# Computer Networks

## UE23CS252B

## 4th Semester, Academic Year 2025

Date:15-04-2025

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|---|---|---|

## FLAVOURS OF TCP-

### TAHOE-

### Code-

```
This script is created by NSG2 beta1
# <http://wushoupong.googlepages.com/nsg>

#===================================
#     Simulation parameters setup
#===================================
set val(stop)   20;# time of simulation end

#===================================
#       Initialization
#===================================
#Create a ns simulator
set ns [new Simulator]

#Open the NS trace file
set tracefile [open out.tr w]
```

```
$ns trace-all $tracefile

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

set file6 [open cw6.out w]
puts $file6 "Title = Congestion Window @ Node 6"
puts $file6 "title_x = Time in Sec"
puts $file6 "title_y = Window Size"

set file2 [open cw2.out w]
puts $file2 "Title = Congestion Window @ Node 2"
puts $file2 "title_x = Time in Sec"
puts $file2 "title_y = Window Size"

#=================================
#       Nodes Definition
#=================================
#Create 7 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]
set n6 [$ns node]
      Links Definition
#=================================
#Createlinks between nodes
$ns duplex-link $n0 $n1 100.0Mb 10ms DropTail
```

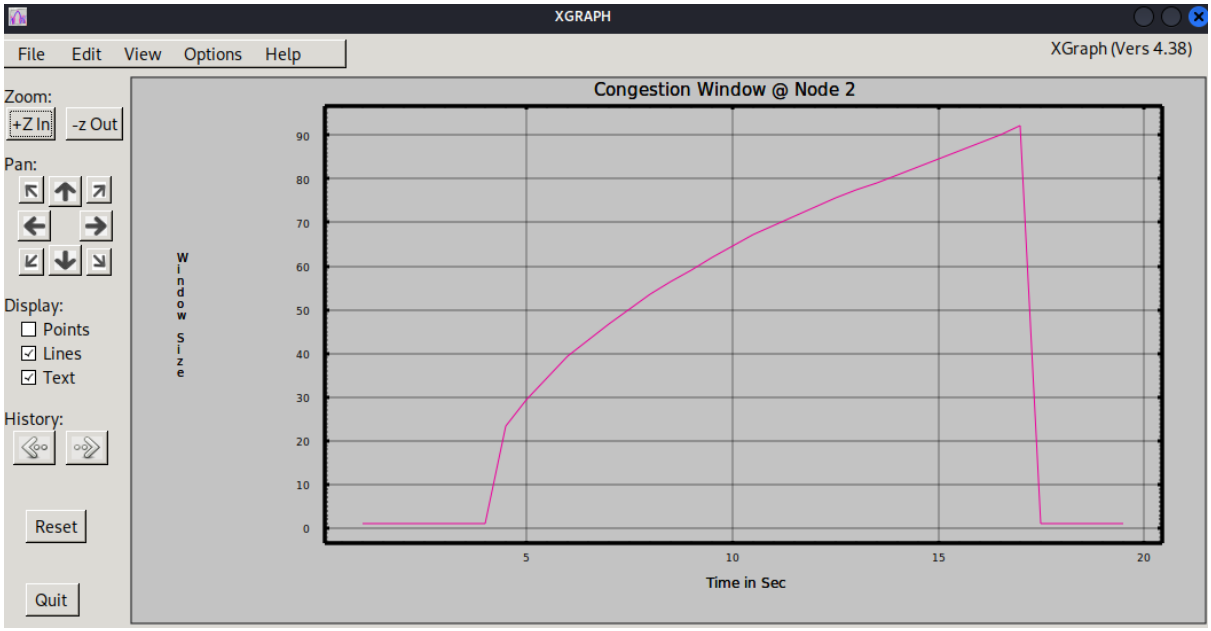
```
$ns queue-limit $n0 $n1 100
$ns duplex-link $n0 $n2 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n2 50
$ns duplex-link $n0 $n3 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n3 50
$ns duplex-link $n0 $n4 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n4 50
$ns duplex-link $n1 $n5 100.0Mb 10ms DropTail
$ns queue-limit $n1 $n5 50
$ns duplex-link $n1 $n6 100.0Mb 10ms DropTail
$ns queue-limit $n1 $n6 50

#===================================
#        Agents Definition
#===================================
#Setup a TCP connection (n6 to n4)
set tcp0 [new Agent/TCP]
$ns attach-agent $n6 $tcp0
set sink0 [new Agent/TCPSink]
$ns attach-agent $n4 $sink0
$ns connect $tcp0 $sink0
$tcp0 set packetSize_ 3000

#Setup a TCP connection  (n2 to n5)
set tcp1 [new Agent/TCP]
$ns attach-agent $n2 $tcp1
set sink1 [new Agent/TCPSink]
$ns attach-agent $n5 $sink1
$ns connect $tcp1 $sink1
$tcp1 set packetSize_ 1500
```

