escaping the dependency hell: concept to check update compatibility in fieldbus systems

(external) Bachelor-/Master thesis

This thesis aims to develop a methology and programm to check the compatibility of fieldbus communication if one of the communication partners is updated

Motivation

In todays manufacturing environment fieldbus systems are usually used for communication between devices. Manufacturing assemblies are often unique compositions of standardized components which are build especcially for one plant. The operation of those plants usually follows the "never change a running system" principle. Upcoming cybersecurity regulation will lead to neccesary software updates for components and systems. This raises the question if the plant and especially the communication between devices is still working after a software update or if maybe over updates and changes are needed.
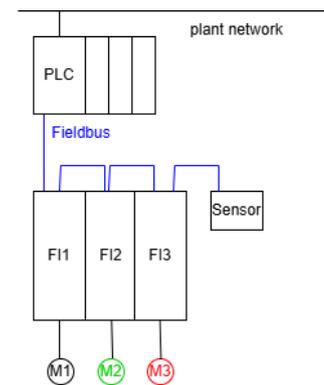

Figure 1: schematic structure of a simple manufacturing system

Goals

The aim of this thesis is to figure out which possibilities the common used fieldbus system EtherCAT (and Profinet in case of Master thesis) provide to modell compatibility relevant information. Based on this information a concept to check compatibility between versions shall be developed and ideally implemented.
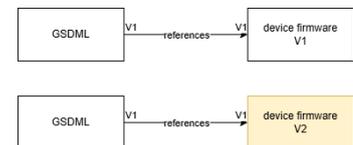*hint: this thesis can also be written at SEW-EURODRIVE*

Figure 2: one-way reference between device description and device firmware

Helpful interests and prior knowledge

- interest in digital twins, information modelling
- interest in industrial communication and control systems
- programming skills and fun at programming
- Lecture Cyber-Physical Production Systems

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