SIMULATION OF DISTANCE VECTOR ROUTING PROTOCOL

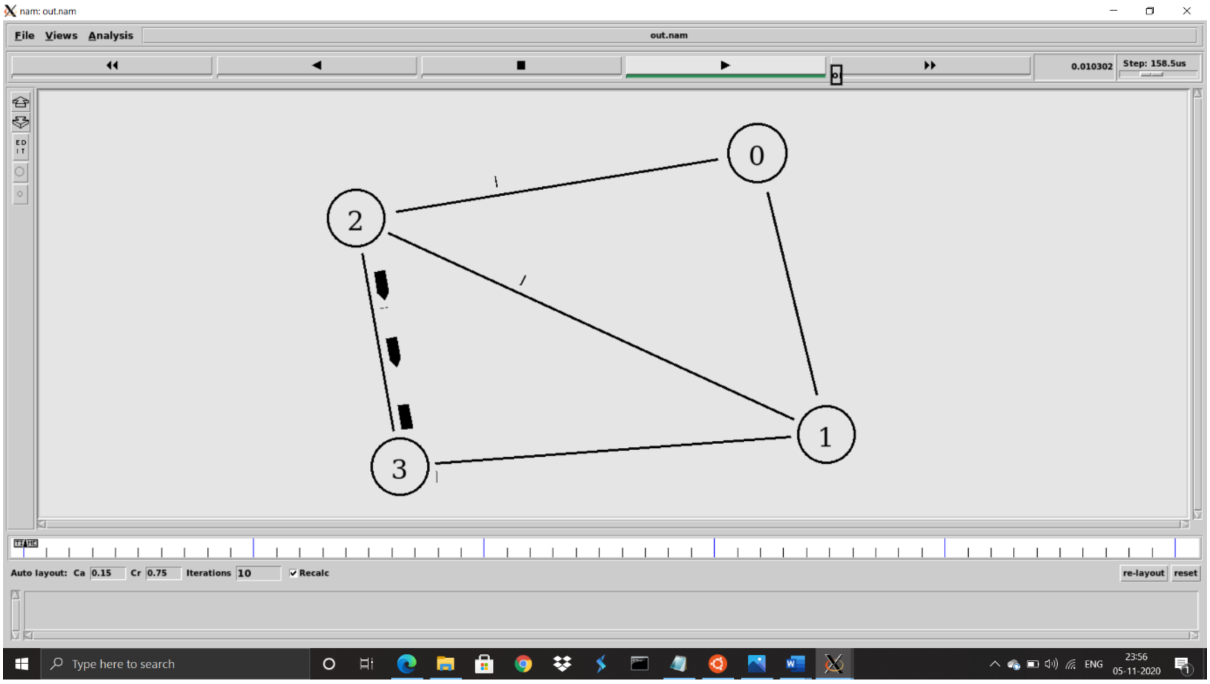
- A distance-vector routing protocol in data networks determines the best route for data packets based on distance.
- Distance-vector routing protocols measure the distance by the number of routers a packet has to pass, one router counts as one hop.
- The router sends its knowledge about the network to only those routers which have direct links.
- The information is received by the router and uses the information to update its own routing table.
- Each router receives and saves the most recently received distance vector from each of its neighbours. A router recalculates its distance vector when:
    - It receives a distance vector from a neighbour containing different information than before.
    - It discovers that a link to a neighbour has gone down

```
set ns [new Simulator]

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

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

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

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

        $ns duplex-link $n0 $n1 1Mb 10ms DropTail
        $ns duplex-link $n1 $n3 1Mb 10ms DropTail
        $ns duplex-link $n2 $n1 1Mb 10ms DropTail
        $ns duplex-link $n2 $n0 1Mb 10ms DropTail
        $ns duplex-link $n2 $n3 1Mb 10ms DropTail

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

```
set tcp [new Agent/TCP]
$ns attach-agent $n1 $tcp

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

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

set udp [new Agent/UDP]
$ns attach-agent $n2 $udp

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

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

$ns connect $tcp $sink
$ns connect $udp $null

$ns rtmodel-at 1.0 down $n2 $n3
$ns rtmodel-at 2.0 up $n2 $n3

$ns rtproto DV

$ns at 0.0 "$ftp start"
$ns at 0.0 "$cbr start"

