Project Report: Cloud Document Sharing Platform

UID: 23BCS10135
Name: Aryan Srivastav
Section: KRG-2-B
Subject: PBLJ

1. Description

The Cloud Document Sharing Platform is a comprehensive full-stack web application designed to provide secure, enterprise-grade file sharing capabilities with granular access control and comprehensive audit trails. The platform addresses the growing need for organizations to share sensitive documents securely while maintaining complete visibility over file access and usage patterns.

Built with a modern tech stack comprising React for the frontend, Spring Boot for backend services, AWS S3 for scalable cloud storage, and MySQL for relational data management, the platform offers a seamless user experience while ensuring robust security measures. The system focuses on three core pillars: secure file storage, intelligent access management, and comprehensive activity monitoring.

Unlike traditional file sharing solutions that often compromise on either security or usability, this platform strikes a balance by providing intuitive interfaces backed by enterprise-level security protocols. Every file interaction is logged, permissions are dynamically managed, and users can collaborate confidently knowing their documents are protected by industry-standard security measures.

2. Problem Statement

Current file sharing solutions in organizational environments often fall short in several critical areas. Traditional email attachments have size limitations and lack version control, while basic cloud storage services provide insufficient access control granularity and limited audit capabilities.

Many organizations struggle with:

- Lack of granular permission controls - inability to set specific access levels for different users
- Poor audit trails - limited visibility into who accessed what files and when
- Security vulnerabilities - inadequate protection for sensitive documents
- Version management issues - confusion over document versions and updates
- Compliance challenges - difficulty meeting regulatory requirements for document access logging

The Cloud Document Sharing Platform addresses these pain points by providing a centralized, secure environment where organizations can share files with confidence, knowing that every access attempt is logged, permissions are properly managed, and sensitive data remains protected throughout its lifecycle.

3. System Design

High-Level Architecture

Frontend Layer

- React-based single-page application providing responsive, intuitive user interfaces
- Component-based architecture for modular development and maintenance
- Real-time updates for file status and activity notifications
- Progressive web app capabilities for mobile access

Backend Services

- Spring Boot microservices architecture ensuring scalability and maintainability
- RESTful APIs for frontend-backend communication
- JWT-based authentication and authorization
- Scheduled services for cleanup and maintenance tasks

Storage Layer

- AWS S3 integration for scalable, durable file storage
- Intelligent file organization using S3 prefixes and metadata
- Automated backup and versioning capabilities

Database Layer

- MySQL database for relational data including user profiles, permissions, and activity logs
- Optimized indexing for fast query performance
- Regular backup and recovery procedures

Project Report: Cloud Document Sharing Platform

Data Flow Architecture

1. User Authentication: Users log in through Spring Security-managed authentication
2. File Upload: React frontend uploads files directly to S3 via presigned URLs
3. Metadata Storage: File metadata and permissions stored in MySQL
4. Access Control: Spring Boot APIs validate user permissions before granting access
5. Activity Logging: All file interactions logged to MySQL for audit purposes
6. Real-time Updates: WebSocket connections provide live activity feeds

Low-Level Modules

Upload Manager

- Multi-file upload support with progress tracking and error handling
- File type validation and size restrictions
- Automatic virus scanning integration
- Metadata extraction and storage (file size, type, upload timestamp)
- Duplicate detection and handling

Access Control System

- Role-based access control (RBAC) with customizable permission levels
- Dynamic permission assignment and revocation
- Time-limited access links with expiration management
- Department-based and project-based access groups
- Guest access with restricted permissions

Activity Logs Module

- Comprehensive audit trail capturing all file interactions
- Real-time activity dashboard with filtering and search capabilities
- Automated reporting for compliance requirements
- User activity analytics and insights
- Export functionality for external audit tools

Project Report: Cloud Document Sharing Platform

4. Application Type

Platform Type: Full-stack web application with cloud-native architecture

Domain: Enterprise Document Management / Secure File Sharing

Deployment Model: Cloud-hosted with AWS infrastructure

Target Users:

