

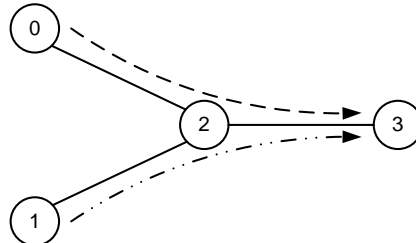


# Vidyavardhini's College of Engineering & Technology

## Department of Information Technology

### Experiment No. 6

**Aim:** To implement the given network topology and transmit data over the shared links using NS2.



**Apparatus (software):** System with Ubuntu, NS2, NAM

#### **Procedure:**

1. Create a Simulator Object.
2. Open the nam trace file.
3. Define a 'finish' procedure.
4. Close the Trace file.
5. Execute nam on the Trace file.
6. Create four nodes.
7. Create a duplex link between the nodes as per the topology.
8. Create agents for sending and receiving data and attach them to appropriate nodes.
9. Create traffic sources and attach them to appropriate agents.
10. Program when to send data and when to stop sending data.
11. Call the finish procedure and run the simulation.
12. Observe the output and save the same.

#### **Program:**

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

#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 trace file
    close $nf
    #Execute nam on the trace file
    exec nam out.nam &
    exit 0
}
```



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#Define different colors for data flows

\$ns color 1 Blue

\$ns color 2 Red

#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 1Mb 10ms DropTail

\$ns duplex-link \$n1 \$n2 1Mb 10ms DropTail

\$ns duplex-link \$n3 \$n2 1Mb 10ms SFQ #SFQ=stochastic fair queueing

#Layout the network as our choice

\$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 the link between node 2 and node 3

\$ns duplex-link-op \$n2 \$n3 queuePos 0.5

#Create a UDP agent and attach it to node n0

set udp0 [new Agent/UDP]

\$udp0 set class\_ 1

\$ns attach-agent \$n0 \$udp0

# Create a CBR traffic source and attach it to udp0

set cbr0 [new Application/Traffic/CBR]

\$cbr0 set packetSize\_ 500

\$cbr0 set interval\_ 0.005

\$cbr0 attach-agent \$udp0

#Create a Null agent (a traffic sink) and attach it to node n3

set null0 [new Agent/Null]

\$ns attach-agent \$n3 \$null0

#Create a UDP agent and attach it to node n1

set udp1 [new Agent/UDP]

\$udp1 set class\_ 2

\$ns attach-agent \$n1 \$udp1

# Create a CBR traffic source and attach it to udp1

set cbr1 [new Application/Traffic/CBR]

\$cbr1 set packetSize\_ 500



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```
$cbr1 set interval_ 0.005
$cbr1 attach-agent $udp1
#Create a Null agent (a traffic sink) and attach it to node n3
set null1 [new Agent/Null]
$ns attach-agent $n3 $null1

#Connect the traffic sources with the traffic sink
$ns connect $udp0 $null0
$ns connect $udp1 $null1

#Schedule events for the CBR agents
$ns at 0.5 "$cbr0 start"
$ns at 1.0 "$cbr1 start"
$ns at 4.0 "$cbr1 stop"
$ns at 4.5 "$cbr0 stop"
#Call the finish procedure after 5 seconds of simulation time
$ns at 5.0 "finish"

# Exit NS2
$ns at 5.5 "exit"

#Run the simulation
$ns run
```

#### **Conclusion:**

Q. When the packets are accumulated in the queue?

Ans.- When the packet generation speed is more than the link bandwidth, the packets are accumulated in the queue.

Q. Which type of queue gives a fair chance to transmit the data on the shared link?

Ans.- SFQ (stochastic fair queueing) queue gives a fair chance to transmit the data on the shared link.