**Project 4.1 Bonus**

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# 1. Simulate periods of live connection and disconnection for users

If the user’s connection to the engine is lost for any reason, the process on the server side will maintain state for that user should they attempt to reconnect. When the user messages the Manager it will check if that user already has an active process and will connect them to if it there is one. Doing so effectively restores them to where they left off.

In the event that the server side client process is killed, its state can be reconstructed from the ets tables, which store data such that they can be quickly and efficiently queried to retrieve it at any time.

# 2. Zipf distribution

How to run the Zipf simulation

1. Change directory to the top level of the project tree
2. Run “**mix run Chirper.exs num\_user peak\_frequency -bonus**”

We simulate a Zipf distribution on the number of followers each user has. To determine the number of followers a user has, we first have to assign a rank or ordering to the users. We use the arbitrary ordering of our text file of usernames to establish this order.

Then, we assign the number of followers given by , where is the index in sorted order where the user belongs. The number of users and are user parameters. **PeakFrequency must be less than the number of users.** Typically, you set , where the -1 is there because a user can’t follow itself, so they can have at most followers. To account for the float values, we must convert them into ints. This is done using the ceil() function which takes the next closest integer away from 0. Thus, every user follows at least one person.

Once we have the distribution, we populate the following list inside the driver (simulator) and tell the actors who to follow, which then send a GenServer follow command to its corresponding server-side client. Then, we set the number of tweets each user sends to be proportional to the Zipf distribution, and then the driver randomly selects some retweets. We can then verify this functionality by inspecting each user’s dashboard. The Zipf functionality works as intended.