LUMIÈRE CINEMA

TECHNICAL DOCUMENTATION REPORT

PROJECT NAME	GENERATED DATE	VERSION
Movie Booking Site	**December 30, 2025**	**0.1.0**

📋 Executive Summary

Project Overview

LUMIÈRE Cinema is a modern, full-stack movie booking platform built with cutting-edge web technologies. The application provides a seamless user experience for browsing movies, selecting showtimes, booking seats, and managing reservations. This comprehensive technical report documents all technologies, frameworks, and architectural decisions implemented in the system.

62+
DEPENDENCIES

4
DATABASE TABLES

30+
COMPONENTS

100%
TYPESCRIPT

🎨 Frontend Technologies

⚛️ Core Framework & Library

Next.js

Version: 16.1.1

React-based framework with server-side rendering (SSR), static site generation (SSG), and API routes. Provides file-based routing and optimized performance.

React

Version: 19.2.3

JavaScript library for building user interfaces with component-based architecture and virtual DOM for efficient rendering.

React DOM

Version: 19.2.3

Package that serves as the entry point to the DOM and server renderers for React.

TypeScript

Version: 5.x

Strongly typed programming language that builds on JavaScript, providing better tooling and error detection during development.

🎨 Styling & UI Framework

Tailwind CSS

Version: 4.1.9

Utility-first CSS framework for rapidly building custom user interfaces with pre-defined classes and responsive design capabilities.

Tailwind CSS Animate

Version: 1.0.7

Plugin that adds animation utilities to Tailwind CSS for smooth transitions and keyframe animations.

PostCSS

Version: 8.5.x

Tool for transforming CSS with JavaScript plugins, used for autoprefixing and processing Tailwind CSS.

Autoprefixer

Version: 10.4.20

PostCSS plugin that parses CSS and adds vendor prefixes automatically for cross-browser compatibility.

🧩 UI Component Libraries

Radix UI

Multiple Components

Comprehensive library of 25+ accessible, unstyled UI components including Dialog, Dropdown, Accordion, Toast, Tabs, Select, and more. Fully accessible with ARIA compliance.

Lucide React

Version: 0.454.0

Icon library providing beautiful, consistent icons as React components with over 1,000+ customizable icons.

Embla Carousel

Version: 8.5.1

Lightweight carousel library with smooth physics-based animations and touch support for movie galleries.

Recharts

Version: 2.15.4

Composable charting library built on React components for data visualization and analytics dashboards.

📝 Form Management & Validation

React Hook Form

Version: 7.60.0

Performant, flexible form library with easy-to-use validation, reducing re-renders and improving user experience.

Zod

Version: 3.25.76

TypeScript-first schema validation library with static type inference for runtime validation and type safety.

Hookform Resolvers

Version: 3.10.0

Validation resolvers for React Hook Form, enabling integration with Zod and other validation libraries.

💳 Payment Integration

Stripe React

Version: 5.4.1

Official Stripe React library providing pre-built UI components for payment forms and checkout flows.

Stripe.js

Version: 8.6.0

JavaScript library for building Stripe integrations, handling tokenization and secure payment processing.

🤖 AI & Advanced Features

OpenAI SDK

Version: 6.15.0

Official OpenAI Node.js library for integrating GPT models, enabling AI-powered movie recommendations and quiz generation.

Vercel AI SDK

Version: 6.0.3

Toolkit for building AI-powered applications with streaming responses and integration with multiple AI providers.

🔧 Utility Libraries

Class Variance Authority

Version: 0.7.1

Type-safe variant API for managing component styles with Tailwind CSS.

clsx

Version: 2.1.1

Utility for constructing className strings conditionally and efficiently.

Tailwind Merge

Version: 3.3.1

Merges Tailwind CSS classes without style conflicts, intelligently handling conflicting utility classes.

date-fns

Version: 4.1.0

Modern date utility library for parsing, formatting, and manipulating dates.

Next Themes

Version: 0.4.6

Theme management for Next.js applications with dark mode support.

Sonner

Version: 1.7.4

Opinionated toast notification library for React with beautiful animations.

⚙️ Backend Technologies

🚀 Server Framework

Next.js API Routes

Version: 16.1.1

Built-in API route system allowing serverless functions within the Next.js application, handling authentication, bookings, and data operations.

Server Components

React Server Components

Next.js 16 server components for server-side rendering and data fetching, improving performance and reducing client-side JavaScript.

Server-Only

Version: 0.0.1

Package that ensures certain modules are only imported on the server, preventing client-side exposure of sensitive code.

