



Piu Piu

Decentralized Timeline

Large Scale Distributed Systems

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Agenda

Technology Stack

Features

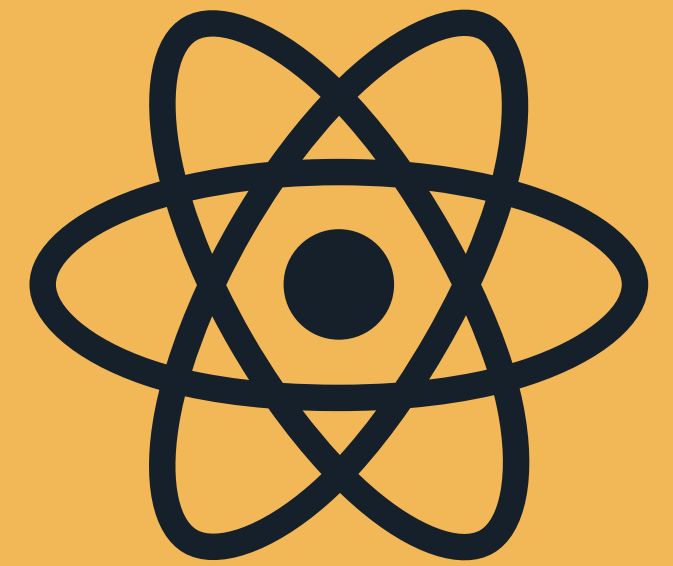
Architectural Design

Design Aspects



Technology Stack

JS





Features

A dark-themed mobile app screen for registration. At the top is the cartoon bird logo. Below it, the word "Register" is centered. There are three input fields for "Username", "Password", and "Confirm Password". At the bottom, there is a link "Already have an account? [Login](#)" and a blue "Register" button.

Register

A dark-themed mobile app screen for login. At the top is the cartoon bird logo. Below it, the word "Login" is centered. There are two input fields for "Username" and "Password". Below these, there is a link "Do not have an account yet? [Register](#) [Enter as a Guest](#)" and a blue "Login" button.

