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Experiment-2

1. Create the following scenario with two nodes n0 and n1 and link in between.

- *Sender agent: Agent/UDP*
- *Receiver agent: Agent/Null*
- *Connect agents*
- *Data source: Application/Traffic/CBR*
- *Run from 0.5 to 4.5 sec, finish at 5.0 sec*

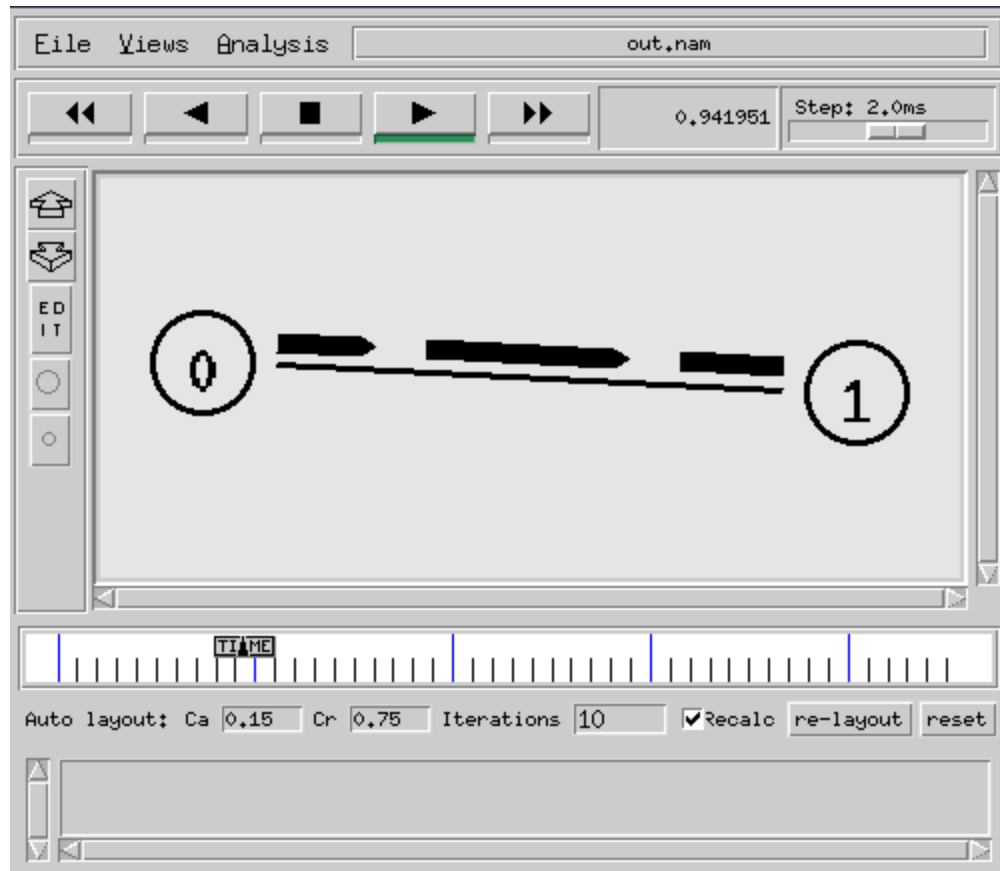
Script:

```
set ns [new Simulator]
set nf [open out.nam w]
$ns namtrace-all $nf
proc finish {} {
    global ns nf
    $ns flush-trace
    close $nf
    exec nam out.nam &
    exit 0
}
$ns at 5.0 "finish"
set n0 [$ns node]
set n1 [$ns node]
$ns duplex-link $n0 $n1 1Mb 10ms DropTail
#Create a UDP agent and attach it to node n0
set udp0 [new Agent/UDP]
$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
set null0 [new Agent/Null]
$ns attach-agent $n1 $null0
$ns connect $udp0 $null0
$ns at 0.5 "$cbr0 start"
$ns at 4.5 "$cbr0 stop"
$ns run
```

Output:

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3. Write a TCL script to simulate a file transfer with using ns 2:

Consider a client and a server. The server is running a FTP application (over TCP). The client sends a request to download a file of size 10 MB from the server. Write a script to simulate this scenario. Let node #0 be the server and node #1 be the client. TCP packet size is 1500 B. Assume typical values for other parameters.

Script:

```
set ns [new Simulator]

set namfile [open ex_02.nam w]
$ns namtrace-all $namfile

set tracefile [open ex_02.tr w]
$ns trace-all $tracefile

Agent/TCP set packetSize_ 1500

set n0 [$ns node]
set n1 [$ns node]
```

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```
$ns duplex-link $n0 $n1 1Mb 10ms DropTail
```

