AetherNote Project Report

Abstract

AetherNote is a modern note-taking web application designed to work seamlessly in both offline and online modes. It provides flexibility for guest users with offline storage and ensures data persistence and synchronization for authenticated users. The system prioritizes privacy, security, and simplicity while offering powerful features such as cloud sync, encrypted backups, and conflict resolution mechanisms.

Introduction

In the modern digital age, note-taking applications have become an essential productivity tool. AetherNote was developed with the goal of bridging the gap between offline and online note management. Unlike traditional note-taking apps that rely solely on internet connectivity, AetherNote empowers users to take notes anytime, anywhere, without sacrificing data security or synchronization. This makes it highly adaptable for students, professionals, and everyday users.

Tools Used

- Frontend: React.js for building the user interface.
- Backend & Database: Supabase PostgreSQL for data storage and authentication.
- Authentication: Supabase Auth for secure user login and session management.
- Local Storage: IndexedDB for offline guest notes.
- Encryption: Client-side encryption for backup and restore functionality.
- Sync Mechanism: Conflict resolution with 'last-updated-wins' strategy.

Steps Involved in Building the Project

1. Requirement Analysis – Identified the need for a note-taking app with both offline and online functionality.
2. Frontend Development – Implemented the UI using React.js, providing note CRUD features, pinning, and archiving.
3. Guest Mode Implementation – Configured IndexedDB for offline storage and designed encrypted backup & restore features.
4. Authentication Setup – Integrated Supabase Auth to enable secure logins and user-based note management.
5. Database Integration – Used Supabase PostgreSQL to store and sync notes across devices.
6. Sync Service Development – Built a synchronization layer to merge guest and cloud notes using conflict resolution strategies.
7. Testing & Debugging – Conducted thorough testing to ensure smooth offline-to-online transitions and data consistency.

Conclusion

AetherNote successfully combines offline-first note-taking with secure cloud synchronization. Its guest mode ensures accessibility without an account, while authenticated users benefit from real-time sync and data persistence. The app emphasizes privacy with encrypted backups, making it suitable for a wide range of users. Future improvements, such as background auto-sync and mobile optimizations, will further enhance its usability and adoption.