDP between n1-n3. Apply relevant applications over TCP and UDP agents, changing the parameter and determine the number of packets sent by TCP / UDP.

Topology:



Source code:

```
#==================================
#     Simulation parameters setup
#==================================
set val(stop)   10.0                ;# time of simulation end

#==================================
#        Initialization
#==================================
```

```
#Create a ns simulator
set ns [new Simulator]

#Open the NS trace file
set tracefile [open pOpen.tr w]
$ns trace-all $tracefile

#Open the NAM trace file
set namfile [open pOpen.nam w]
$ns namtrace-all $namfile

#===================================
#        Nodes Definition
#===================================
#Create 4 nodes
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]

#===================================
#        Links Definition
#===================================
#Createlinks between nodes
$ns duplex-link $n0 $n2 0.5Mb 10ms DropTail
$ns queue-limit $n0 $n2 50
$ns duplex-link $n1 $n2 1.0Mb 10ms DropTail
$ns queue-limit $n1 $n2 10
$ns duplex-link $n2 $n3 0.5Mb 10ms DropTail
$ns queue-limit $n2 $n3 10

#Give node position (for NAM)
$ns duplex-link-op $n0 $n2 orient right-down
$ns duplex-link-op $n1 $n2 orient right-up
$ns duplex-link-op $n2 $n3 orient right
```

```
#==================================
#        Agents Definition
#==================================
#Setup a TCP connection
set tcp0 [new Agent/TCP]
$ns attach-agent $n0 $tcp0
set sink2 [new Agent/TCPSink]
$ns attach-agent $n3 $sink2
$ns connect $tcp0 $sink2
$tcp0 set packetSize_ 1500

#Setup a UDP connection
set udp1 [new Agent/UDP]
$ns attach-agent $n1 $udp1
set null3 [new Agent/Null]
$ns attach-agent $n3 $null3
$ns connect $udp1 $null3
$udp1 set packetSize_ 1500


#==================================
#        Applications Definition
#==================================
#Setup a FTP Application over TCP connection
set ftp0 [new Application/FTP]
$ftp0 attach-agent $tcp0
$ns at 1.0 "$ftp0 start"
$ns at 6.0 "$ftp0 stop"

#Setup a CBR Application over UDP connection
set cbr1 [new Application/Traffic/CBR]
$cbr1 attach-agent $udp1
$cbr1 set packetSize_ 1000
$cbr1 set rate_ 1.0Mb
```

```
$cbr1 set random_ null
$ns at 4.0 "$cbr1 start"
$ns at 9.0 "$cbr1 stop"


#===================================
#        Termination
#===================================
#Define a 'finish' procedure
proc finish {} {
    global ns tracefile namfile
    $ns flush-trace
    close $tracefile
    close $namfile
    exec nam pOpen.nam &
    exit 0
}
$ns at $val(stop) "$ns nam-end-wireless $val(stop)"
$ns at $val(stop) "finish"
$ns at $val(stop) "puts \"done\" ; $ns halt"
$ns run
```

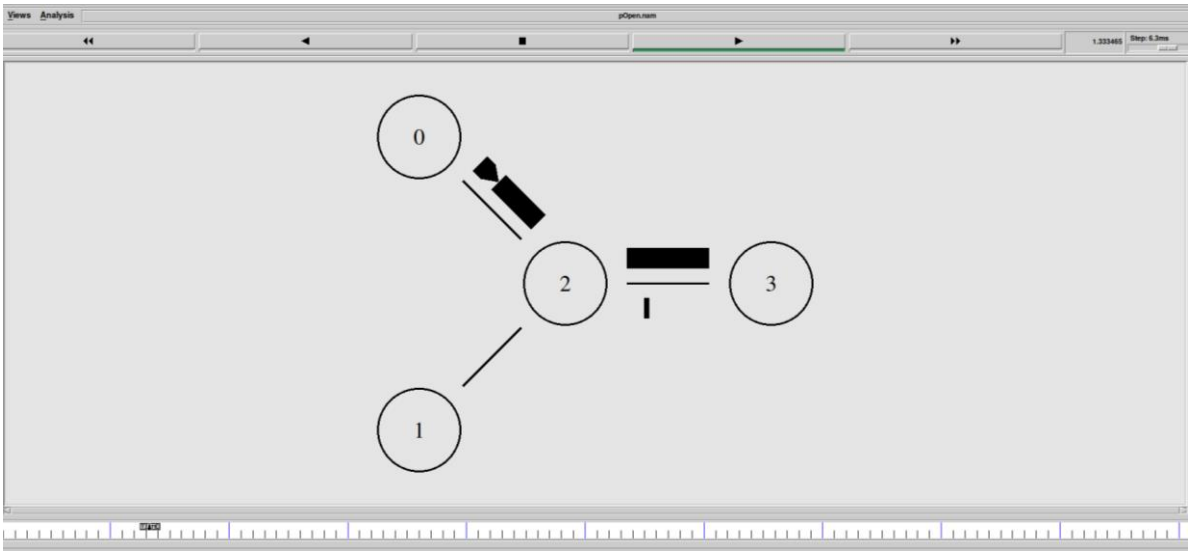
Parameters:

