

Towards Quantum-Ready End-to-End Security & Resilience for Critical Infrastructures

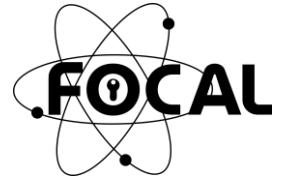
Prof. Dr. Angelos Marnerides, Senior Member IEEE

Department of Electrical and Computer Engineering

KIOS Research & Innovation Centre of Excellence

University of Cyprus

marnerides.angelos@ucy.ac.cy



The Upcoming Quantum Disruption

- Quantum computing already capable of breaking current cryptographic standards (RSA, ECC).
- Semiconductor-driven digital infrastructures—AI, automotive, industrial IoT → high risk.
- Quantum-era readiness → strategic imperative for chipmakers and system integrators.
- Early transition → trust, compliance, and competitiveness in global markets.



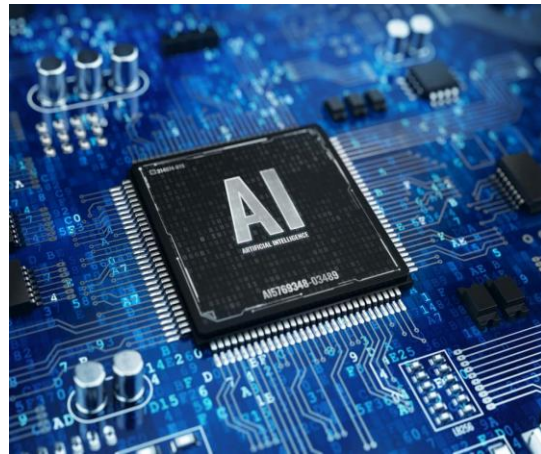
Next-Gen Systems, Next-Level Risk

- Emerging systems rely on trusted communication from cloud to edge.
- Long-lifecycle embedded devices in edge networks will outlive today's encryption standards.
- Quantum attacks → compromise data, firmware, and authentication layers.
- Ensuring end-to-end resilience → a growing concern.



Towards Post Quantum Cryptography (PQC)

- PQC → a remedy on quantum attacks
- Recent NIST PQC standards → built for powerful data centers, not lightweight embedded systems.
- Need → hybrid and lightweight PQC mechanisms
- Underpinned by → crypto-agile AI-driven hardware
- Orchestrated by → programmable network components.



FOCAL: PQC for Critical Edge Networks

- €6,5M EU Horizon Project (2025-2028)
- 15 partners, University of Cyprus (coordinator)
- PQC framework for resource-constrained, edge-oriented environments.
- Hardware–software co-design path to embed PQC capabilities in future semiconductor platforms in 4 large-scale pilot demonstrators.
- 1 out of 3 selected projects helping the EU backbone to transition towards PQC.



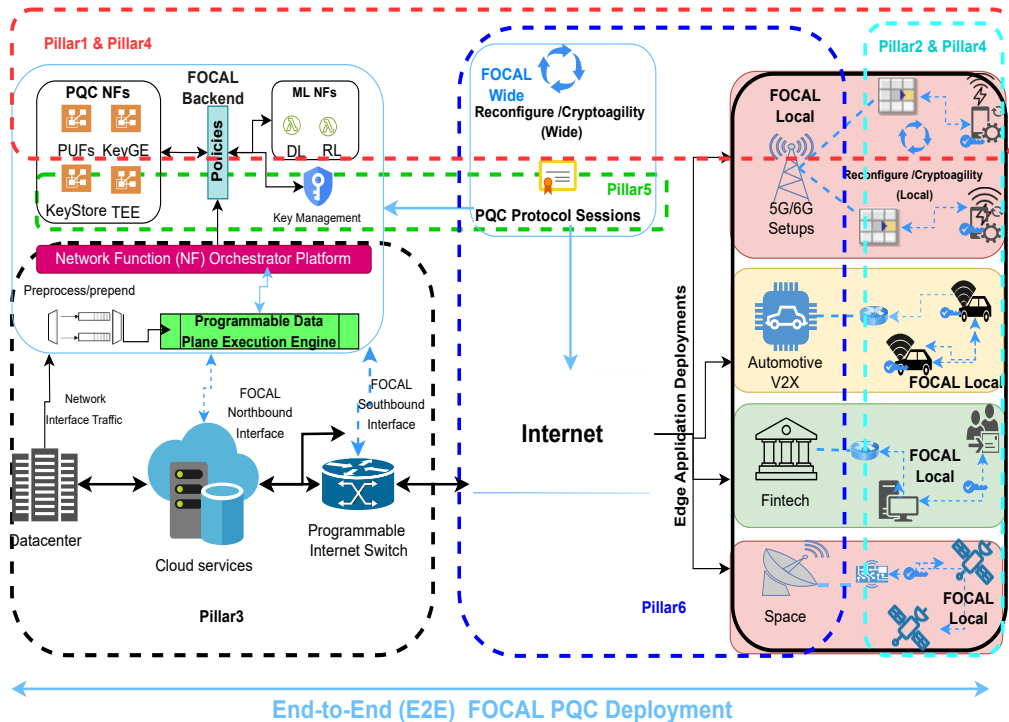
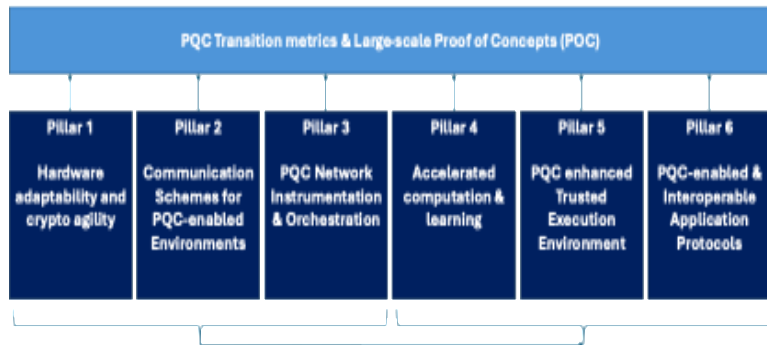
**OFFICIALLY
LAUNCHED**



Funded by
the European Union



FOCAL – High Level



Thank you

Stay in touch

connect@focal-pqc.eu

www.focal-pqc.eu

consortium partners



CERTH
CENTRE FOR
RESEARCH & TECHNOLOGY
HELLAS



csem Cyb@rEcoCul



hellasat

umec



SpinEdge



UNIVERSITÄT ZU LÜBECK



FOCAL is funded under the EU Horizon programme and the European Cybersecurity Competence Centre (ECCC) of the EU under Grant Agreement: **101225859**.