$ns at 5.0 "finish"
$ns run
```

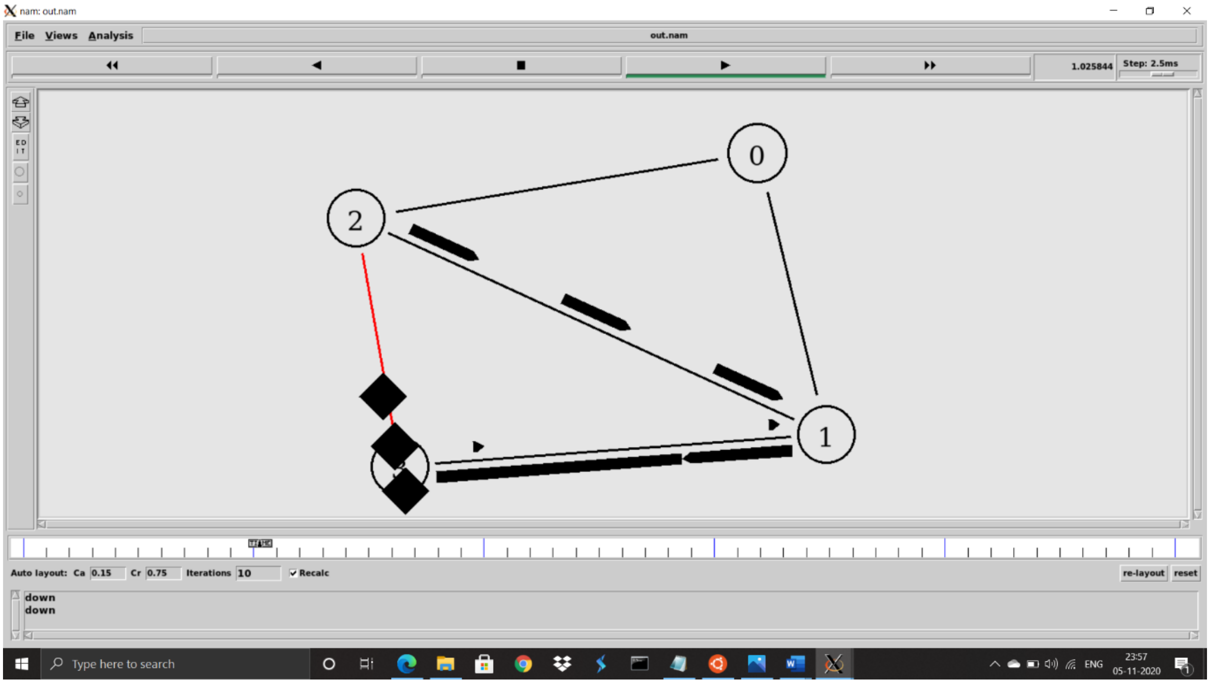
- Bandwidth 1Mbps
- Delay 10ms
- Queue DropTail
- Source node – n2
- Destination node -n3

1. Initially Packets are being forwarded from node n2 to n3



Auto layout: Ca 0.15 Cr 0.75 Iterations 10 ☑ Recalc

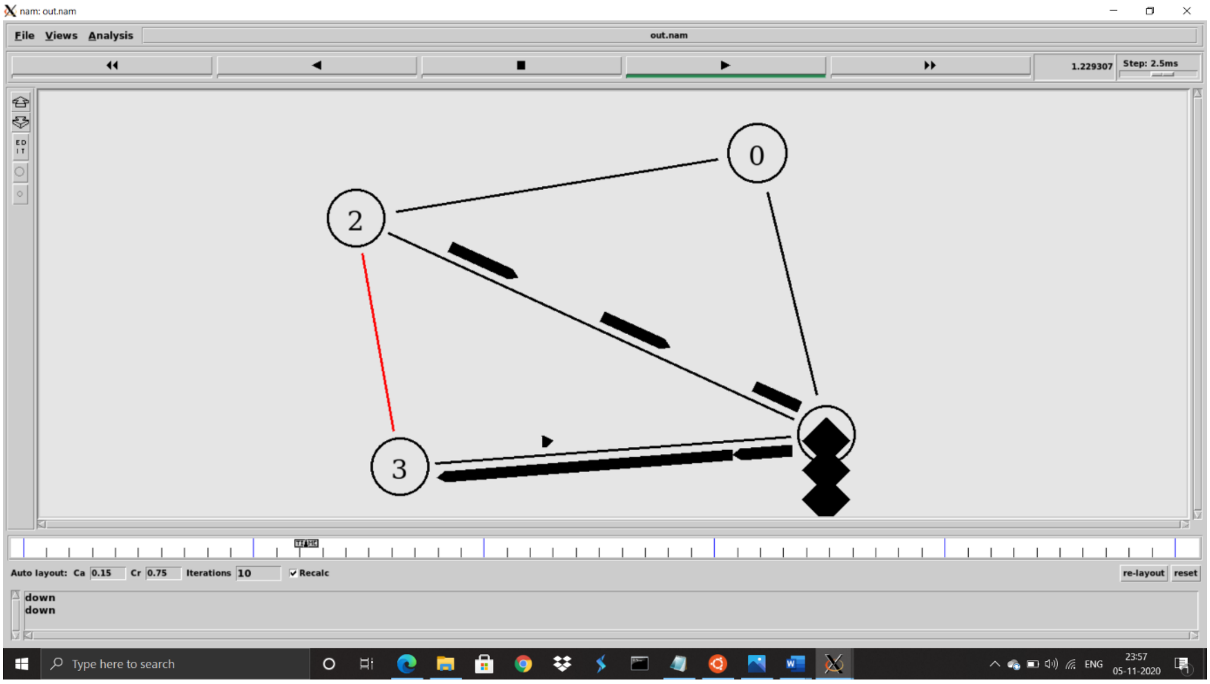
2. At time t=1 the link between nodes n2 and n3 goes down.



Auto layout: Ca 0.15 Cr 0.75 Iterations 10 ☑ Recalc

