Career Journey in Embeded Software Engineering

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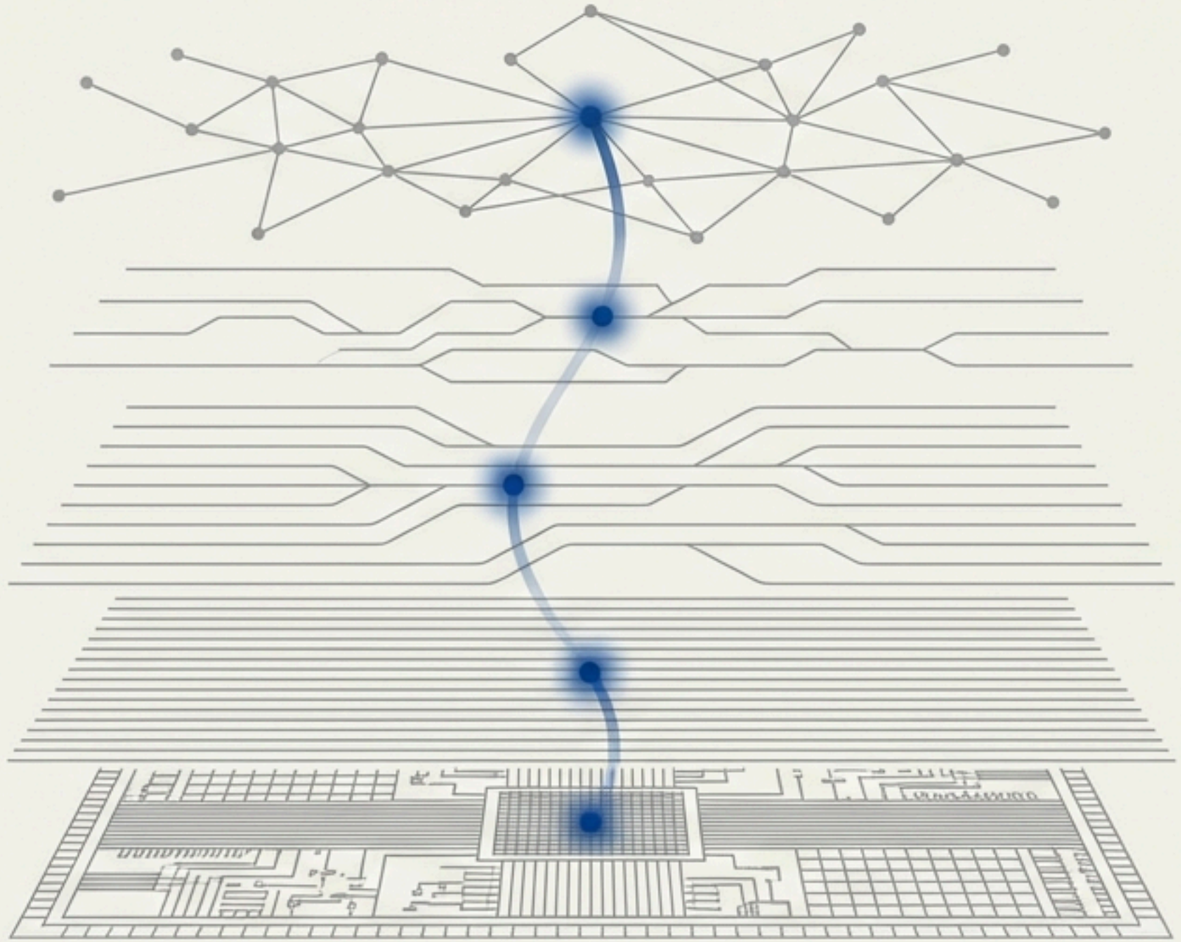
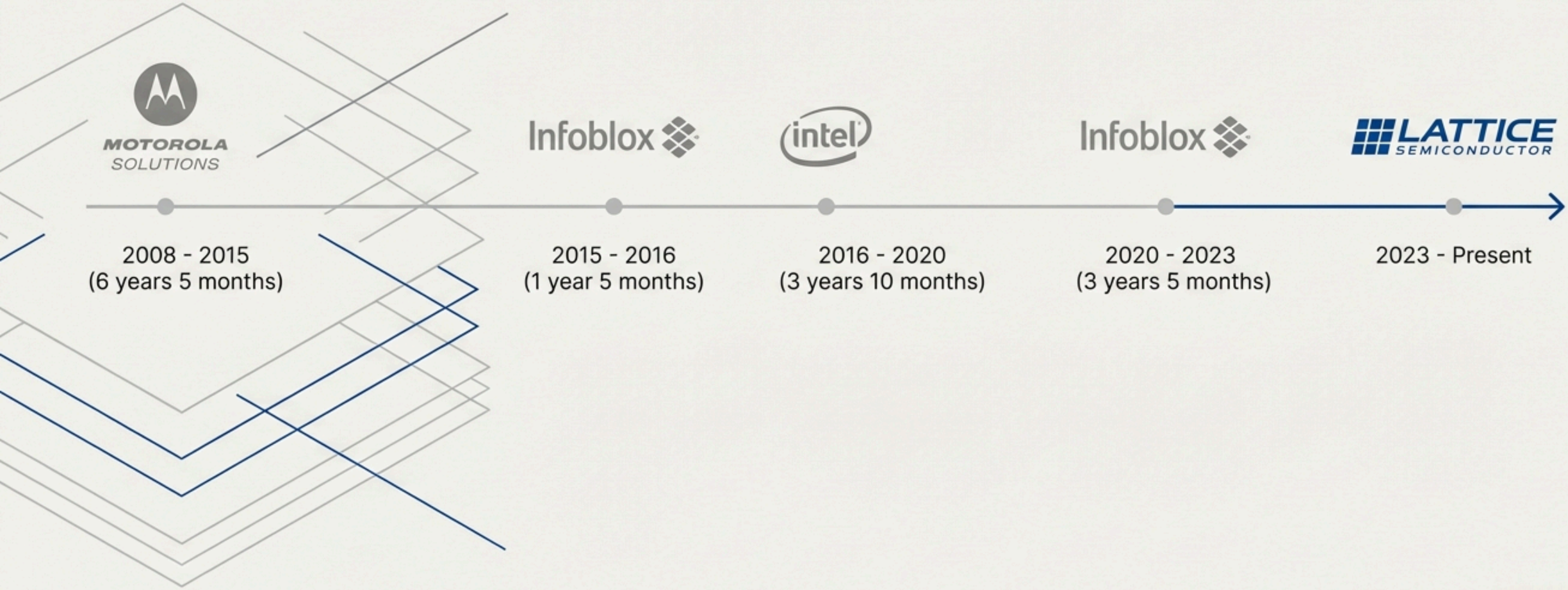


