

# DISTRIBUTED OPERATING SYSTEM PRINCIPLES

## PROJECT 4.2

### (README)

#### Team Members:

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#### Demo Video Link

<https://www.youtube.com/watch?v=3z6y0e42RkE>

#### Overview

In the first phase of the project, we created a Twitter simulator called Tweeter that includes the following features: user registration, sending and receiving tweets, user and hashtag following and retweets. For the second phase of the project, we built a REST API interface using WebSockets to implement the above-mentioned features.

#### Implementation:

##### WebSockets:

The WebSocket protocol allows two-way communication between the client and host server over a single TCP connection. In Erlang, a variety of framework libraries are available such as Cowboy, Elli, MochiWeb, SocketIO, and so on. For our project, we decided to use the Cowboy framework along with Rebar3 for project setup and the Postgres database.

##### Functions/Features:

- Register user: user registration with a unique id
- Send Tweets: Tweets with hashtags and other user mentions.
- Subscribe/Follow: Users can follow other users.
- Re-tweets: user gets a tweet received by the sender from different means.
- Search/Query tweets: search or filter tweets with user mention or hashtag.

##### Compilation and Execution:

1. Extract the zip file.
2. cd to the project4 directory.
3. Install rebar3.
4. Open the `erl` shell in this directory
5. Compile the code file:
  - a. `c(tweeter_server).`
  - b. `c(tweeter_app).`
  - c. `c(tweeter_sup).`
6. CMD 1 (server):
  - a. `rebar3 shell --name user1@<ip_address> --setcookie <cookie_name>`
  - b. `tweeter_server:initServer().`
7. CMD2 (for user):
  - a. `Rebar3 shell --name user1@<ip_address> -- setcookie <cookie_name>`
  - b. `net_adm:ping('server@<ip_address>').`
  - c. `S=rpc:call('server@<ip_address>',erlang,whereis,[server]).`
  - d. `S! {self(), {login, "user 1"}}.`
8. To login/register:

- a. S! {self(), {register/login, "handle"}}.
9. To tweet
  - a. S! {self(), {tweet, "Write tweet here"}}.

## Termination

The code terminates once a threshold is reached for the number of requests or can be manually terminated.

## Output:

### Login/Register and Follow

```

~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 > rebar3 shell --name se
rver@10.20.63.42 --setcookie aditya
====> Verifying dependencies...
====> Analyzing applications...
====> Compiling tweeter
Erlang/OTP 24
[erts-12.2.1] [source] [64-bit] [smp:12:12] [ds:12:12:10] [async-threads:1] [jit]
Eshell V12.2.1 (abort with ^G)
(server@10.20.63.42)1> ====> Booted tweeter
(server@10.20.63.42)1> tweeter_s
tweeter_server tweeter_sup
(server@10.20.63.42)1> tweeter_server:initServer().

(local2@10.20.63.42)2> S = rpc:call('server@10.20.63.42', erlang, whereis, [server]).
<12756.149.0>
(local2@10.20.63.42)3> S! {self(), {login, }}
(local2@10.20.63.42)3>
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 > rebar3 shell --name local2@10.2
0.63.42 --setcookie aditya
====> Verifying dependencies...
====> Analyzing applications...
====> Compiling tweeter
Erlang/OTP 24 [erts-12.2.1] [source] [64-bit] [smp:12:12] [ds:12:12:10] [async-threads:1] [jit]
Eshell V12.2.1 (abort with ^G)
(local@10.20.63.42)1> ====> Booted tweeter
(local@10.20.63.42)1> net_adm:ping('server@10.20.63.42').
pong
(local2@10.20.63.42)2> S = rpc:call('server@10.20.63.42', erlang, whereis, [server]).
<12756.149.0>
(local2@10.20.63.42)3> S! {self(), {login, "adisuper"}}.
<0.149.0>, {login, "adisuper"}
(local2@10.20.63.42)4>
(local@10.20.63.42)5>
"adisuper-G7-7700" 21:22 01-Dec-22
  
```

### Database connection for login and follow:

```

pgAdmin 4
File Object Tools Help
Servers (1)
  localhost
    Databases (3)
      adisuper
      postgres
      tweeter_db
    Casts
    Catalogs
    Event Triggers
    Extensions
    Foreign Data Wrappers
    Languages
    Publications
    Schemas (1)
      public
        Aggregates
        Collations
        Domains
        FTS Configurations
        FTS Dictionaries
        FTS Parsers
        FTS Templates
        Foreign Tables
        Functions
        Materialized Views
        Operators
        Procedures
        Sequences
        Tables (3)
          followers
          tweets
          tweets
            Columns
            Constraints
            Indexes
            RLS Policies
            Rules
            Triggers
            Trigger Functions
            Types
  