```
down
down
```

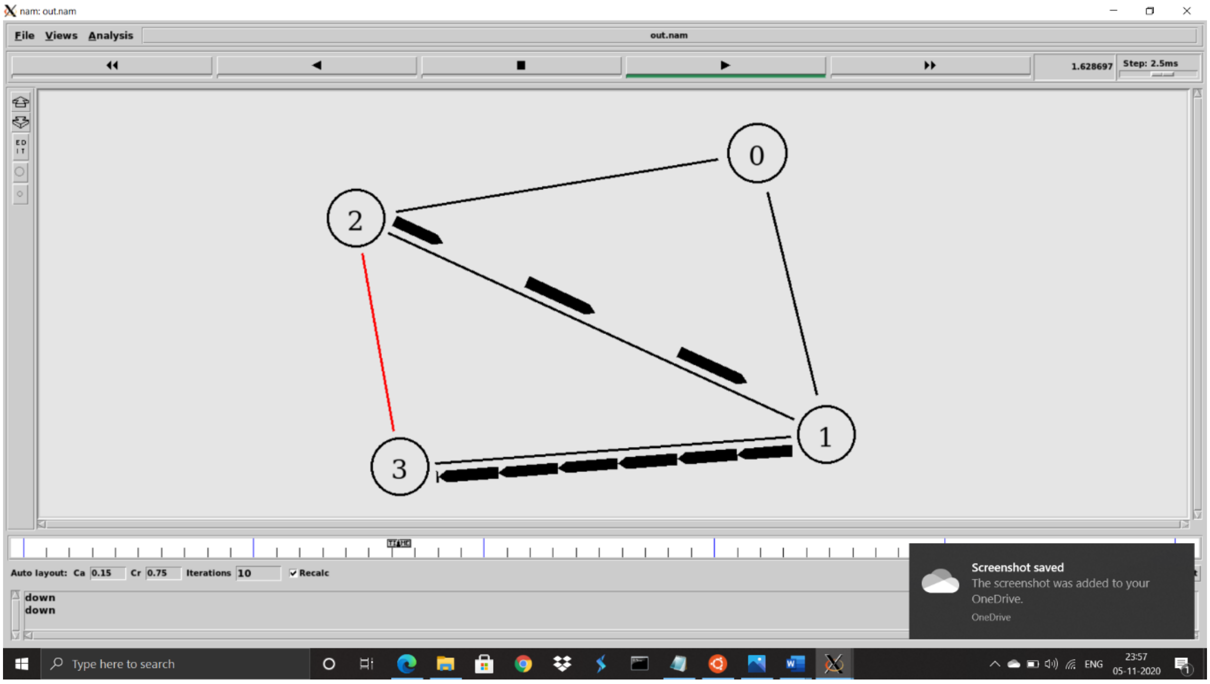
3. This has resulted in loss of packets.



Auto layout: Ca 0.15 Cr 0.75 Iterations 10 ☑ Recalc