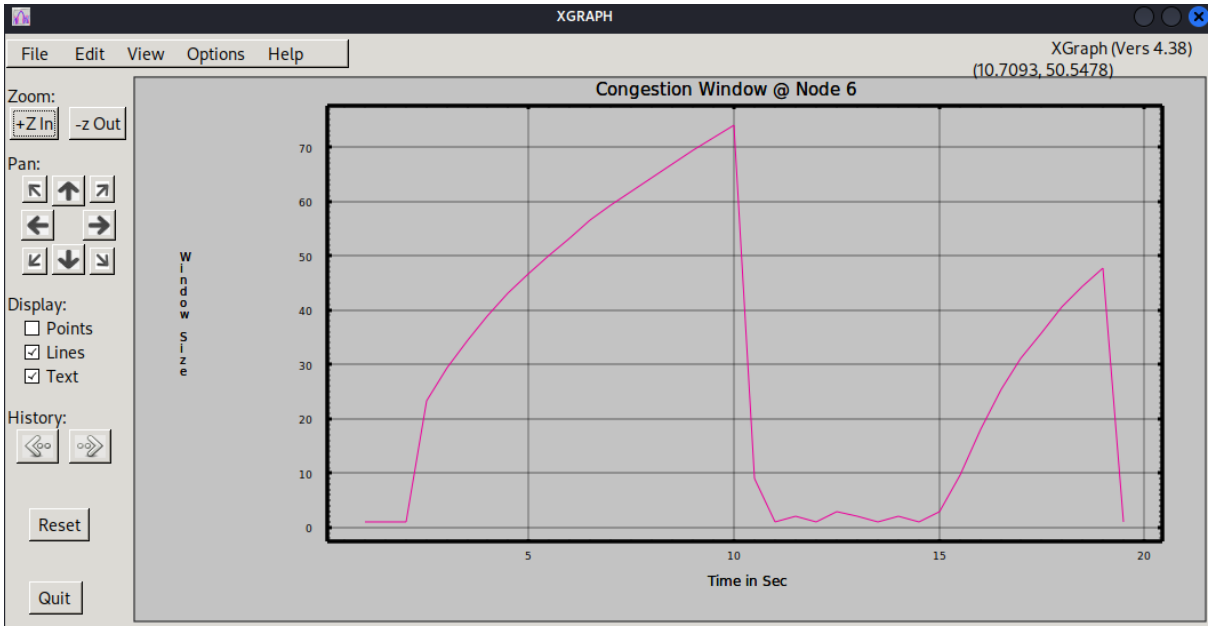
```
#Setup a UDP connection  (n6 to n4)
set udp0 [new Agent/UDP]
$ns attach-agent $n6 $udp0
set sink1 [new Agent/LossMonitor]
$ns attach-agent $n4 $sink1
$ns connect $udp0 $sink1
$udp0 set packetSize_ 1500

#==================================
#       Applications Definition
#==================================
#Setup a FTP Application over TCP connection
set ftp0 [new Application/FTP]
$ftp0 attach-agent $tcp0

#Setup a FTP Application over 2nd TCP connection
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1

#Setup a CBR Application over UDP connection
set cbr0 [new Application/Traffic/CBR]
$cbr0 attach-agent $udp0
$cbr0 set rate_ 99.9Mb
$cbr0 set random_ null

proc record {} {
    global tcp0 tcp1 file6 file2

    #Get an instance of the simulator
    set ns [Simulator instance]
```

```
        #Set the time after which the procedure should be called again
        set time 0.5

        #How many bytes have been received by the traffic sinks?
        set cw6 [$tcp0 set cwnd_]
        set cw2 [$tcp1 set cwnd_]

        #Get the current time
        set now [$ns now]

        puts $file6 "$now $cw6"
        puts $file2 "$now $cw2"

        #Re-schedule the procedure
        $ns at [expr $now+$time] "record"
}

$ns at 1.0 "record"
$ns at 2.0 "$ftp0 start"
$ns at 4.0 "$ftp1 start"
$ns at 10.0 "$cbr0 start"
$ns at 15.0 "$cbr0 stop"
$ns at 17.0 "$ftp1 stop"
$ns at 19.0 "$ftp0 stop"


#====================================
#       Termination
#====================================
#Define a 'finish' procedure
proc finish {} {
```

```
    global ns namfile tracefile file6 file2
    $ns flush-trace
    close $tracefile
    close $namfile
    close $file6
    close $file2
    exec nam out.nam &
    exec /home/pranav/Downloads/xgraph/bin/xgraph cw6.out &
    exec /home/pranav/Downloads/xgraph/bin/xgraph cw2.out &
    exit 0
}
$ns at $val(stop) "finish"
$ns run
```

