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My protocol for semester project 2025

Abstract

This document specifies a SImply Communication Protocol (SCP) used for structured communication between a client and a server over TCP. The protocol supports multiplication, mean calculation, and list subtraction operations through structured binary messages.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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Table of Contents

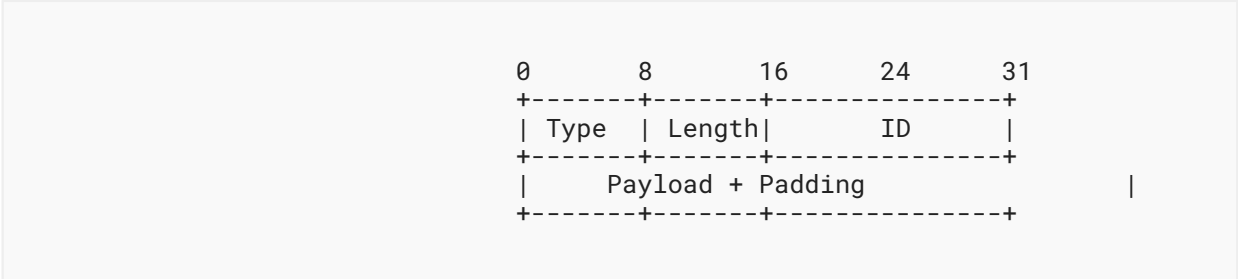
1. Introduction

This is a lightweight binary protocol designed to handle basic arithmetic operations between a client and a server. Each message consists of a fixed-size header and a variable-size payload, with optional padding to align the message size to a multiple of 4 bytes.

2. Message Structure

2.1. Client to Server Messages

Messages sent from the client to the server contain a header and a payload, aligned to 4 bytes.

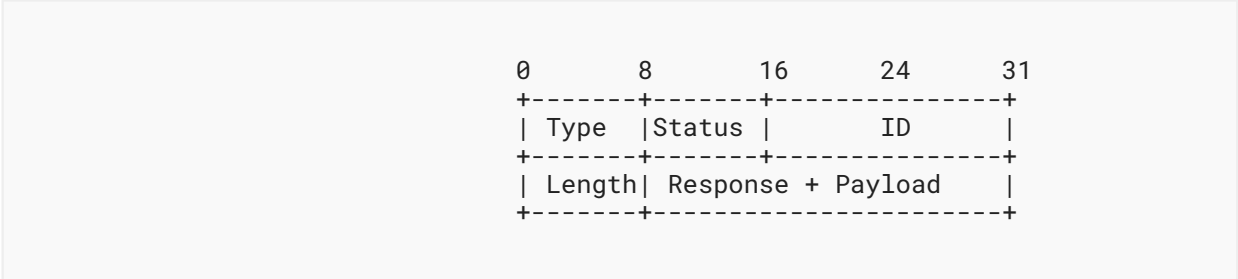


- Type (1 byte): Operation type (1 = Multiply, 2 = Mean, 3 = Subtraction).
- Length (1 byte): Total length of the message (header + payload) in bytes, excluding padding.
- ID (2 bytes): Unique identifier used to match request and response.

The payload is operation-specific. Padding is added (if needed) to ensure 4-byte alignment.

2.2. Server to Client Messages

The server responds with a header, result payload, and optional padding for alignment.



- Type (1 byte): Operation type, same as the request.
- Status (1 byte): Operation status (e.g., 200 = Success).
- ID (2 bytes): Matches the ID in the request.
- Length (1 byte): Total length of the server message (excluding padding).

3. Communication Sequence and Port Information

3.1. Message Sequence

The communication consists of a single request from the client and a single response from the server. After the response is sent, the transaction ends.

```
Client                              Server
  |                                   |
  |-------- Request Message ------->|
  |                                   |
  |<------- Response Message -------|
  |                                   |
 (End of communication)
```

Each request has a unique ID, which the server copies in the response to allow matching.

3.2. Port Usage

The server listens on 12345 TCP port.

4. Operation Types and Payload Formats

Type	Operation	Payload Format	Response Payload
1	Multiply	Signed Bytes (b)	Signed 4-byte Integer (i)
2	Mean	Unsigned Bytes (B)	4-byte Float (f)
3	Subtraction	Unsigned Shorts (H)	Signed 4-byte Integers (i[])

Table 1

5. Status Codes

Status	Description
200	Success
0	Invalid list length
1	Invalid numbers for multiplication
2	Invalid numbers for mean
3	Invalid numbers for subtraction
4	Bad list half splitting for subtraction
100	Invalid message type

Table 2

6. Security Considerations

This protocol assumes a trusted environment and does not include encryption, authentication, or protection against man-in-the-middle attacks. It is intended for use in controlled environments or over secure channels.

7. IANA Considerations

This document does not request any IANA actions.

8. Normative References

[KuroseRoss] Kurose, J.F. and K.W. Ross, "Computer Networking: A Top-Down Approach", Book 6th Edition, 2017.

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