Chair of Network Architectures and Services
School of Computation, Information, and Technology
Technical University of Munich

TUM

Thesis B.Sc.

Thesis M.Sc.

Guided Research

Influence of Load on an Industrial Ethernet Network based on Profinet

Motivation

Industrial Ethernet [2] is an updated version of the Ethernet protocol and in this case based on ProfiNet [3]. These additions allow for specific use-cases of industrial networks, such as real-time and non-real-time traffic, as well as including cyclic and acyclic traffic in the same network. This has major effects on how the controller within an industrial machine reacts on unforeseen network traffic.

The task in this theses is to analyze pre-recorded traffic from different scenarios (including idle state, robot is moving, video traffic is being recorded, and additional load is added to the network), to extract information (including influences on bandwidth, latency, and cycle times, and which additional traffic is created through those scenarios). The thesis focuses on building an analysis tool for recorded industrial traffic [1] and aims to detect anomalies within the recorded traffic patterns.

Your Profile

- General interest in computer networks
- Experience with Linux and Python programming
- Interests in data analysis and evaluation

Your Tasks

- Conducting research on Industrial Ethernet and normal behvaior
- Extract data from the provided data-sets
- Built a tool-chain to analyze and evaluate the extracted data
- Provide insights towards detected behavior and anomalies

Literature

[1] S. Alcock, P. Lorier, and R. Nelson. Libtrace: a packet capture and analysis library. *ACM SIGCOMM Computer Communication Review*, 42(2):42–48, 2012.

[2] P. S. Marshall and J. S. Rinaldi. *Industrial Ethernet*. ISA, 2004.

[3] M. Popp. Das profinet io-buch. *Berlin· Offenbach: VDE VERLAG*, 2010.

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