LAB-3: Topologies

Awk script for performance comparison:

```
BEGIN{
   drop=0;
   sum=0;
}
{
   if($1 == "d")
   {
        drop++;
   }
   sum+=$2
}

END{
   print "Avg. packet travel time=" sum/NR
   print "Number of packets dropped=" drop
}
```

Bus topology

Tcl code:

```
set ns [new Simulator]

set ta [open lab3.tr w]
$ns trace-all $ta

set nf [open lab3.nam w]
$ns namtrace-all $nf

$ns color 1 Blue
$ns color 2 Red

proc finish {} {
        global ns nf ta
        $ns flush-trace
        #Close the NAM trace file
        close $ta
        close $nf
        #Execute NAM on the trace file
        exec nam lab3.nam &
        exit 0
}
```

```
#create six 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 lan [$ns newLan "$n0 $n1 $n2 $n3 $n4 $n5" 0.5Mb 60ms LL Queue/DropTail MAC/Csma/Cd
Channel]

#setup TCP1 connection
set tcp1 [new Agent/TCP]
$ns attach-agent $n0 $tcp1

set sink1 [new Agent/TCPSink]
$ns attach-agent $n4 $sink1

$ns connect $tcp1 $sink1
$tcp1 set packet_size_ 552

#set ftp over tcp connection
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1

#setup TCP2 connection
set tcp2 [new Agent/TCP]
$ns attach-agent $n1 $tcp2

set sink2 [new Agent/TCPSink]
$ns attach-agent $n3 $sink2

$ns connect $tcp2 $sink2
$tcp2 set packet_size_ 552

#set ftp over tcp connection
set ftp2 [new Application/FTP]
$ftp2 attach-agent $tcp2
```
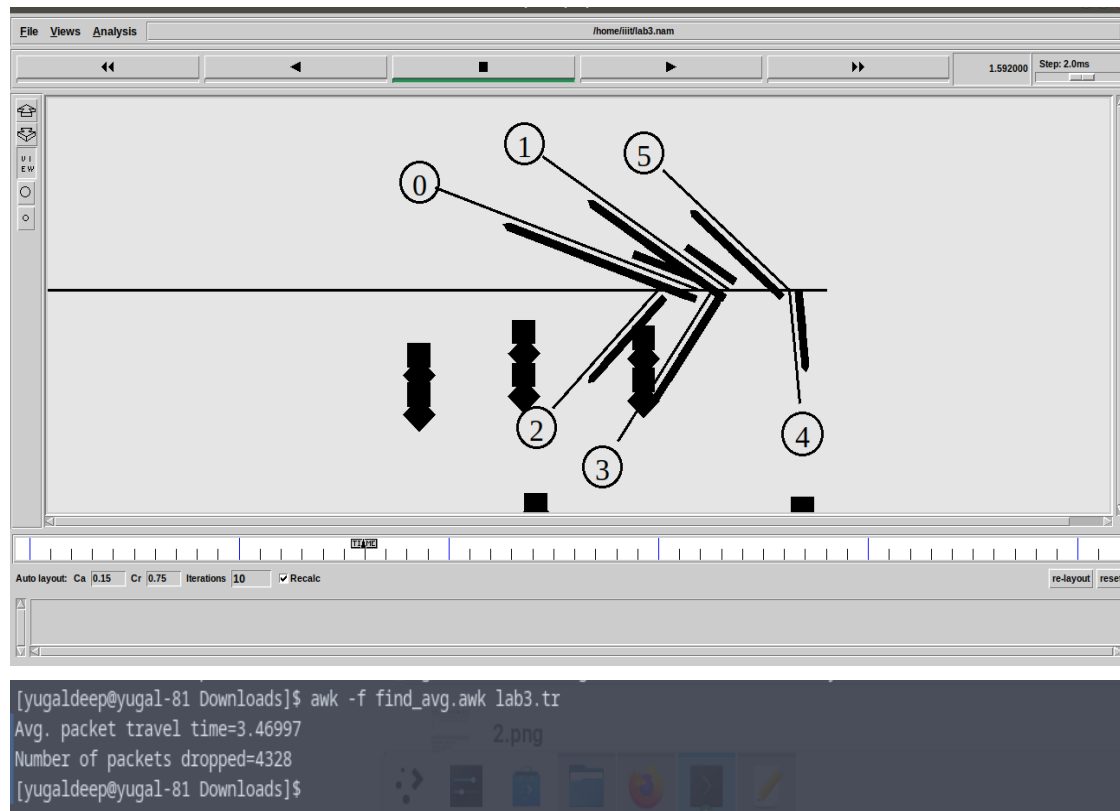
#scheduling the events
$ns at 1.0 "$ftp1 start"
$ns at 1.0 "$ftp2 start"
$ns at 5.0 "$ftp1 stop"
$ns at 5.0 "$ftp2 stop"