```
set tcp [new Agent/TCP]
$ns attach-agent $n0 $tcp
```

```
set sink [new Agent/TCPSink]
$ns attach-agent $n1 $sink
```

```
$ns connect $tcp $sink
```

```
set ftp [new Application/FTP]
$ftp attach-agent $tcp
```

```
set filesize [expr 10*1024*1024]
$ns at 0.0 "$ftp send $filesize"
```

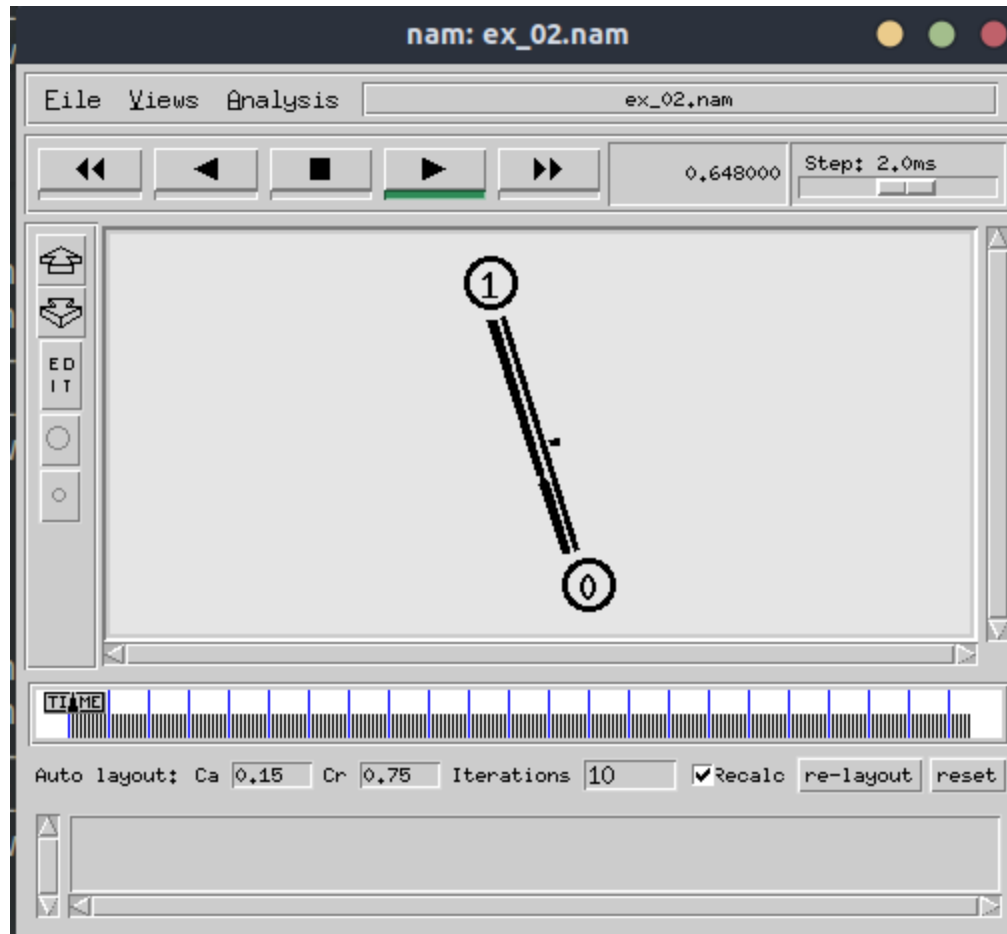
```
proc finish {} {
    global ns namfile tracefile
    $ns flush-trace
    close $namfile
    close $tracefile
    set awkCode {
        BEGIN {} {
            if ($1 == "r" && $4 == 1 && $6 > 1500) {
                count = count + $6 - ($6 % 1500);
                print $2, count >> "ex_02.data";
            } } END{}
        }
    exec awk $awkCode ex_02.tr
    exec nam ex_02.nam &
    exec xgraph -bb -tk -x Time -y Bytes ex_02.data -bg white &
    exit 0
}
```

```
$ns at 100.0 "finish"
```

```
$ns run
```

Output:

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4. Write a TCL script to simulate the network described below using ns2:

Consider a small network with five nodes n_0 , n_1 , n_2 , n_3 , n_4 , forming a star topology. The node n_4 is at the center. Node n_0 is a TCP source, which transmits packets to node n_3 (a TCP sink) through the node n_4 . Node n_1 is another traffic source, and sends UDP packets to node n_2 through n_4 . The duration of the simulation time is 10 seconds.

Script:

```
set ns [new Simulator]
set namfile [open ex_01.nam w]
$ns namtrace-all $namfile
```

```
set tracefile [open ex_01.tr w]
$ns trace-all $tracefile
```

```
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
```

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set n3 [\$ns node]

set n4 [\$ns node]

\$ns duplex-link \$n0 \$n4 1Mb 10ms DropTail

\$ns duplex-link \$n1 \$n4 1Mb 10ms DropTail

\$ns duplex-link \$n4 \$n3 1Mb 10ms DropTail

\$ns duplex-link \$n4 \$n2 1Mb 10ms DropTail

set tcp [new Agent/TCP]

\$ns attach-agent \$n0 \$tcp

set sink [new Agent/TCPSink]

\$ns attach-agent \$n3 \$sink

\$ns connect \$tcp \$sink

set ftp [new Application/FTP]

\$ftp attach-agent \$tcp

set udp [new Agent/UDP]

\$ns attach-agent \$n1 \$udp

set null [new Agent/Null]

\$ns attach-agent \$n2 \$null

\$ns connect \$udp \$null

\$udp set class_ 1

\$ns color 1 Blue

\$tcp set class_ 2

\$ns color 2 Red

set cbr [new Application/Traffic/CBR]

\$cbr set packetize_ 500

\$cbr set interval_ 0.005

\$cbr attach-agent \$udp

\$ns at 0.0 "\$cbr start"

\$ns at 0.0 "\$ftp start"

\$ns at 9.0 "\$cbr stop"

\$ns at 9.0 "\$ftp stop"

proc finish {} {

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```
global ns namfile tracefile
$ns flush-trace
close $namfile
close $tracefile
exec nam ex_01.nam &
exit 0
}
```

\$ns at 10.0 "finish"
\$ns run

Output:

