COMPUTER NETWORK PROJECT

BATCH: B2

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PROJECT NAME:

STAR AND TREE TOPOLOGIES IMPLEMENTATION

OVERVIEW

What is a Topology?

The physical topology of a network refers to the configuration of cables, computers, and other peripherals. Physical topology should not be confused with logical topology which is the method used to pass information between workstations.

Star

A star topology is designed with each node (file server, workstations, and peripherals) connected directly to a central network hub, switch, or concentrator (See fig. 2).

Data on a star network passes through the hub, switch, or concentrator before continuing to its destination. The hub, switch, or concentrator manages and controls all functions of the network. It also acts as a repeater for the data flow. This configuration is common with twisted pair cable; however, it can also be used with coaxial cable or fiber optic cable.

Advantages of a Star Topology

- *Easy to install and wire.*
- *No disruptions to the network when connecting or removing devices.*
- *Easy to detect faults and to remove parts.*

Disadvantages of a Star Topology

- *Requires more cable length than a linear topology.*
- *If the hub, switch, or concentrator fails, nodes attached are disabled.*
- *More expensive than linear bus topologies because of the cost of the hubs, etc.*

Tree or Expanded Star

A tree topology combines characteristics of linear bus and star topologies. It consists of groups of star-configured workstations connected to a linear bus backbone cable (See fig. 3). Tree topologies allow for the expansion of an existing network, and enable schools to configure a network to meet their needs.

Advantages of a Tree Topology

- *Point-to-point wiring for individual segments.*
- *Supported by several hardware and software venders.*

Disadvantages of a Tree Topology

- *Overall length of each segment is limited by the type of cabling used.*
- *If the backbone line breaks, the entire segment goes down.*
- *More difficult to configure and wire than other topologies.*

CODE

Star

```
set ns [new Simulator]
set nt [open out.tr w]
$ns trace-all $nt
set nf [open out.nam w]
$ns namtrace-all $nf


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



$ns duplex-link $n0 $n1 1Mb 2ms DropTail
$ns duplex-link-op $n0 $n1 orient up

$ns duplex-link $n0 $n2 1Mb 2ms DropTail
$ns duplex-link-op $n0 $n2 orient down

$ns duplex-link $n0 $n3 1Mb 2ms DropTail
```

```
$ns duplex-link-op $n0 $n3 orient left

$ns duplex-link $n0 $n4 1Mb 2ms DropTail
$ns duplex-link-op $n0 $n4 orient right



##UDP
set udp [new Agent/UDP]
$ns attach-agent $n0 $udp

set null [new Agent/Null]
$ns attach-agent $n1 $null

$ns connect $udp $null
$udp set fid_ 0
$ns color 0 blue

##UDP1
set udp1 [new Agent/UDP]
$ns attach-agent $n0 $udp1

set null [new Agent/Null]
$ns attach-agent $n3 $null
```

```
$ns connect $udp1 $null
$udp1 set fid_ 0
$ns color 0 blue

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

set sink [new Agent/TCPSink]
$ns attach-agent $n2 $sink

$ns connect $tcp $sink
$tcp set fid_ 1
$ns color 1 red



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

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

$ns connect $tcp1 $sink
```

```
$tcp1 set fid_ 1

$ns color 1 red


##UDP

set cbr [new Application/Traffic/CBR]

$cbr attach-agent $udp


set cbr1 [new Application/Traffic/CBR]

$cbr1 attach-agent $udp1


##TCP

set ftp [new Application/FTP]

$ftp attach-agent $tcp


set ftp1 [new Application/FTP]

$ftp1 attach-agent $tcp1



$ns at 1.0 "$cbr start"

$ns at 1.1 "$cbr1 start"

$ns at 1.0 "$ftp start"

$ns at 1.1 "$ftp1 start"

$ns at 6.0 "$ftp stop"

$ns at 6.0 "$ftp1 stop"
```

```
$ns at 6.0 "$cbr1 stop"

$ns at 6.0 "$cbr stop"

$ns at 7.0 "finish"


proc finish { } {

        global ns nf nt

        $ns flush-trace

        close $nf

        close $nt

        exec nam out.nam &

        exit 0

}


$ns run
```

Tree

```
set ns [new Simulator]

set nt [open out.tr w]

$ns trace-all $nt

set nf [open out.nam w]

$ns namtrace-all $nf




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]

$ns duplex-link $n0 $n1 1Mb 2ms DropTail
$ns duplex-link-op $n0 $n1 orient left-down

$ns duplex-link $n0 $n2 1Mb 2ms DropTail
$ns duplex-link-op $n0 $n2 orient right-down

$ns duplex-link $n1 $n3 1Mb 2ms DropTail
$ns duplex-link-op $n1 $n3 orient left-down

$ns duplex-link $n1 $n4 1Mb 2ms DropTail
$ns duplex-link-op $n1 $n4 orient right-down

$ns duplex-link $n2 $n5 1Mb 2ms DropTail
$ns duplex-link-op $n2 $n5 orient left-down

$ns duplex-link $n2 $n6 1Mb 2ms DropTail
$ns duplex-link-op $n2 $n6 orient right-down
```

```
##UDP
set udp [new Agent/UDP]
$ns attach-agent $n0 $udp

set null [new Agent/Null]
$ns attach-agent $n1 $null

$ns connect $udp $null
$udp set fid_ 0
$ns color 0 blue

##UDP1
set udp1 [new Agent/UDP]
$ns attach-agent $n1 $udp1

set null [new Agent/Null]
$ns attach-agent $n3 $null

$ns connect $udp1 $null
$udp1 set fid_ 0
$ns color 0 blue

##UDP2
```

```
set udp2 [new Agent/UDP]
$ns attach-agent $n1 $udp2

set null [new Agent/Null]
$ns attach-agent $n4 $null

$ns connect $udp2 $null
$udp2 set fid_ 0
$ns color 0 blue

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

set sink [new Agent/TCPSink]
$ns attach-agent $n2 $sink

$ns connect $tcp $sink
$tcp set fid_ 1
$ns color 1 red


##TCP1
set tcp1 [new Agent/TCP]
```

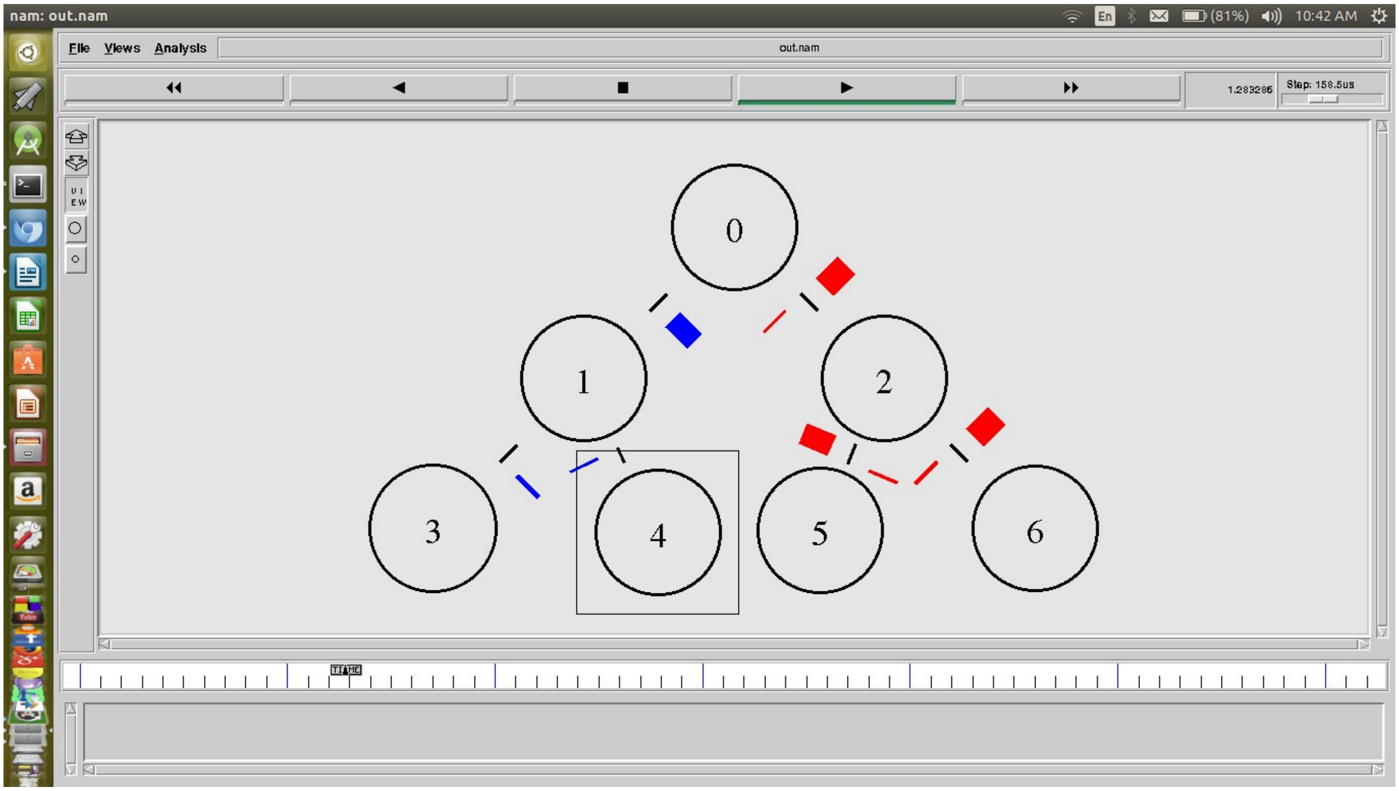
```
$ns attach-agent $n2 $tcp1

set sink [new Agent/TCPSink]
$ns attach-agent $n5 $sink

$ns connect $tcp1 $sink
$tcp1 set fid_ 1
$ns color 1 red

##TCP2
set tcp2 [new Agent/TCP]
$ns attach-agent $n2 $tcp2

set sink [new Agent/TCPSink]
$ns attach-agent $n6 $sink

$ns connect $tcp2 $sink
$tcp2 set fid_ 1
$ns color 1 red

##UDP
set cbr [new Application/Traffic/CBR]
$cbr attach-agent $udp
```

```
set cbr1 [new Application/Traffic/CBR]

$cbr1 attach-agent $udp1


set cbr2 [new Application/Traffic/CBR]

$cbr2 attach-agent $udp2


##TCP

set ftp [new Application/FTP]

$ftp attach-agent $tcp


set ftp1 [new Application/FTP]

$ftp1 attach-agent $tcp1


set ftp2 [new Application/FTP]

$ftp2 attach-agent $tcp2


$ns at 1.0 "$cbr start"

$ns at 1.1 "$cbr1 start"

$ns at 1.1 "$cbr2 start"

$ns at 1.0 "$ftp start"

$ns at 1.1 "$ftp1 start"

$ns at 1.1 "$ftp2 start"

$ns at 6.0 "$ftp stop"

$ns at 6.0 "$ftp1 stop"
```

