Lehrstuhl für Sicherheit in der Informatik
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HiWi-Job *or* ***Bachelor's thesis*** *in collaboration with Fraunhofer Research Institute AISEC*

Cyber-Resilient IoT Platforms

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Motivation

While weaknesses of devices in the Internet-of-Things (IoT) are revealed on a regular basis, the tremendous demand for new IoT applications nevertheless leads to the rapid deployment of new software and platforms. Since IoT is a low-price market, applications and system architectures are developed with a strong focus on functionality, leaving wide surface to both remote software-level and physical attack vectors. An approach possibly more promising than expecting the diverse IoT suppliers to deliver more secure products is to design a cyber-resilient IoT platform, where IoT software can be securely managed remotely, easing developers from the burden of secure system design.

Task Description

The main goal of this work is to drive further the concepts and implementation of an existing cyber-resilient IoT platform. The starting point is an existing prototype on an ARM Cortex-M microcontroller. This first step is to familiarize with the prototype and the platform's principles. The work then focuses on the further development of the platform's security and management functionalities, and on testing and embedding the platform into a realistic IoT scenario. Examples for contributions are to create a minimal remote management backend, improve the networking connectivity on the controller, to further implement a minimal hypervisor, or to challenge the platform's security mechanisms.

Requirements

- Most important: motivation to work in the field of microcontrollers
- Good C programming skills and basic experiences with microcontroller programming
- Experience with microcontroller/ARM security features

Contact

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