```

Query History

```

1 SELECT * FROM public.followers
2
  
```

Scratch Pad

	character varying (40)	character varying (40)
1	adisuper	adisuper
2	adisuper	adisuper
3	adisuper	adisuper

Total rows: 3 of 3 Query complete 00:00:00.104

## Send Tweet and notification

```
Alacritty
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
~/courses/DOSP/COP5615-DOSP-Project/project4/tweeter  P aditya 74 >
rebar3 shell --name server@10.20.63.42 --setcookie aditya
====> Verifying dependencies...
====> Analyzing applications...
====> Compiling tweeter
Erlang/OTP 24 [erts-12.2.1] [source] [64-bit] [smp:12:12] [ds:12:12:10] [async-threads:1] [jit]

Eshell V12.2.1 (abort with ^G)
(server@10.20.63.42)1> ====> Booted tweeter

(server@10.20.63.42)1> tweeter_s
tweeter_server  tweeter_sup
(server@10.20.63.42)1> tweeter_server:initServer().
Followers: []
LoggedInUsers: #{<13812.149.0> => "jv",<13797.149.0> => "adisuper"}UPI: <13812.149.0>
H: "jv"UPI: <13797.149.0>
H: "adisuper"Followers: [{<"adisuper">}]
LoggedInUsers: #{<13812.149.0> => "jv",<13797.149.0> => "adisuper"}UPI: <13812.149.0>
H: "jv"UPI: <13797.149.0>
H: "adisuper"Sent live notification to "adisuper" (<13797.149.0>)

(local2@10.20.63.42)3> S! {self(), {login, }}
(local2@10.20.63.42)3>

~/D/COP5615-DOSP-Project/project4/tweeter  P aditya 74 > rebar3 shell --name local2@10.2
0.63.42 --setcookie aditya
====> Verifying dependencies...
====> Analyzing applications...
====> Compiling tweeter
Erlang/OTP 24 [erts-12.2.1] [source] [64-bit] [smp:12:12] [ds:12:12:10] [async-threads:1] [jit]

Eshell V12.2.1 (abort with ^G)
(local2@10.20.63.42)1> ====> Booted tweeter

(local2@10.20.63.42)1> net_adm:ping('server@10.20.63.42').
pong
(local2@10.20.63.42)2> S = rpc:call('server@10.20.63.42', erlang, whereis, [server]).
<12756.149.0>
(local2@10.20.63.42)3> S! {self(), {login, "jv"}}.
{<0.149.0>,{login,"jv"}}
(local2@10.20.63.42)4> S! {self(), {follow, "adisuper"}}.
{<0.149.0>,{follow,"adisuper"}}
(local2@10.20.63.42)5> S! {self(), {tweet, "hihi"}}.
{<0.149.0>,{tweet,"hihi"}}
(local2@10.20.63.42)6> S! {self(), {tweet, "hihi"}}.
{<0.149.0>,{tweet,"hihi"}}
(local2@10.20.63.42)7>

"adisuper-G7-7700" 21:25 01-Dec-22
```

## Database setup for tweet send and notification

pgAdmin 4

Browser: public.tweets/tweeter\_db/postgres@localhost

Query: `SELECT * FROM public.tweets ORDER BY id ASC`

by	id	tweet
character varying (40)	[PK] bigint	character varying (250)
adisuper	1	Hi
adisuper	2	Hihi
adisuper	3	Hi
anun	4	hihi
adisuper	5	hihi
adisuper	6	hihi
jv	7	hihi
jv	8	hihi

Total rows: 8 of 8 Query complete 00:00:00.145 Ln 1, Col 1

## Simulator:

```
info] TwitterSimulatorUser9 posted a new tweet
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] TwitterSimulatorUser8 posted a new tweet
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] TwitterSimulatorUser1 posted a new tweet
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] TwitterSimulatorUser7 posted a new tweet
info] Websocket message pushed
info] TwitterSimulatorUser6 posted a new tweet
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed
info] Websocket message pushed[info] TwitterSimulatorUser5 posted a new tweet
```