The Trajectory of Expertise



Building the Foundation in Embedded Systems at Motorola

Core Challenge

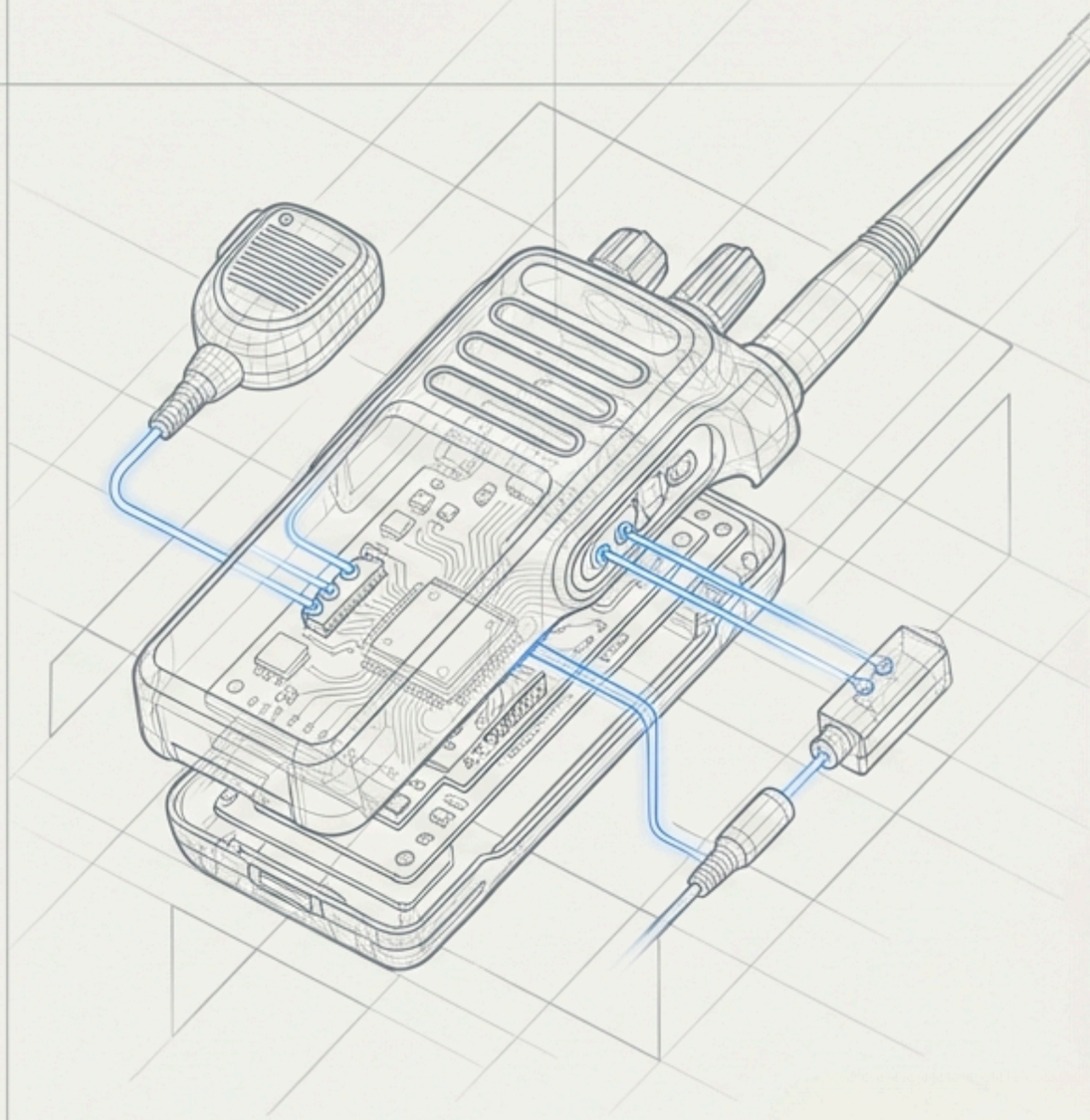
Engineer robust, real-time software for mission-critical digital professional radios, focusing on the complex interface between hardware and software.

Key Contributions

- Owned development for power management and accessory interface software, ensuring device reliability and interoperability.
- Mastered low-level I/O and wire protocols to manage communication between the core device and its peripherals.
- Operated within an Agile development environment to deliver consistent software updates.

Technology Stack

C++ C Embedded Systems Real-Time Communication



Accelerating Network Performance at Infoblox

Core Challenge

Mitigate DNS DDoS attacks and resolve performance bottlenecks by processing high-speed network packets directly on multi-core hardware accelerators.

Key Contributions

- Developed DDoS mitigation applications for Linux platforms, running on both virtual and physical network accelerators.
- Debugged and solved complex embedded software issues related to the PCIe-based Network Accelerator.
- Engineered solutions for high-throughput packet processing on hardware with multiple cores.

