TechInf
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Integration of RIOT OS into SecureWSN using TinyIPFIX for Data Gathering (BA/MA)

Over several years a big IoT network called SecureWSN was established and continuously expended towards a trustworthy environmental monitoring framework for constrained networks. The network itself consists of 3 parts: (1) Data collection via constrained devices, (2) gateway component handling incoming data and managing the network called CoMaDa, and (3) a framework realizing backend and front-end for the end-user called WebMaDa. Several theses are available in those parts of SecureWSN.

This thesis looks on the extension of the data collection part via constraint devices. Concrete this means to implement the standardized TinyIPFIX protocol (RFC 8272). Its idea is to separate meta data and measured data in order to save payload in the limited maximum transmission unit. Implementations for IRIS, OpenMote, and TelosB are available. Currently we miss the support of devices running RIOT OS, which is the target platform in this thesis. The protocol itself should supports push notification (interval based sending of measurements) and pull notifications triggered by authorized persons on request (e.g., in emergency cases).

The following things are requested to be designed, implemented, and evaluated (most likely via proof-of-concept) in this thesis:

- TinyIPFIX protocol (pull and push support) under RIOT OS
- Integration and support into CoMaDa and WebMaDa
  - Configuration and deployment
  - XML integration for template translation
  - Integration into logging system
  - Integration into privilege management
  - Accessibility via front-end for end-user

Finally, the report needs to be written, as well as a detailed documentation and handing over a running VM with the complete project with all sources. Depending on the chosen thesis type the content will be adapted. Depending of the results we will try to publish it on high ranked conferences and workshops.

Knowledge in C programming and little bit SQL, PHP, JavaScript, and AngularJS for CoMaDa/WebMaDa integration would be an advantage.

We will offer you:

- Access to existing source code in different operating systems (TinyOS and Contiki)
- Access to written theses of SecureWSN
- Virtual machine running Ubuntu and CoMaDa including a link to WebMaDa and the backend
- Initial literature
- Smart working environment
- Deep contact to supervisors and a lot of discussions and knowledge exchange

As this work is based on different works and research results, a willingness to familiarize oneself with the existing system is expected. Based on the results of the work, further work will be put out to tender, so that detailed documentation is required at all levels, as well as close cooperation with the supervisors.

If you are interesting in this thesis contact us and let's discuss:

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