Zurich University of Applied Sciences

zh aw School of Engineering

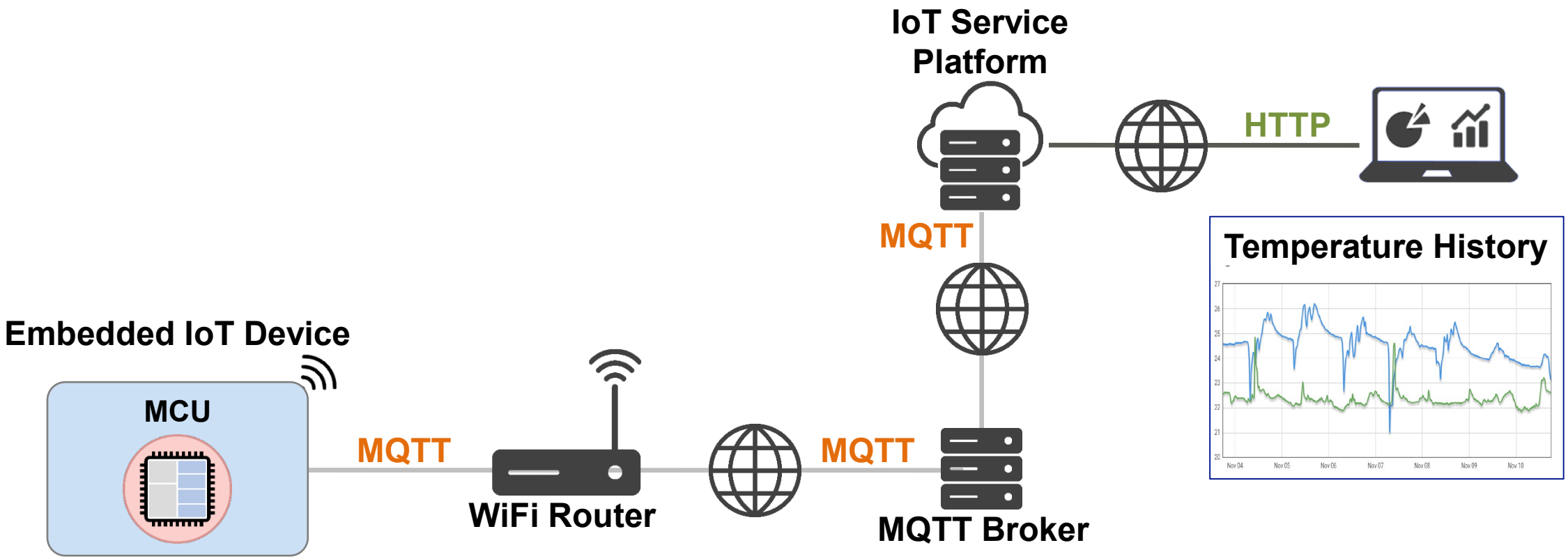
Security for low power IoT Devices

A systematic design process shown on a practical example

3. February 2021
Lea Zimmerli, Mario Noseda, Prof. Andreas Rüst
Institute of Embedded Systems, Winterthur
lea.zimmerli@zhaw.ch

