SyncSpace : A Web-Hosted Distributed Collaborative Workspace

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Team 19

Introduction

This project aims to develop a distributed system for real-time remote collaboration, seamlessly integrating voice chat, interactive boards, and synchronized workspaces—features that set it apart from existing platforms like Slack, Discord, and Microsoft Teams.

Objective

To build a distributed system that facilitates seamless collaboration in professional remote work environments by integrating real-time communication, interactive workspaces, and synchronization features within a single application.

Background & Motivation

This project is inspired by prior work in real-time communication applications like a chatroom. While many existing platforms primarily focus on messaging and voice communication, this project aims to extend beyond basic interactions by incorporating real-time collaborative features. Drawing from tools like Miro, Slack, and Microsoft Teams, the goal is to develop a distributed application that enables seamless collaboration within a shared workspace, ensuring synchronization across all users.

Methodology

- The system will be a web-hosted distributed application designed for seamless real-time collaboration. The core functionality will revolve around a collaborative workspace where users can engage in various interactive activities while remaining in sync.
- Key features include:
    - Voice chat rooms to facilitate real-time discussion.
    - Whiteboards and code spaces to enable interactive collaboration.
    - Screen sharing with potential multi-user interactivity.
- Replication is intended to be implemented using one of the following distributed models to ensure a fault tolerant system. The goal with implementing replication is to ensure high availability and reliability:
    - Single Leader-Multiple Follower Model (Primary replication design)
    - Bully Leader Election Algorithm (Leader election)
- The focus will be on creating a professional collaborative work environment that maintains consistency while multiple users interact with shared content.

Expected Outcomes

- A web-hosted distributed application that enables real-time remote collaboration while ensuring fault tolerance and scalability.
- A seamless experience where users feel as though they are working in a shared space with synchronized changes, supported by distributed coordination mechanisms.

Timeline

- Week 1-2: Research and finalize technology stack & distributed algorithms.
- Week 3-4: Develop the foundational chat system with voice integration.
- Week 5-6: Implement collaborative workspace features (whiteboard, code space, screen sharing).
- Week 7-8: Integrate distributed algorithms for synchronization and real-time collaboration.
- Week 9-10: Testing, optimization, and final refinements.
- Final Week: Demo and Final Report

References

Microsoft Teams: Collaborative Workspaces, MIRO, Discord, A previous project of chatroom (github link).