1. STAR

```
set ns [new Simulator]

$ns color 1 Blue
$ns color 2 Red

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
}


set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]


$ns duplex-link $n1 $n0 2Mb 10ms DropTail
$ns duplex-link $n2 $n0 2Mb 10ms DropTail
$ns duplex-link $n3 $n0 2Mb 10ms DropTail
$ns duplex-link $n4 $n0 2Mb 10ms DropTail




$ns duplex-link-op $n1 $n0 orient right-down
$ns duplex-link-op $n2 $n0 orient right-up
$ns duplex-link-op $n3 $n0 orient left-up
$ns duplex-link-op $n4 $n0 orient left-down



set tcp [new Agent/TCP]
$tcp set class_ 2
$ns attach-agent $n2 $tcp
set sink [new Agent/TCPSink]
$ns attach-agent $n4 $sink
$ns connect $tcp $sink
$tcp set fid_ 1


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

```
$ftp set type_ FTP
$ftp set packet_size_ 1000
$ftp set interval_ 0.001s

set tcp1 [new Agent/TCP]
$tcp1 set class_ 3
$ns attach-agent $n1 $tcp1
set sink1 [new Agent/TCPSink]
$ns attach-agent $n3 $sink1
$ns connect $tcp1 $sink1
$tcp1 set fid_ 2


set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1
$ftp1 set type_ FTP
$ftp1 set packet_size_ 1000
$ftp1 set interval_ 0.001s

$ns at 0.01 "$ftp start"
$ns at 15.0 "$ftp stop"
$ns at 0.02 "$ftp1 start"
$ns at 15.0 "$ftp1 stop"


$ns at 16.0 "$ns detach-agent $n2 $tcp ; $ns detach-agent $n4 $sink"
$ns at 16.0 "$ns detach-agent $n1 $tcp1 ; $ns detach-agent $n3 $sink"


$ns at 16.5 "finish"

$ns run
```

2. RING

```
#Create a simulator object
set ns [new Simulator]
#Open the nam trace file
set nf [open out.nam w]
$ns namtrace-all $nf

#Define a 'finish' procedure


#Open the nam trace file
set nf [open out.nam w]
$ns namtrace-all $nf
proc finish {} {
global ns nf

$ns flush-trace

#Execute nam on the trace file
```

```
exec nam out.nam &
exit 0
}

#Create two nodes
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
#Create a duplex link between the nodes
$ns duplex-link $n0 $n1 5Mb 10ms DropTail
$ns duplex-link $n1 $n2 5Mb 10ms DropTail
$ns duplex-link $n2 $n3 5Mb 10ms DropTail
$ns duplex-link $n3 $n4 5Mb 10ms DropTail
$ns duplex-link $n4 $n0 5Mb 10ms DropTail
$ns duplex-link-op $n0 $n1 orient right-down
$ns duplex-link-op $n1 $n2 orient down
$ns duplex-link-op $n2 $n3 orient left
$ns duplex-link-op $n3 $n4 orient up
$ns duplex-link-op $n4 $n0 orient right-up
#Create a TCP agent and attach it to node n2 and node n1
set tcp1 [new Agent/TCP]
$ns attach-agent $n2 $tcp1
$tcp1 set window_ 8
$tcp1 set fid_ 1
$tcp1 set class_ 1
set sink1 [new Agent/TCPSink]
$ns attach-agent $n4 $sink1
$ns connect $tcp1 $sink1
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1
$ftp1  set rate 1000Mb
$ns at 0.01 "$ftp1 start"
$ns at 5 "$ftp1 stop"
#Call the finish procedure after 5 seconds of simulation time
$ns at 5 "finish"
$ns run
```

3. MESH TCP

```
#Create a simulator object
set ns [new Simulator]
#Open the nam trace file
set nf [open out.nam w]
$ns namtrace-all $nf
#Define a 'finish' procedure
proc finish {} {
global ns nf
$ns flush-trace
#Close the trace file
close $nf
```

```
#Executenam on the trace file
exec nam out.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]
#Create links between the nodes
$ns duplex-link $n0 $n1 5Mbps 15ms DropTail
$ns duplex-link $n0 $n2 5Mbps 15ms DropTail
$ns duplex-link $n0 $n3 5Mbps 15ms DropTail
$ns duplex-link $n0 $n4 5Mbps 15ms DropTail
$ns duplex-link $n0 $n5 5Mbps 15ms DropTail
$ns duplex-link $n1 $n2 5Mbps 15ms DropTail
$ns duplex-link $n1 $n3 5Mbps 15ms DropTail
$ns duplex-link $n1 $n4 5Mbps 15ms DropTail
$ns duplex-link $n1 $n5 5Mbps 15ms DropTail
$ns duplex-link $n2 $n3 5Mbps 15ms DropTail
$ns duplex-link $n2 $n4 5Mbps 15ms DropTail
$ns duplex-link $n2 $n5 5Mbps 15ms DropTail
$ns duplex-link $n3 $n4 5Mbps 15ms DropTail
$ns duplex-link $n3 $n5 5Mbps 15ms DropTail
$ns duplex-link $n4 $n5 5Mbps 15ms DropTail

