The LNM Institute of Information Technology, Jaipur

Computer Networks Lab

Lab Assignment 2

Objective: **(Layered Architecture) Learn communication in layered environment**

Tasks 1: Network Design

1. Create a network (name "layerNetwork") with two nodes, where each node has two layers: network, and data-link layer. Both nodes are connected with delay channel of 100ms (check simulation manual of OMNeT++ or tic-toc tutorials 3.1). (Hint: design layers as simple module, and node as compound module).
2. Each layer communicates through protocol data unit (PDU). The network layer PDU is N_PDU, and data-link layer PDU is DL_PDU. Create a packet for each PDU. Both layers communicate through addresses (source and destination). (Hint: design all PDU's as packet type message definition)
3. Communication will start from the network layer of the source node to next bottom layer then this node transfer this DL_PDU to the destination node.

Tasks 2: Protocol Design and Simulation

1. Define source, destination address and number of packets as parameters in *omnetpp.ini* file.
2. Enable event logging in omnetpp.ini file and visualise packet tracing.
3. (Network Layer Communication) Source Node (SN) sends 10 packets with id 1 to 10 to destination node (DN) with delay of RTT. DN receives each packet and deletes it.
4. (Data-link Layer Communication) In SN, for each received PDU from upper layer, it encapsulate in a new data-link layer PDU (type as "Data") and assigns id in modulo-2 (0 and 1) manner i.e. id of the first PDU will be 0 then second PDU will be 1 then again 0 and so on. In DN, data-link layer sends "Ack" to SN and also forwards the decapsulated PDU to upper layer.