Assignment - B2

Problem statement :-

Use network simulator ns-2 to implement

(a) monitoring traffic for given topology.

(b) Analysis of csmA & ethernet protocols.

(c) Network Routing - shortest path routing.

(d) Analysis of congestion control (TCP, UDP).

Theory :-

- **Network Traffic monitoring :-**

Network traffic monitoring is the process of reviewing, analyzing & managing network traffic for any abnormally or process that can affect network performance, availability & security. It is a network management process that was various tools & techniques to study computer network based communication data.

- Carrier-sense multiple Access (csmA) :-

It is media Access control (mac) protocol in which a node verifies the absence of traffic before transmitting

on a shared transmitting medium such as electrical or a band of magnetic spectrum.

- A transmitter attempts to determine whether another transmission is in progress before iniating a transmission.

- Using CSMA, multiple nodes may in turn send & recieve on some medium.

- CSMA / CD -

- It is modification of pure CSMA.
- Used to improve CSMA performance by terminating transmission as soon as collision is detected ; thus shortening the time required before a retry can be attempted.

- It is the LAN access method used in ethernet.

- Network Routing.

Routing is the process of selecting a path for traffic in a network or between or across multiple networks.

AODV Routing Protocol :-

- AODV (Ad-hoc on demand Distance Vector) is loop free routing protocol for ad-hoc networks.
- At each node, AODV, maintains a routing table.
  The routing table entry for a designation contains three essential fields.
  - a next hop node
  - a sequence no.
  - a hop count.

- Congestion in computer Network -
    A state occurring in network layer when message traffic is so heavy that it slows down network response time.

Effects of congestion :-

- As delay increases, performance decreases
- If delay increases, retransmission occurs, making situation worse.
- Congestion control is network layer issue.

Network Simulator :-

A network simulator is a software that predicts the behaviour of computer network.

TCL :-
- It is tool command language.
- It is powerful scripting language with programming language.

Conclusion :-

We have learnt the concepts of monitoring network traffic, CSMA protocol, network routing, AODV routing protocol & demonstrated using NS-2 (Network Simulator).

```
set ns [new Simulator]

$ns color 1 Blue
$ns color 2 Red

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

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

proc finish {} {

    global ns nf nt
    $ns flush-trace

    close $nf
    close $nt

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

$ns duplex-link $n3 $n2 1Mb 10ms DropTail
$ns duplex-link $n3 $n4 1Mb 10ms DropTail

$ns queue-limit $n3 $n2 10
$ns queue-limit $n3 $n4 10

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

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

$ns duplex-link-op $n3 $n2 queuePos 0.5
$ns duplex-link-op $n3 $n4 queuePos 0.5

set tcp [new Agent/TCP]
$tcp set class_ 2
$ns attach-agent $n0 $tcp
set sink [new Agent/TCPSink]
$ns attach-agent $n2 $sink
```

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

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

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

set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1
$ftp1 set type_ FTP


$ns at 0.1 "$ftp start"
$ns at 2 "$ftp stop"
$ns at 0.2 "$ftp1 start"
$ns at 2 "$ftp1 stop"
$ns at 2.1 "finish"

$ns run
```

```
File  Edit  View  Search  Terminal  Help

rajat@minekarrajat619:~/Desktop/ass10-ns2-star$ ls
out.nam  out.tr  packet_delivery_ratio.awk  star.tcl  throughput.awk
rajat@minekarrajat619:~/Desktop/ass10-ns2-star$ awk -f throughput.awk out.tr
Number of records is 4620
Output:
   - Total transmitted bits = 6634240 bits
   - Total droppedBits bits = 99840 bits
   - duration = 1.96664 s
   - Thoughput = 3373.39 kbps.
rajat@minekarrajat619:~/Desktop/ass10-ns2-star$ █
```