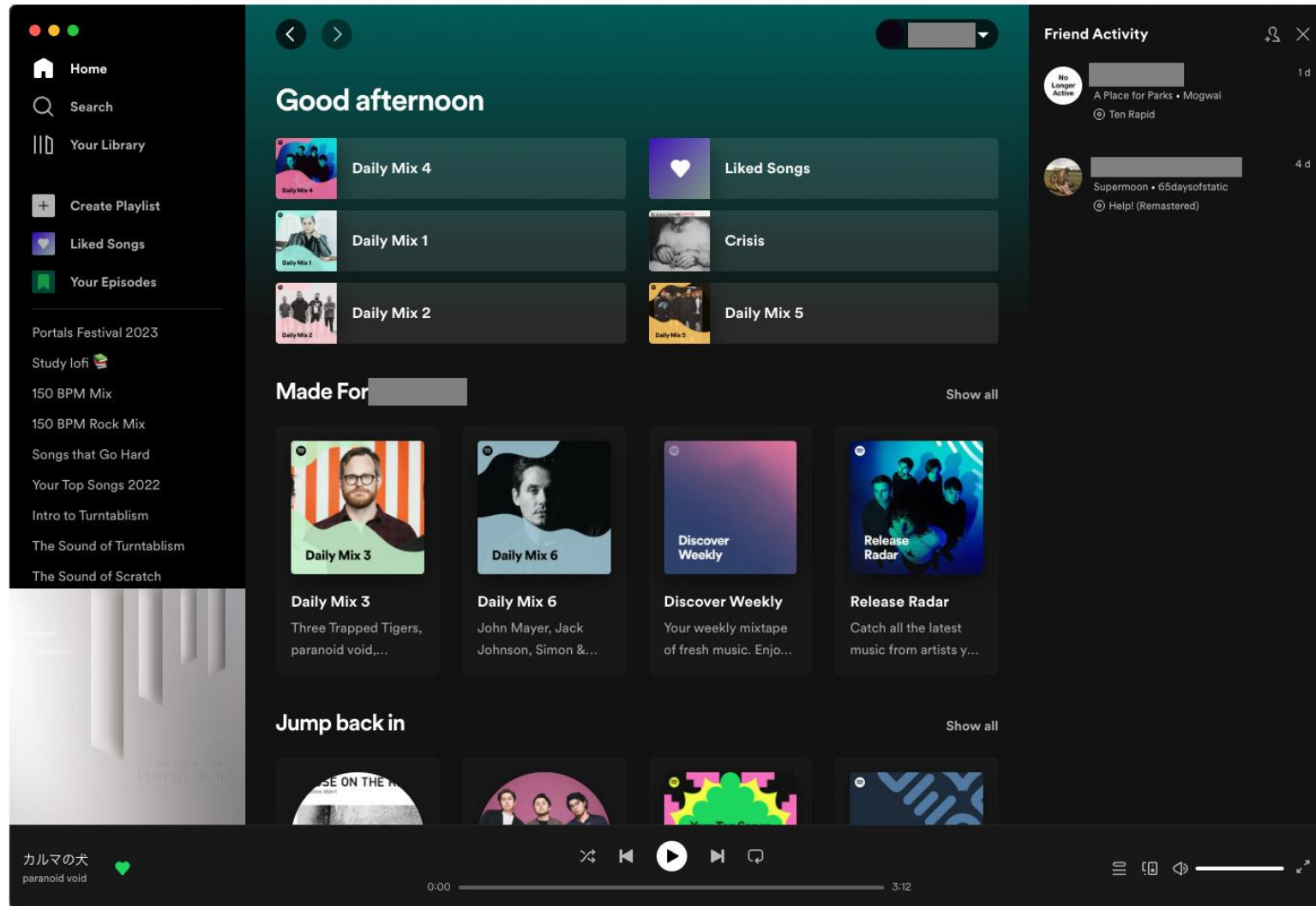# 17-423/723:
Designing Large-scale Software Systems

Recitation
Activity: Design for Scalability

Mar 21, 2025

Exercise #1: Design Spotify

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- Sketch a design of a music streaming application (e.g., Spotify), focusing on two operations: **Searching for songs** and **playing a playlist of songs**

- **Questions to discuss**:
  - What data do we need store for the operations?
  - What data storage model (relational vs. document) for which data?
  - What are major components in the system?
  - What type of scaling (vertical, horizontal, or both) do we apply?
  - How do we distribute data (replication, partitioning, or both)?
  - If replication is used, synchronous vs. asynchronous replication?
  - Which data do we cache? Where is the cache stored?