## Output-






# RENO-

# Code-

This script is created by NSG2 beta1

# <http://wushoupong.googlepages.com/nsg>

#==================================

# Simulation parameters setup

#==================================

set val(stop) 20;# time of simulation end

#==================================

# Initialization

#==================================

#Create a ns simulator

set ns [new Simulator]

#Open the NS trace file

set tracefile [open out.tr w]

$ns trace-all $tracefile

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

set file6 [open cw6.out w]
puts $file6 "Title = Congestion Window @ Node 6"
puts $file6 "title_x = Time in Sec"
puts $file6 "title_y = Window Size"

set file2 [open cw2.out w]
puts $file2 "Title = Congestion Window @ Node 2"
puts $file2 "title_x = Time in Sec"
puts $file2 "title_y = Window Size"

#=================================
#       Nodes Definition
#=================================
#Create 7 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]
set n6 [$ns node]
      Links Definition
#=================================
#Createlinks between nodes
$ns duplex-link $n0 $n1 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n1 100
```

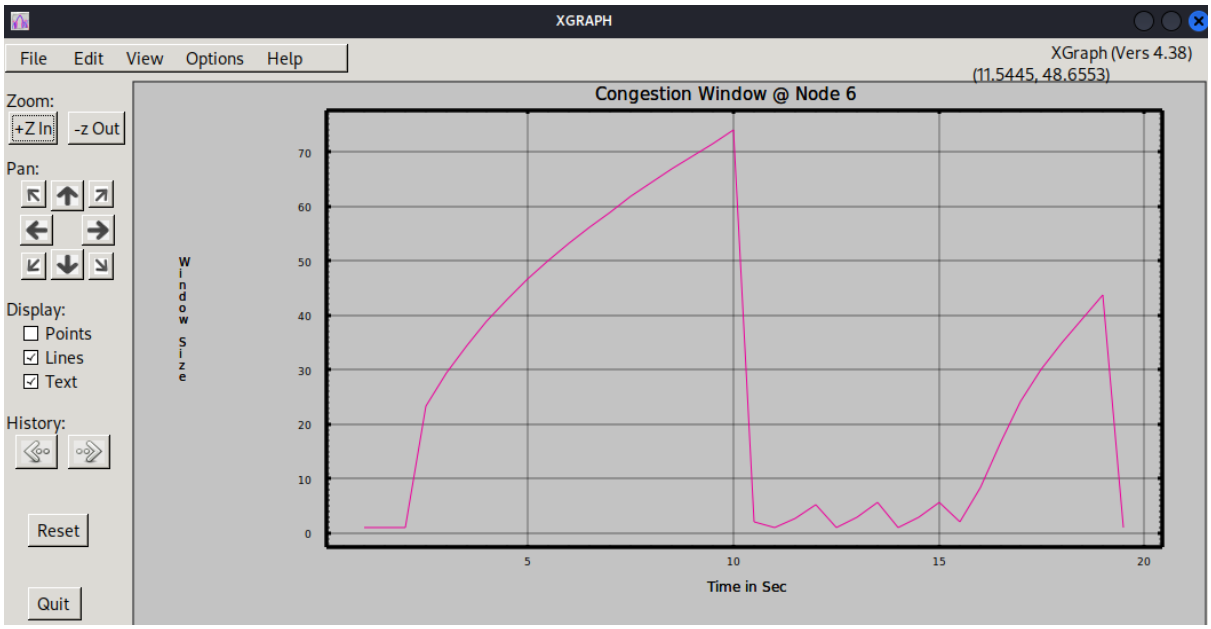
```
$ns duplex-link $n0 $n2 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n2 50
$ns duplex-link $n0 $n3 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n3 50
$ns duplex-link $n0 $n4 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n4 50
$ns duplex-link $n1 $n5 100.0Mb 10ms DropTail
$ns queue-limit $n1 $n5 50
$ns duplex-link $n1 $n6 100.0Mb 10ms DropTail
$ns queue-limit $n1 $n6 50