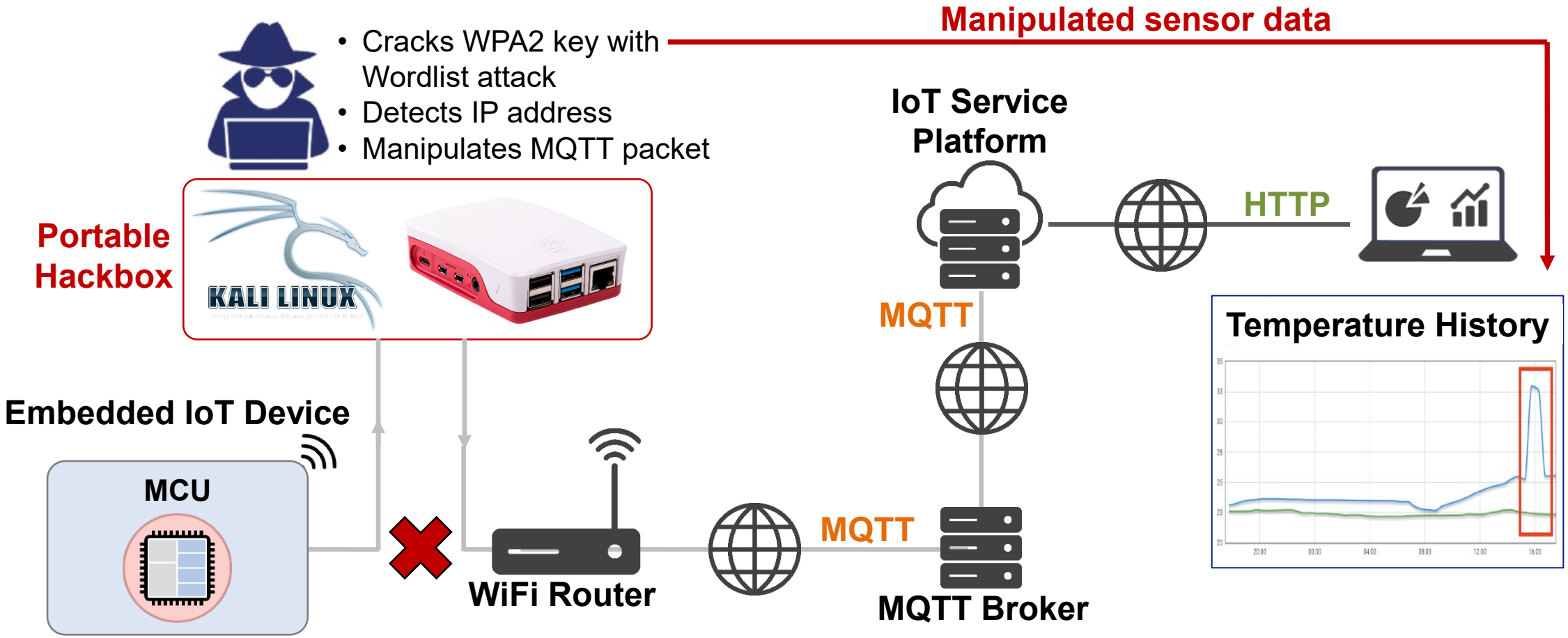
ZHAW Plattform Industrie 4.0

Connecting a Sensor to the “Cloud”



Unprotected IoT Applications Are an Easy Target

Zurich University of Applied Sciences
zh aw School of Engineering



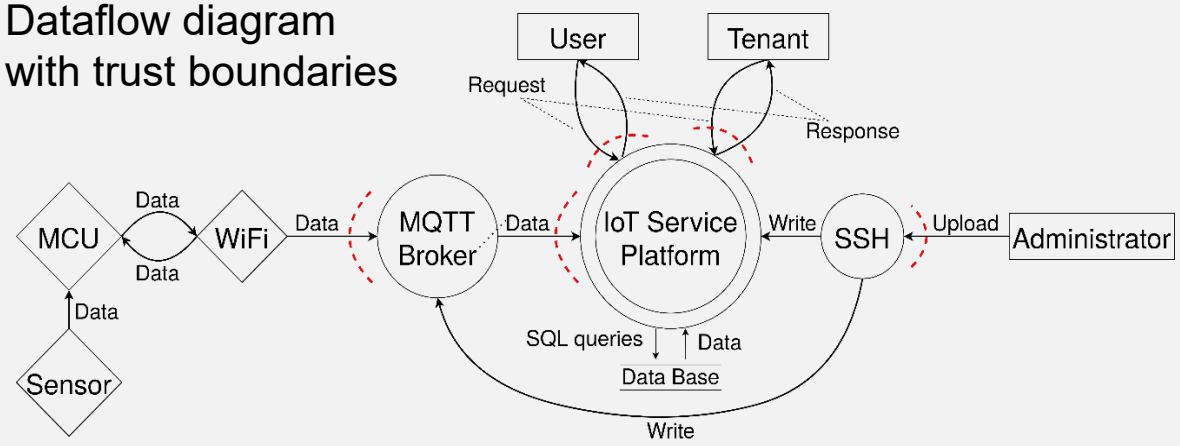
The slide shows an example of a man-in-the-middle attack. Further attacks on the unprotected MQTT transmission are possible.

