

Towards Quantum Secure Hybrid Wi-Fi for Enterprise Networks

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I. ABSTRACT

The rapid advancement of quantum computing presents an immediate challenge to the cybersecurity landscape, requiring communication and networking protocols and infrastructure to be secured against store-now-decrypt-later and emerging post-quantum threats. While post-quantum cryptography (PQC) and quantum key distribution (QKD) are two prominent alternatives to public key cryptography for defending against post-quantum attacks, each has its own advantages and challenges. In this ongoing research, we are investigating a hybrid quantum-secure Wi-Fi protocol that integrates PQC and QKD to protect wireless networks. Additionally, we are evaluating different configurations of PQC and QKD across wireless and fiber networks to identify a practical, scalable quantum-secure solution for enterprise environments. Our goal is to propose a quantum-secure framework that safeguards enterprise networks from both current and future quantum threats.