EX.No 8. Simulation of Distance Vector/Link State Routing.

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a) Distance Vector routing protocol ROUTING

Aim:

To simulate and study the link state routing algorithm using simulation using NS2.

Distance Vector routing protocol

Routing is the process of selecting best paths in a network. In the past, the term routing was also used to mean forwarding network traffic among networks. However this latter function is muchbetter described as simply forwarding. Routing is performed for many kinds of networks, including the telephone network (circuit switching), electronic data networks (such as the Internet), and transportation networks. This article is concerned primarily with routing in electronic data networks using packet switching technology .In packet switching networks, routing directs packet forwarding (the transit of logically addressed network packets from their source toward their ultimate destination) through intermediate nodes. Intermediate nodes are typically network hardware devices such as routers, bridges, gateways, firewalls, or switches. General-purpose computers can also forward packets and perform routing, though they are not specialized hardware and may suffer from limited performance. The routing process usually directs forwarding on the basis of routing tables which maintain a record of the routes to various network destinations. Thus, constructing routing tables, which are held in the router's memory, is very important for efficient routing. Most routing algorithms use only one network path at a time. Multipath routing techniques enable the use of multiple alternative paths. In case of overlapping/equal routes, the following elements are considered in order to decide which routes get installed into the routing table (sorted by priority):

1. Prefix-Length: where longer subnet masks are preferred (independent of whether it is within a routing

protocol or over different routing protocol)

2. Metric: where a lower metric/cost is preferred (only valid within one and the same routing protocol)

3. Administrative distance: where a lower distance is preferred (only valid between different routing protocols) Routing, in a more narrow sense of the term, is often contrasted with bridging in its assumption that network addresses are structured and that similar addresses imply proximity within the network. Structured addresses allow a single routing table entry to represent the route to a group of devices. In large networks,

structured addressing (routing, in the narrow sense) outperforms unstructured addressing (bridging). Routing has become the dominant form of addressing on the Internet. Bridging is still widely used within localized environments.

Algorithm

There are several variants of flooding algorithm. Most work roughly as follows:

1. Each node acts as both a transmitter and a receiver.

2. Each node tries to forward every message to every one of its neighbours except the source node. This results in every message eventually being delivered to all reachable parts of the network. Algorithms may need to be more complex than this, since, in some case, precautions have to be taken to avoid wasted duplicate deliveries and infinite loops, and to allow messages to eventually expire from the system. A variant of flooding called selective flooding partially addresses these issues by only sending packets to routers in the same direction. In selective flooding the routers don't send every incoming packet on every line but only on those lines which are going approximately in the right direction.

Program:

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

set tcp [new Agent/TCP]
$ns attach-agent $n0 $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 $n1 $n3
$ns rtmodel-at 2.0 up $n1 $n3

$ns rtproto DV

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

$ns at 5.0 "finish"

$ns run
```

Result:

Thus the Distance Vector Routing Algorithm was Simulated and studied