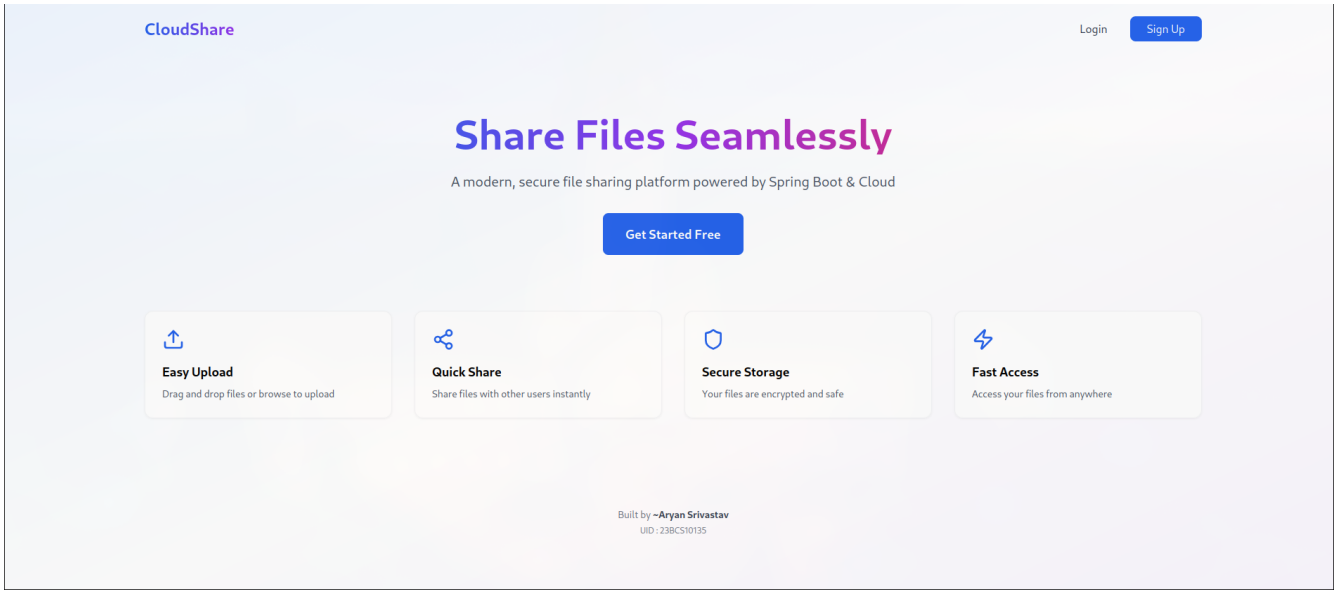
- Enterprise teams requiring secure document collaboration
- Legal firms handling confidential client documents
- Healthcare organizations managing patient records and compliance
- Financial institutions sharing sensitive financial documents
- Educational institutions for academic resource sharing

Technical Specifications:

- Frontend: React 18+ with TypeScript for type safety
- Backend: Spring Boot 3.x with Java 17+
- Database: MySQL 8.0 with InnoDB storage engine
- Cloud Storage: AWS S3 with server-side encryption
- Authentication: JWT tokens with refresh mechanism
- Monitoring: Integrated logging and performance metrics

Project Report: Cloud Document Sharing Platform

5. Conclusion



The Cloud Document Sharing Platform represents a practical, market-ready solution that addresses real organizational pain points while demonstrating mastery of modern full-stack development practices. The project's strength lies in its comprehensive approach to security, usability, and compliance.

Technical Excellence:

- Demonstrates proficiency across multiple technologies and platforms
- Implements industry-standard security practices and patterns
- Shows understanding of cloud architecture and scalability principles
- Incorporates real-world requirements like audit logging and access control

Project Report: Cloud Document Sharing Platform

Real-World Applicability:

- Addresses genuine market needs in enterprise document management
- Scalable architecture supporting future feature extensions
- Compliance-ready design meeting regulatory requirements
- Professional-grade security suitable for sensitive data handling

Future Enhancement Opportunities:

- Advanced Analytics: Machine learning-powered insights on document usage patterns
- Integration Capabilities: APIs for third-party application integration
- Mobile Applications: Native iOS and Android apps for enhanced mobility
- Advanced Security: Zero-trust architecture and end-to-end encryption
- Workflow Automation: Document approval and review workflows
- Global CDN: Multi-region deployment for international organizations