Low Level Design(LLD)

PlayWave: Video Streaming WebApp Remaining

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1. Introduction

1.1 Why this Low Level Design Document?

The purpose of this **Low Level Design (LLD)** document is to define the component-level architecture for **PlayWave Video Streaming App**. It provides in-depth technical details regarding **backend, frontend, APIs, and database schemas**, ensuring smooth implementation.

This document will:

- Describe the **detailed design of each module**.
- Define **API endpoints and their behavior**.
- Specify **error handling and security measures**.

1.2 Scope

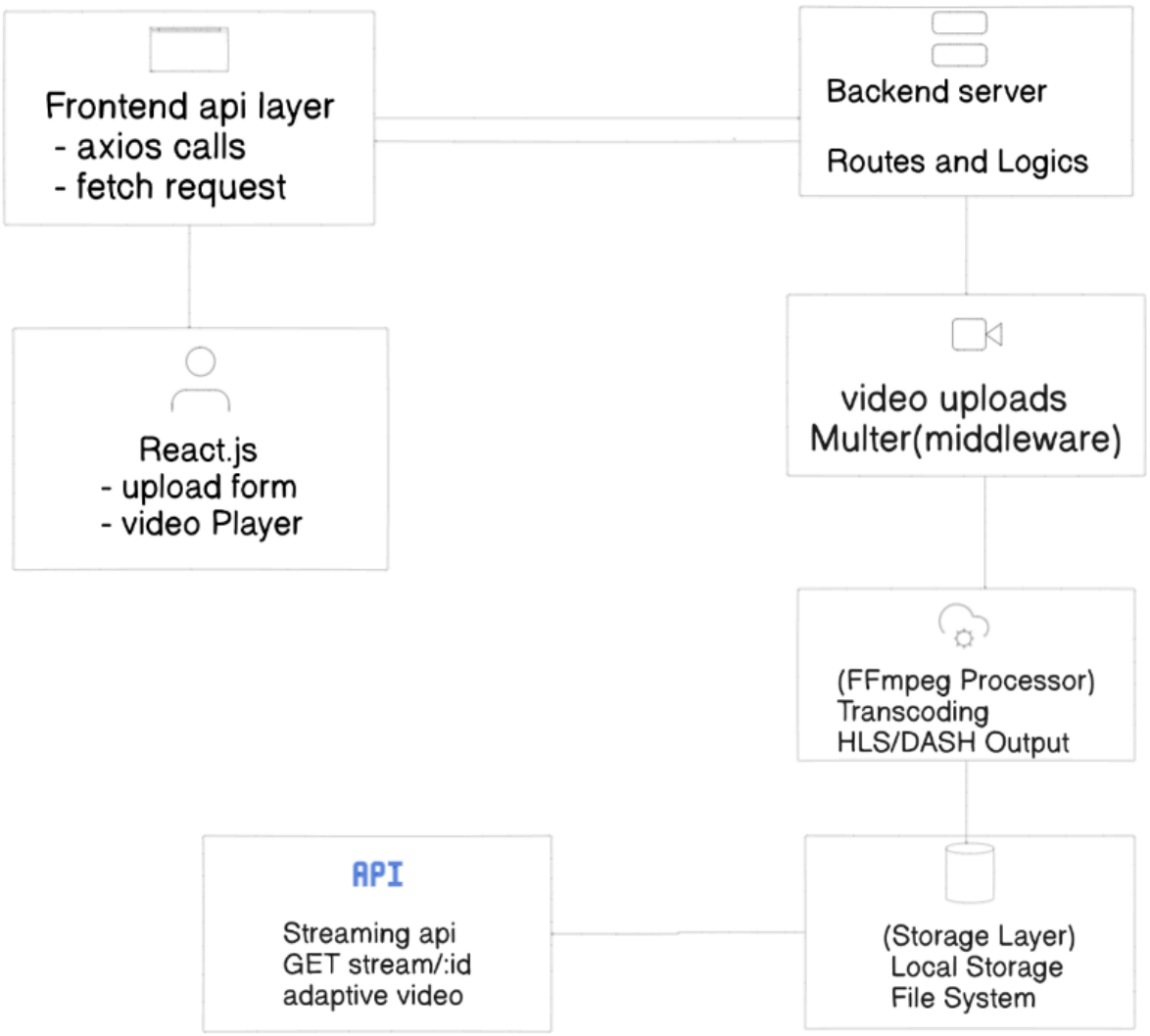
The **LLD** focuses on breaking down **each system component** into detailed **functional blocks**, including how they **interact with each other**.

1.3 Definitions

- **Multer**: Middleware for handling file uploads in Node.js.
- **FFmpeg**: A tool for video processing and conversion.
- **Express.js**: Web framework for handling API requests.

2. Component-Level Design

2.1 System Architecture (Enhanced Overview)



2.2 API Endpoints and Routes

2.2.1 Video Upload API

- **POST /upload** – Uploads video file to local storage.

- **Middleware**: Multer (for handling file uploads).

2.2.2 Video Processing API

- **POST /process/:id** – Converts uploaded video to HLS/DASH using FFmpeg.

2.2.3 Video Streaming API

- **GET /stream/:id** – Serves video files to the frontend player.

3. Error Handling and Logging

- **Try-Catch Blocks**: Used for handling errors in API routes.
- **Winston Logger**: Logs API calls and errors for debugging.
- **Validation Middleware**: Ensures only valid files are uploaded.

4. Security Considerations

- **Rate Limiting**: Prevents abuse of API calls.
- **CORS Policy**: Restricts access to trusted origins.

5. Conclusion

The **PlayWave Low Level Design (LLD)** provides a comprehensive breakdown of **backend, frontend, API endpoints, and security features**. This ensures **structured development, efficient debugging, and robust security** for a seamless video streaming experience.