

Mohamed Fathy Salah — Backend Engineer

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Experience

- **BackEnd Engineer, EFG Holding – AFKAR Technology** Apr 2024 – Present
Maintained and enhanced 17 microservices with a strong focus on performance, scalability, security, and consistency.
Tech Stack: .NET, SQL Server, MongoDB, Redis, RabbitMQ, Python, Microservices, Clean and Layered Architecture
 - **Payment Service Optimization:** Reduced execution time by:
 - * Resolving a race condition caused by concurrent row inserts.
 - * Parallelizing client payments for improved throughput.
 - * Optimizing algorithm complexity to $O(n \log n)$.
 - * Limiting database interactions to two trips: one for read and one for update.
 - **Rule Engine Optimization (ValU):** Improved execution time by 350
 - * Precompiling rules, keys, and formulas.
 - * Using lazy evaluation for conditional logic.
 - * Replacing multiple key resolutions with a single compiled execution path.
 - * Optimizing rule definitions, keys, and stored procedures.
 - * Vertically slicing large tables to isolate infrequently used columns.
 - * Rewrote the entire service by separating business logic into .NET code and moving dynamic configurations to the database, reducing the 95th percentile execution time from 70 seconds to 2 seconds.
 - **Distributed Transactions:** Implemented the Saga Pattern for consistent distributed transaction management across services.
 - **Database Optimization:**
 - * Replaced inefficient N+1 queries with optimized single-query operations.
 - * Added Redis caching to reduce DB load and response times.
 - * Created targeted indexes and applied table slicing to enhance performance.
 - * Cut database load by 70% and reduced API response time by 40%.
 - **Data & Workflow Migration:**
 - * Automated the migration of old Elsa workflows.
 - * Transformed 100,000+ unstructured records from Excel and Word documents into structured relational data prior to go-live.
 - **Team Contributions:**
 - * Led code reviews and enforced best practices.
 - * Mentored junior developers on architecture and coding standards.
 - * Applied OWASP-aligned security practices across services.
 - * Authored internal scripts to automate repetitive daily tasks, improving team efficiency and consistency.
- **BackEnd Engineer, Self Employed** Jun 2022 – Present
Tech Stack: .NET, PostgreSQL, React, TypeScript
 - Developed JavaScript automation scripts to streamline and eliminate repetitive tasks during my service in the Egyptian Armed Forces.
 - Developed freelance projects, focusing on scalable backend solutions.
- **Teaching Assistant, Shoubra Faculty of Engineering** Oct 2022 – Jan 2023
Teaching Assistant in Computer Engineering, Department of Electrical Engineering.

Skills

- **Programming Languages:** C# (Proficient), C++, JavaScript, TypeScript, Python.
- **.NET Ecosystem:** .NET, ASP.NET Core, Entity Framework Core, Dapper ORM, LINQ, MassTransit, SignalR, xUnit, Moq.
- **Web & API Development:** RESTful APIs, HTTP, WebSockets, gRPC, GraphQL, HTML, CSS.
- **Databases:** SQL, SQL Server, PostgreSQL, SQLite, MongoDB, Redis.
- **Message Brokers & Eventing:** RabbitMQ, MassTransit, Event-Driven Architecture, Pub/Sub Messaging.
- **Architecture & Design:** Microservices, Modular Monolith, Layered, Hexagonal, Onion, Clean Architecture, SOLID Principles, Design Patterns, Test Pyramid, Object-Oriented Programming (OOP).
- **DevOps & CI/CD:** Git, GitHub, GitHub Actions, Docker, Kubernetes, OpenShift, Azure DevOps.
- **Linux & Scripting:** Bash scripting, systemd, Linux development environment.
- **Computer Science Foundations:** Algorithms, Data Structures, Race Condition Debugging, Caching Strategies.
- **Security:** Familiarity with OWASP best practices for secure software development.
- **Soft Skills:** Communication with stakeholders, Team collaboration and mentoring, Rapid adaptability, Problem-solving, Critical thinking, Effective time management.
- **Languages:** Arabic (Native), English (Proficient - C2).

Projects

- **Maskan** *.NET, C#, PostgreSQL, ReactJS, Tailwind, AWS EC2, CICD*
Multi-tenant real estate management web application for brokers, featuring role-based access control, browser caching strategies, CDN integration, and compliance with OWASP security best practices; supports 5,000+ unique visitors per month and includes real-time user notifications for matching property requests.
- **Circle** *TypeScript, ReactJS, Expo*
cross-platform expense management application for personal and group use, featuring an optimized algorithm for minimal settlement plans, along with interactive reports and visual charts for financial insights.
- **E-Commerce VTON** *TypeScript, Express, Python, FastAPI, Machine Learning, 3D Modeling, MongoDB, Next.js, NATS, Kubernetes, CI/CD*
Event-driven microservice platform for virtual garment shopping.
- **Healthy Meal** *TypeScript, Apollo GraphQL, PostgreSQL, OAuth, Jest, CI/CD*
Meal planning system based on preferences, ingredients, and body shape.

Education

- **Benha University** Bachelor's in Computer Engineering (GPA: 4.0 / 91%) Sep 2017 – Jun 2022

Awards

- Ranked 1st in Bachelor (2022)
- Ranked 118th in ECPC Qualification (2021)
- Ranked 21st in ECPC Qualification and 30th in ACPC Qualification (2022)

Courses & Books

- **.NET 8 Microservices:** ASP.NET Web API, Docker, RabbitMQ, gRPC, YARP Gateway
- **Network Engineering:** Low latency and high throughput backend design
- **Node.js + React Microservices:** E-Commerce microservice app
- **Database Systems (CMU)**
- **Performance Engineering (MIT)**
- Clean Code — Code Refactoring — Design Patterns — DS & Algo Made Easy
- **Awesome Low Level Design**
- **Awesome System Design**