National Institute of Technology, Rourkela
DCCN Lab (CS3072)
6th Semester – 2023 Spring Sem

Evaluation Scheme:-
Day to Day Evaluation: 50 Marks
Lab Test / Viva: 20 Marks
Quiz: 20 Marks
Project based Assignment:10 Marks

Lab 10

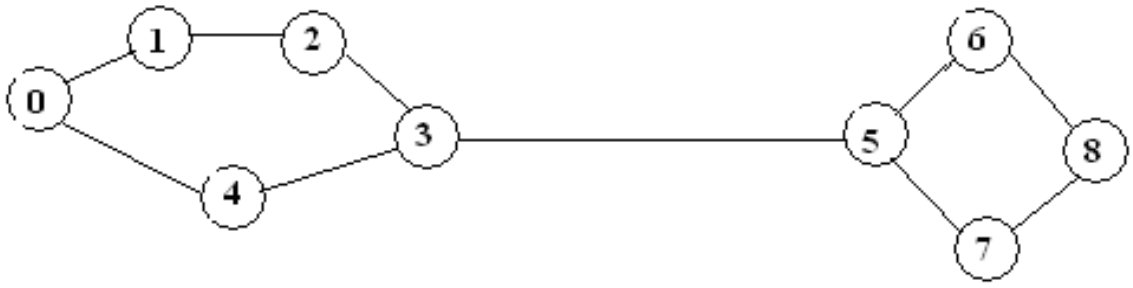
Objective: Implementation of multicast routing using ns2 and performance analysis of AODV routing.

Q.1 Write a tcl script to construct the network given in Figure 1 below which includes the following:

- Run the simulation for 90 sec.
- Node 0 acting as source node and node 8 as the destination node.
- Traffic type is of FTP.
- Create a multicast group "grp0".
- Attach node 0 as sender for the group.
- Nodes 7, 6 and 8 join the grp0 after 0.3 sec from CBR traffic starts.
- Node 0 using CBR traffic.

Find the following:

a. Find the maximum time taken by packet to reach at node 8 from source node, for each type of traffic.
b. Also find the number of packets received at node 8, for each type of traffic.



Bandwidth and delay of the links 0-1 is 5 Mb/2 ms
Bandwidth and delay of the links 1-2-3 is 5 Mb/1 ms
All other links are 5Mb/ 2 ms

Figure 1

Q.2 Consider the network scenario used in Lab Assignment 9. Using AWK scripts, calculate throughput at all the receiver nodes individually for individual traffic.

Hint for Multicast Routing:

```
# Creating the core event scheduler
   set ns [new Simulator]
# Turn on multicast support
   $ns multicast
$ns color 1 red
$ns color 2 blue

# Creating nodes
    ...FILL IN...

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

# Creating links
# All with bandwidth XMb, delay Yms, and queue type
# Set queue limit (buffer size) to Q packets in the bottleneck link
$ns queue-limit node node  ...FILL IN...

# Set link orientation for nam
    ...FILL IN...

# Set queue position for nam
$ns duplex-link-op node node queuePos -0.5

# Set multicast routing to dense mode
    ...FILL IN...

# Use nam trace format for TCP variable trace, this is required by
# nam visualization of TCP.
Agent/TCP set nam_tracevar_ true

# Create a TCP connection from sender to receiver
    ...FILL IN...
$tcp set fid_ 1
$tcp set window_ 20

# Create an FTP source and attach it to the TCP connection
    ...FILL IN...

# Create a UDP connection from node to a multicast group
    ...FILL IN...
$udp set fid_ 2

# Create a CBR source and attach it to the UDP connection
    ...FILL IN...

# Create dummy receivers and attach them to the receiving nodes
set rcvr0 [new Agent/Null]
$ns attach-agent node $rcvr0

# Schedule events to happen
    ...FILL IN...

# A finish proc to flush traces and out call nam
    ...FILL IN...
# Start the event scheduler
$ns run
```