Exercise #2: Design Slack

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- Sketch a design of a group communication platform (e.g., Slack), focusing on two operations: **Viewing a channel** and **sending a message to a channel**
- **Questions to discuss**:
  - What data do we need store for the operations?
  - What data storage model (relational vs. document) for which data?
  - What are major components in the system?
  - What type of scaling (vertical, horizontal, or both) do we apply?
  - How do we distribute data (replication, partitioning, or both)?
  - If replication is used, synchronous vs. asynchronous replication?
  - Which data do we cache? Where is the cache stored?

Slack Design (2018)
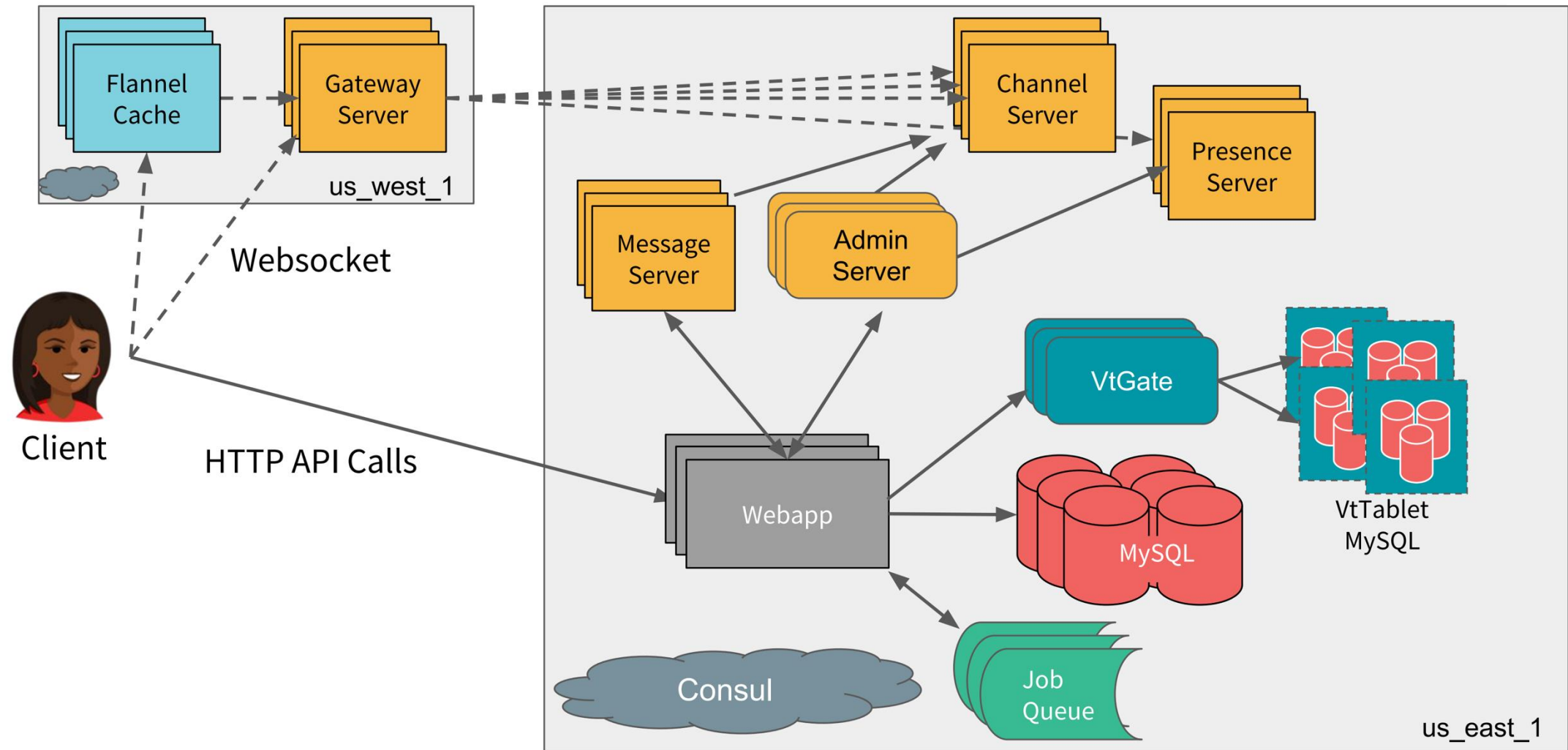
Scaling Slack - The Good, the Unexpected, and the Road Ahead (Mike Demmer, 2018)