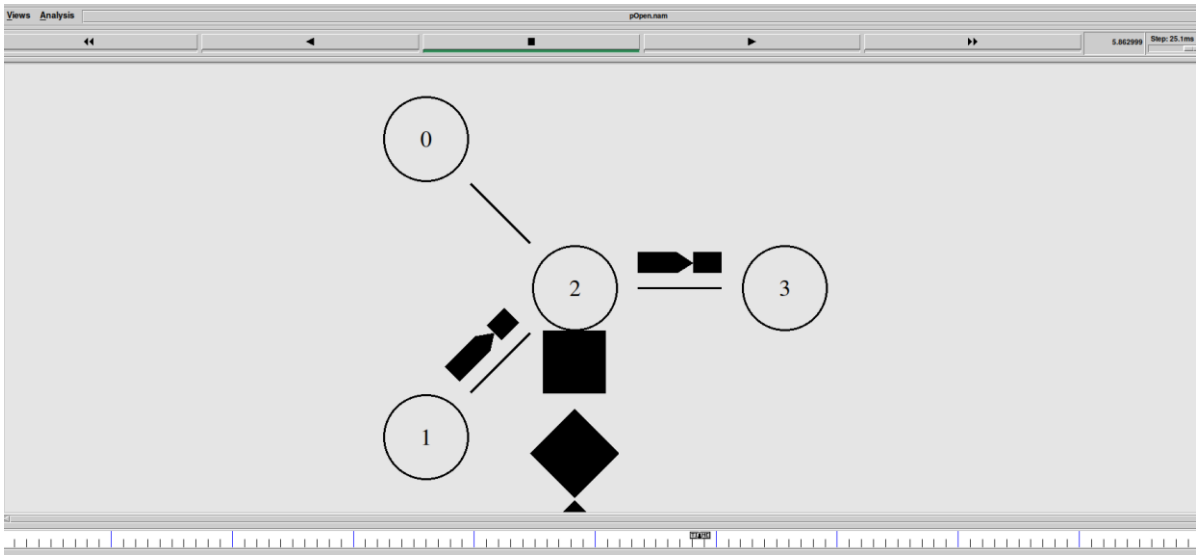
n0-n2 => capacity=0.5, queue size=50
n1-n2 => capacity=1, queue size=10
n2-n3 => capacity=0.5, queue size=10

Agents used: n0 – TCP source, n3 – TCP sink
Agents used: n1 – UDP source, n3 – UDP destination (NULL)

Application used for TCP is FTP where start time = 1ms and stop time = 6ms
Application used for UDP is CBR where start time = 4ms and stop time = 9ms

Output:






```
raghavendrakm@raghavendrakm-VirtualBox:~/Downloads/cns/openEnded$ cat pOpen.tr|cut -d " " -f1,5|grep +|grep -c "tcp"
296
raghavendrakm@raghavendrakm-VirtualBox:~/Downloads/cns/openEnded$ cat pOpen.tr|cut -d " " -f1,5|grep +|grep -c "cbr"
1252
raghavendrakm@raghavendrakm-VirtualBox:~/Downloads/cns/openEnded$ cat pOpen.tr|cut -d " " -f1,5|grep r|grep -c "tcp"
277
raghavendrakm@raghavendrakm-VirtualBox:~/Downloads/cns/openEnded$ cat pOpen.tr|cut -d " " -f1,5|grep r|grep -c "cbr"
3436
raghavendrakm@raghavendrakm-VirtualBox:~/Downloads/cns/openEnded$ cat pOpen.tr|cut -d " " -f1,5|grep d|grep -c "tcp"
19
raghavendrakm@raghavendrakm-VirtualBox:~/Downloads/cns/openEnded$ cat pOpen.tr|cut -d " " -f1,5|grep d|grep -c "cbr"
320
raghavendrakm@raghavendrakm-VirtualBox:~/Downloads/cns/openEnded$
```