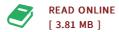# Heterogeneity in Distributed Embedded Systems

By Tobias Baumgartner

Cuvillier Verlag Nov 2012, 2012. Taschenbuch. Condition: Neu. Neuware - Advances in the field of wireless sensor networks (WSNs) over the last decade have led to a great number of available hardware platforms and operating systems for embedded devices. With the upcoming research area called Internet of Things (IoT) even more new platforms appeared. Consequently, we are now faced with a vast amount of different embedded systems, ranging from tiny microcontrollers to comparably powerful smartphones. Unfortunately, this diversity of hardware architectures has not yet been fully addressed by any generic software architecture. Various operating systems for embedded devices are available, however, each of them cover only a few architectures. Using Java is not possible on tiny microcontrollers because of the lack of a Java Virtual Machine (JVM) on these platforms. Similarly, the entire field of testing is not geared towards dealing with the amount of heterogeneity. Testing environments are mostly homogeneous, and it is not possible to evaluate ideas on large-sized networks consisting of heterogeneous nodes. In this work, we present techniques to address the aforementioned problems. We introduce modern programming paradigms known from desktop computers and transfer these ideas to embedded systems. Furthermore, we built a testing platform consisting...

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