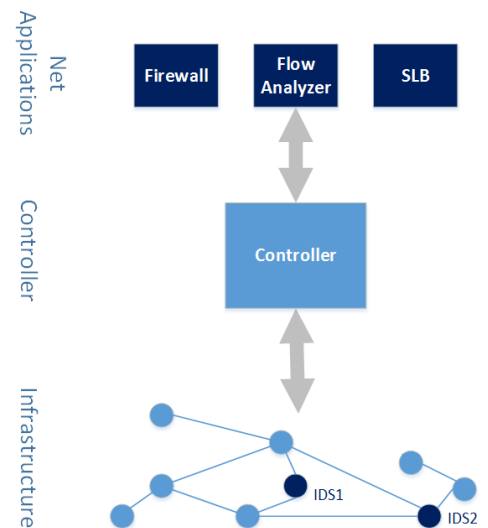


Master's Thesis: Secure Reference Architecture for SDN in Industrial IoT

Background

Software-Defined Networking (SDN) is an approach to computer networking that allows network administrators to manage network services through the abstraction of lower-level functionality. SDN is meant to address the fact that the static architecture of traditional networks does not support the dynamic, scalable computing and storage requirements of more modern computing environments such as the Internet of Things (IoT) paradigm and especially Industrial IoT (IIoT). This is done by decoupling or disassociating the system that makes decisions about where traffic is sent (the control plane) from the underlying systems that forward traffic to the designated destination (the data plane). This abstraction introduces another single point of failure, the centralized control / management interface. Whereas several approaches exist on how to distribute the control level to multiple controllers (HyperFlow, ONOS), the area of interest here is how to protect this centralized controller with appropriate security measures. Therefore, a reference architecture needs to be implemented as well as performing a vulnerability- / risk-assessment for this reference architecture.



Task

In this work, it is your task to develop and describe a reference architecture towards secure Software-Defined Networking, especially considering industrial Internet of Things (IIoT) and brought along risks. A reasonable course of action will start by designing a model-like scenario, which combines both paradigms, which can be used for, one the the hand a risk- and vulnerability-assessment, on the other hand, a comprehensive requirements-deduction. Based on your results and state-of-the-art techniques, you have to propose a univervally adoptable reference architecture. Finally you need to show your concept's effectiveness by implementing crucial parts of it in a test-environment.

Requirements

- Advanced comprehension of networking and network security
- Basic knowledge of Linux and SDN-technology (e.g., Openflow)
- Fundamental programming skills

Organizational

This project originated and is being performed in collaboration with **Airbus Defence and Space GmbH**, which will take part in your assistance. You will have a time limit of **5 month** to perform this work in **German** or **English** language.

Your advisors for this topic are **Michael Steinke** (UniBW), **Daniel Meister** (Airbus) under supervision of **Prof. Dr. Wolfgang Hommel**.

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