Open Thesis / Project

Evaluating the End-to-End Dependability of Distributed Wireless Systems

Thesis Type
Master Project / Master Thesis

Motivation

The recent trend in developing safety-critical cyber-physical systems (CPS) is to move from local standalone solutions to solutions based on a distributed architecture where, e.g., safety and mission-critical operations are distributed in the device-edge-cloud continuum. A critical factor in such systems is the communication between the different components. Wireless communication provides a high level of flexibility, however, its dependability (i.e., reliability, timeliness, and availability) is heavily depending on different environmental conditions: for example, interference and multipath effects can negatively impact the communication reliability. To guarantee proper and safe operation for such wirelessly connected safety-critical CPS, meeting given end-to-end (E2E) dependability requirements is highly important. Therefore, we want to evaluate different solutions that try to tackle the problem of ensuring E2E dependability in device-edge-cloud based architectures.
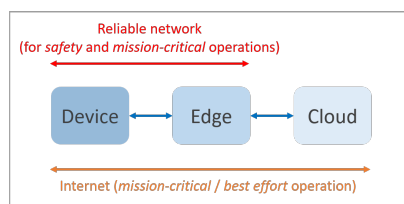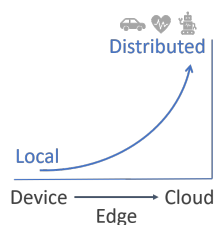
Goals and Tasks
Within this context, the student can explore several directions and perform different tasks, such as:

- Implement and evaluate existing methods that focus on improving E2E dependability;
- Design and evaluation of a multi-radio platform;
- Evaluate the E2E performance of different protocols in this context (e.g., UDP, CoAP, etc.);

Target Group

- Students of ICE/Telematics;
- Students of Computer Science;
- Students of Electrical Engineering.

Required Prior Knowledge

- Knowledge of networked embedded systems;
- Excellent C programming skills;
- Experience with wireless technologies and embedded platforms is a plus.

Contact Person

- DI Elisabeth Salomon
  elisabeth.salomon@tugraz.at
- Dr. Carlo Alberto Boano
  cboano@tugraz.at

Institute of Technical Informatics
Networked Embedded Systems Group

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