CS3102 P2: Practical Report

Reliable Data Transfer Using UDP

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1 Introduction

This report cover the design and implementation of a connetion-oritented, reliable, unicast, transport protocol,built on top of UDP.
The protocol in question is called RDT - Reliable Data Transport

2 Design

This section will describe the design of the RDT protocol and the considerations that informed this design.

2.1 Packet Structure
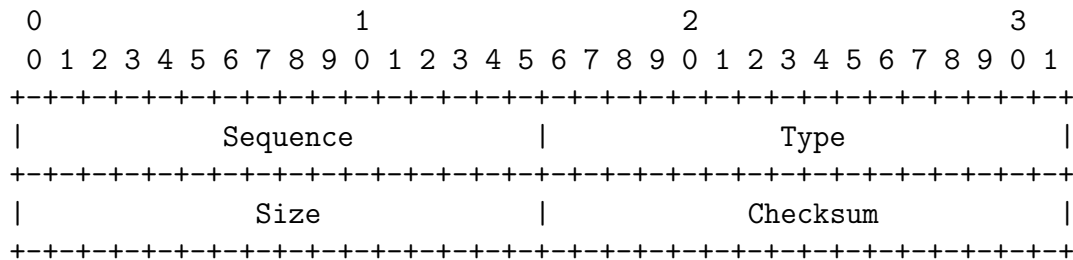
RDT packets are constructed with the following structure:

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|             Sequence          |              Type             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|              Size             |            Checksum           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Figure 1: RDT Header

The `type` field contains one following values, denoting the type of the packet:

- 0 - SYN.

- 1 - SYN ACK

- 2 - DATA

- 3 - DATA ACK

- 4 - FIN

- 5 - FIN ACK

This approach was chosen over a flag-based approach, as it makes it easier to check packet type and there were only a small number of types to define given the simple nature of the protocol.

32 bit values for were chosen for sequence and size as long data type often used for file sizes, and subsequently need to have 32 bit for sequence as product of buffer size.

200 ms is used initially for the handshake RTO, as packet is only 12 bytes.

2.2 Finite State Machine

3 Testing

This section will detail how RDT was tested to validate correct operation.

3.1 Methodology

To test the ability of RDT to deliver packets in a reliable and ordered manner, two test programs were created. The latter was run on **pc** and the former on **pc**. Slurpe was place in the middle. A file was transmitted from A to B. Decoded with SHA.

4 Analysis

- Size of header vs size of packet

- Bandwidth utilization

5 RDT Packet Data Size

Several experiments were carried out to measure the effect of varying the RDT packet size.

The maximum packet size supported by UDP datagrams is 65,507 for IPv4 (this analysis will not consider IPv6), therefore given a fixed header size of