

الجمهورية الجزائرية الديمقراطية الشعبية
République Algérienne Démocratique et Populaire
وزارة التعليم العالي و البحث العلمي
Ministère de l'Enseignement Supérieur et de la Recherche Scientifique
المدرسة العليا للإعلام الآلي 8 ماي 1945
École Supérieure en Informatique
8 Mai 1945 Sidi Bel Abbès



THESIS

To obtain the diploma of **Master**
Field: **Informatique**
Specialty: **Ingénierie des Systèmes Informatiques (ISI)**

Theme

INNOVATIVE APPROACHES TO IoT SECURITY: FIDO PROTOCOL IN
CLOUD EDGE COMPUTING

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Submission Date:

In front of the jury composed of:

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Academic Year : 2023-2024

The recent studies underscore the significant potential of the FIDO protocol in enhancing security and efficiency within cloud edge environments, especially in IoT contexts. By enabling strong, passwordless authentication, FIDO significantly improves security, reducing the risk of phishing, credential stuffing, and man-in-the-middle attacks. This protocol's reliance on public key cryptography also ensures a robust defense against common cyber threats. Additionally, FIDO simplifies the user experience by eliminating the need for passwords, making authentication more seamless across multiple devices and services. The protocol's scalability has been demonstrated in supporting large numbers of devices and users without compromising performance, a critical factor in rapidly expanding IoT networks. Furthermore, FIDO's integration with existing security frameworks, such as OAuth 2.0 and Zero Trust architectures, enhances overall system security while maintaining flexibility. However, challenges remain, including the need for widespread adoption of FIDO-compliant devices and the complexities of integrating with legacy systems. Despite these hurdles, successful real-world deployments across various industries highlight FIDO's effectiveness in securing sensitive data and supporting large-scale IoT networks. Looking forward, the research suggests that FIDO's role in emerging technologies like 5G, AI, and blockchain will be critical.

Key words: Cloud Edge Environments, IoT Security, Passwordless Authentication, Public Key Cryptography, Scalability, Zero Trust Architecture, Edge Computing