**Maintaining Causal Consistency in Replicas**

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**Files:**

* Datacenter.c – Datacenter implementation
* DBHandler.c – Handles all the read/write request to the Database
* DependencyUtilities – Implementation of all the functions related to dependencies
* Client.c – Client implementation
* Test1.c – Datacenter implementation with hardcoded delays to test the first test case

**Data Structure format for maintaining dependency (DependencyUtilities.h):**

* struct Dependency: holds key, timestamp and datacenter ID
* struct Operation: holds key, new data, and datacenter ID
* struct DependencyList: holds list of dependencies, number of dependencies and the operation to execute if the dependency check satisfies
* Pending queue is a list of DependencyList

**Datacenter Functions implemented:**

* initializeSockets() – initializes the datacenter server sockets and the client socket array to handle multiple client connections
* initMulticastSocket() – initializes the multicast socket which is used to broadcast replicated writes to other datacenters
* readFromDataStore() – reads and returns data corresponding to a given key from the database
* writeToDataStore() – writes data corresponding to a given key to the database
* sendReplicatedWrite() – sends replicated write request to a particular datacenter
* messageHandler() – handles read, write and replicated write requests, and also initiates replicated writes to all the other datacenters
* listening() – ‘select’ based implementation of server that listens to all the read, write or replicated write requests from multiple connections simultaneously

**Dependency Functions implemented:**

* appendClientDependencyList() – creates or appends dependency list of a particular client
* clearDependencyList() – clears dependency list of a particular client
* checkDependency() – checks if the dependencies of a replicated write request satisfy
* appendPendingQueue() – appends the pending queue with a dependency list
* removerFromPendingQueue() – removes a dependency list from the pending queue

**Client Functions implemented:**

* sendWriteRequest() – sends write request to the connected datacenter
* sendReadequestRequest() – sends read request to the connected datacenter
* initializeSocket() – creates the socket and also establishes a connection to the datacenter

**Working:**

**What is working?**

**Compiling and executing:**