Technology Stack

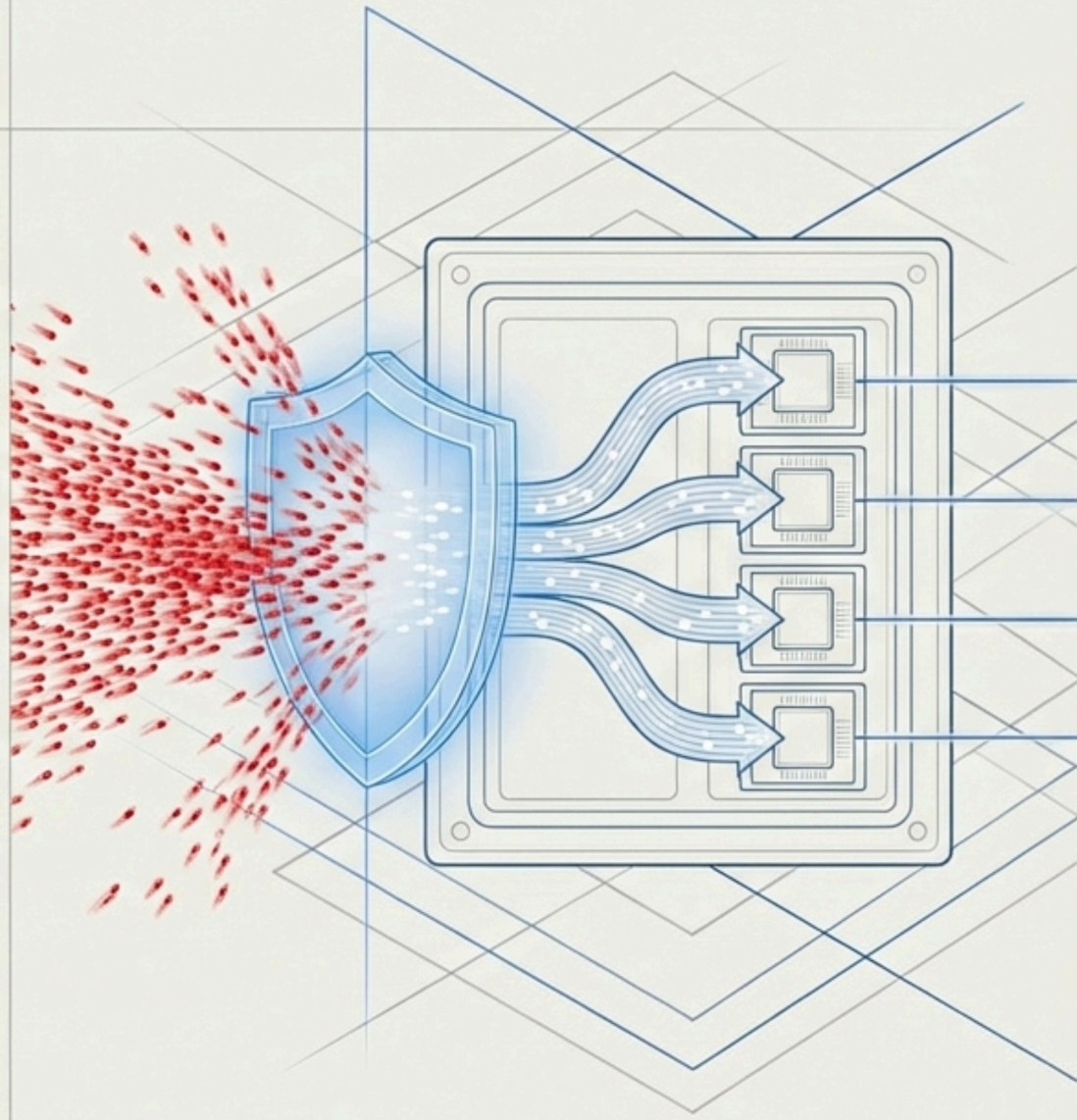
C

Python

Linux

PCIe

Multi-core Processors



Mastering the Linux Stack for Intel FPGAs

Core Challenge

Ensure the stability, security, and performance of the entire Linux OS stack for Intel's advanced ARM SoC FPGAs.

Key Contributions

- Designed and debugged critical Linux drivers for Display Port and Ethernet, including specialized 1588 (PTP) and TSN (Time-Sensitive Networking) protocols.
- Maintained the nightly Linux kernel and full Yocto build frameworks, resolving security flaws and managing version upgrades.
- Authored and maintained core drivers for the Intel FPGA ARM SoC, including Frame Buffer (as featured on Phoronix), GPIO, I2C, and SPI.

