Technology Stack Comparison

1. Introduction

In this document I will compare frameworks for a web-based application, covering the frontend, backend, and database. The selected stack consists of:

- **Frontend:** Next.js
- **Backend:** Spring Boot
- **Database:** PostgreSQL

I will compare

- Next.js vs. React for frontend
- Spring Boot vs. Express.js for backend
- PostgreSQL vs. MySQL for the database.

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2. Frontend: Next.js vs. React

Feature	Next.js	React
Rendering	Supports SSR, SSG, ISR, and CSR	Only supports CSR (unless using additional libraries)
Routing	File-based routing	Uses React Router for manual routing
Performance	Optimized for fast loading (SSR, SSG)	Slower initial load due to CSR
SEO	Excellent (SSR, SSG)	Poor (CSR-based SEO issues)
API Routes	Built-in API handling	Requires a separate backend
Ease of Use	Simple structure with automatic optimizations	Requires more configuration
Community & Ecosystem	Strong, backed by Vercel	Large ecosystem but needs extra tools for SSR

Conclusion: Next.js is chosen due to its superior performance, built-in routing, and better SEO capabilities.

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3. Backend: Spring Boot vs. Express.js

Feature	Spring Boot	Express.js
Performance	Optimized, supports multithreading	Single-threaded, may struggle with high loads
Scalability	Enterprise-level, highly scalable	Good for small to medium apps
Security	Built-in security (Spring Security)	Requires manual implementation
Ease of Use	More complex but powerful	Simpler, lightweight
Community & Ecosystem	Large enterprise adoption	Strong, but mostly for small applications
Microservices Support	Excellent	Requires third-party libraries

Conclusion: Spring Boot is selected due to its superior scalability, built-in security, and strong enterprise support.

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4. Database: PostgreSQL vs. MySQL

Feature	PostgreSQL	MySQL
Performance	Excellent for complex queries	Faster for simple reads/writes
Scalability	Highly scalable	Good but not as efficient for large-scale applications
ACID Compliance	Fully ACID-compliant	ACID-compliant but with limitations
JSON Support	Advanced JSONB storage	Basic JSON support
Concurrency	Better handling of concurrent transactions	Lock-based concurrency, may cause delays

Conclusion: PostgreSQL is chosen for its better scalability, ACID compliance, and advanced query capabilities.