

Defining a Reference Architecture for Predictive Maintenance Systems: A Case Study Using the Microsoft Azure IoT-Cloud Components

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Abstract : Current preventive maintenance measures are cost intensive and not efficient. With the available sensor data of state of the art internet of things devices new possibilities of automated data processing emerge. Current advances in data science and in machine learning enable new, so called predictive maintenance technologies, which empower data scientists to forecast possible system failures. The goal of this approach is to cut expenses in preventive maintenance by automating the detection of possible failures and to improve efficiency and quality of maintenance measures. Additionally, a centralization of the sensor data monitoring can be achieved by using this approach. This paper describes the approach of three students to define a reference architecture for a predictive maintenance solution in the internet of things domain with a connected smartphone app for service technicians. The reference architecture is validated by a case study. The case study is implemented with current Microsoft Azure cloud technologies. The results of the case study show that the reference architecture is valid and can be used to achieve a system for predictive maintenance execution with the cloud components of Microsoft Azure. The used concepts are technology platform agnostic and can be reused in many different cloud platforms. The reference architecture is valid and can be used in many use cases, like gas station maintenance, elevator maintenance and many more.

Keywords : case study, internet of things, predictive maintenance, reference architecture

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