#Create a TCP agent and attach it to node n2 and node n1
set tcp1 [new Agent/TCP/Reno]
$ns attach-agent $n5 $tcp1
$tcp1 set window_ 8
$tcp1 set fid_ 1
$tcp1 set class_ 1
set sink1 [new Agent/TCPSink]
$ns attach-agent $n0 $sink1
$ns connect $tcp1 $sink1
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1
$ftp1 set type_ FTP

set tcp2 [new Agent/TCP/Reno]
$ns attach-agent $n0 $tcp2
$tcp2 set window_ 8
$tcp2 set fid_ 2
$tcp2 set class_ 2
set sink2 [new Agent/TCPSink]
$ns attach-agent $n1 $sink2
$ns connect $tcp2 $sink2
set ftp2 [new Application/FTP]
$ftp2 attach-agent $tcp2
$ftp2 set type_ FTP
```

```
$ns at 0.01 "$ftp1 start"
$ns at 5 "$ftp1 stop"
$ns at 0.01 "$ftp2 start"
$ns at 5 "$ftp2 stop"
#Call the finish procedure after 5 seconds of simulation time
$ns at 5 "finish"
$ns run
```

MESH UDP

```
set ns [new Simulator]

$ns color 1 Blue
$ns color 2 Red

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
}


set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]


$ns duplex-link $n0 $n1 5Mb 15ms DropTail
$ns duplex-link $n0 $n2 5Mb 15ms DropTail
$ns duplex-link $n0 $n3 5Mb 15ms DropTail
$ns duplex-link $n0 $n4 5Mb 15ms DropTail
$ns duplex-link $n0 $n5 5Mb 15ms DropTail
$ns duplex-link $n1 $n2 5Mb 15ms DropTail
$ns duplex-link $n1 $n3 5Mb 15ms DropTail
$ns duplex-link $n1 $n4 5Mb 15ms DropTail
$ns duplex-link $n1 $n5 5Mb 15ms DropTail
$ns duplex-link $n2 $n3 5Mb 15ms DropTail
$ns duplex-link $n2 $n4 5Mb 15ms DropTail
$ns duplex-link $n2 $n5 5Mb 15ms DropTail
$ns duplex-link $n3 $n4 5Mb 15ms DropTail
$ns duplex-link $n3 $n4 5Mb 15ms DropTail
$ns duplex-link $n3 $n5 5Mb 15ms DropTail
$ns duplex-link $n4 $n5 5Mb 15ms DropTail
```

```
$ns duplex-link $n5 $n0 5Mb 15ms DropTail



$ns duplex-link-op $n0 $n1 orient right
$ns duplex-link-op $n1 $n2 orient right-down
$ns duplex-link-op $n2 $n3 orient left-down
$ns duplex-link-op $n3 $n4 orient left
$ns duplex-link-op $n4 $n5 orient left-up
$ns duplex-link-op $n5 $n0 orient right-up



set udp [new Agent/UDP]
$udp set class_ 2
$ns attach-agent $n2 $udp
set null [new Agent/Null]
$ns attach-agent $n4 $null
$ns connect $udp $null
$udp set fid_ 1


set cbr [new Application/Traffic/CBR]
$cbr attach-agent $udp
$cbr set type_ CBR
$cbr set packet_size_ 1000

set udp1 [new Agent/UDP]
$udp1 set class_ 3
$ns attach-agent $n1 $udp1
set null1 [new Agent/Null]
$ns attach-agent $n5 $null1
$ns connect $udp1 $null1
$udp1 set fid_ 2

set cbr1 [new Application/Traffic/CBR]
$cbr1 attach-agent $udp1
$cbr1 set type_ CBR
$cbr1 set packet_size_ 1000

$ns at 0.01 "$cbr start"
$ns at 5.0 "$cbr stop"
$ns at 0.01 "$cbr1 start"
$ns at 5.0 "$cbr1 stop"


$ns at 6.0 "finish"

$ns run
```

4. BUS

```
#Create a simulator object
set ns [new Simulator]
$ns color 1 Green

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

proc finish {} {
 global ns tracefile namfile
 $ns flush-trace
 close $tracefile
 close $namfile
 exec nam out.nam &
 exit 0
}
#Create two nodes
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]

#Create a duplex link between the nodes
$ns duplex-link $n0 $n1 100Mb 10ms DropTail
$ns queue-limit $n0 $n1 50

$ns duplex-link-op $n0 $n1 orient right

set lan [ $ns newLan "$n1 $n2 $n3 $n4 $n5" 12Mb 10ms LL Queue/DropTail MAC/-802_3 channel
]

#Create a TCP agent and attach it to node n2 and node n1
set tcp1 [new Agent/TCP]
$ns attach-agent $n2 $tcp1
set sink1 [new Agent/TCPSink]
$ns attach-agent $n3 $sink1
$ns connect $tcp1 $sink1
$tcp1 set fid_ 1
$tcp1 set packetSize_ 500
$tcp1 set interval_ 0.01s

set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1
$ftp1 set type_ FTP
$ns at 0.01 "$ftp1 start"
$ns at 5.0 "$ftp1 stop"
#Call the finish procedure after 5 seconds of simulation time
```

