ALESSIO FALANGA

SOFTWARE ARCHITECT & SYSTEMS ENGINEER

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Systems Architect and Full-Stack Engineer specializing in high-concurrency PostgreSQL relational platforms, cloud-native containerized microservices, distributed workflows, and localized AI infrastructure. Experienced in architecting mission-critical industrial ERP/WMS platforms from the ground up (multi-warehouse logistics, supplier automated scraping, QA traceability) and orchestrating autonomous agentic pipelines (FastAPI, n8n, PGVector, Docker, NVIDIA DGX on-premise testing). Proven track record in eliminating operational bottlenecks and bridging complex technical architecture with real business economics.

PROFESSIONAL EXPERIENCE

High-Impact Architecture & Production Systems

PISCINE CV — Componenti Verificati | Software Architect & Systems Engineer

01/2025 – Present · On-site (TV, IT)

Technical Lead architecting a proprietary industrial ERP/WMS platform from scratch, transforming operations into an automated, data-driven enterprise.

Live Sandbox: demoplatform.alessiofalanga.it

- **Proprietary Industrial WMS/ERP Platform:** Architected and scaled an end-to-end operational operating system (Next.js App Router, Prisma, PostgreSQL across **27 active modules**) managing multi-warehouse stock, supplier purchases with carrier tracking (BRT, DHL, GLS), RMA disputes, and task dispatch.
- **Public Interactive Sandbox & Multi-Tier Safety Reset:** Deployed a public live sandbox with 1-click role switching (Admin, Technician, Warehouse, Sales, Logistics) and automated 60-minute baseline state restoration; engineered ironclad fail-safes (including direct SQL engine check `SELECT current_database()`) mathematically preventing resets against production data.
- **Multi-Warehouse ACID Integrity:** Engineered a transactional inventory reconciliation engine synchronizing physical stock, committed quantities, and discrepancy audits between central headquarters and third-party logistics hubs, guaranteeing zero stockout drift.
- **Industrial QA & Traceability ("Componenti Verificati"):** Designed the company's trademark testing ecosystem: physical water-testing protocols, server-side **FFmpeg** video transcoding, **MinIO S3** cloud streaming, and instant cryptographic QR-code certificates for field technicians.
- **Supplier Data Ingestion & Financial ERP Sync:** Built high-throughput scraping pipelines (cURL Multi, Firecrawl API) dynamically indexing supplier catalogs; integrated bidirectional synchronization with Danea EasyFatt to protect real-time profit margins.
- **DevSecOps & Self-Hosted Infrastructure:** Containerized microservices on Docker with Traefik reverse proxy routing, MinIO S3 object storage, and automated deployment pipelines, ensuring 99.9% uptime and zero vendor lock-in.

VERTIGO SRL | Full-Stack & Infrastructure Engineer

02/2026 – Present · Hybrid (VE, IT)

Leading infrastructure migration, database cluster optimization, and localized enterprise AI agent orchestration.

- **Cloud-to-Baremetal Migration:** Architected full migration from managed cloud (Supabase) to a self-hosted Docker/Dokploy environment with **PgBouncer** connection pooling and PostgreSQL schema tuning, cutting monthly infrastructure costs by **60%** and query latency by **50%**.
- **Multi-Modal AI Agent Pipelines:** Designed autonomous event-driven agentic workflows using **n8n**, **PGVector**, Whisper audio transcription, Gemini Vision, and local LLM tool calling (Google Workspace, flights, CRM); integrated custom WhatsApp gateway forks.
- **On-Premise LLM Serving (NVIDIA DGX):** Benchmarked, quantized, and deployed open-source frontier models on dedicated enterprise hardware (NVIDIA DGX), guaranteeing strict corporate data sovereignty and eliminating third-party API dependencies.
- **Enterprise Security & APM:** Implemented automated secret scanning, Postman Vault governance, structured logging, and robust CI/CD automation across distributed microservices.

BYTEDMINDS LTD. | Full-Stack Engineer

07/2025 – 01/2026 · London, UK (Remote)

Contributed to the engineering and delivery of high-availability AI-enabled B2B SaaS solutions.

- **Full-Stack SaaS Delivery:** Engineered core features across Vue 3 / Nuxt and Node.js backend routes with PostgreSQL; collaborated with data teams to translate ML/AI outputs into high-performance user interfaces.
- **Enterprise Auth & Document Workflows:** Implemented JWT authentication, role-based access control (RBAC), server-side PDF generation, digital signature verification, and secure S3 file uploads with validation.
- **Containerization & DevOps:** Containerized services with Docker and docker-compose, setting up automated CI/CD pipelines that reduced deployment cycle times by **~70%**.

UNILAB SRL | Software Developer Intern (VB.NET, C# Algorithms)

06/2022 – 07/2022 · Padova, IT

Refactored legacy thermodynamic calculation software, updating numerical algorithms and data structures for industrial heat exchangers.