#=================================
#       Agents Definition
#=================================
#Setup a TCP connection (n6 to n4)
set tcp0 [new Agent/TCP/Reno]
$ns attach-agent $n6 $tcp0
set sink0 [new Agent/TCPSink]
$ns attach-agent $n4 $sink0
$ns connect $tcp0 $sink0
$tcp0 set packetSize_ 4000

#Setup a TCP connection  (n2 to n5)
set tcp1 [new Agent/TCP/Reno]
$ns attach-agent $n2 $tcp1
set sink1 [new Agent/TCPSink]
$ns attach-agent $n5 $sink1
$ns connect $tcp1 $sink1
$tcp1 set packetSize_ 2000

#Setup a UDP connection  (n6 to n4)
```

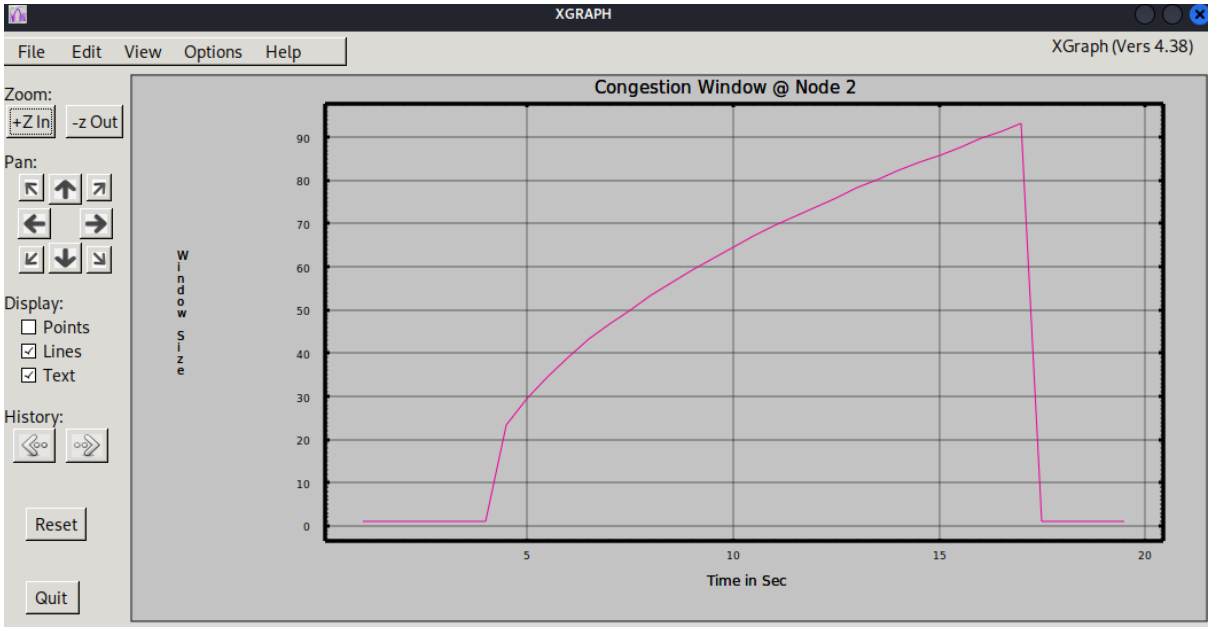
```
set udp0 [new Agent/UDP]
$ns attach-agent $n6 $udp0
set sink1 [new Agent/LossMonitor]
$ns attach-agent $n4 $sink1
$ns connect $udp0 $sink1
$udp0 set packetSize_ 1500