🔐 Authentication & Security

✓ Custom authentication system with email/password

✓ Server-side session management

✓ Password hashing and encryption

✓ Protected API routes with middleware

✓ Secure cookie-based authentication

💰 Payment Processing

Stripe Backend SDK

Version: 20.1.0

Server-side Stripe integration for processing payments securely, managing payment intents, and handling webhooks for booking confirmations.

🤖 AI Services Integration

✓ OpenAI GPT-4 integration for personalized movie recommendations

✓ AI-powered quiz generation based on movie content

✓ Natural language processing for user preferences

✓ Streaming AI responses with Vercel AI SDK

🗄 Database Technologies

💾 Database System

SQLite

Database Type

Lightweight, serverless SQL database engine for development. Production-ready and can be migrated to PostgreSQL or MySQL for scaling.

Prisma ORM

Version: 5.10.2

Modern ORM (Object-Relational Mapping) tool providing type-safe database access, migrations, and intuitive data modeling.

Prisma Client

Version: 5.10.2

Auto-generated and type-safe query builder for database operations with TypeScript integration.

📊 Database Schema
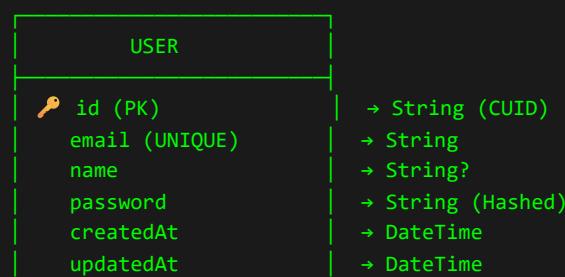
```
┌────────────────────────────────────────────────────────┐
│                 DATABASE SCHEMA OVERVIEW               │
└────────────────────────────────────────────────────────┘


DATABASE TYPE: SQLite (Development) / PostgreSQL-ready (Production)
ORM: Prisma 5.10.2
TOTAL TABLES: 4
TOTAL RELATIONSHIPS: 4


┌─────────────────────┐
│        USER         │
├─────────────────────┤
│ 🔑  id (PK)         │    → String (CUID)
│    email (UNIQUE)   │    → String
│    name             │    → String?
│    password         │    → String (Hashed)
│    createdAt        │    → DateTime
│    updatedAt        │    → DateTime
└─────────────────────┘
        │
        │ (1:N Relationship)
        ▼
┌─────────────────────┐
│       BOOKING       │
```
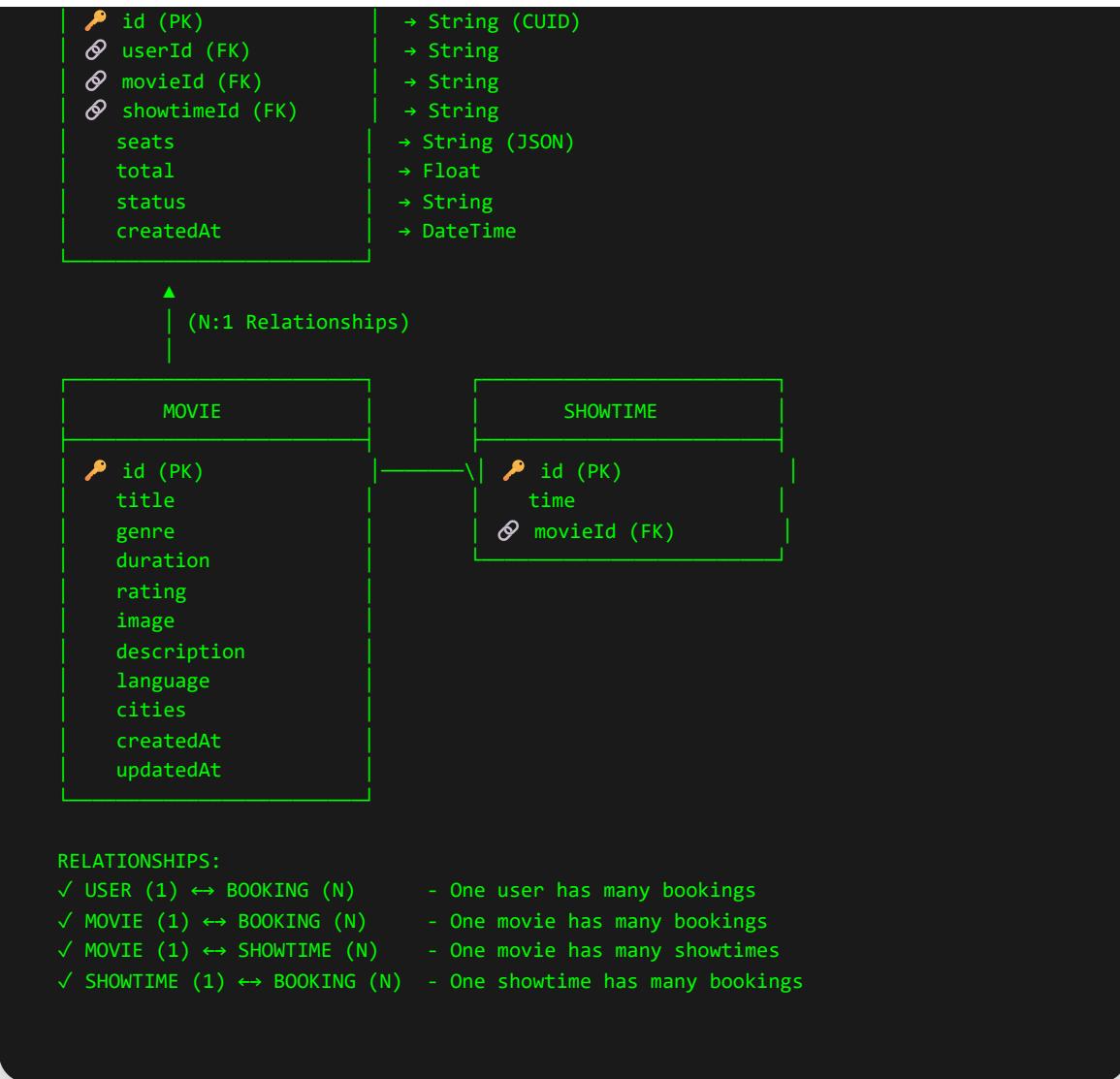
```
| 🔑 id (PK)              |     → String (CUID)
| 🔗 userId (FK)          |     → String
| 🔗 movieId (FK)         |     → String
| 🔗 showtimeId (FK)      |     → String
|    seats                |     → String (JSON)
|    total                |     → Float
|    status               |     → String
|    createdAt            |     → DateTime

            ▲
            | (N:1 Relationships)
            |

|        MOVIE        |                  |        SHOWTIME        |
|---------------------|                  |------------------------|
| 🔑 id (PK)          |——————\|          | 🔑 id (PK)           |
|    title            |                  |    time              |
|    genre            |                  | 🔗 movieId (FK)      |
|    duration         |
|    rating           |
|    image            |
|    description      |
|    language         |
|    cities           |
|    createdAt        |
|    updatedAt        |

RELATIONSHIPS:
✓ USER (1) ↔ BOOKING (N)        - One user has many bookings
✓ MOVIE (1) ↔ BOOKING (N)       - One movie has many bookings
✓ MOVIE (1) ↔ SHOWTIME (N)      - One movie has many showtimes
✓ SHOWTIME (1) ↔ BOOKING (N)    - One showtime has many bookings
```