Security by Design – a Systematic Process

Zurich University of Applied Sciences
zh aw School of Engineering

Threat Analysis

Dataflow diagram with trust boundaries



STRIDE

- **S**poofing
- **T**ampering
- **R**epudiation
- **I**nformation disclosure
- **D**enial of service
- **E**levation of privilege

derive

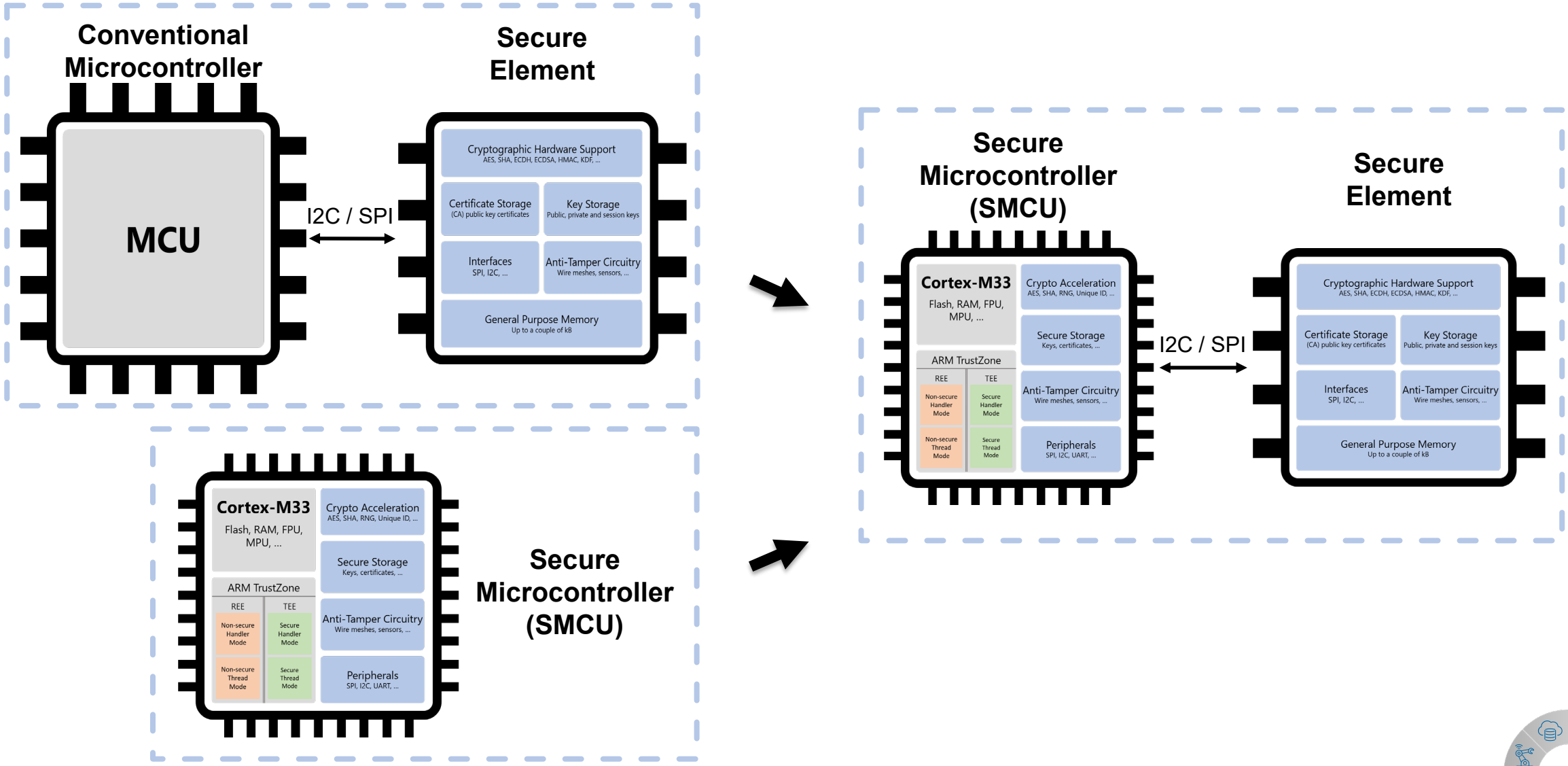
Security Requirements

define

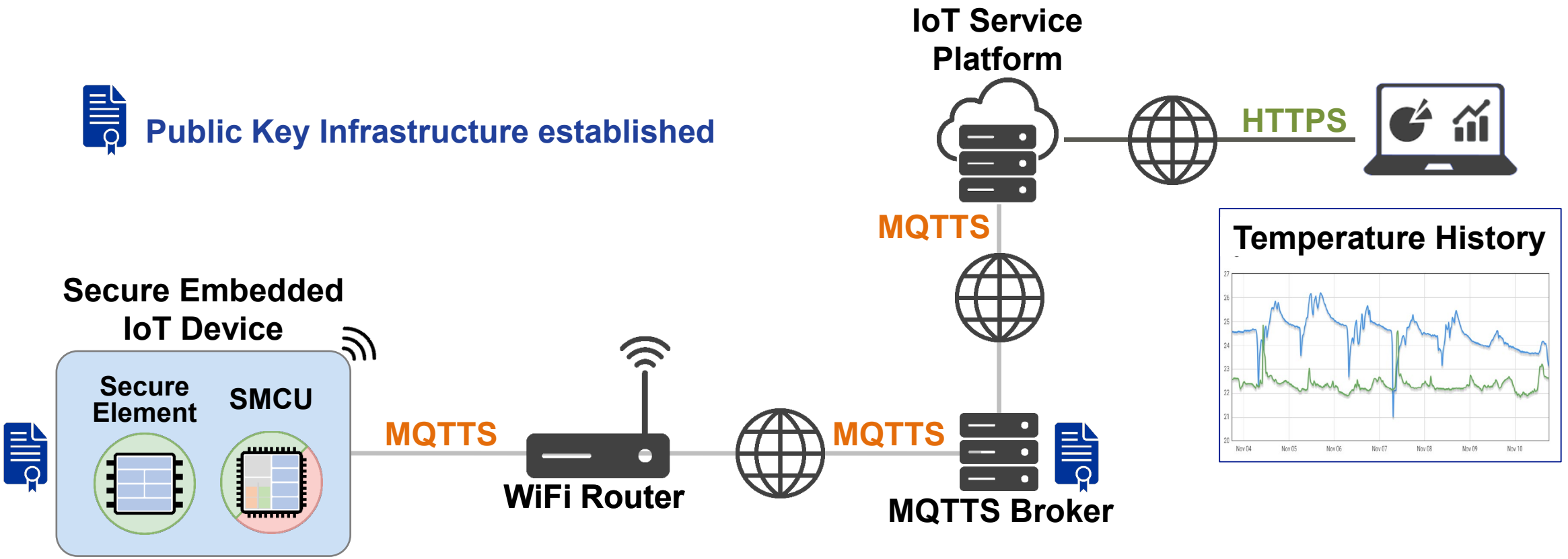
Counter Measures

