**LIVEDOCS: A PEER-TO-PEER REAL-TIME COLLABORATIVE DOCUMENT EDITOR USING WEBRTC AND CRDTS**

**A PROJECT REPORT**

***Submitted by***

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**ABSTRACT**

LiveDocs is a decentralized, real-time collaborative document editor designed to enable seamless and efficient collaboration without reliance on centralized servers. Unlike traditional cloud-based solutions such as Google Docs, LiveDocs utilizes WebRTC for direct P2P communication and Yjs (CRDTs) for distributed data synchronization. This architecture ensures low-latency collaboration, enhanced fault tolerance, and seamless scalability, supporting millions of concurrent users. Key features include real-time editing, and role-based access control, all powered by a resilient P2P network. Secure authentication is ensured through JWT-based access control, enabling efficient document indexing and user management while delivering a modern and sleek user experience. By eliminating centralized infrastructure, LiveDocs reduces server costs, enhances scalability, and improves fault tolerance, making it an ideal solution for teams, enterprises, and large-scale applications requiring secure and real-time document collaboration.

**Keywords:**

Peer-to-Peer Collaboration, Real-Time Document Editing, WebRTC, CRDTs (Yjs), Decentralized Collaboration, JWT Authentication.

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**LIST OF ABBREVIATIONS**

|  |  |
| --- | --- |
| **ABBREVIATION** | **EXPANSION** |
| AI | Artificial Intelligence |
| API | Application Programming Interface |
| CRDT | Conflict-Free Replicated Data Type |
| CSS | Cascading Style Sheets |
| JSON | JavaScript Object Notation |
| JWT | JSON Web Token |
| NAT | Network Address Translation |
| ORM | Object-Relation Mapping |
| OT | Operational Transformation |
| P2P | Peer-to-Peer |
| SQL | Structured Query Language |
| STUN | Session Traversal Utilities for NAT |
| TURN | Traversal Using Relays around NAT |
| UI | User Interface |
| WebRTC | Web Real-Time Communication |