```
down
down
```

4. Distance Vector Routing Protocol therefore finds an alternate route from node n2 to n3 via node n1 (n2->>n1->>n3)

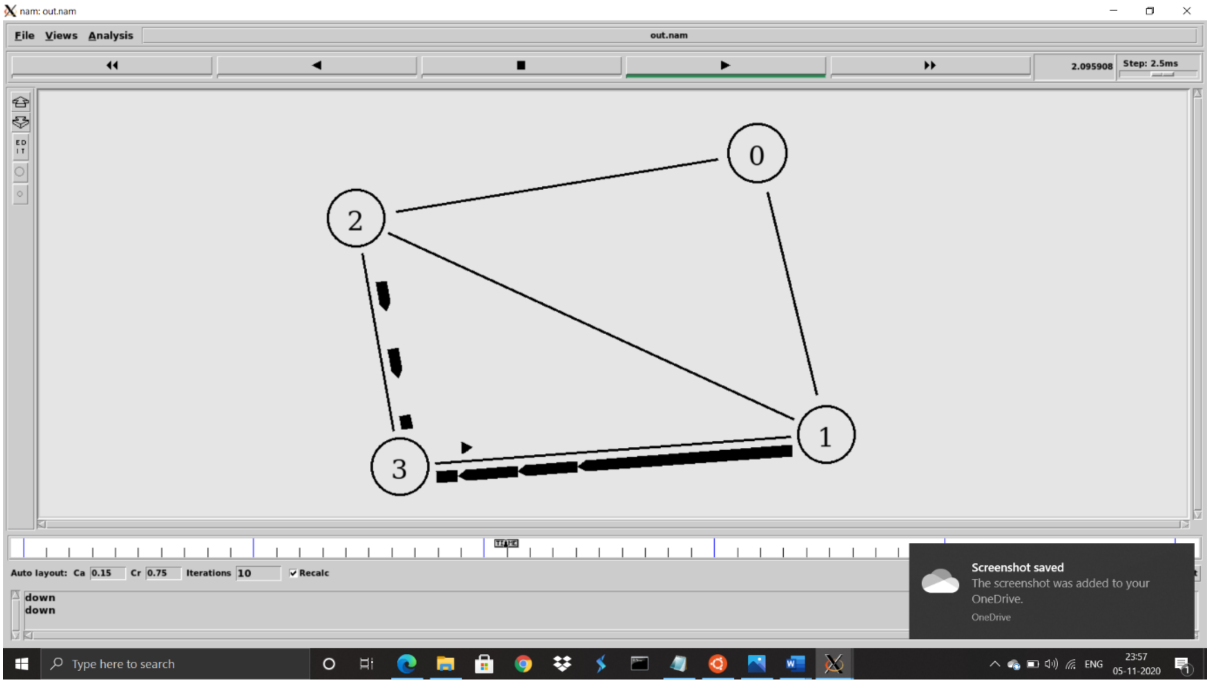


Auto layout: Ca 0.15 Cr 0.75 Iterations 10 ☑ Recalc

