ADR-2

Migration from Node.js to Java for Backend Development

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Status

Accepted

Author

System Architecture Team

Context

The backend of PitchPlease was originally planned to be implemented using Node.js. While it offered rapid prototyping and ease of use, several emerging needs including more robust scalability, better alignment with team skill sets, and efficient microservice decomposition have motivated reevaluation. Increasing complexity of business logic and the need for clearer module boundaries and performance efficiency became key concerns.

Decision

We have decided to migrate the backend services from Node.js to Java. All new microservices will be implemented using Java.

Alternatives

Alternative	Pros	Cons
Continue with Node.js	Lightweight, asynchronous, quick development	Callback hell, less type safety, harder to manage large scale systems, less performant for CPU-intensive tasks
Use Python (FastAPI)	Simple syntax, quick MVPs	Poor multi-threaded performance, less optimized for high-concurrency APIs

Migrate to Java (Chosen)	Strong OOP, mature ecosystem, team familiarity, better support for structured microservices	Slightly more verbose, steeper learning for frontend devs interacting with backend

Rationale

Java offers better long-term maintainability and performance for large-scale backend systems. It supports strong typing, structured concurrency, and built-in multithreading, which are beneficial for implementing a robust microservices architecture. Furthermore, the existing development team has prior experience with Java, lowering the training overhead and increasing development velocity.

Consequences

- Migration will take time and careful planning to avoid service disruption.
- Immediate refactoring overhead, but reduced complexity and better scalability in the long run.
- Increased performance and better separation of concerns using OOP principles.
- Team productivity is expected to rise as most developers are already comfortable with Java.

References

- https://developer.oracle.com/java/architecture/
- https://medium.com/backenders-club/the-use-of-java-in-backend-development-6a256fe29107