#==================================
#       Applications Definition
#==================================
#Setup a FTP Application over TCP connection
set ftp0 [new Application/FTP]
$ftp0 attach-agent $tcp0

#Setup a FTP Application over 2nd TCP connection
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1

#Setup a CBR Application over UDP connection
set cbr0 [new Application/Traffic/CBR]
$cbr0 attach-agent $udp0
$cbr0 set rate_ 99.9Mb
$cbr0 set random_ null

proc record {} {
    global tcp0 tcp1 file6 file2

    #Get an instance of the simulator
    set ns [Simulator instance]

    #Set the time after which the procedure should be called again
```

```
        set time 0.5

        #How many bytes have been received by the traffic sinks?
        set cw6 [$tcp0 set cwnd_]
        set cw2 [$tcp1 set cwnd_]

        #Get the current time
        set now [$ns now]

        puts $file6 "$now $cw6"
        puts $file2 "$now $cw2"

        #Re-schedule the procedure
        $ns at [expr $now+$time] "record"
}

$ns at 1.0 "record"
$ns at 2.0 "$ftp0 start"
$ns at 4.0 "$ftp1 start"
$ns at 10.0 "$cbr0 start"
$ns at 15.0 "$cbr0 stop"
$ns at 17.0 "$ftp1 stop"
$ns at 19.0 "$ftp0 stop"



#====================================
#       Termination
#====================================
#Define a 'finish' procedure
proc finish {} {
    global ns namfile tracefile file6 file2
```

```
    $ns flush-trace
    close $tracefile
    close $namfile
    close $file6
    close $file2
    exec nam out.nam &
    exec /home/pranav/Downloads/xgraph/bin/xgraph cw6.out &
    exec /home/pranav/Downloads/xgraph/bin/xgraph cw2.out &
    exit 0
}
$ns at $val(stop) "finish"
$ns run
```

## Output-






# VEGAS-

# Code-

This script is created by NSG2 beta1

# <http://wushoupong.googlepages.com/nsg>

#==================================

#  Simulation parameters setup

#==================================

set val(stop)  20;# time of simulation end

#==================================

#  Initialization

#==================================

#Create a ns simulator

set ns [new Simulator]

#Open the NS trace file

set tracefile [open out.tr w]

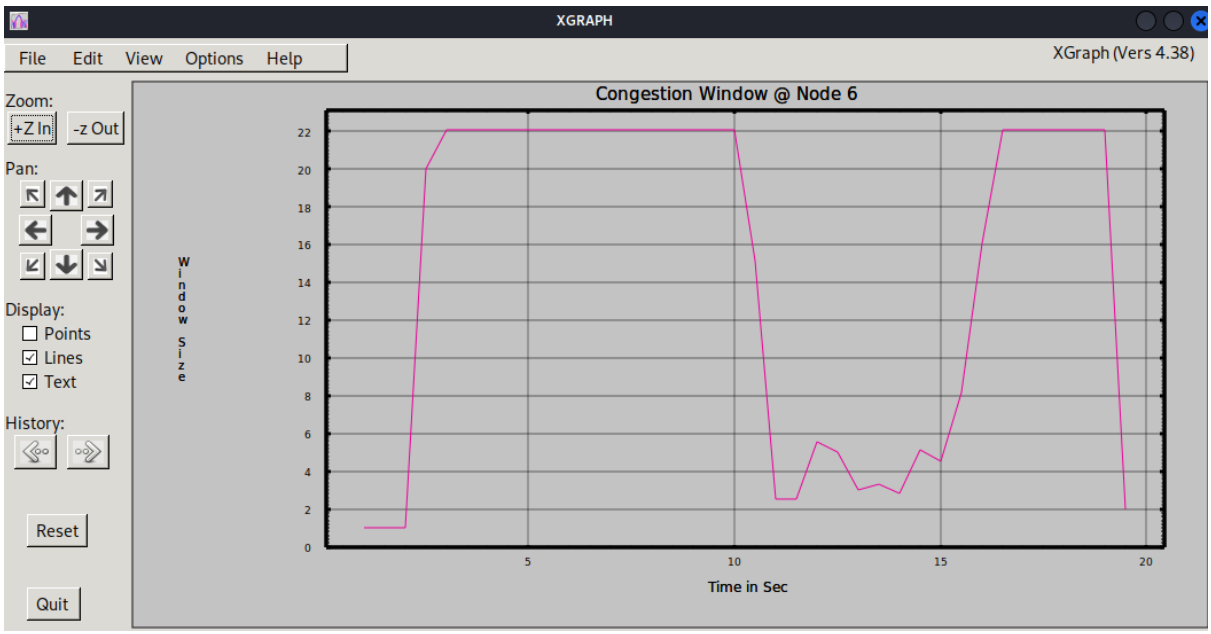
```
$ns trace-all $tracefile

