PROJECT DEFINITION:

This project's objective is to create a Twitter clone and client tester/simulator using Erlang and the Actor Model. As of this now, it doesn't seem like Tweeter has a WebSocket API. In order to properly leverage Web Sockets in the future, we need to build an engine as part of this project's initial phase. A Twitter-type engine will be put into place with functionality including account creation, tweeting, following users' tweets, retweeting, and searching subscribed tweets. The engine will present the tweet types live if the user is connected (without querying).

INTRODUCTION:

The project folder has three files:

- Client.erl
- Server.erl
- Report.pdf

INSTRUCTIONS TO RUN CODE:

- There are 2 files in this project. Both the files have to be compiled as follows:

  c(server).
  c(client).

- Open 1 terminal, and after navigating to the source folder execute the following commands:

  server:start().

- Open 3 terminals, and after navigating to the source folder execute the following commands:

  client:start().

WHAT IS WORKING?

- Users initially register themselves.
- Users sign in, changing their status to "Online."
- Subscribe: The Zipf distribution is used to mimic followers for each user.
- Tweets are sent by internet users and are then read by their followers.
- Retweets: Users have the option to repost tweets created by followers.
- Live Tweets: Users' tweets are immediately visible on the feed of their online followers.
- Tweet querying: Search feature that allows users to look for hashtags, mentions, or keywords

WHAT IS THE LARGEST NETWORK YOU MANAGED TO DEAL?

Number of Users: 2500 (Approximately more than 14000 tweets)

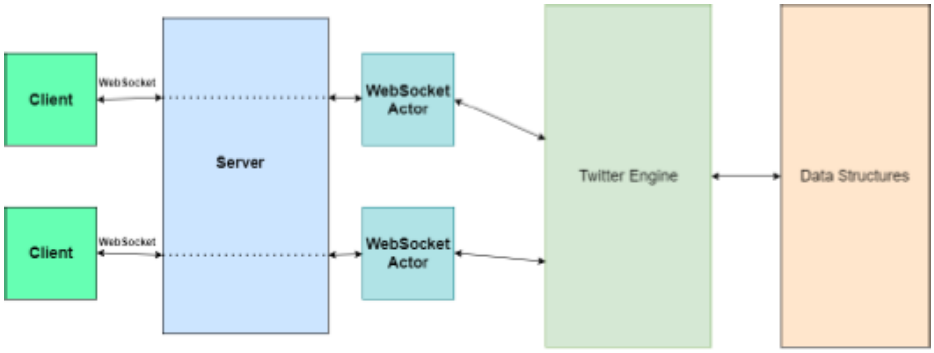
FUNCTIONALITIES IMPLEMENTED

1. **Register**: When a new user registers, if they do not already exist, they are added to an empty hash table called "users" that contains their username, password, list of followers.
2. **Login**: The username and password of a user who wishes to log in are compared to the appropriate values in the hashtable. They must match for the user to be logged in. Then, this user is included in the set activeUsers, which already includes all of the active users.
3. **Logout** : causes the user's information to disappear from the activeUsers collection.
4. Follow: When a user chooses to follow another user, that person's followers are added to their list in the "followers" table.
5. **Subscribe to hashtags**: When a person subscribes to a hashtag, all tweets using that hashtag are sent to them. In order to complete this procedure, a hash table named hashtagSubscribers is used to store all of a certain hashtag's subscribers. Additionally, the user's news feed shows every tweet that meets the criterion.
6. **Tweet** : When a user tweets, it appears in the news feeds of all of their followers. This operation is carried out by tweetManagementMessages actor, which saves the messages.
7. **Retweet** : When a user chooses to retweet, the tweet appears in the news feeds of all of the user's followers. The tweetManagementMessages actor both displays and stores tweets on all required newsfeeds.
8. **Mentions** : Whenever a tweet is mentioned The user is informed of the mention on their individual news feed when a tweet with a mention is identified by ParserMessages.
9. **Query subscribed tweets** : In this case, the newsfeed of the user is returned with the tweets that have been tweeted or retweeted by the persons that they follow as well as the hashtags that they have subscribed to.
10. **Query with Hashtag Search** : All tweets containing the specified hashtags are shown in the user's newsfeed.
11. **Query with mentions** : All of a specific user's mentions are shown in this query on the user's newsfeed.