SELECTED FLAGSHIP PROJECTS

Production Platforms & Open Architecture

SOLOB2B — B2B Industrial Surplus Marketplace & ReAct AI Copilot

solob2b.it

`Nuxt 4 · Node.js 22 · PostgreSQL 16 (pgvector) · Drizzle ORM · FastAPI · Python 3.13 · Stripe Connect`

- **Modular Monolith & Concurrency:** Engineered a production marketplace (26 tables, 78 Nitro API handlers, 45 frontend views, 17 migrations) with PostgreSQL transactional row locks (`FOR UPDATE`), eliminating N+1 queries through set-based spatial and product matching.
- **FinTech, Compliance & Escrow:** Integrated Stripe Connect split escrow payments, automated European VIES VAT validation, Italian SDI electronic invoicing (FatturaPA XML), and tamper-resistant GDPR audit logs.
- **Autonomous ReAct AI Analytics Engine:** Built a dedicated FastAPI (Python 3.13) analytics microservice featuring a ReAct agent that transforms natural language into executable Pandas code inside a zero-network `ProcessSandbox`, self-healing runtime errors and generating interactive **Plotly** HTML charts with full xAI reasoning traces.
- **Vector Search & SOS Matchmaker:** Paired 384-dimensional **pgvector** embeddings (HNSW cosine) with Gemini Vision for automated spec extraction and real-time geospatial matching of emergency construction requests (SOS Broadcasts).

PARLAMENTO TRASPARENTE — Civic Tech & Semantic Legislative Graph

parlamentotrasparente.it

`Next.js 16 · React 19 · TypeScript · SPARQL · SQLite WAL (better-sqlite3) · Docker · Dokploy`

- **Semantic Web & Open Data ETL:** Ingested official Italian Chamber of Deputies Linked Open Data via SPARQL endpoints; built custom Node.js ETL pipelines normalizing millions of parliamentary records into high-concurrency SQLite (WAL mode).
- **Resilient Ingestion Engine:** Multi-stage Docker build deployed on Dokploy with concurrency locks, integrity verifications, automatic ID reconciliation, API retries, and official institutional photo fallbacks.
- **Cryptographically Grounded AI:** Engineered summarization pipelines anchored to SHA-256 cryptographic hashes of official parliamentary acts, eliminating hallucination risks in public legal data; WCAG 2.2 AA compliant.

OPENWA (ADVANCED FORK) — AI WhatsApp Gateway & Multi-Modal Hub

github.com/falassio/OpenWA

`NestJS · TypeORM · PostgreSQL (pgvector) · Redis · BullMQ · n8n · Whisper · Gemini Vision`

- **Event-Driven Middleware Pipeline:** Forked and re-engineered the OpenWA gateway in NestJS with an asynchronous plugin hook system, intercepting and transforming message payloads without blocking the main event loop.
- **In-Database RAG & Vector Memory:** Built a high-performance vector retrieval layer (pgvector & SQLite) with token-efficient formatting that strips redundant metadata, reducing LLM prompt overhead by 50%.
- **Resilient Queues & Multi-Modal n8n Agents:** Integrated Redis and BullMQ with exponential backoff and idempotency keys; orchestrated n8n agents supporting Whisper voice transcription, Gemini Vision, and tool-calling on Google APIs and flights.

ENTERPRISE HEALTHCARE DISPATCH [NDA] — High-Security Medical Operations

`Nuxt 4 · PostgreSQL · Prisma ORM · Stripe API · AES-256-GCM · Docker · TOTP 2FA`

- **Field-Level Cryptography & GDPR:** Engineered AES-256-GCM encryption for patient health records at rest, 7-year tamper-resistant audit logs, 2FA/TOTP authentication, and automated right-to-erasure workflows.
- **Hierarchical 5-Tier RBAC & FinTech:** Built strict server-side boundary checks separating logistics from confidential clinical data across 5 user tiers; automated commission routing via Stripe Split Payments.

EDUCATION & ACADEMIC BACKGROUND

B.SC. IN COMPUTER SCIENCE

`Expected June 2027`

Ca' Foscari University of Venice

Core studies in Algorithms & Data Structures, Relational Database Systems, Operating Systems, and Distributed Computing.

IT & TELECOM DIPLOMA

`2019 – 2023`

Levi-Ponti Technical Institute, Mirano

Specialization in telecommunications, operating systems, and network protocols.

TECHNICAL STACK & ENGINEERING SKILLS

`CORE LANGUAGES:` **TypeScript**, **Python**, **SQL**, Node.js, PHP (Modern OOP), C#, Bash

`BACKEND FRAMEWORKS:` **FastAPI**, **Nuxt 4 / Nitro**, **Next.js** (App Router), NestJS, REST/SSR

`DEVOPS & INFRA:` **Docker**, **Kubernetes (K8s)**, Dokploy, Traefik, MinIO / S3, CI/CD, Linux

`DATABASES & ORM:` **PostgreSQL** (PgBouncer, GIN, HNSW), SQLite (WAL), **Prisma**, **Drizzle ORM**, Redis

`DATA & AI:` **pgvector**, **n8n** (Agentic Graphs), PyTorch, Sentence-Transformers, SPARQL, Local LLMs

`FINTECH & MEDIA:` **Stripe Connect Escrow**, SDI FatturaPA XML, VIES API, FFmpeg, Canvas 3D

KEY CERTIFICATIONS & ACCREDITATIONS

DATABASE: SQL (Advanced) — HackerRank

CLOUD: K8s Operators Advanced — IBM / Cognitive Class

NETWORKING: CCNAv7 Enterprise & Linux — Cisco Academy

API & GOVERNANCE: Enterprise Admin Path — Postman

LANGUAGES

Italian: Native

English: **B2** (CLA Ca' Foscari)