Implement Counter-Measures on Your Embedded System

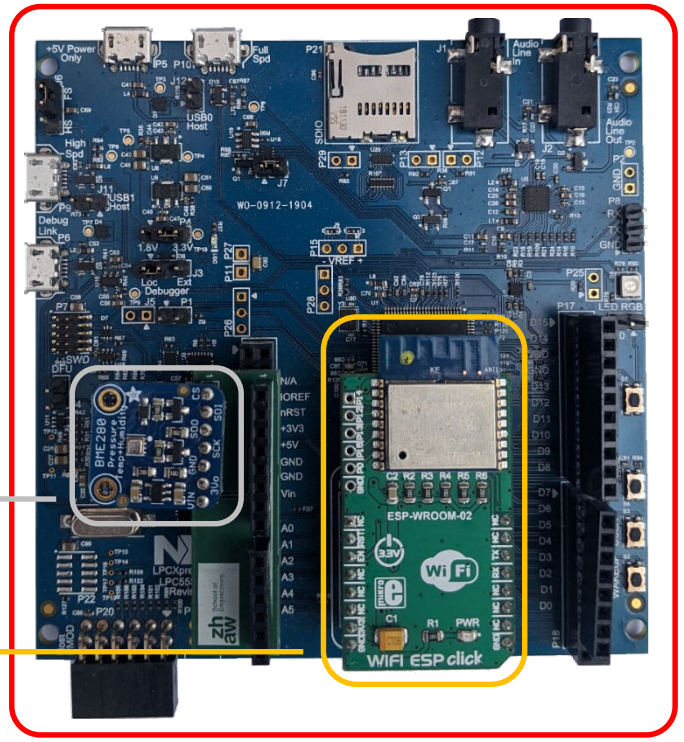
Zurich University of Applied Sciences
zh aw School of Engineering

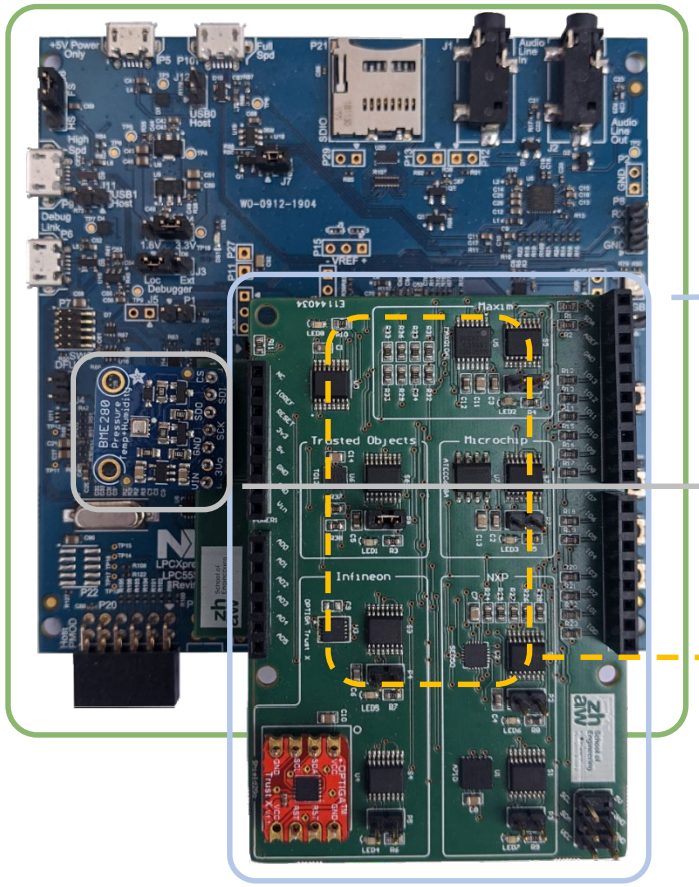


Connect Securely to the “Cloud”



