Software-Defined Automation
Can We Now Talk About Security?

Masterthesis

This thesis aims to evaluate whether and to what extent security concepts from the IT are transferable to software-defined automation (SDA).

Motivation

The ongoing convergence of IT and OT, accelerated by software-defined automation, is fundamentally reshaping automation architectures. Modern OT environments increasingly adopt IT-native paradigms such as containerization, virtualization, agile/DevOps practices, and cloud/edge architectures, while also bringing IT applications to the field level and moving traditional OT applications into the cloud.

This rapid "IT-ification" of OT raises a critical but insufficiently researched question: which IT security concepts are truly transferable to OT in a software-defined automation context, and under what conditions?
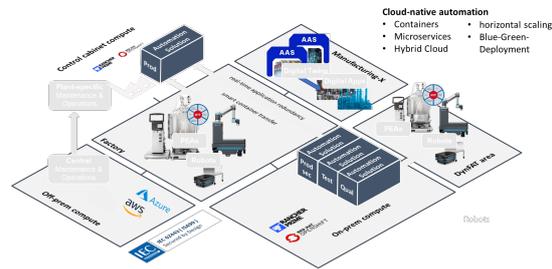

Figure 1: SDA Vision

Goals

- Systematically analyze the fit, limitations, and necessary adaptations of IT security principles for software-defined automation

- Evaluate standards and regulation like IEC 62443 and CRA for this trend

- Evaluate considerations and approaches through one or more case studies

Interests and Helpful Prior Knowledge

- Basic Understanding of Industrial Automation

- Good Understanding of virtualization technologies
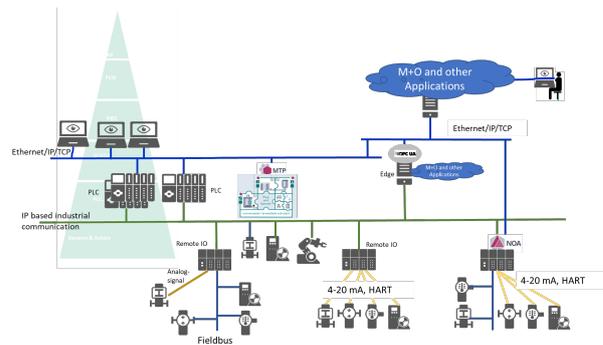
- Interest to get familiar with emerging security concepts

Figure 2: SDA Automation Architecture

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