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

set file6 [open cw6.out w]
puts $file6 "Title = Congestion Window @ Node 6"
puts $file6 "title_x = Time in Sec"
puts $file6 "title_y = Window Size"

set file2 [open cw2.out w]
puts $file2 "Title = Congestion Window @ Node 2"
puts $file2 "title_x = Time in Sec"
puts $file2 "title_y = Window Size"

#=================================
#       Nodes Definition
#=================================
#Create 7 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]
set n6 [$ns node]
      Links Definition
#=================================
#Createlinks between nodes
$ns duplex-link $n0 $n1 100.0Mb 10ms DropTail
```

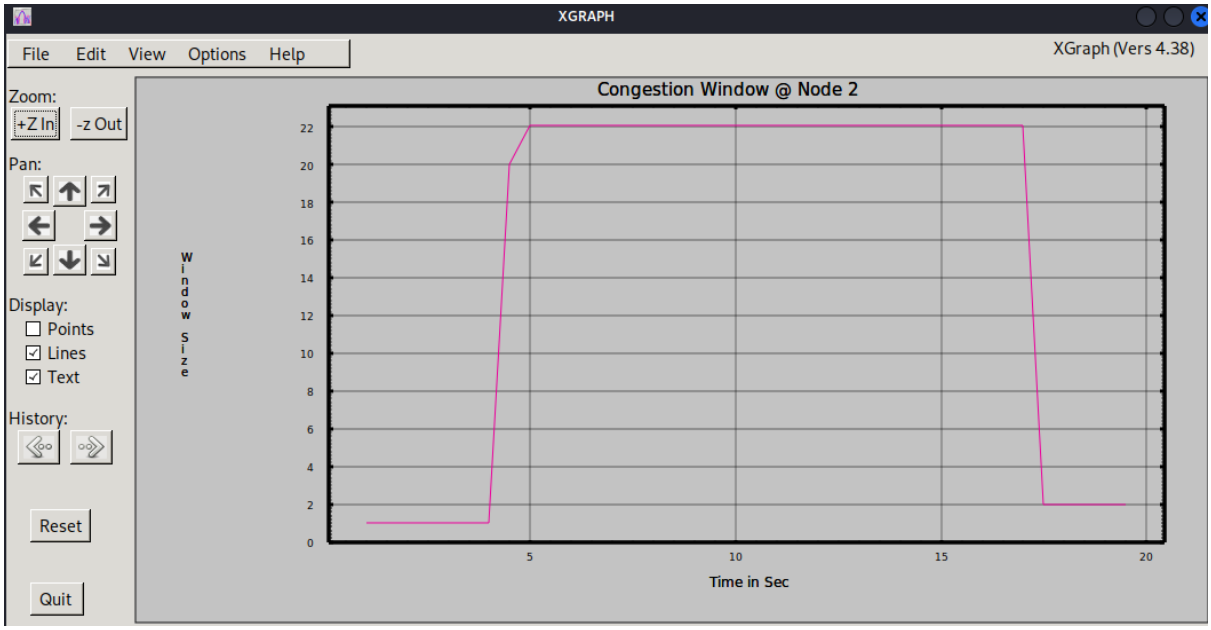
```
$ns queue-limit $n0 $n1 100
$ns duplex-link $n0 $n2 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n2 50
$ns duplex-link $n0 $n3 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n3 50
$ns duplex-link $n0 $n4 100.0Mb 10ms DropTail
$ns queue-limit $n0 $n4 50
$ns duplex-link $n1 $n5 100.0Mb 10ms DropTail
$ns queue-limit $n1 $n5 50
$ns duplex-link $n1 $n6 100.0Mb 10ms DropTail
$ns queue-limit $n1 $n6 50