```
$ns at 5 "finish"
$ns run
```

5. NAM

```
set ns [new Simulator]


$ns color 1 Blue
$ns color 2 Red

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
}

set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]
set n6 [$ns node]


$ns duplex-link $n1 $n3 2Mb 10ms DropTail
$ns duplex-link $n2 $n3 2Mb 10ms DropTail
$ns duplex-link $n4 $n3 2Mb 10ms DropTail
$ns duplex-link $n6 $n3 2Mb 10ms DropTail

$ns duplex-link $n5 $n4 10Mb 5ms DropTail
$ns duplex-link $n6 $n5 2Mb 10ms DropTail

$ns duplex-link $n1 $n6 2Mb 10ms DropTail
$ns duplex-link $n2 $n4 5Mb 15ms DropTail
$ns duplex-link $n1 $n2 5Mb 15ms DropTail



$ns duplex-link-op $n3 $n1 orient left-down
$ns duplex-link-op $n3 $n2 orient right-down
$ns duplex-link-op $n3 $n4 orient right-up
$ns duplex-link-op $n3 $n6 orient left-up

$ns duplex-link-op $n4 $n5 orient left-up
$ns duplex-link-op $n6 $n5 orient right-up
```

```
$ns duplex-link-op $n6 $n1 orient down
$ns duplex-link-op $n4 $n2 orient down
$ns duplex-link-op $n1 $n2 orient right


set tcp [new Agent/TCP]
$tcp set class_ 2
$ns attach-agent $n2 $tcp
set sink [new Agent/TCPSink]
$ns attach-agent $n5 $sink
$ns connect $tcp $sink
$tcp set fid_ 1


set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ftp set type_ FTP
$ftp set packet_size_ 1000
$ftp set rate_ 100


set tcp1 [new Agent/TCP]
$tcp1 set class_ 3
$ns attach-agent $n1 $tcp1
set sink1 [new Agent/TCPSink]
$ns attach-agent $n4 $sink1
$ns connect $tcp1 $sink1
$tcp1 set fid_ 2


set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1
$ftp1 set type_ FTP
$ftp1 set packet_size_ 1000
$ftp1 set rate_ 100


$ns at 0.01 "$ftp start"
$ns at 7.0 "$ftp stop"
$ns at 8.0 "$ftp1 start"
$ns at 15.0 "$ftp1 stop"


$ns at 7.5 "$ns detach-agent $n2 $tcp ; $ns detach-agent $n5 $sink"
$ns at 16.0 "$ns detach-agent $n1 $tcp1 ; $ns detach-agent $n4 $sink"

$ns at 16.5 "finish"


$ns run
```

6. TCP UDP

```
set ns [new Simulator]

$ns color 1 Blue
$ns color 2 Red

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
}




set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]

$ns duplex-link $n0 $n1 2Mb 10ms DropTail
$ns duplex-link $n0 $n2 2Mb 10ms DropTail
$ns duplex-link $n0 $n3 2Mb 10ms DropTail
$ns duplex-link $n1 $n3 2Mb 10ms DropTail
$ns duplex-link $n3 $n4 2Mb 10ms DropTail
$ns duplex-link $n2 $n4 2Mb 10ms DropTail
$ns duplex-link $n4 $n5 2Mb 10ms DropTail
$ns duplex-link $n3 $n5 2Mb 10ms DropTail


$ns duplex-link-op $n0 $n1 orient right-up
$ns duplex-link-op $n0 $n3 orient right-up
$ns duplex-link-op $n0 $n2 orient right-down
$ns duplex-link-op $n1 $n3 orient right
$ns duplex-link-op $n3 $n4 orient down
$ns duplex-link-op $n2 $n4 orient right
$ns duplex-link-op $n4 $n5 orient right-up
$ns duplex-link-op $n3 $n5 orient right-down


set tcp [new Agent/TCP]
$tcp set class_ 2
$ns attach-agent $n1 $tcp
set sink [new Agent/TCPSink]
$ns attach-agent $n4 $sink
```

```
$ns connect $tcp $sink
$tcp set fid_ 1

set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ftp set type_ FTP
$ftp set packet_size_ 1000
$ftp set interval_ 0.001s

set udp [new Agent/UDP]
$udp set class_ 3
$ns attach-agent $n0 $udp
set null [new Agent/Null]
$ns attach-agent $n5 $null
$ns connect $udp $null
$udp set fid_ 2


set cbr [new Application/Traffic/CBR]
$cbr attach-agent $udp
$cbr set type_ CBR
$cbr set packet_size_ 1000
$cbr set interval_ 0.001s

$ns at 0.01 "$ftp start"
$ns at 5.0 "$ftp stop"
$ns at 0.01 "$cbr start"
$ns at 5.0 "$cbr stop"


#$ns at 16.0 "$ns detach-agent $n1 $tcp ; $ns detach-agent $n4 $sink"
#$ns at 16.0 "$ns detach-agent $n0 $udp ; $ns detach-agent $n5 $null"


$ns at 5 "finish"

$ns run
```