Security Analysis and Extension of Embedded Operating Systems

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Motivation

The Internet of Things consists mainly of resource-constrained devices based on low-end microcontrollers. Several strategies for protecting this devices from remote exploitation exist. Unfortunately, only a subset of them is used in the main stream Real Time Operating Systems (RTOSs).

Task Description

In course of this work an analysis and summary of the implemented security mechanisms in an open source RTOS like, e.g., mbedOS will be conducted. In the next step, attack vectors on the system circumventing the security mechanisms, as well as possible improvements on the side of defenses, have to be evaluated. The work likely involves investigating the MPU and other features of standard Cortex-M microcontrollers, and to set up a demonstrator based on the results of the work.

Requirements

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

Contact

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