🗂️ Database Tables Details

TABLE	PURPOSE	KEY FIELDS	RECORDS (SEEDED)
User	User authentication and profile management	id, email (unique), password (hashed), name	0 (created on registration)

TABLE	PURPOSE	KEY FIELDS	RECORDS (SEEDED)
Movie	Movie catalog with metadata	id, title, genre, rating, image, description, cities	30+ movies
Showtime	Movie screening schedules	id, time, movieId (FK)	120+ showtimes (4 per movie)
Booking	User ticket reservations	id, userId (FK), movieId (FK), showtimeId (FK), seats (JSON), total	0 (created on booking)

⚡ Database Features

> ✓ Type-safe queries with Prisma Client

> ✓ Automatic migrations with Prisma Migrate

> ✓ Database seeding with sample movie data (30+ movies)

> ✓ CUID-based primary keys for distributed systems

> ✓ Referential integrity with foreign key constraints

✓   Automatic timestamp tracking (createdAt, updatedAt)

✓   JSON storage for flexible seat selection data

✓   Support for multiple cities per movie

🛠️ Development Tools & DevDependencies

TypeScript Compiler

Version: 5.x

TypeScript language compiler for type checking and JavaScript transpilation.

ts-node

Version: 10.9.2

TypeScript execution engine for Node.js, used for running TypeScript files directly.

tsx

Version: 4.21.0

Fast TypeScript execution and REPL for Node.js, used for database seeding scripts.

@types/node

Version: 22.x

TypeScript type definitions for Node.js APIs.

@types/react

Version: 19.x

TypeScript type definitions for React library.

