

# Digitally Connecting Devices on Mettler Toledo Shopfloor

Graduate

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**Introduction:** In the rapidly evolving landscape of industrial production, the connectivity of devices on a shopfloor has emerged as a critical factor in optimizing operational efficiency and ensuring seamless production processes. This thesis focuses on the development of a scalable architecture and communication protocol for device connectivity at Mettler Toledo's shopfloor, specifically within the framework of the Lean Manufacturing Execution System (LMES). The initial problem centered around the lack of a standardized approach for device connectivity, leading to operational inefficiencies, security vulnerabilities, and challenges in data management.

**Objective:** The primary objective of this thesis was to develop a solution that could be seamlessly integrated into LMES, allowing it to function as a centralized hub for data transmission and analysis. This involved identifying and establishing a scalable architecture that supports efficient and manageable data flow across different sectors of the production environment. The selection of appropriate communication protocols, with a focus on MQTT for its lightweight and efficient messaging capabilities, was crucial. The development of a proof-of-concept using MQTT protocol to connect devices, specifically the AUBO Cobot i7, was undertaken to demonstrate the practical application of the proposed architecture and protocol in a real-world setting.

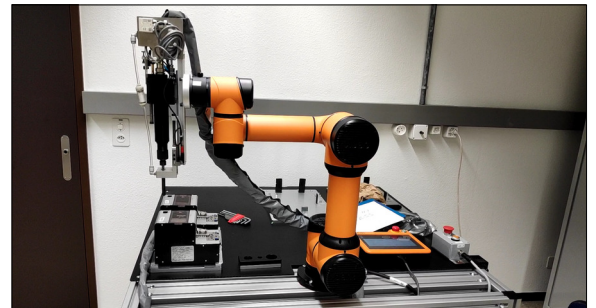
**Result:** The result was a functional prototype MQTT client integrated into LMES, adaptable for future use with various devices, demonstrating the potential for scalable and efficient device connectivity in industrial settings. The prototype showed the feasibility of employing MQTT protocol for real-time data communication. The outlook involves expanding

cobot functionalities, integrating additional devices, and adapting the client for OPC UA compatibility. The successful integration of the MQTT client into LMES and its adaptability for various devices signifies a significant advancement in smart manufacturing, highlighting the potential for further development and contributions to industrial automation.

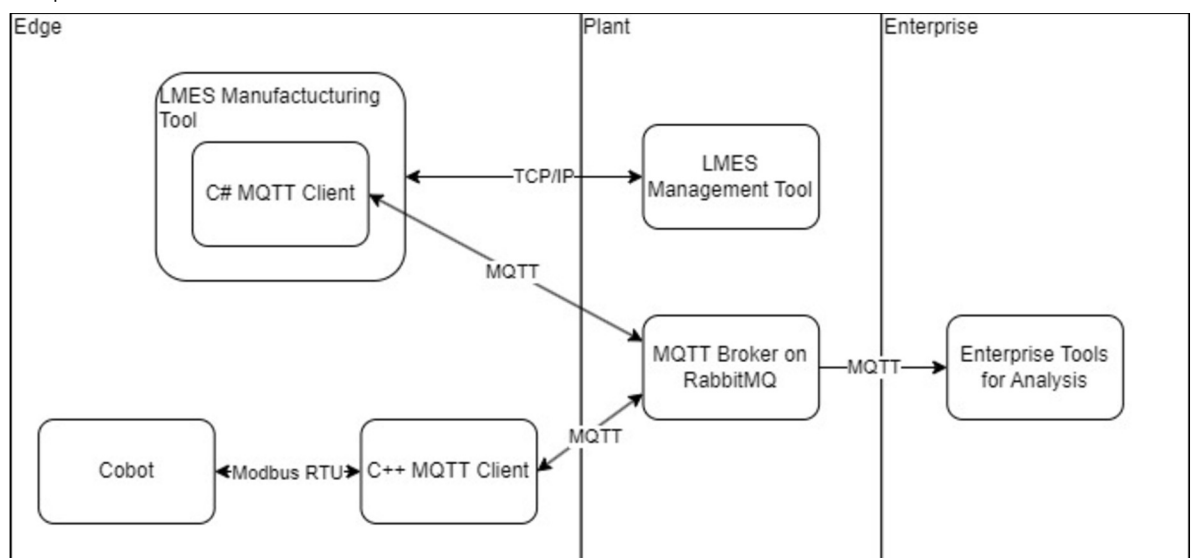
**Mettler Toledo Shopfloor with Automated Guided Vehicle (AGV)**  
Own presentation



**AUBO Cobot i7**  
Own presentation



**Solution Architecture using MQTT**  
Own presentation



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