$ns at 5.1 "finish"
$ns run

Output:


```
[yugaldeep@yugal-81 Downloads]$ awk -f find_avg.awk lab3.tr
Avg. packet travel time=3.46997
Number of packets dropped=4328
[yugaldeep@yugal-81 Downloads]$
```

Ring Topology

Tcl code:
set ns [new Simulator]

set ta [open lab3_ring.tr w]
$ns trace-all $ta

set nf [open lab3_ring.nam w]
$ns namtrace-all $nf

```
$ns color 1 Blue
$ns color 2 Red

proc finish {} {
        global ns nf ta
        $ns flush-trace
        #Close the NAM trace file
        close $ta
        close $nf
        #Execute NAM on the trace file
        exec nam lab3_ring.nam &
        exit 0
}


#create six 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]

$n0 color green
$n4 color green

$n1 color red
$n5 color red

$ns duplex-link $n0 $n1 0.5Mb 10ms DropTail
$ns duplex-link $n1 $n2 0.5Mb 10ms DropTail
$ns duplex-link $n2 $n3 0.5Mb 10ms DropTail
$ns duplex-link $n3 $n4 0.5Mb 10ms DropTail
$ns duplex-link $n4 $n5 0.5Mb 10ms DropTail
$ns duplex-link $n5 $n0 0.5Mb 10ms DropTail

$ns queue-limit $n0 $n1 2
$ns queue-limit $n1 $n2 2
$ns queue-limit $n2 $n3 2
$ns queue-limit $n3 $n4 2
$ns queue-limit $n4 $n5 2
$ns queue-limit $n5 $n0 2
```

```
#setup TCP1 connection
set tcp1 [new Agent/TCP]
$ns attach-agent $n0 $tcp1

set sink1 [new Agent/TCPSink]
$ns attach-agent $n4 $sink1

$ns connect $tcp1 $sink1
$tcp1 set packet_size_ 552

#set ftp1 over tcp1 connection
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1

#setup TCP2 connection
set tcp2 [new Agent/TCP]
$ns attach-agent $n5 $tcp2

set sink2 [new Agent/TCPSink]
$ns attach-agent $n1 $sink2

$ns connect $tcp2 $sink2
$tcp2 set packet_size_ 552

#set ftp2 over tcp2 connection
set ftp2 [new Application/FTP]
$ftp2 attach-agent $tcp2


#scheduling the events
$ns at 1.0 "$ftp1 start"
$ns at 1.0 "$ftp2 start"
$ns at 5.0 "$ftp1 stop"
$ns at 5.0 "$ftp2 stop"

$ns at 5.1 "finish"
$ns run
```
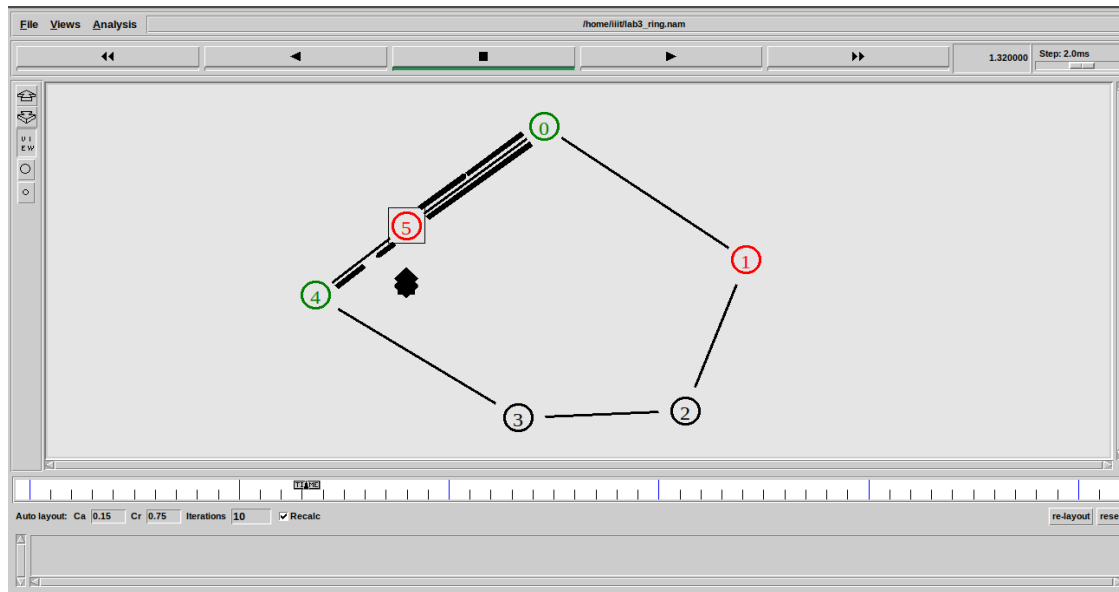
Output:

Star Topology

Tcl code:

```
set ns [new Simulator]

set ta [open lab3_star.tr w]
$ns trace-all $ta

set nf [open lab3_star.nam w]
$ns namtrace-all $nf

$ns color 1 Blue
$ns color 2 Red

proc finish {} {
        global ns nf ta
        $ns flush-trace
        #Close the NAM trace file
        close $ta
        close $nf
        #Execute NAM on the trace file
        exec nam lab3_star.nam &
        exit 0
}
```

```
#create six 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]

$n6 shape box

$n0 color green
$n4 color green

$n1 color red
$n5 color red

$ns duplex-link $n0 $n6 0.5Mb 10ms DropTail
$ns duplex-link $n1 $n6 0.5Mb 10ms DropTail
$ns duplex-link $n2 $n6 0.5Mb 10ms DropTail
$ns duplex-link $n3 $n6 0.5Mb 10ms DropTail
$ns duplex-link $n4 $n6 0.5Mb 10ms DropTail
$ns duplex-link $n5 $n6 0.5Mb 10ms DropTail

$ns queue-limit $n0 $n6 2
$ns queue-limit $n1 $n6 2
$ns queue-limit $n2 $n6 2
$ns queue-limit $n3 $n6 2
$ns queue-limit $n4 $n6 2
$ns queue-limit $n5 $n6 2


#setup TCP1 connection
set tcp1 [new Agent/TCP]
$ns attach-agent $n0 $tcp1

set sink1 [new Agent/TCPSink]
$ns attach-agent $n4 $sink1

$ns connect $tcp1 $sink1
$tcp1 set packet_size_ 552
```

```
#set ftp1 over tcp1 connection
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1

#setup TCP2 connection
set tcp2 [new Agent/TCP]
$ns attach-agent $n5 $tcp2

set sink2 [new Agent/TCPSink]
$ns attach-agent $n1 $sink2

$ns connect $tcp2 $sink2
$tcp2 set packet_size_ 552

#set ftp2 over tcp2 connection
set ftp2 [new Application/FTP]
$ftp2 attach-agent $tcp2


#scheduling the events

$ns at 1.0 "$ftp1 start"
$ns at 1.0 "$ftp2 start"
$ns at 5.0 "$ftp1 stop"
$ns at 5.0 "$ftp2 stop"

$ns at 5.1 "finish"
$ns run
```
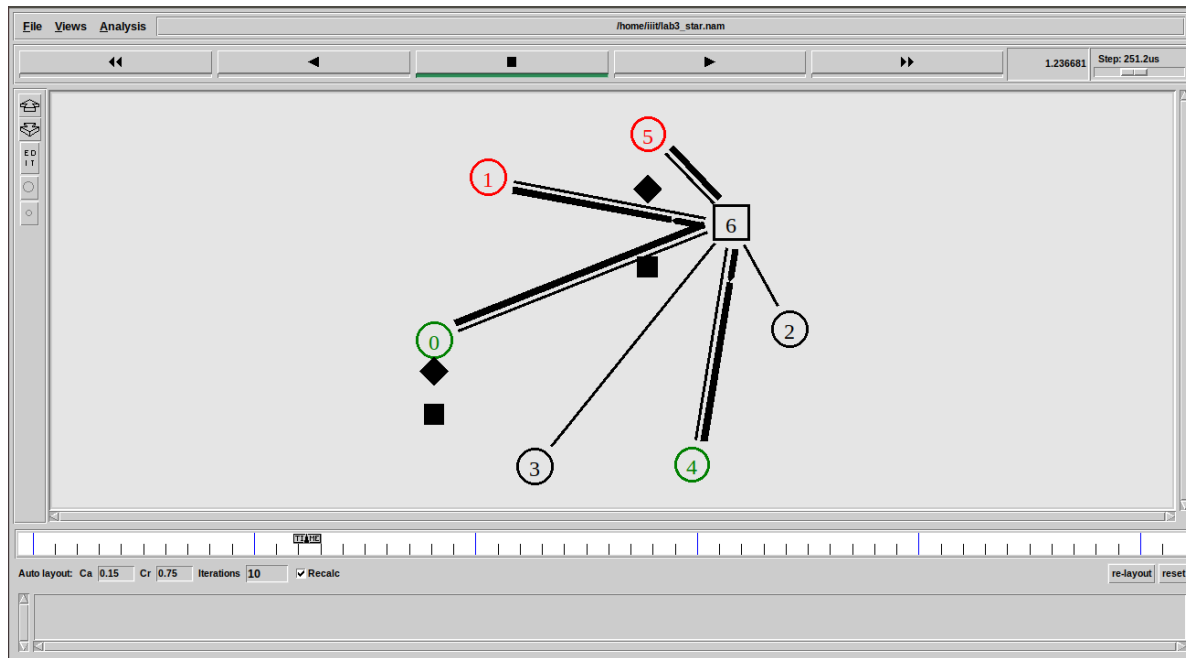
Output:


```
[yugaldeep@yugal-81 Downloads]$ awk -f find_avg.awk lab3_star.tr
Avg. packet travel time=2.92628
Number of packets dropped=24
[yugaldeep@yugal-81 Downloads]$
```