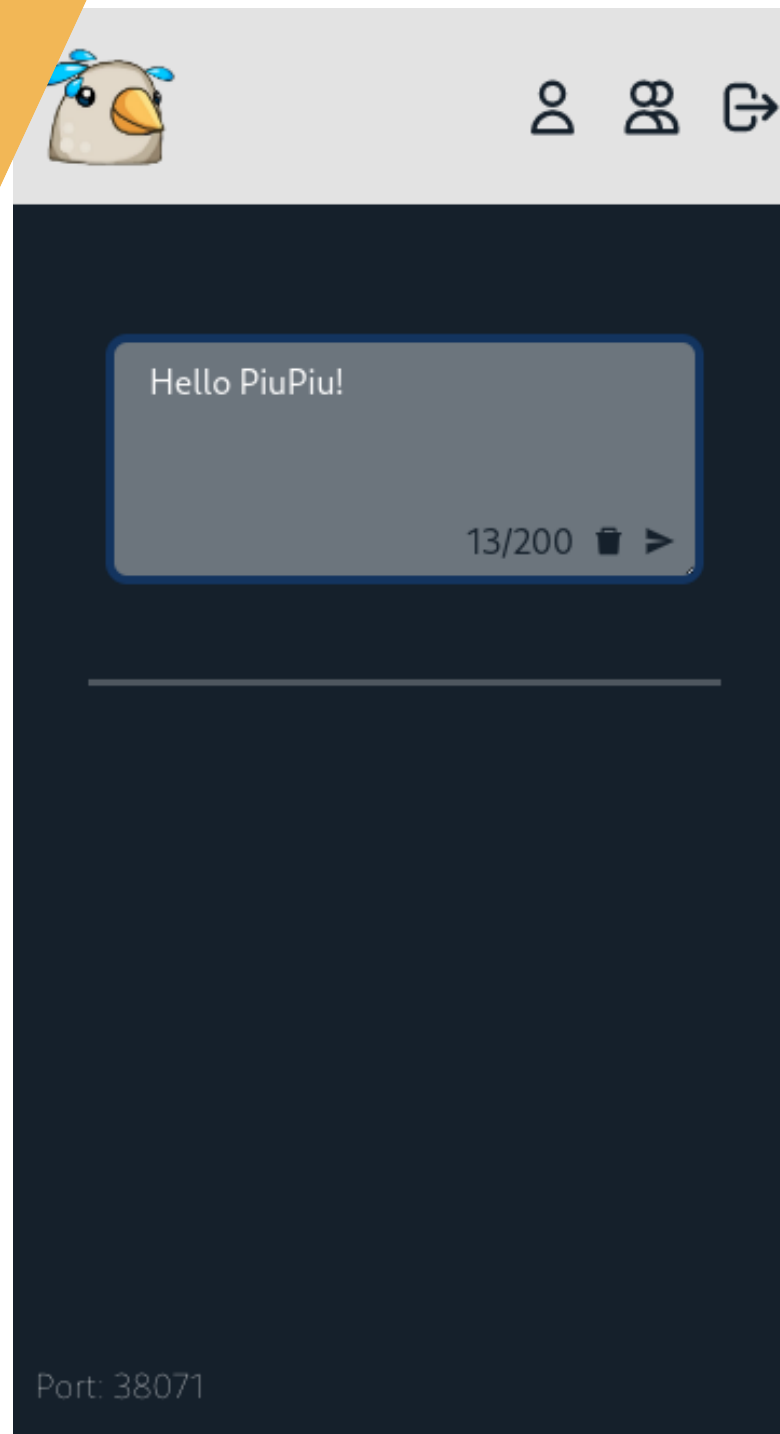
Login

A dark-themed mobile app screen for a user profile. At the top is a light grey header bar containing the cartoon bird logo, a home icon, a search icon, and a share icon. Three orange arrows point to these icons. Below the header, the user's name "beatriz" is displayed, followed by "1 followers 2 following". A horizontal line separates the header from the main content. The main content shows a post by "beatriz" from "2 minutes ago" with the text "Me trying to understand where all the cool kids are going to nowadays 🤘 #mastodon". At the bottom left, the text "Port: 44911" is visible.