COWBOY WEBSOCKET IMPLEMENTATION :

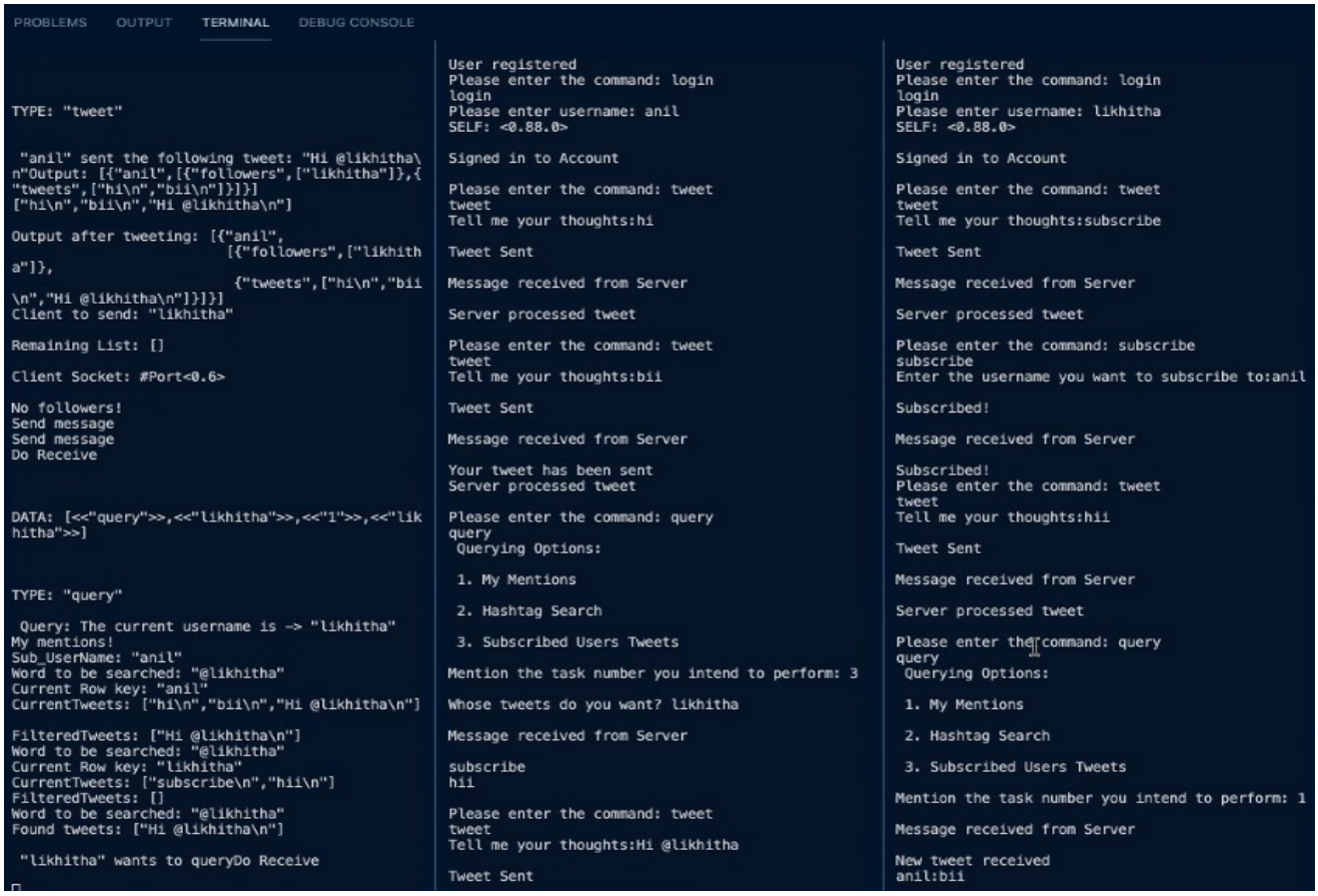
- Cowboy-HTTP server specifically designed for Erlang/OTP that is lightweight, fast, flexible.
- It is intended to be easy to use, provide excellent performance, and handle high levels of concurrency.
- Its capabilities make it particularly useful for building real-time, push-based systems like WebSockets, which require sustained connections and rapid communication.
- In addition to WebSockets, Cowboy offers support for HTTP/1.1, automatic gzip compression, and HTTP/2, and has a user-friendly, modular design.
- It is also known for its supportive community.

TWITTER CLONE ARCHITECTURE :



Output :

This output shows 3 terminals, 1st being the server and the rest 2 being the clients. We perform different functionalities among the clients that include register, login, subscribe, tweet, mentions, subscribed user tweets.



Performance/Result :

N	Register	N users each send 10 tweets	Zipf Subscribe	query N users	query N hashtag	query N mention	N Random Ops
5	666.233	205.079	24.298	56.772	32.508	26.786	57.228
10	733.093	430.135	56.139	115.522	52.339	62.416	59.15
25	897.055	1323.834	142.986	273.695	143.03	137.197	190.614
50	854.437	1879.112	519.926	849.082	548.267	376.573	243.331
100	1490.262	4164.361	495.873	1033.252	481.241	499.128	1052.928
200	1369.463	7293.959	962.082	2533.047	1555.6	1484.396	964.004
400	1651.013	9670.899	1861.88	1725.916	1448.488	823.629	1477.641
800	2789.465	20472.086	3703.907	2603.206	1613.939	1596.774	2233.754
1600	4682.687	39561.866	7994.289	5416.036	3177.96	3134.087	5481.83
3200	8491.195	123532.468	17137.942	15653.312	7527.78	6828.806	11886.567