

DESIGN OF A WSN PLATFORM FOR LONG-TERM ENVIRONMENTAL MONITORING FOR IOT APPLICATIONS

INTRODUCTION:

The Internet of Things (IoT) provides a virtual view, via the wireless protocol, to a huge variety of real life objects, ranging from a car, to a teacup, to a building, to trees in a forest. Its appeal is the ubiquitous generalized access to the status and location of any “thing” we may be interested in. Wireless sensor networks (WSN) are well suited for long-term environmental data acquisition for IoT representation. This paper presents the functional design and implementation of a complete WSN platform that can be used for a range of long-term environmental monitoring IoT applications. The application requirements for low cost, high number of sensors, fast deployment, long lifetime, low maintenance, and high quality of service are considered in the specification and design of the platform and of all its components. Low-effort platform reuse is also considered starting from the specifications and at all design levels for a wide array of related monitoring applications.

MORE than a decade ago, the Internet of Things (IoT) paradigm was coined in which computers were able to access data about objects and environment without human interaction. It was aimed to complement human-entered data that was seen as a limiting factor to acquisition accuracy, pervasiveness, and cost.

Two technologies were traditionally considered key enablers for the IoT paradigm: the radio-frequency identification (RFID) and the wireless sensor networks (WSN). While the former is well established for low-cost identification and tracking, WSNs bring IoT applications richer capabilities for both sensing and actuation. In fact, WSN solutions already cover a very broad range of applications, and research and technology advances continuously expand their application field. This trend also increases their use in IoT applications for versatile low-cost data acquisition and actuation. However, the sheer diversity of WSN applications makes increasingly difficult to define “typical” requirements for their hardware and software. In fact, the generic WSN components often need to be adapted to specific application requirements and

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environmental conditions. These ad hoc changes tend to adversely impact the overall solution complexity, cost, reliability, and maintenance that in turn effectively curtail WSN adoption, including their use in IoT applications.

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