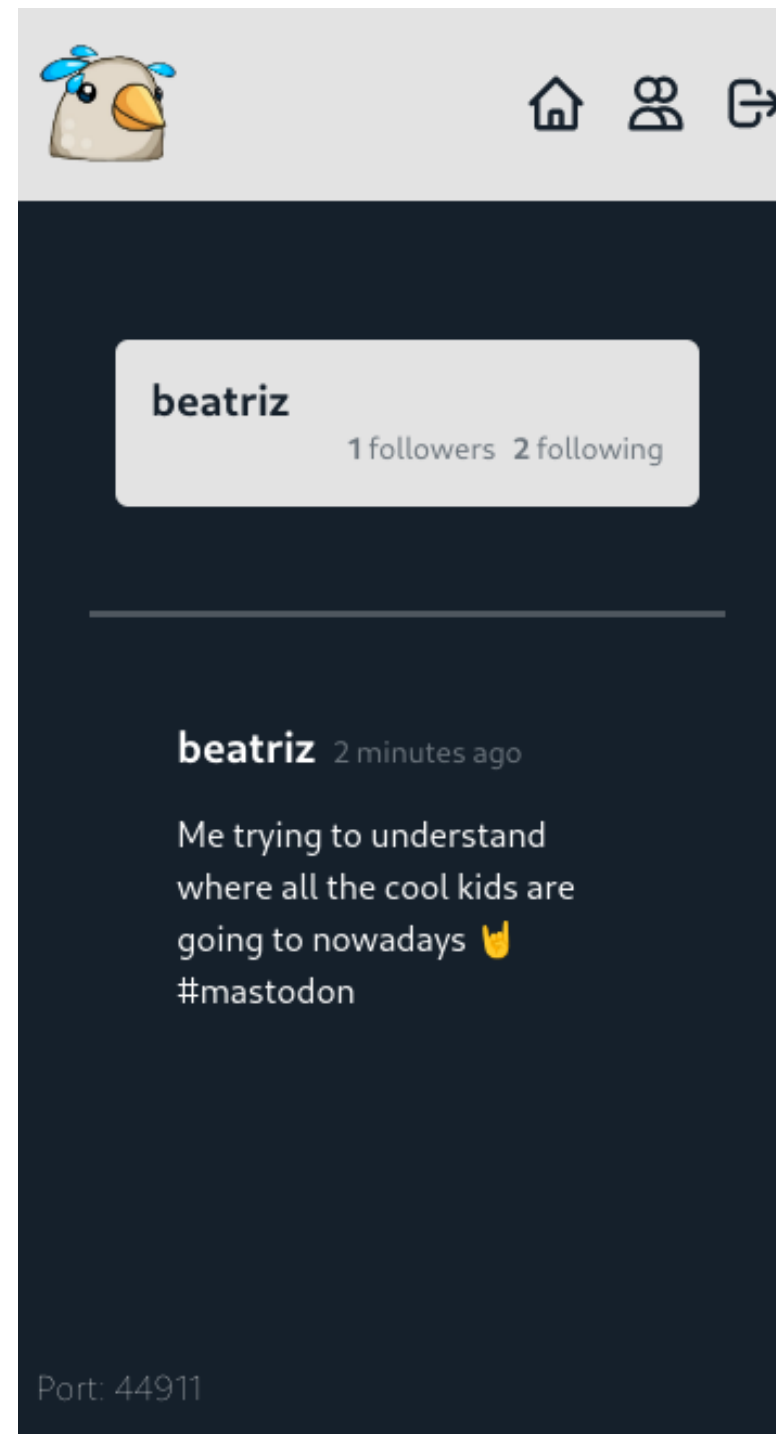
Logout



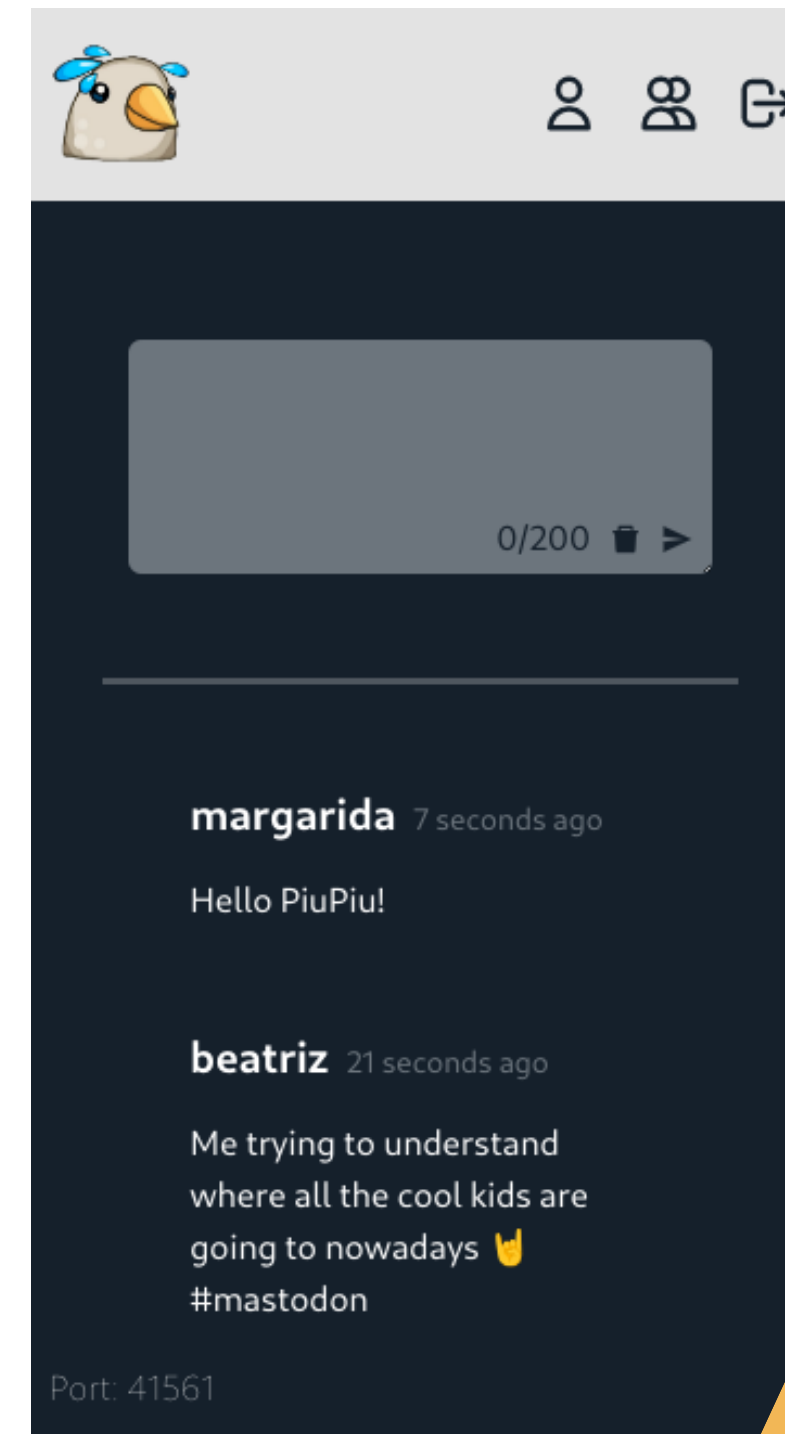
Features



Post (offline)