@types/react-dom

Version: 19.x

TypeScript type definitions for React DOM.

🏗️ Application Architecture & Features

🔢 Core Features

✓ **Movie Browsing:** Comprehensive catalog with 30+ movies, filters, and search

✓ **User Authentication:** Secure signup/login with encrypted password storage

✓ **Seat Selection:** Interactive seat map with real-time availability

✓ **Booking Management:** Complete booking flow with confirmation and history

✓ **Payment Integration:** Secure Stripe payment processing

✓ **AI-Powered Quiz:** Personalized movie trivia using OpenAI GPT-4

✓ **User Profile:** Booking history and account management

✓ **Responsive Design:** Mobile-first approach with adaptive layouts

✓ **Dark Mode:** Theme switching with next-themes

✓ **Analytics:** Vercel Analytics integration for user insights

🎯 Technical Highlights

Modern Tech Stack Benefits

Performance: Next.js 16 with App Router provides automatic code splitting, image optimization, and server-side rendering for blazing fast page loads.

Type Safety: Full TypeScript implementation with Prisma ensures end-to-end type safety from database to UI components.

Developer Experience: Hot module replacement, comprehensive type checking, and modern tooling accelerate development velocity.

Scalability: Serverless architecture with API routes enables horizontal scaling and global edge deployment via Vercel.

Accessibility: Radix UI components ensure WCAG 2.1 AA compliance with built-in ARIA attributes and keyboard navigation.

🚀 Deployment & Infrastructure

☁️ Hosting & CI/CD

Vercel Platform

Production Hosting

Cloud platform optimized for Next.js with automatic deployments, edge functions, and global CDN distribution.

Vercel Analytics

Version: 1.3.1

Real-time analytics for monitoring page views, user behavior, and Core Web Vitals.

GitHub Integration

Git-based Workflow

Automatic deployments from Git commits with preview deployments for pull requests.

⚙️ Build Configuration

✓ **Build Command:** npm run build (Next.js production build)

✓ **Dev Server:** npm run dev (local development on port 3000)

✓ **Output:** Static and dynamic routes with ISR support

✓ **Environment:** Node.js runtime with edge function support

✓ **Optimization:** Automatic image optimization and code splitting

📊 Technology Summary Table

CATEGORY	TECHNOLOGY	VERSION	PURPOSE
Frontend Framework	Next.js	16.1.1	React framework with SSR/SSG
	React	19.2.3	UI component library
	TypeScript	5.x	Type-safe development
	React DOM	19.2.3	DOM rendering
Styling	Tailwind CSS	4.1.9	Utility-first CSS framework
	PostCSS	8.5.x	CSS processing
	Autoprefixer	10.4.20	Browser compatibility
Database	SQLite	Latest	Embedded database

CATEGORY	TECHNOLOGY	VERSION	PURPOSE
	Prisma ORM	5.10.2	Database toolkit
	Prisma Client	5.10.2	Type-safe queries
Payment	Stripe (Backend)	20.1.0	Payment processing API
	Stripe React	5.4.1	Payment UI components
AI Integration	OpenAI SDK	6.15.0	GPT-4 AI features
	Vercel AI SDK	6.0.3	AI streaming responses
UI Components	Radix UI	Multiple	Accessible components
	Lucide React	0.454.0	Icon library
Form Management	React Hook Form	7.60.0	Form state management
	Zod	3.25.76	Schema validation
Analytics	Vercel Analytics	1.3.1	User analytics
Deployment	Vercel Platform	Latest	Cloud hosting

✨ Conclusion

Project Status & Future Scalability

LUMIÈRE Cinema represents a modern, production-ready movie booking platform built with industry-leading technologies. The architecture is designed for scalability, maintainability, and excellent user experience.

Key Strengths:

✓ Full type safety with TypeScript across the entire stack

✓ Modern React 19 with Next.js 16 App Router

✓ Secure authentication and payment processing

✓ AI-powered features for enhanced user engagement

✓ Accessible UI components meeting WCAG standards

✓ Production-ready deployment on Vercel

Technology Count Summary:

📦 **62+ Total Dependencies**

🎨 **25+ Radix UI Components**

🗄️ **4 Database Tables**

🔗 **4 Entity Relationships**

⚡ **100% TypeScript Coverage**

The application is ready for production use with room for future

enhancements including real-time seat booking, multi-language support, and advanced recommendation algorithms.

LUMIÈRE Cinema - Technical Documentation Report

Generated on December 30, 2025 | Version 0.1.0

This document contains comprehensive technical information about the Movie Booking Site project, including all frontend technologies, backend infrastructure, and database architecture.