Technology Stack

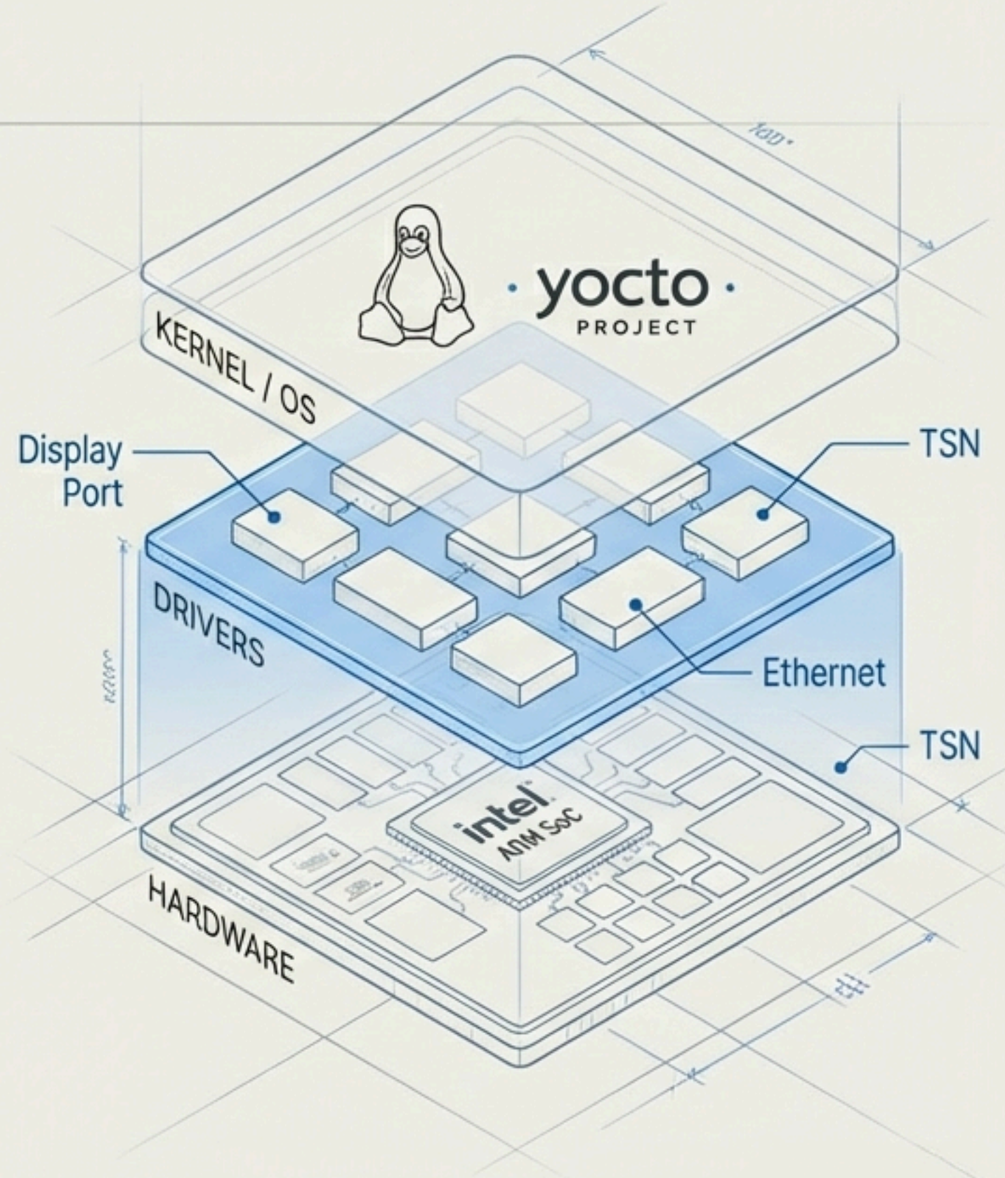
Linux Kernel

Yocto Project

FPGA (Altera)

C

Device Drivers



Architecting DNS Security in the Cloud with Infoblox

Core Challenge

Detect and analyze malicious DNS traffic by developing a scalable, cloud-based packet inspection application.

Key Contributions

- Developed a cloud application to perform deep inspection of DNS packets for security threats.
- Engineered a backend security service running on a modern HTTP/2.0 stack.
- Diagnosed and resolved critical performance bottlenecks and subtle Ethernet packet corruption issues in a complex, distributed Linux environment.