#===================================
#        Agents Definition
#===================================
#Setup a TCP connection (n6 to n4)
set tcp0 [new Agent/TCP/Vegas]
$ns attach-agent $n6 $tcp0
set sink0 [new Agent/TCPSink]
$ns attach-agent $n4 $sink0
$ns connect $tcp0 $sink0
$tcp0 set packetSize_ 2000

#Setup a TCP connection  (n2 to n5)
set tcp1 [new Agent/TCP/Vegas]
$ns attach-agent $n2 $tcp1
set sink1 [new Agent/TCPSink]
$ns attach-agent $n5 $sink1
$ns connect $tcp1 $sink1
$tcp1 set packetSize_ 1000
```

```
#Setup a UDP connection  (n6 to n4)
set udp0 [new Agent/UDP]
$ns attach-agent $n6 $udp0
set sink1 [new Agent/LossMonitor]
$ns attach-agent $n4 $sink1
$ns connect $udp0 $sink1
$udp0 set packetSize_ 1000

#==================================
#       Applications Definition
#==================================
#Setup a FTP Application over TCP connection
set ftp0 [new Application/FTP]
$ftp0 attach-agent $tcp0

#Setup a FTP Application over 2nd TCP connection
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1

#Setup a CBR Application over UDP connection
set cbr0 [new Application/Traffic/CBR]
$cbr0 attach-agent $udp0
$cbr0 set rate_ 99.9Mb
$cbr0 set random_ null

proc record {} {
        global tcp0 tcp1 file6 file2

        #Get an instance of the simulator
        set ns [Simulator instance]
```

```
        #Set the time after which the procedure should be called again
        set time 0.5

        #How many bytes have been received by the traffic sinks?
        set cw6 [$tcp0 set cwnd_]
        set cw2 [$tcp1 set cwnd_]

        #Get the current time
        set now [$ns now]

        puts $file6 "$now $cw6"
        puts $file2 "$now $cw2"

        #Re-schedule the procedure
        $ns at [expr $now+$time] "record"
}

$ns at 1.0 "record"
$ns at 2.0 "$ftp0 start"
$ns at 4.0 "$ftp1 start"
$ns at 10.0 "$cbr0 start"
$ns at 15.0 "$cbr0 stop"
$ns at 17.0 "$ftp1 stop"
$ns at 19.0 "$ftp0 stop"


#====================================
#       Termination
#====================================
#Define a 'finish' procedure
proc finish {} {
```

```
    global ns namfile tracefile file6 file2
    $ns flush-trace
    close $tracefile
    close $namfile
    close $file6
    close $file2
    exec nam out.nam &
    exec /home/pranav/Downloads/xgraph/bin/xgraph cw6.out &
    exec /home/pranav/Downloads/xgraph/bin/xgraph cw2.out &
    exit 0
}
$ns at $val(stop) "finish"
$ns run
```




XGRAPH
File
Edit
View
Options
Help
XGraph (Vers 4.38)
Zoom:
+Z In
-z Out
Pan:
Display:
Points
Lines
Text
History:
Reset
Quit
Congestion Window @ Node 2
Window Size
0
2
4
6
8
10
12
14
16
18
20
22
5
10
15
20
Time in Sec