Computer Networks - Exp 8
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Aim

To implement and understand the tcp-udp scenario in NS2.

Theory

TCP is a connection-oriented protocol, whereas UDP is a connectionless protocol. A key difference between TCP and UDP is speed, as TCP is comparatively slower than UDP. Overall, UDP is a much faster, simpler, and efficient protocol, however, retransmission of lost data packets is only possible with TCP.

NS2 stands for Network Simulator Version 2. It is an open-source event-driven simulator designed specifically for research in computer communication networks.

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.

A “TCP” agent is attached to n1, and a connection is established to a TCP “sink” agent attached to n3. A TCP “sink” agent generates and sends ACK packets to the sender (TCP agent) and frees the received packets. A “UDP” agent that is attached to n0 is connected to a “null” agent attached to n3.

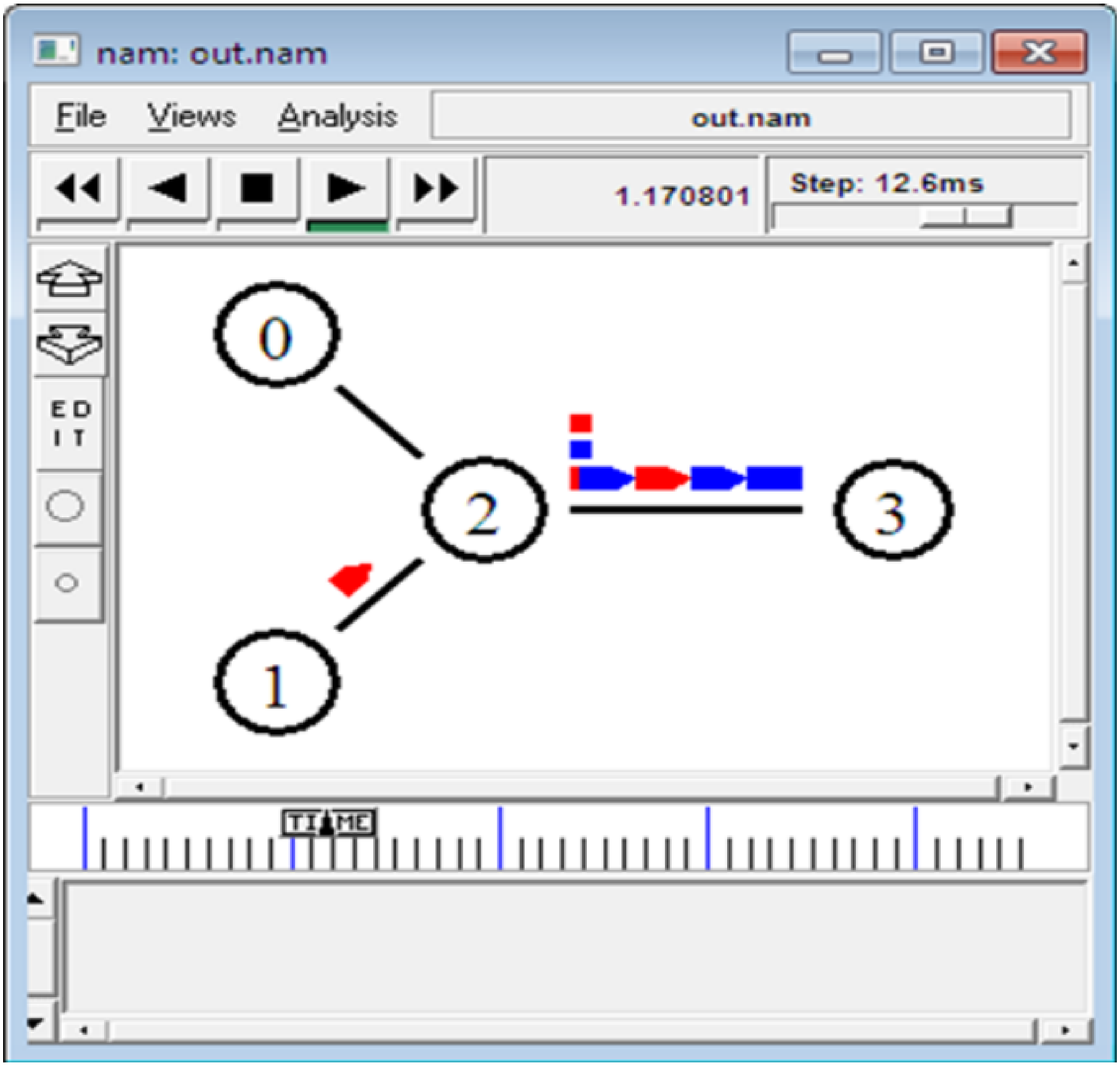
Commands

```
#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



Conclusion

Thus, we studied the TCP-UDP scenario in NS2.