```
down
down
```

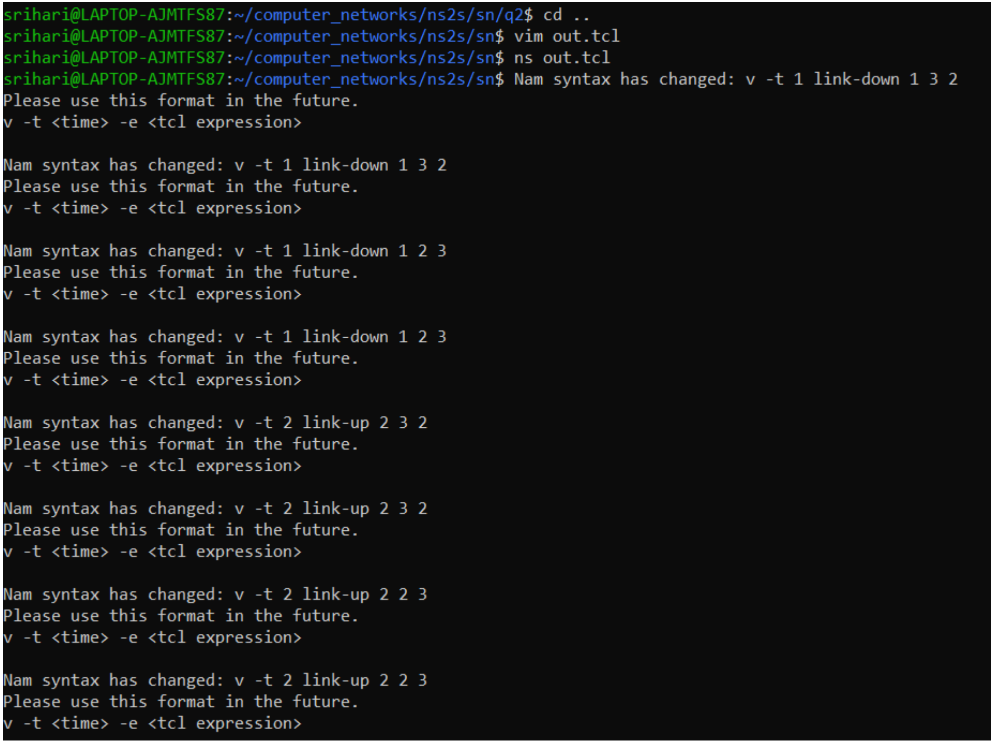
Screenshot saved
The screenshot was added to your OneDrive.
OneDrive

5. At time t=2 the link between n2 and n3 comes up, hence it takes the original route n2->>n3. Point to Note: tcp packets are sent from node n1 to n3 which results in n3 sending ack back to n1.



Screenshot saved
The screenshot was added to your OneDrive.
OneDrive

6. Terminal Output



```
srihari@LAPTOP-AJMTFS87:~/computer_networks/ns2s/sn/q2$ cd ..
srihari@LAPTOP-AJMTFS87:~/computer_networks/ns2s/sn$ vim out.tcl
srihari@LAPTOP-AJMTFS87:~/computer_networks/ns2s/sn$ ns out.tcl
srihari@LAPTOP-AJMTFS87:~/computer_networks/ns2s/sn$ Nam syntax has changed: v -t 1 link-down 1 3 2
Please use this format in the future.
v -t <time> -e <tcl expression>

Nam syntax has changed: v -t 1 link-down 1 3 2
Please use this format in the future.
v -t <time> -e <tcl expression>

Nam syntax has changed: v -t 1 link-down 1 2 3
Please use this format in the future.
v -t <time> -e <tcl expression>

Nam syntax has changed: v -t 1 link-down 1 2 3
Please use this format in the future.
v -t <time> -e <tcl expression>

Nam syntax has changed: v -t 2 link-up 2 3 2
Please use this format in the future.
v -t <time> -e <tcl expression>

Nam syntax has changed: v -t 2 link-up 2 3 2
Please use this format in the future.
v -t <time> -e <tcl expression>

Nam syntax has changed: v -t 2 link-up 2 2 3
Please use this format in the future.
v -t <time> -e <tcl expression>

Nam syntax has changed: v -t 2 link-up 2 2 3
Please use this format in the future.
v -t <time> -e <tcl expression>
```