Survivable Social Network on a Chip Team S-16 A2

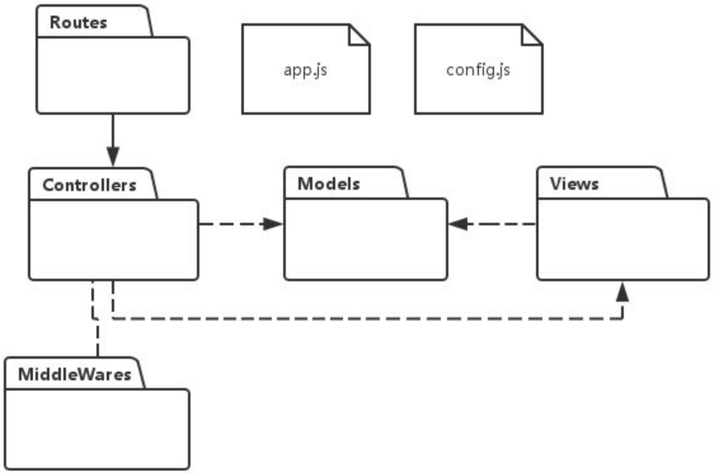
Explain vision of the system here.

Technical Constraints

- **Hardware**: App server runs on a Beaglebone Black with wireless dongle and powered by a rechargeable battery. Clients connect to the app server via their mobile phone browsers. Memory and performance limited by hardware.
- **Client Side Software**: based on HTML5 (HTML5, CSS3, JS) on mobile browser (initially only Chrome on iPhone will be supported)

High-Level Functional Requirements

- *Login/Register/Logout for all users (including administrators)*
- *Users can chat in a public chatroom, or chat between two users*
- Users can share and modify their status.
- Coordinators have the privilege to post announcements, administrators have the privilege to check and update users' profiles
- Users could search for information stored in the system according to some key words.



Top 3 Non-Functional Requirements

Works Out-of-the-Box > Usability *> Energy Consumption*

Both BBB and smart phones have the electrical limits. They could only work continuously for a few days or even shorter.

Architectural Decisions with Rationale

- Server-side JS (node.js) for low footprint and reasonable performance (event-based, non-blocking asynchronous I/O, easily configurable pipe-and-filter for processing incoming requests via middleware)
- Lightweight MVC on the server side via the **express** framework
- **RESTful** API for core functionality to reduce coupling between UI and back-end
- Event-based fast dynamic updates via web-sockets
- The CRUD operations on DB are done in an OO way through a **ORM** library.
- **Single Page Application**: most requests are sent through Ajax. Update the content on the screen without reloading the whole page.
- **MVVM** pattern on the front-end side. Angular.js supports two-way data binding.
- **Modular development** both on server side (nodejs) and client side (sea.js)
- Use **Grunt/Mocha** to do the unit testing

Design Decisions with Rationale

- **ORM(Proxy)**: Design and implement the models in an OO way and map models to db tables.
- Use **Adapter** design pattern is used to be able to substitute a test database for the production database during testing
- **Singleton**: The DB connection, as well as logger, should be singleton.
- **Observer**: To decrease coherence, related components should subscribe events in the system. For example, when a user posts a new message, DB should record it, and the server should push it to other users.
- **Facade**: All the complicated DB operations should be encapsulated behind a facade interface.
- **Factory** Method: In the front-end, there are many code that are repeatedly used in many places. We need to encapsulate them as different services. Then write some factory methods to create these services.
- **Bridge**: Different users might have different roles. A user should owns an attribute, role. Role should be an interface, which has different concrete implementations, such as common user and administrator.

Responsibilities of Main Components

- **socket.io:** dynamic updates from server to client, clients' views are automatically updated when new messages are post or when new new users login
- **Bootstrap**: responsive design, clean, scalable UI layout
- **SQLite**: light-weight DB
- **Sequelize**: an ORM tool for node.js, which allows us to implement DB operations in an OO way
- **Sea.js and Grunt:** organize and modularize client-side code ...
- **Angular.js**: MVVM implementation on the client-side, ajax request and response functions.
- **JQuery**: Bootstrap is based on Jquery. Furthermore, when we need to manipulate DOM elements frequently, JQuery is more convenient than Angular.
- **Node.js/Express**: We'll use node.js to develop the http server. Express.js is a basic MVC framework based on node.js.
- **Underscore**: provides many useful functions. We just use those functions instead of re-inventing the wheels.
- **JSON**: Communication protocal between client and server