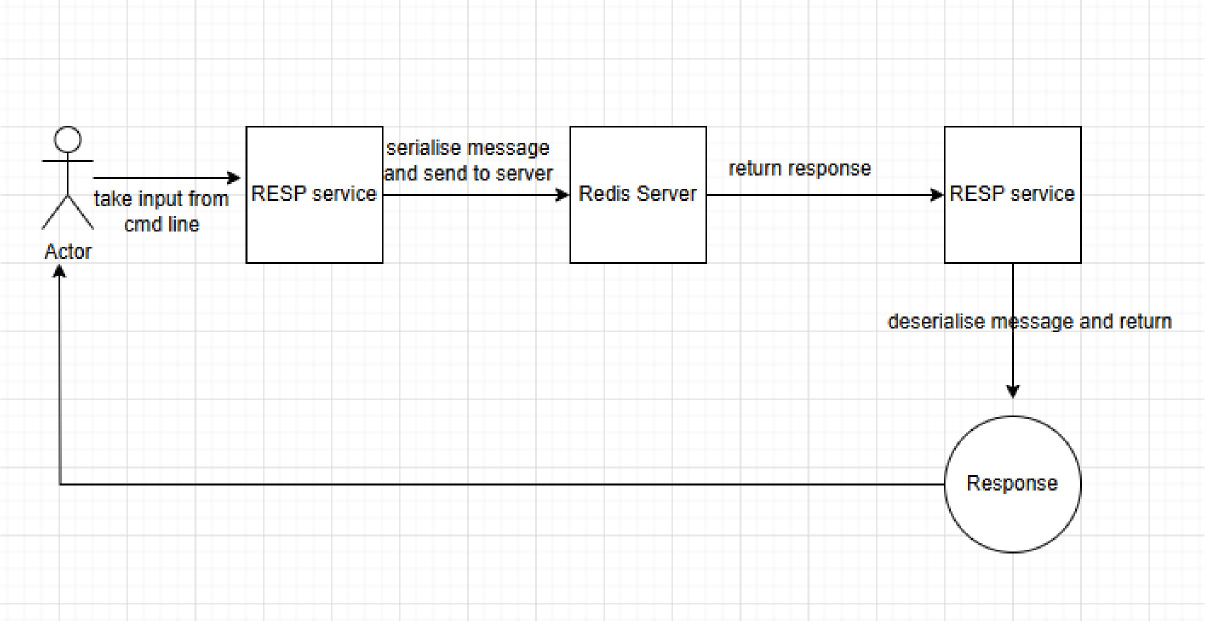
Redis Server

It is an in-memory database that allows us to do fast lookups and retrieval. It uses RESP message format for serialisation and deserialisation.

Data Flow our project:



For speed, the Redis server is implemented using asyncio sockets which allows asynchronous processing of requests/responses and uses TCP connection as RESP is more suitable with TCP connections.

Input supports the following command:

1. String Commands
   a. SET <key> <value> - set the string value of a key with support for following options
      i. EX <seconds> - set the specified expire time, in seconds (a pos int)
      ii. PX<milliseconds> - set the specified expire time, in milliseconds (a pos int)
      iii. EAXT <timestamp-seconds> - set the specified unix time at which the key will expire, in milliseconds (a pos int)
      iv. PXAT <timestamp-milliseconds> - set the specified unix time at which the key will expire, in milliseconds (a pos int)
   b. GET <key> - get the value of a key
   c. DEL <key> - delete a key

   d. EXISTS <key> - returns if key exists, can take multiple keys as arguments and returns the number of existing keys in the list.
   e. ECHO <message> - prints the message.
   f. PING – returns PONG.

2. Integer Commands
   a. INCR <key> - increment the integer value of the key by one
   b. DECR <key> - decrement the integer value of the key by one
3. List Commands
   a. LPUSH <key> <value> - insert the value at the head of the list.
   b. RPUSH <key> <value> - insert the value at the tail of the list.

Output from the Redis Server supports the following RESP style data types:

1. Simple Strings – first byte represented by +.
2. Errors – first byte of reply is -.
3. Integers – first byte of reply is :
4. Bulk Strings – first byte of reply is $
5. Arrays – first byte of reply is *
6. Null Bulk strings - first byte of reply is $-1
7. Null Arrays - first byte of reply is *-1

Persistence mechanisms we have used in the project:

1. AOF – we append all the write operations into a single file and replay this file on Redis server shutdown, restart, or crash.