

Networks Lab Report

Assignment 2

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1 Objectives

Implement three data link layer protocols, Stop and Wait, Go Back N Sliding Window and Selective Repeat Sliding Window for flow control.

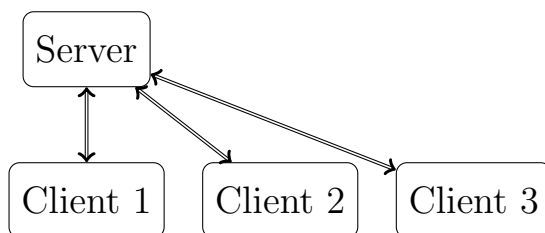
2 Design and Implementation

2.1 Program structure

The implementation is done using sockets. The clients and server communicate with each other using sockets. Listening on the channel is done through a separate thread (for both client and server). There can be multiple client instances. All the clients are connected to the central server.

2.1.1 The Server class

The server class instance acts as a medium to connect two clients. Whenever the server starts listening and accepting client socket connections. Each time a client connection is made, its control is passed on to the client handler thread. The client handler thread then listens for incoming frames from the assigned client socket. The server also maintains a list of mappings of clients with port numbers and client addresses. Whenever a client tries to connect to a server. The server maps the port number with the client address. When a client tries to send messages to another client, the server checks the destination address of the message, finds the port mapped to the address and forwards the message to the destination client.



2.1.2 The Client class

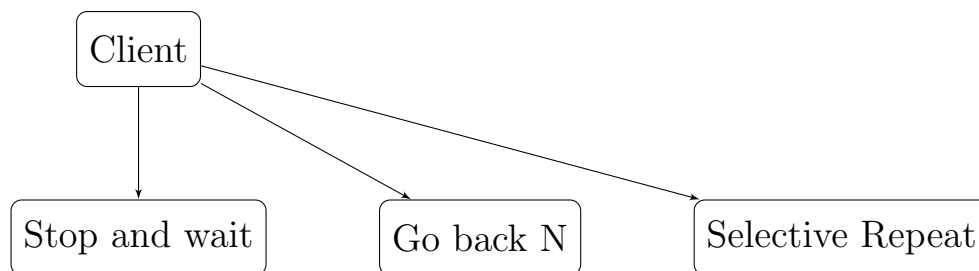
The client class provides all the basic infrastructure for communication with the server. Listening is done on a separate thread for each client. Whenever a client tries to connect to a server, it sends a request to connect frame which contains the address of the client. In the server side, the server registers the port number and the address in its address list and sends back an request accept frame.

The Client class has six specialization subclasses. Each pair of subclass (a sender client and a receiver client) implements one of the three data link layer protocols.

Stop and Wait in SAWSenderClient and SAWReceiverClient

Go back N in GNSenderClient and GNReceiverClient

Selective Repeat in SRSenderClient and SRReceiverClient



2.1.3 The Frame structure

Preamble	Destination	Source	Data
1 byte	1 byte	1 byte	1 to 10 bytes

Preamble stores information about the frame type.

If the preamble is set to 00000000 then it is for dhcpLite request

If the preamble is set to 00000001 then it is for dhcpLite granted

If the preamble is set to 00000010 then it is for dhcpLite rejected

If the preamble is set to 10000000 then it is for data transfer

2.2 Code snippets

3 Test cases and Results