CSCI 5673 : Distributed Systems - Spring 23

Assignment 1 – Marketplace

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Source Code

Github : Assignment4

Evaluation

Scenario 1 : Average response time for each client function when all replicas run normally

Scenario 2 : Average response time for each client function when one server-side sellers interface replica and one server-side buyers interface to which some of the clients are connected fail.

Scenario 3 : Average response time for each client function when one product database replica (not the leader) fails.

Scenario 4 : Average response time for each client function when the product database Replica acting as Leader fails.

Scenario	Buyer(Response Time)	Seller(Response Time)	Buyer(Throughput) (Number of requests / Total Time)	Seller(Throughput) (Number of requests / Total Time)
1	33.10018349	39.780184911	0.0285	0.0315
2	44.20154363	42.532623312	0.0185	0.0130

Scenario 3 and 4 was difficult to reproduce as it was not under our control because the Raft implementation takes care of such failures. It makes sure that the replica is available using heartbeat Psync “getStatus” cluster check.

The above table was created based on running the system for two scenarios. The details on how to run the system and the performance scripts are mentioned in the README.md file

Observation

1) As we increased the number of operations at the database, There was a lot of UDP packet loss which led to negative acks which increased the overall API time.
2) Psync raft implementation looked pretty solid, there were less failures with increase in operations.
3) There is another reason for the dip in performance. The database has to handle concurrent read and write. The locking mechanism can further cause a delay.
4) The server has to take care of handling connections (creating, maintaining and closing connections). When there is only one instance of a client, The process becomes very simple but when the number of instances increases, The connection handling creates an extra load at the server.
5) The replication increased the wait time especially if the operation failed (Re execution of the operation) and each replica had to wait for sequence messages, also with UDP message loss, Handling negative acks further caused replicas to send out sequence message