**Project 4**

**Project Report – Twitter Clone**

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**November 14th, 2022**

**Task:**

To implement a simulation of Twitter with clients, server, supervisor/tester and measure different performance metrics like time taken for tasks along with random client disconnection and reconnection i.e.. dropout.

**What is Working?**

* When the user is connected, deliver tweets live (without querying)
* Registration of user accounts,
* Send tweet with or without hashtags and mentions,
* Subscribing to user's tweets,
* Re-tweeting
* Allow querying tweets subscribed to, tweets with specific hashtags, tweets in which the user is mentioned.
* Simulate of live connection and disconnection of users.
* Zipf Distribution. The more the subscribers a user has, the more it tweets with respect to the Zipf distribution.
* A supervisor sends instructions to clients
* Client listens to both supervisor and server. Then acts according to the instructions from supervisor i.e.. To send tweet, retweet etc.
* Server executes commands from Clients and returns results.

**Steps for execution are given below:**

Open up two terminals in the directory of code file.

Run the project by using commands in terminal:

-> erl -sname paris

-> c(project4).

-> project4:startServer().

Now in 2nd terminal type.

-> erl -sname berlin

-> project4:startActors(paris@USER, NumActors, NumRequests)

where NumActors = number of Actors/Clients, NumRequests = number of requests sent by each actor/client.

**Sample execution:**

**Of project4.erl : This shows time taken for each commands to execute on average.**

Graphical user interface, text, application

Description automatically generated

**What is the largest number of actors you managed to deal with for Twitter Clone?**

For NumActors = 10000 and NumRequests = 10 for each actor.

Graphical user interface, text, application

Description automatically generated

For NumReqeusts = 10 and NumActors = 10000 for each actor.

**Dropout – Disconnection and Reconnection:**

Disconnecting and reconnecting random actors leads to.

For NumReqeusts = 100 and NumActors = 100 for each actor.

With Dropout = 10%

Graphical user interface, text

Description automatically generated

Disconnecting and reconnecting random actors leads to.

For NumReqeusts = 100 and NumActors = 100 for each actor.

With Dropout = 50%

Graphical user interface, text

Description automatically generated

Total time taken to execute code is increased, the higher the dropout value is. This is due to the fact that if a lot of actors are unresponsive, a lot of messages will not be delivered until they come back online, thus incurring extra overhead and delay.

**The zipf Distribution:**

Formula:

Text

Description automatically generated

Sample Demonstration:

Table, Excel

Description automatically generated

Note: x here is the rank of actors based on subscribers.

Here probabilities sum upto 100 which means the formula is working as intended.

Using the formula, The Actors with more subscribers send more tweets.

**To view logs:**

**Sample execution:**

**Of project4Logs.erl : This shows the logs of commands executed.**

**Graphical user interface

Description automatically generated with medium confidence**

**To view Logs Execute following commands in code directory:**

**erl -sname w1**

**c(project4Logs).**

**project4Logs:startServer().**

In 2nd terminal:

erl -sname w2

Project4Logs:startActors(w1@USER, NumActors, NumRequests)

**Conclusion:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number of Actors | Number of Requests per Actor | Average time to tweet (ms) | Average time to subscribe (ms) | Average time to Retweet (ms) | Average time to search by hashtags or mentions (ms) |
| 10 | 10 | 36.3 | 6.4 | 6.5 | 5189 |
| 50 | 50 | 48.4 | 25.3 | 23.4 | 5532 |
| 100 | 100 | 73.6 | 37.1 | 38.4 | 5984 |

The time taken to tweet, retweet, subscribe and query hashtags or mentions is directly proportional to the number of clients and the number of requests per client.

Furthermore, increasing dropout ie. Rate at which users disconnect and reconnect, also increases total time taken for execution.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Number of Actors | Number of Requests per Actor | Dropout | Average time to tweet (ms) | Average time to subscribe (ms) | Average time to Retweet (ms) | Average time to search by hashtags or mentions (ms) |
| 10 | 10 | 10 | 73.4 | 37.4 | 38.4 | 5984 |
| 100 | 100 | 50 | 75.6 | 37.1 | 101.3 | 6390 |