CS 578

Programming Assignment - 4.1

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Design:

This design is for implementation of datastore (key-value) with GigaPaxos RSM. This design uses GigaPaxos for fault tolerance, ordering, and replication while accepting SQL-style requests (CQL commands) encoded as strings inside GigaPaxos request packets and executing them on a Cassandra backend.

MyDBReplicableAppGP.java

Architecture:

- GigaPaxos: External framework to provide consistency, replication and request handling.
- MyDBReplicatedAppGP: Implements the replicable class; processing requests, cassandra execution etc.
- Cassandra Backend: This is the data storage in this implementation.

Initialisation:
- Reads the keyspace name from args[0].
- Connects to a Cassandra cluster (default 127.0.0.1:9042).
- Creates the keyspace if missing.
- Creates a simple kv(k text PRIMARY KEY, v int) table.

Request:

-   The requests come in the form of requestpackets

Checkpointing:

-   GigaPaxos expects snapshot/restore functionality to reconstruct the replicated state machine's logical snapshot.
-   This means no meaningful checkpointing is implemented.
-   Because of this, many test cases fail.

Failing:

-   Request Parsing Tests: getRequest() returns null, which means GigaPaxos cannot translate string-based client requests into request objects. Many test suites send string requests and expect them to be converted.
-   Error Handling Tests: execute prints a stack trace and returns false, but Paxos expects certain action.
-   Recovery Tests: Because checkpoints are not implemented, the recovery tests are not passing.