

SSN COLLEGE OF ENGINEERING, KALAVAKKAM
 (An Autonomous Institution, Affiliated to Anna University, Chennai)
 DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
 UCS1511 – COMPUTER NETWORKS LAB

Lab Exercise 11: Performance Evaluation of TCP and UDP

Aim:

Write tcl script to do evaluate the performance of TCP and UDP sharing a bottleneck line.

Algorithm:

1. Create six nodes and the links between the nodes as
 - a. 0 → 2 2Mb 10 ms duplex link
 - b. 1 → 2 2Mb 10 ms duplex link
 - c. 2 → 3 0.3Mb 100ms simplex link
 - d. 3 → 2 0.3Mb 100ms simplex link (link 2 → 3 is a bottleneck)
 - e. 3 → 4 0.5Mb 40ms duplex link
 - f. 3 → 5 0.5Mb 40ms duplex link
2. Align the nodes properly.
3. Set Queue Size of link (n2-n3) to 10 (or) 5.
4. Setup a TCP connection over 0 and 4 and its flow id, window size, packet size
5. Setup a UDP connection over 1 and 5 with flow id, type, packet size, rate, random fields
6. Set different colors for TCP and UDP.
7. Run the simulation for 5 seconds, and show the simulation in network animator and in trace file.

Analyze the performance of TCP and UDP from the simulation

Code:

```
set ns [new Simulator]

# Set color to the flow packets
$ns color 1 Blue
$ns color 2 Red

set nf [open out.nam w]
$ns namtrace-all $nf

# End procedure
proc finish {} {
  global ns nf
  $ns flush-trace
```

```

        close $nf
        exec nam out.nam &
        exit 0
    }

# 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]

# Create network connections
$ns duplex-link $n0 $n2 2Mb 10ms DropTail
$ns duplex-link $n1 $n2 2Mb 10ms DropTail
$ns simplex-link $n3 $n2 0.3Mb 100ms DropTail
$ns simplex-link $n2 $n3 0.3Mb 100ms DropTail
$ns duplex-link $n3 $n4 0.5Mb 40ms DropTail
$ns duplex-link $n3 $n5 0.5Mb 40ms DropTail

# Orient the connections
$ns duplex-link-op $n0 $n2 orient right-down
$ns duplex-link-op $n1 $n2 orient right-up
$ns simplex-link-op $n2 $n3 orient right
$ns duplex-link-op $n3 $n4 orient right-up
$ns duplex-link-op $n3 $n5 orient right-down

$ns queue-limit $n2 $n3 10
$ns duplex-link-op $n2 $n3 queuePos 0.5

# Create tcp connection
set tcp [new Agent/TCP]
$ns attach-agent $n0 $tcp
set sink [new Agent/TCPSink/DelAck]
$ns attach-agent $n4 $sink
$ns connect $tcp $sink
$tcp set fid_ 1
$tcp set window_ 8000
$tcp set packetSize_ 512

# Connect TCP to FTP application
set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ftp set type_ FTP

# Create UDP connection
set udp [new Agent/UDP]
$ns attach-agent $n1 $udp
set null [new Agent/Null]
$ns attach-agent $n5 $null
$ns connect $udp $null
$udp set fid_ 2

# Connect UDP to CBR Application
set cbr [new Application/Traffic/CBR]
$cbr attach-agent $udp
$cbr set type_ CBR
$cbr set packet_size_ 1024

