

Diogo Fonseca

Connectivity & Network Engineer | 5G Cloud-Native | Kubernetes & Helm

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PROFESSIONAL SUMMARY

Connectivity & Network Engineer at Capgemini Engineering, deployed as an external consultant on Nokia's 5G Core programme. Hands-on with the full Nokia cloud-native 5GC stack (NRD, CMG, CMM, SDL, UPF, SPF) on Kubernetes with Helm-based lifecycle management, and certified across the Nokia L2 Associate track (six certifications in six months). Background in telecommunications engineering (ISEL) complemented by self-built expertise in LLM/RAG systems, container security, and SDN/NFV. Comfortable bridging deep telco protocols, cloud-native infrastructure, and applied AI.

PROFESSIONAL EXPERIENCE

Connectivity & Network Engineer — Capgemini Engineering

September 2025 – Present · Lisbon, Portugal · Client assignment: Nokia (5G Core programme)

- Embedded with Nokia's 5G Core team to deploy and operate cloud-native network functions — **NRD** (Network Resource Director), **CMG** (Cloud Mobile Gateway), **CMM** (Cloud Mobility Manager), **SDL** (Shared Data Layer), **UPF**, and **SPF** — on Kubernetes via Helm.
- Completed Nokia's L2 Associate certification track across the core 5GC product portfolio (six certifications in six months), enabling autonomous delivery on customer engagements.
- Deliver continuous deployment, network-slicing configuration, and end-to-end troubleshooting of production 5G Core NFs for tier-1 European mobile operators, sustaining 5GC service stability across release cycles.
- Perform structured root-cause analysis on logs, PCAPs, and Kubernetes events to diagnose signalling and user-plane issues across the 5GC Service-Based Architecture.
- Leveraged a self-built local RAG pipeline (Ollama + Qdrant) to accelerate analysis of Nokia technical documentation, shortening troubleshooting cycle times on recurring incident patterns.
- Collaborate cross-functionally with R&D, integration, and customer-facing teams to deliver fixes and feature rollouts in production environments.

PROJECTS

Local LLM & RAG Pipeline for Technical Knowledge Management

Personal / Side project — 2025

- Architected and deployed a fully local Retrieval-Augmented Generation pipeline using **Ollama** (LLM serving), **Qdrant** (vector database), and **AnythingLLM** (orchestration), enabling private semantic search across technical documentation.
- Designed the ingestion and embedding workflow for heterogeneous sources (PDFs, Markdown, code), optimising chunking and retrieval parameters for technical Q&A accuracy.
- Demonstrates applied capability in modern AI/ML tooling, infrastructure-as-code patterns, and on-premise GPU workload deployment — directly transferable to MLOps and Edge-AI scenarios in telco.

dcfonsec.org — Personal Knowledge Map & Portfolio

Ongoing

- Built and maintain a public “second-brain” knowledge graph and engineering portfolio at www.dcfonsec.org, covering telco, cloud-native, and AI topics.
- Self-hosted on a personal Ubuntu (WSL2) environment using **Docker Compose**, fronted by **Nginx** with **Nginx Proxy Manager** for routing, and exposed publicly via **Cloudflare Tunnel** for zero-trust ingress.
- Demonstrates applied containerisation, reverse-proxy configuration, and secure remote-access networking — the same stack patterns used in cloud-native production environments.

CO₂ Capture Estimation from Satellite Imagery — ESA/NASA · Câmara de Lisboa & Câmara de Oeiras (UIREKA)

Project lead — ISEL, 2024–2025

- Led a multi-stakeholder project with Lisbon and Oeiras municipalities to quantify CO₂ absorption from urban vegetation using multi-spectral satellite data from ESA and NASA missions.
- Engineered the image-processing pipeline, applying vegetation classification and band-arithmetic indices (e.g., NDVI) to convert spectral data into actionable carbon-capture estimates for municipal sustainability planning.
- Coordinated requirements with municipal stakeholders and academic supervisors, owning the technical delivery end-to-end.

Drone Research, Design & Development

Academic team project — ISEL

- Contributed to the research, design, and prototyping of UAV platforms within a multidisciplinary engineering team, covering airframe, electronics, and control integration.

Synthetic Aperture Radar (SAR) Image Processing

Academic project — ISEL

- Implemented a SAR image-processing tool with user-configurable low-pass and high-pass filters, region-based statistical analysis, and automated road detection.

Telecommunications Traffic Simulation

Academic project — ISEL

- Developed a computational model to analyse mobile network capacity, optimise channel allocation, and evaluate quality of service under varying traffic loads.

TECHNICAL SKILLS

- **5G / Telecommunications:** 5G Core (Service-Based Architecture), Network Slicing, UPF, CMG, CMM, NRD, SDL, SPF, VNF Onboarding, SDN/NFV, SDH, PDH, DWDM, MPLS, Access/Transmission/Mobile Networks
- **Cloud-Native & DevOps:** Kubernetes, Helm, Docker, Ansible, GitLab CI, container security, YAML manifests, kubectl, Azure container services
- **Network & Protocol Analysis:** Wireshark (3GPP signalling and user-plane flows), PCAP analysis
- **Programming:** Python, C, C++, Java, Assembly, MATLAB, Bash
- **AI / ML:** LLM deployment (Ollama), RAG pipelines, vector databases (Qdrant), embeddings, AnythingLLM
- **Signal & Image Processing:** Digital filter design, spectral analysis, multi-spectral satellite imagery, SAR processing, real-time DSP
- **Modulation & Transmission:** QAM / M-QAM, OFDM, AM/FM, ASK/PSK/FSK
- **Systems & Tooling:** Red Hat Enterprise Linux, Linux (incl. WSL), MobaXterm, Git, GitHub/GitLab

CERTIFICATIONS

Nokia — 5G Core / Cloud-Native (L2 Associate Track)

- Associate (L2) Network Resource Director (NRD) R24 Assessment — *Feb 2026*
- Associate (L2) Cloud Mobility Manager (CMM) — *Oct 2025*
- Associate (L2) Cloud Mobile Gateway (CMG) R24 Curriculum — *Oct 2025*
- Associate (L2) Shared Data Layer (SDL) — *Oct 2025*
- Associate (L2) Kubernetes for Services & Care — *Sep 2025*
- Services Associate (L2) VNF Onboarding — *2025*

Additional Technical Training — LinkedIn Learning

- Securing Containers and Kubernetes Ecosystem — *Sep 2025*
- SDN and Network Function Virtualization (NFV) — *Sep 2025*
- Docker on Azure — *Oct 2025*
- *Further LinkedIn Learning training (Sep–Oct 2025) across AWS, GitLab, Ansible, Python, and Linux shell scripting.*

EDUCATION

Bachelor's Degree in Electronics, Telecommunications, and Computer Engineering

Instituto Superior de Engenharia de Lisboa (ISEL) · 2021 – 2025

Relevant coursework: Mobile & Access Networks, Digital Transmission Systems, Signal Processing, Embedded Systems, Hardware-Software Integration.

LANGUAGES

- **Portuguese:** Native
- **English:** Advanced (C1) — working language in Nokia's international 5G Core programme

ACTIVITIES & ACHIEVEMENTS

- **Underwater Hockey — Portuguese National Team Player.** Sustained high-performance training and international competition representing Portugal; demonstrates discipline, composure under pressure, and team coordination in oxygen-limited, time-critical environments.
- **Youth Coach — Underwater Hockey.** Coach players aged 9–15 every summer; develops mentoring, communication, and structured-teaching skills.
- **Volunteer — Food Bank (Banco Alimentar).** Active volunteer since 2018 (most recent campaign: 2024).