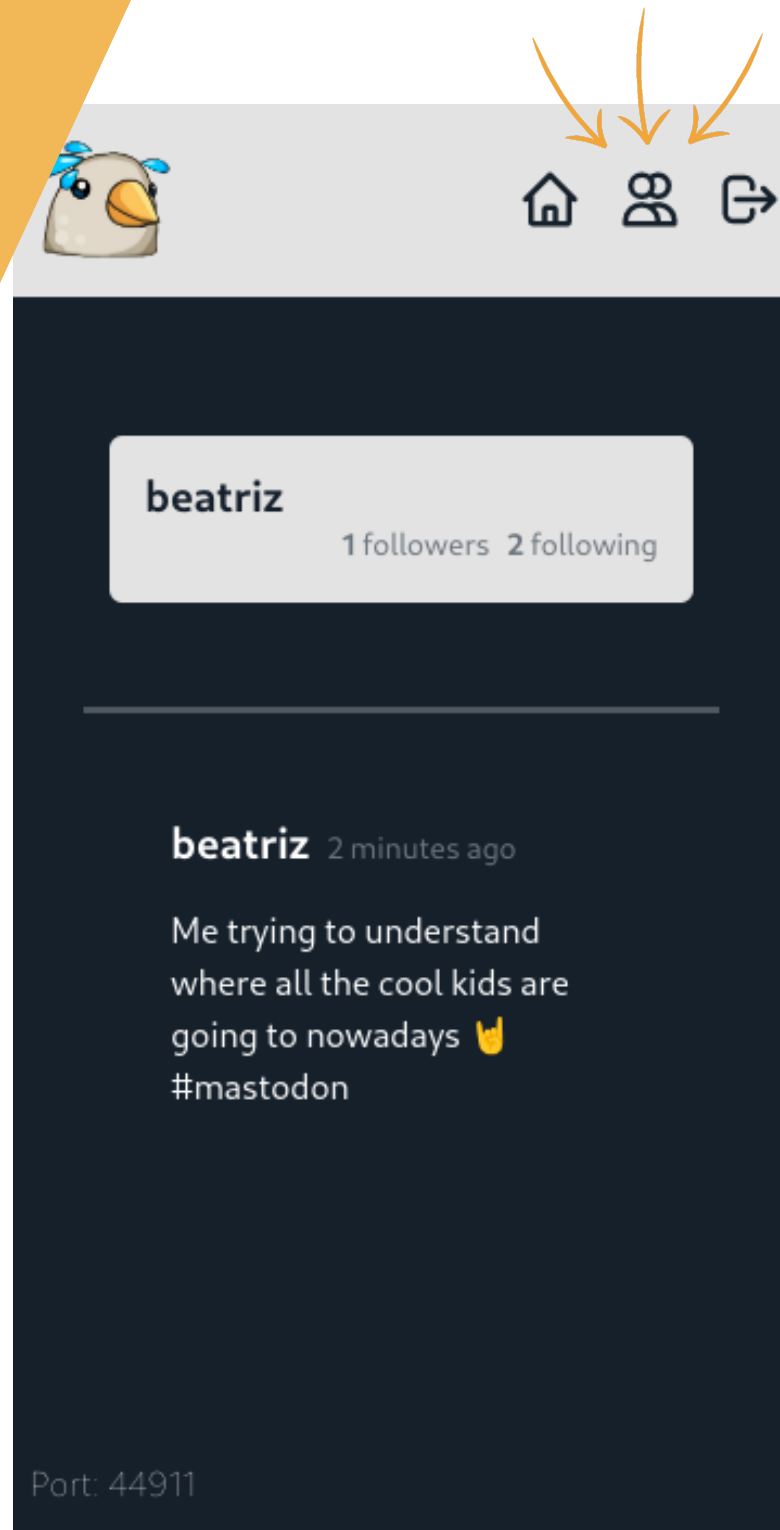
Profile



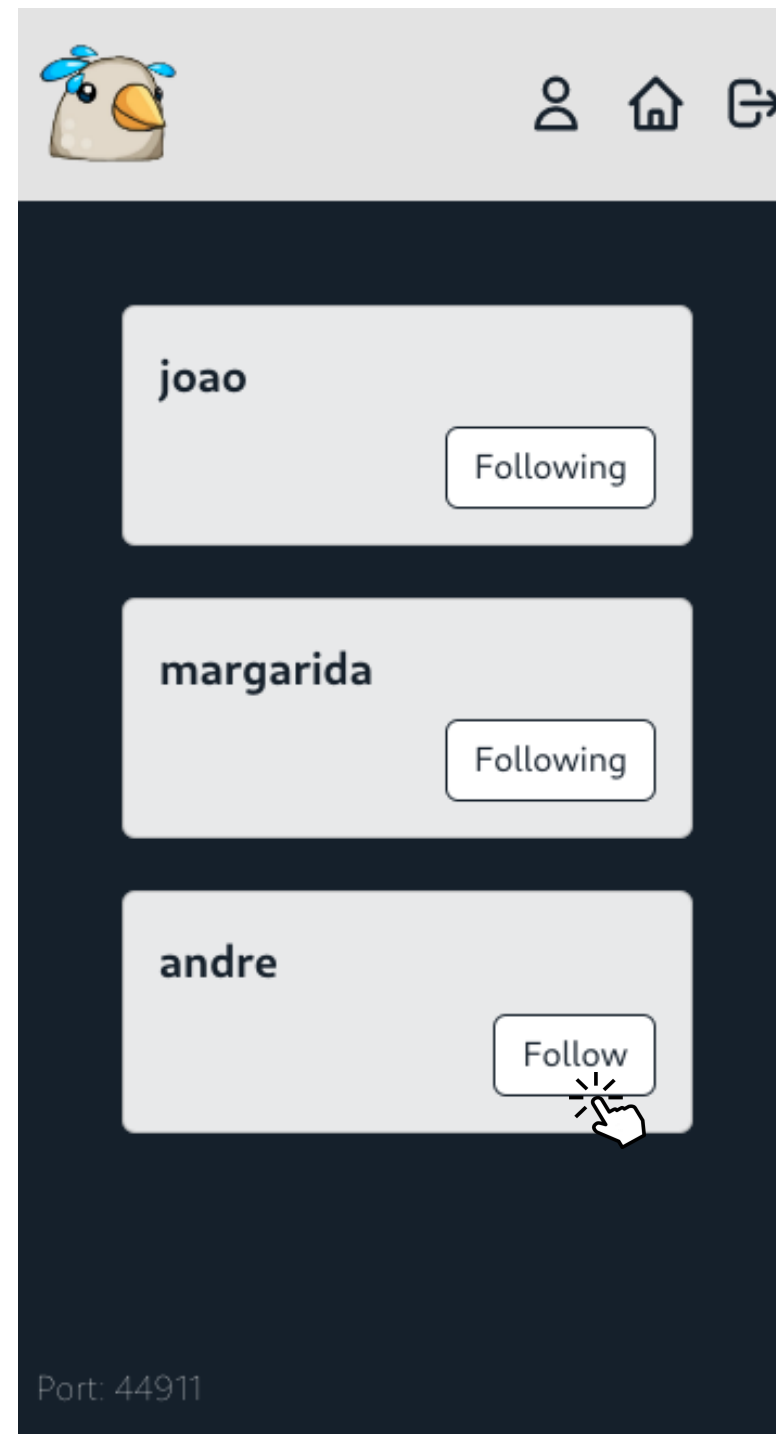
Timeline



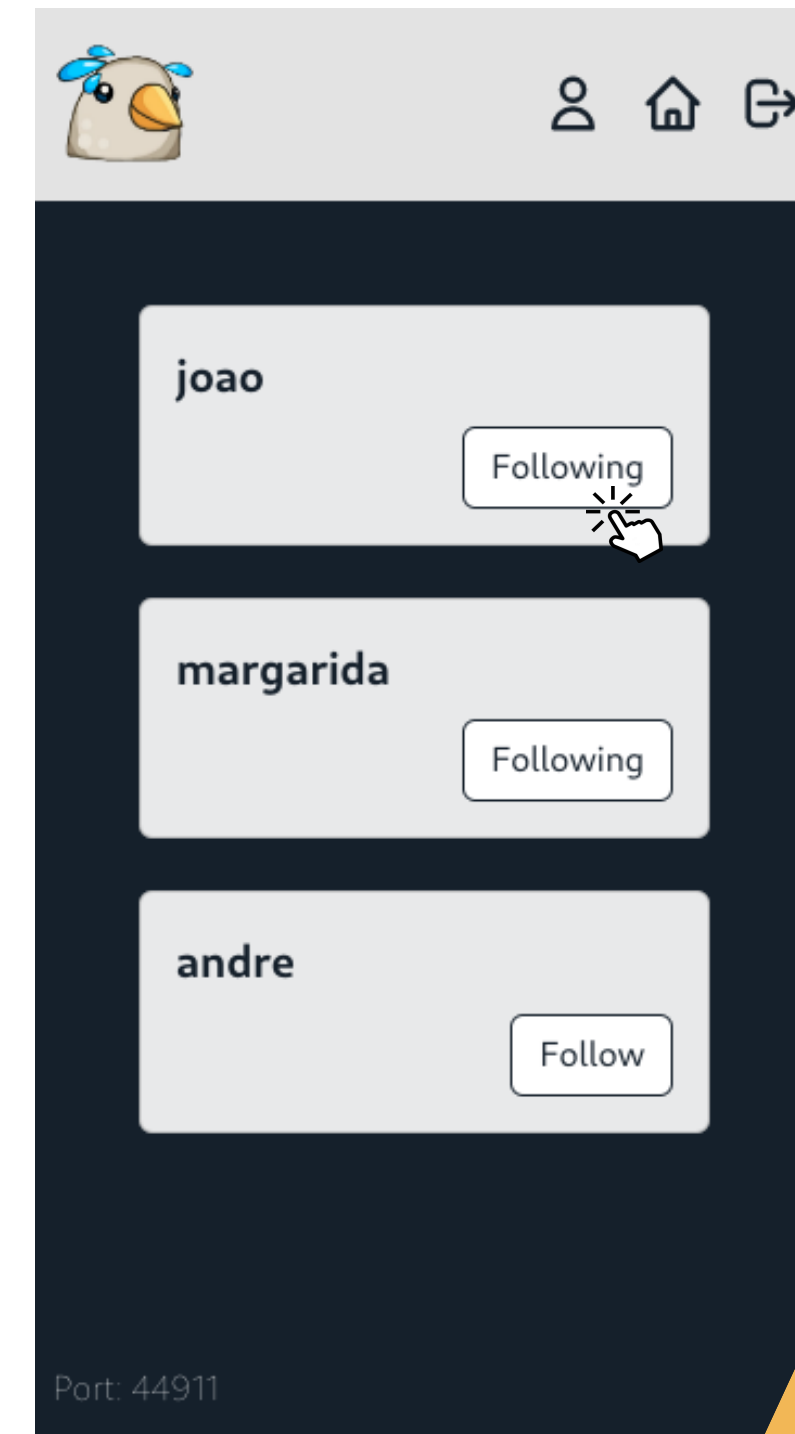
Features



Users



Follow



Unfollow



Architecture Design

- Always one entry point
- New node upon login
- Each node represents an identity
- All nodes can communicate
- Multiple nodes serve as a centralized hub





Design Aspects

Assumptions

- There is always a node running in the network
- Persistency is reliable
- File system is trusted
- All the system components behave as expected



Design Aspects

Backend & Frontend Connection

- Unique express app for each node
- Node's backend port is shared with the frontend
- Each frontend instances makes requests to its node



Design Aspects

Communication in the Network

- Peer Discovery
 - Multicast DNS
 - pubsub Peer Discovery
- Dial protocols
 - Stream Multiplexing
- PubSub
 - Gossip
- Transport
 - TCP