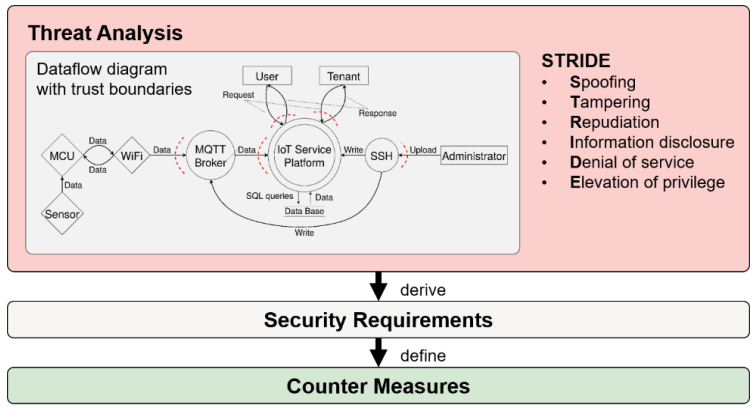
Unsecured and Secured Device

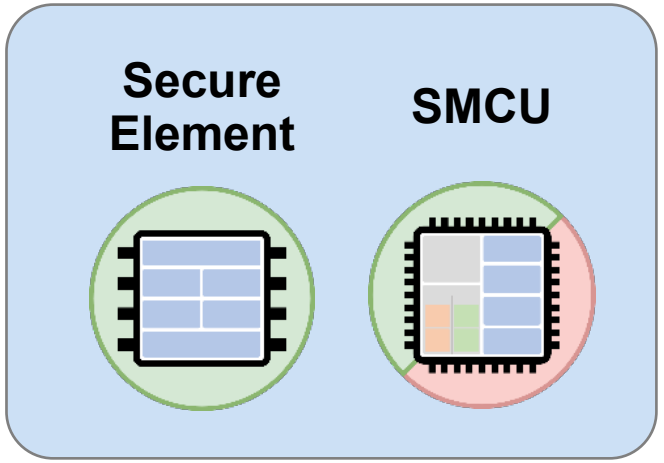


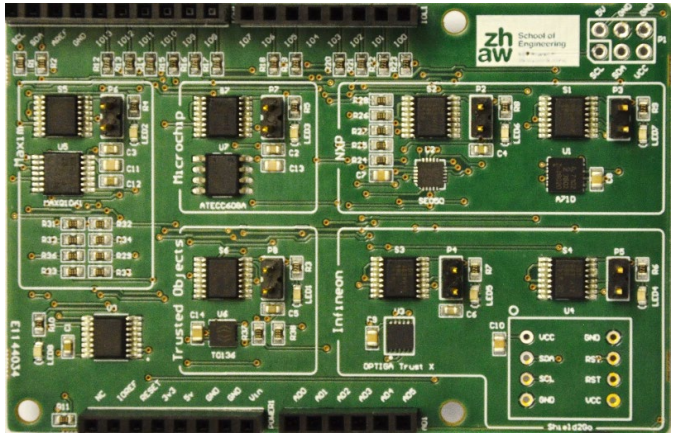


Key Take-Aways

- **If you do not protect your IoT devices, you will be an easy target.**
  - **A Raspberry Pi is enough to perform an attack.**
- **There is a systematic process available to identify your threats, derive security requirements and implement countermeasures.**
- **There are hardware, firmware and software components available as well as organizational issues (like PKI) to implement the countermeasures.**
- **We can support you with securing your application**







Further information

- **White Paper & Video**
  - https://doi.org/10.21256/zhaw-20718
- **Contact**
  - **Lea Zimmerli**
    Zurich University of Applied Sciences
    Institute of Embedded Systems
    Winterthur, Switzerland
    lea.zimmerli@zhaw.ch