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A Secure Authentication Scheme for Internet of Things

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Abstract

Security is one of the major issues in Internet of Things (IoT) research. The rapid growth in the number of IoT devices, the heterogeneity and complexity of these objects and their networks have made authentication a challenging task. Other constraints such as limited computational ability and power, and small storage of some embedded devices make implementation of complex cryptographic algorithms difficult. So far there has been no established industrial standard to address this problem.

Recently, Kalra and Sood, and subsequently Chang *et al.* attempted to solve the authentication problem by proposing key agreement schemes for IoT devices. However, the security of their schemes were unproven. In this paper we demonstrate that these schemes are insecure. We extend upon their work to present a scheme that enables embedded devices to communicate securely with a server on an IoT network. We prove the security of this scheme using formal methods and demonstrate this under the intractability of some well-defined hard problems. We also discuss some practical aspects related to the implementation of the scheme.

Keywords: IoT Security, Authentication, Elliptic Curve Cryptography,

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