DOS PROJECT 1 REPORT

Submitted By: Shashank Ranjan, 03937125 Vipul Mittal, 51901508

INSTALLING AND RUNNING THE PROGRAM:

Prerequisites:

- 1. Install sbt tool:
 - a. echo "deb https://dl.bintray.com/sbt/debian /" | sudo tee -a /etc/apt/sources.list.d/sbt.list
 - b. sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv 642AC823
 - c. sudo apt-get update
 - d. sudo apt-get install sbt

Running the Server:

- 1. Unzip the project folder Project1.zip
- 2. Open Terminal
- 3. Navigate to "BitCoinSystem" folder in the terminal
- 4. Run the command sbt "run <# of zeros>"

Running the Remote Workers:

- 1. Same steps 1 to 3 as above on a difference machine.
- 2. Run the command sbt "run <ip address of the server>"

Note: By default Server Mode will bind on port # 12300 and Remote Worker Mode will bind on port # 13400

RESULTS:

1. Size of work unit for best performance:

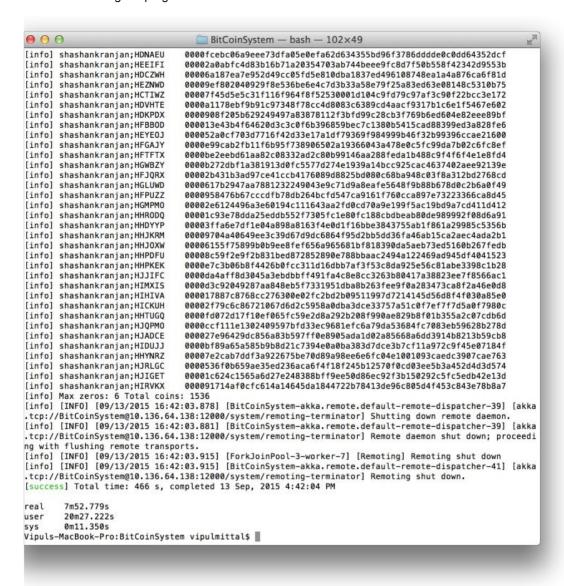
We changed the following configuration values to determine the work size for best performance

- 1. number of actors
- 2. work unit
- 3. threshold for number of coins to mine

The results of using various configuration is displayed in the table above. Based on the table, we were able to determine the work size for best performance to be **100000**

| # 0's | # Actors | Work Unit | Limit | # Match | CPU Time (secs) | Real Time (sec) | Efficiency |
|-------|----------|-----------|-------|---------|-----------------|-----------------|-------------|
| 5 | 3 | 10^4 | 10^6 | 2 | 24.965 | 16.257 | 1.535646183 |
| 5 | 5 | 10^4 | 10^6 | 2 | 25.957 | 16.597 | 1.563957342 |
| 5 | 10 | 10^4 | 10^6 | 2 | 26.896 | 16.306 | 1.649454189 |
| 5 | 5 | 10^5 | 10^6 | 2 | 25.263 | 17.06 | 1.480832356 |
| 5 | 10 | 10^5 | 10^6 | 2 | 26.322 | 15.794 | 1.666582246 |
| 5 | 5 | 10^5 | 10^7 | 8 | 134.234 | 66.17 | 2.028623243 |
| 5 | 10 | 10^5 | 10^7 | 8 | 126.246 | 51.898 | 2.43257929 |
| 5 | 20 | 10^5 | 10^7 | 8 | 144.978 | 57.057 | 2.540932751 |
| 5 | 50 | 10^5 | 10^8 | 93 | 1374.454 | 498.527 | 2.757030211 |
| 5 | 20 | 10^5 | 10^8 | 93 | 1311.972 | 483.587 | 2.71300097 |

2. Result for running the program for sbt "run 4"



Running time

Configuration Used:

Number of Actor: 50
Work Size: 10⁵
Threshold: 10⁸

| Command | CPU Time | Real Time | Efficiency |
|-------------|----------|-----------|-------------|
| sbt "run 4" | 1227.222 | 484.129 | 2.534907019 |
| sbt "run 5" | 1319.279 | 546.261 | 2.41510743 |

4. The coins with most zeros which we managed to find shashankranjan;BQNCFY 00000010454f7bee650f0f570a1843bdcfebc75e953a2e5e56c692caaf011208 shashankranjan;GWACSM 00000041d44dcb99fbb59bb382e24a20a43f61511b520ef865226816d83065a0

5. The largest number of working machines we were able to run our code with