Design Aspects

(Un)Follow Communication in the Network

- PubSub
 - Subscribe to user's topic
- Dial Protocols
 - Follow
 - Unfollow



Design Aspects

Post

Communication in the Network

- PubSub
 - Post
- Dial Protocols
 - Share Posts
 - Request Posts
 - Provide Posts

Posts recorded locally in each node

Posts are available if user or user subscriber is online



Design Aspects

DHT

- Kademlia
- User list
 - Key: Users
 - Value: List of users
- User info
 - Key: Username
 - Value: Password, PeerId, Followers



Design Aspects

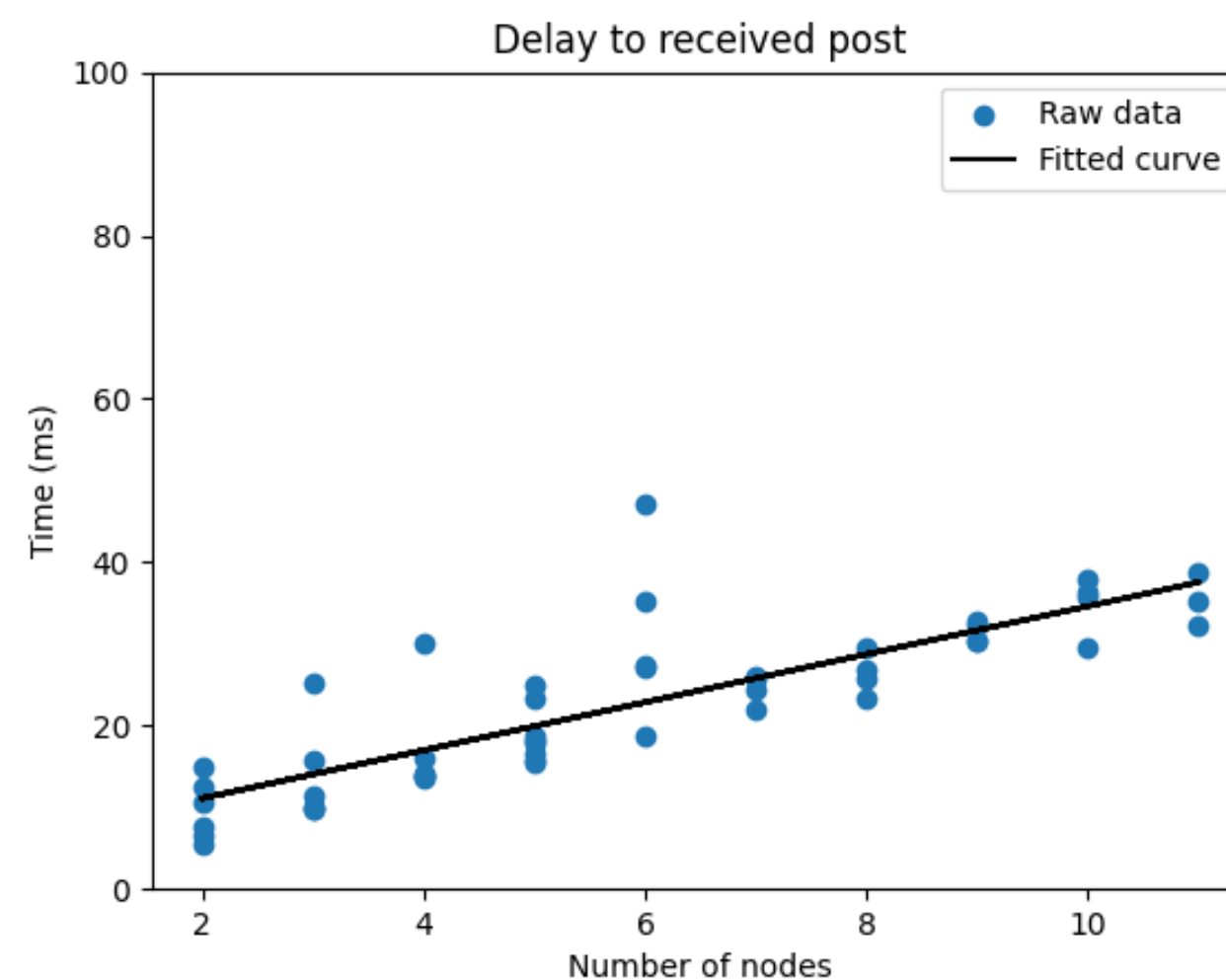
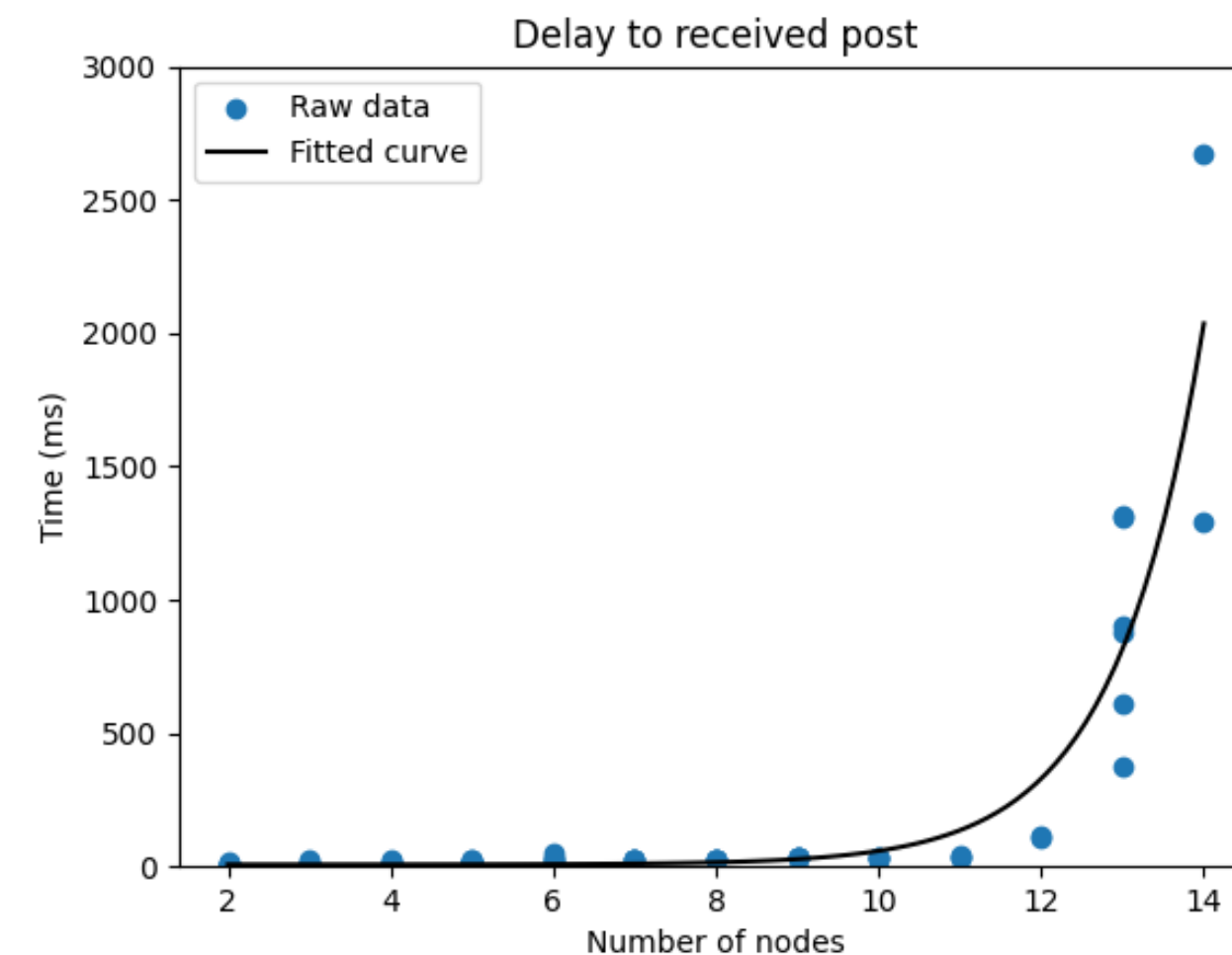
Persistence

- Users
 - Username
 - Password
- Posts
 - Username
 - Message
 - Date
- Followers / Following



Test

Exponential time increase due to experimental setup



Linear relation between time and number of nodes



Welcome to PiuPiu

Login

Username

Password

Do not have an account yet? [Register](#)
[Enter as a Guest](#)