

IAM Dashboard Backend Service - Design Document

Technology Stack

Core Framework: NestJS with TypeScript for enterprise-grade architecture, dependency injection, and modular design.

Database: PostgreSQL with TypeORM for ACID compliance, type-safe operations, and version-controlled migrations.

Security: JWT/Passport.js authentication, bcrypt password hashing, custom RBAC system with guards/decorators, and class-validator for input sanitization.

Supporting Libraries: Swagger (API docs), Jest (testing)

Production Extension

Monitoring: Prometheus metrics for HTTP requests and system health. Winston structured logging for audit trails and error tracking.

Deployment: Docker containerization with Kubernetes orchestration and horizontal pod autoscaling. Managed PostgreSQL with read replicas and automated backups. NGINX/ALB load balancing with SSL termination.

Migrations: Zero-downtime strategy using nullable columns, batch data population, and phased constraint enforcement.

Security & SAST

Static Analysis: SonarQube for code quality and vulnerability scanning, ESLint Security Plugin for JavaScript/TypeScript issues, and Semgrep for Node.js security patterns.

Dynamic Testing: OWASP ZAP automated penetration testing in CI/CD. Snyk/GitHub Security Advisories for dependency scanning. Trivy for container vulnerability scanning.

Data Protection: Encryption at rest and in transit (TLS 1.3), PII encryption with separate key management, comprehensive audit logging, GDPR compliance with data anonymization.

Performance & Reliability

Redis caching for sessions and frequent queries. Database optimization with indexing and connection pooling. API rate limiting and CDN integration. Automated backups with point-in-time recovery and multi-region disaster recovery setup.