Technology Stack

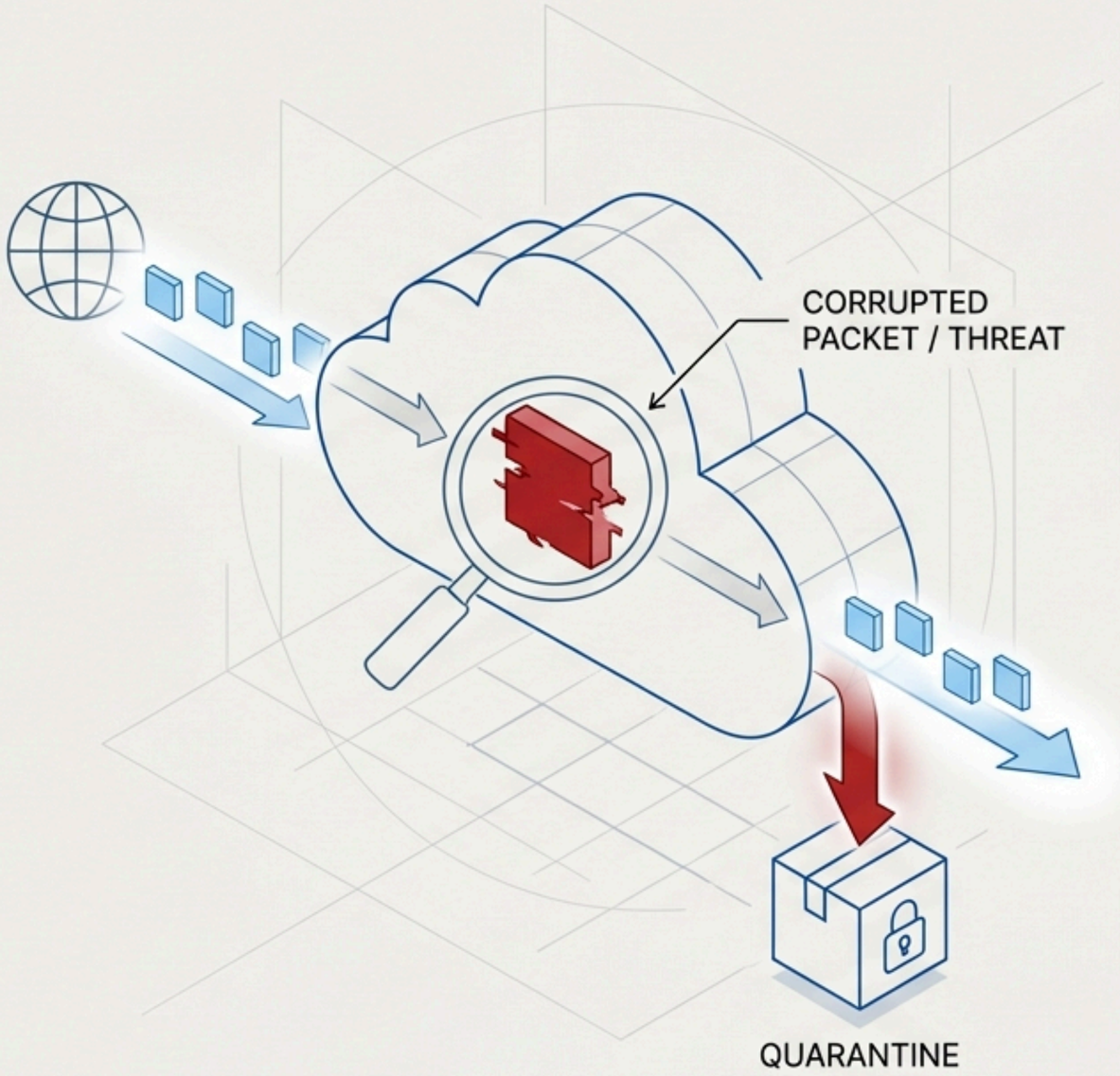
Cloud Applications

DNS Security

Packet Inspection

HTTP/2.0

Linux Performance Tuning



Driving the Future of Industrial Networks at Lattice

Core Challenge

Solve performance bottlenecks and enable next-generation capabilities for industrial applications running on resource-constrained FPGAs.

Key Contributions

- Resolved complex implementation issues for Industrial Ethernet protocols, including EtherCAT and PROFINET.
- Developed and optimized Industrial Ethernet applications on a FreeRTOS stack using soft IP on FPGAs.
- Pioneered a Proof-of-Concept for next-generation Robotics Networks.
- Enabled Zephyr RTOS support for soft RISC-V cores on the FPGA platform.

Technology Stack

Industrial Ethernet

FPGA (Lattice)

FreeRTOS

Zephyr

RISC-V