```

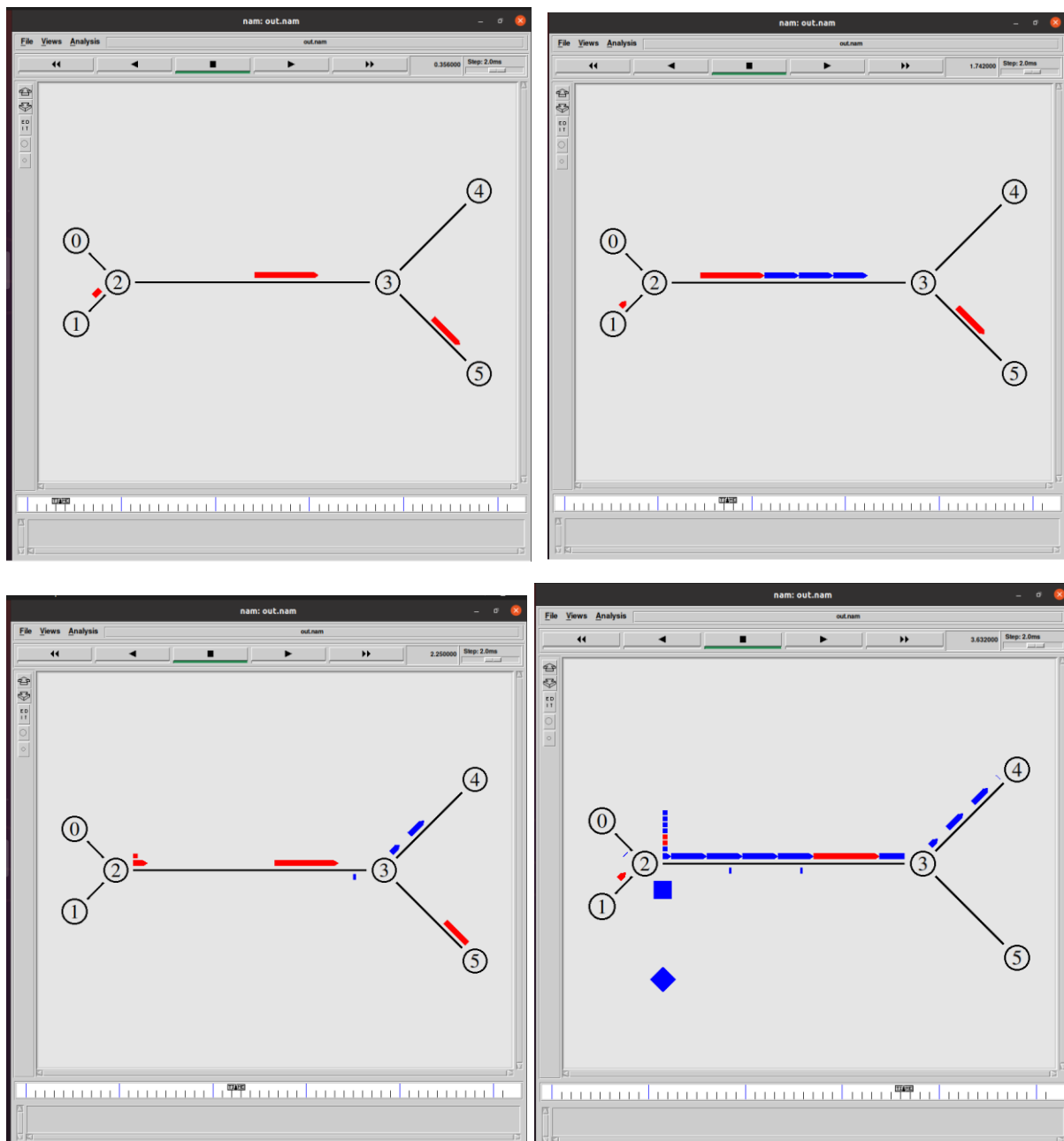
```
$cbr set rate_ 0.1Mb
$cbr set random_ false
```

```
# Timestamp flow animation
$ns at 0.1 "$cbr start"
$ns at 1.0 "$ftp start"
$ns at 4.5 "$ftp stop"
$ns at 5.0 "$cbr stop"
```

```
$ns at 5.0 "$ns detach-agent $n0 $tcp ; $ns detach-agent $n4 $sink"
$ns at 5.5 "finish"
```

```
# Run Simulation
$ns run
```

Output:



Learning outcomes:

1. Reexplored how to run a simple (.tcl) program.
2. Visualized using network animator (nam).
3. Compared TCP against UDP.