CS 550 Programming Assignment #2 - Design Document

Distributed Hash Table System Features:

- Peer to Peer system implementation
- Each peer
  - Maintains a Hash Table which stores data in the form **key,value(String,String)** pair .
  - Peer has the capability to perform put, get and remove operations on the Hash Table of each server
- Static Membership is maintained for the system

Design Considerations:

- The solution is implemented using *JAVA*
- At boot up each peer is aware of other peers .The server data (Ip address, port) is maintained in a properties file in all the peers.
- Unique String Input is generated using ***RandomStringUtils*** provided by common-lang3.jar
- **The inbuilt hash function of String** (s.hashCode()) is used to generate unique hashcode for the generated strings.
- **A mod operation is performed on the hash code generated to determine the server to which the key – value pair should be inserted.**
- *Socket programming* model utilized for communication between the peers.
- *Thread implementation*
  - Server side thread implementation to cater multiple requests from the clients.
  - Client side thread implementation to distribute data to different servers
- *Hash Table* used to maintain the data on the server side as it supports synchronization
  - Hash Table has both Key – Value as Strings.
  - Method that performs put, get and remove operations on the hash table is **Synchronized**
- *Ant* used for the compilation of the source code.
- *Jarvis* environment used for testing the environment with multiple clients.

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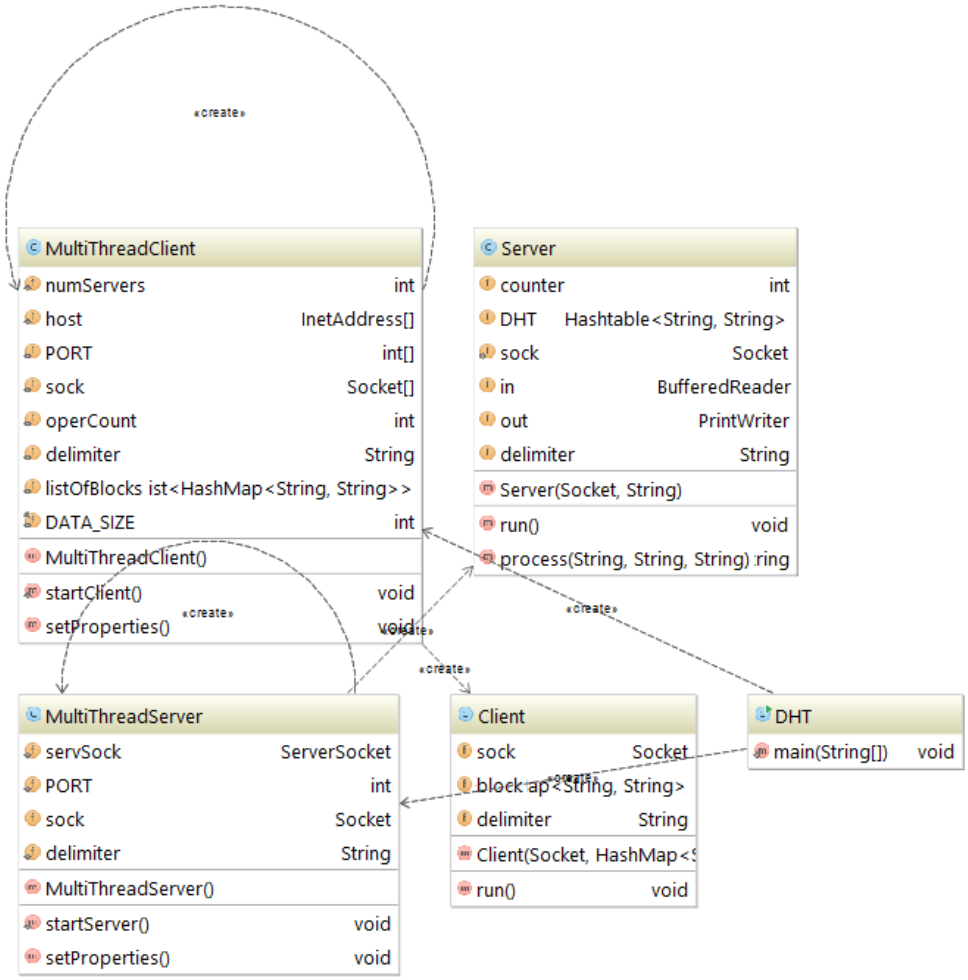
Components of the System : Class Diagram

- Distributed Hash Table System :



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WorkFlow:

Possible Improvements:

- Exception Handling mechanism needs Improvement
- Hash Table replication needs to be implemented for data resilience
- Need to consider the implementation benefits of using Non blocking I/O. Package NIO reference:

http://docs.oracle.com/javase/7/docs/api/java/nio/package-summary.html

References:

1) Java Network Programming by O'Reilly publications : Elliot Rusty Harold
2) An Introduction to Network programming with Java by Springer publications : Jan Graba