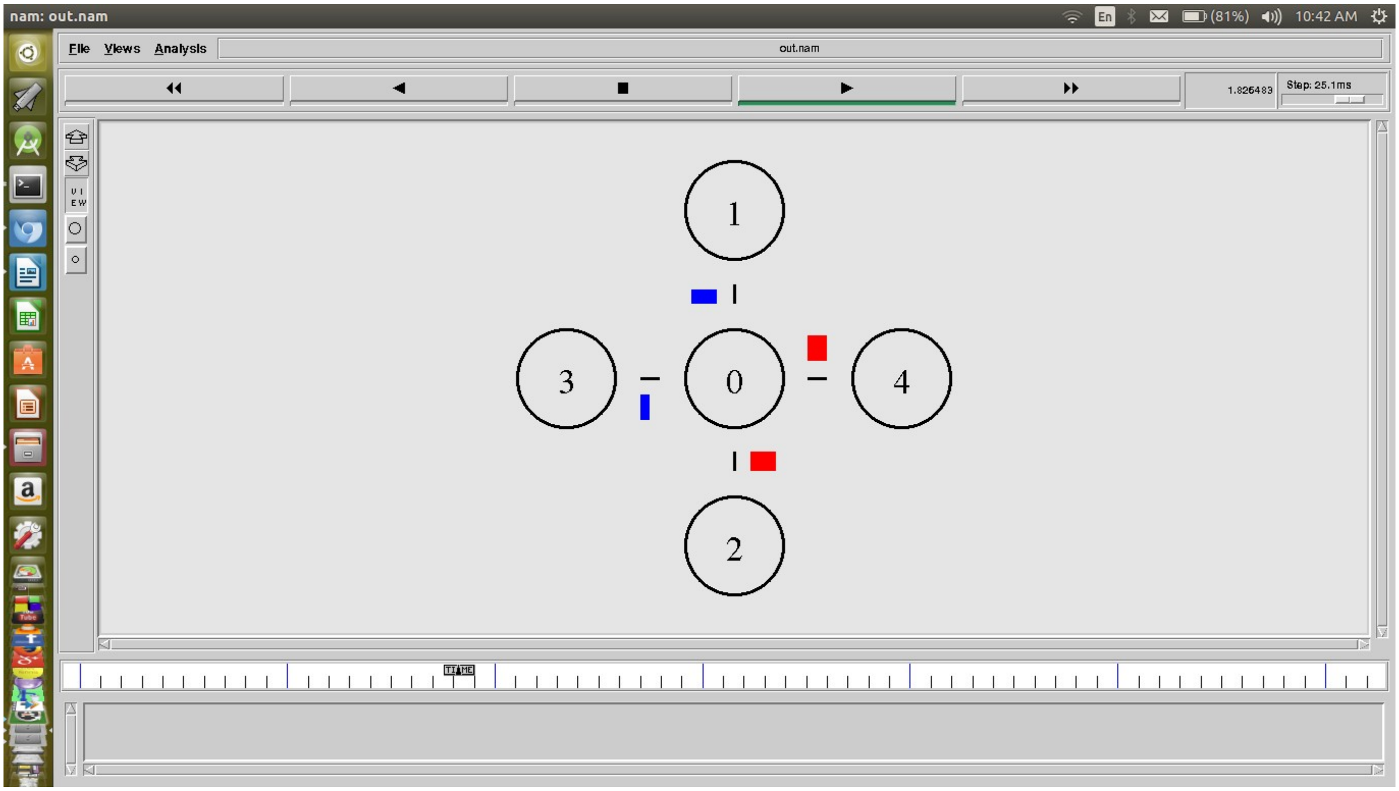
```
$ns at 6.0 "$ftp2 stop"
$ns at 6.0 "$cbr1 stop"
$ns at 6.0 "$cbr2 stop"
$ns at 6.0 "$cbr stop"
$ns at 7.0 "finish"

proc finish { } {
        global ns nf nt
        $ns flush-trace
        close $nf
        close $nt
        exec nam out.nam &
        exit 0
}

$ns run
```

OUTPUT

Tree



Star


nam: out.nam
(81%)
10:42 AM
File
Views
Analysis
out.nam
1.826483
Step: 25.1ms
1
3
0
4
2
TIME