

Lab4: Congestion Window Plot

Tcl Code:

```
#create simulator
set ns [new Simulator]

#Open nam file
set namfile [open lab4_try.nam w]
$ns namtrace-all $namfile

#to create nodes
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]

# to create the link between the nodes with bandwidth, delay and queue
$ns duplex-link $n0 $n2 2Mb 10ms DropTail
$ns duplex-link $n1 $n2 2Mb 10ms DropTail
$ns duplex-link $n2 $n3 0.3Mb 200ms DropTail

#orientation
$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

set lan [$ns newLan "$n3 $n4 $n5" 0.5Mb 40ms LL Queue/DropTail MAC/802_3]

# Sending node is 0 with agent as Reno Agent
set tcp1 [new Agent/TCP/Reno]
$ns attach-agent $n0 $tcp1

# receiving (sink) node is n4
set sink1 [new Agent/TCP/Sink]
$ns attach-agent $n4 $sink1

# establish the traffic between the source and sink
$ns connect $tcp1 $sink1

# Setup a FTP traffic generator on "tcp1"
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1
$ftp1 set type_ FTP
```

```

#Set TCP1 connection to node n1

set tcp2 [new Agent/TCP]

$ns attach-agent $n1 $tcp2

set sink2 [new Agent/TCPSink]
$ns attach-agent $n5 $sink2

$ns connect $tcp2 $sink2

$tcp2 set packetSize_ 552
$tcp2 set fid_ 2

#Setup a telnet over TCP1 connection
set telnet0 [new Application/Telnet]
$telnet0 attach-agent $tcp2

# start/stop the traffic
$ns at 0.1 "$ftp1 start"
$ns at 40.0 "$ftp1 stop"

# Set simulation end time
$ns at 50.0 "finish"
# procedure to plot the congestion window
proc plotWindow {tcpSource outfile} {
    global ns
    set now [$ns now]
    set cwnd [$tcpSource set cwnd_]

# the data is recorded in a file called congestion.xg (this can be plotted # using xgraph or gnuplot. this
example uses xgraph to plot the cwnd_
    puts $outfile "$now $cwnd"
    $ns at [expr $now+0.1] "plotWindow $tcpSource $outfile"
}

set outfile1 [open "congestion1.xg" w]
$ns at 0.0 "plotWindow $tcp1 $outfile1"

set outfile2 [open "congestion2.xg" w]
$ns at 0.0 "plotWindow $tcp2 $outfile2"

```

```

proc finish {} {
    global ns namfile
    close $namfile
    exec nam lab4_try.nam
    exec xgraph congestion1.xg congestion2.xg &
    exit 0
}
# Run simulation
$ns run

```

Output:

