COMPUTER NETWORKG

EXPERIMENT 8

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Aim: Implement and understand TCP-UDP scenario in NS2.

Theory:

A “UDP” agent that is attached to n0 is connected to a “null” agent attached to n3. A “null” agent frees the packets received. An “FTP” and a “CBR” traffic generator are respectively attached to “TCP” and “UDP” agents, and the “CBR” is configured to generate 1 Kbytes packets at the rate of 100 packets per second.

The default TCP packet size in ns-2 is 1000 bytes, so the bottleneck bandwidth is nominally 100 packets/sec or 0.1 packets/ms. The bandwidth × RTT_{noLoad} product is 0.1 packets/ms × 120 ms = 12 packets.

Code:

```
#Create a simulator object set ns [new Simulator]
 #Define different colors for data flows (for NAM)
 $ns color 1 Blue
 $ns color 2 Red

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

 #Define a 'finish' procedure
 proc finish {} { global ns nf
       $ns flush-trace #Close
       the NAM trace file close
       $nf
       #Execute NAM on the trace file
       exec nam out.nam &
       exit 0
 }
```

```
#Create four nodes
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]

#Create links between the nodes
$ns duplex-link $n0 $n2 2Mb 10ms DropTail
$ns duplex-link $n1 $n2 2Mb 10ms DropTail
$ns duplex-link $n2 $n3 1.7Mb 20ms DropTail

#Set Queue Size of link (n2-n3) to 10
$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

#Monitor the queue for link (n2-n3). (for NAM)
$ns duplex-link-op $n2 $n3 queuePos 0.5

#Setup a TCP connection set
tcp [new Agent/TCP] $tcp
set class_ 2 $ns attach-
agent $n0 $tcp set sink
[new Agent/TCPSink] $ns
attach-agent $n3 $sink
$ns connect $tcp $sink
$tcp set fid_ 1

#Setup a FTP over TCP connection
set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ftp set type_ FTP

#Setup a UDP connection
set udp [new Agent/UDP]
$ns attach-agent $n1 $udp
set null [new Agent/Null]
$ns attach-agent $n3 $null
$ns connect $udp $null
$udp set fid_ 2

#Setup a CBR over UDP connection
set cbr [new Application/Traffic/CBR]
$cbr attach-agent $udp
$cbr set type_ CBR
$cbr set packet_size_ 1000
```

```
$cbr set rate_ 1mb
$cbr set random_ false

#Schedule events for the CBR and FTP agents
$ns at 0.1 "$cbr start"
$ns at 1.0 "$ftp start"
$ns at 4.0 "$ftp stop"
$ns at 4.5 "$cbr stop"

#Detach tcp and sink agents (not really necessary)
$ns at 4.5 "$ns detach-agent $n0 $tcp ; $ns detach-agent $n3 $sink"

#Call the finish procedure after 5 seconds of simulation time
$ns at 5.0 "finish"

#Print CBR packet size and interval puts "CBR
packet size = [$cbr set packet_size_]" puts "CBR
interval = [$cbr set interval_]"

#Run the simulation
$ns run
```

Output: