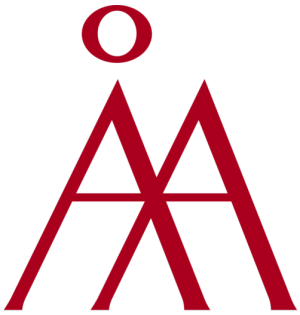

Åbo Akademi University

System Architecture of IoT

Assignment 1

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Contents

0.1 Which application domain and technology are considered to be "the birth of IoT" ?

In 1999, the term "Internet of Things" was first used and popularized by Kevin Ashton who was ther founder of Auto-ID Center at the Massachusetts Institute of Technology (MIT). The company started to design and propagate a cross-company RFID infrastructure for logistics applications. RFID extends for Radio Frequency Identification and it's used to tag objects via electromagnetic fields. Even though this term was first popularized in 1999, it is important to point out that the idea of ubiquitous computing goes back to the late 1980s.

0.2 When defining a reference IoT architecture, what are the main (high level) requirements to be considered? Provide a short description of the requirements.

With the fast-growing number of initiatives working toward a standard architecture, there was need to identify a structure that serves as reference for an overall generic guideline.
For that, some requirements were necessary :

- Connectivity and communications: This might involve one-to-one connectivity (unicast) or data collection and information dissemination to multiple partners (multicast and anycast) [2];
- Device management: Much things must be considered when designing an architecture, such as device configuration, the ability to update the software on a device, locating a lost device, among others;
- Data collection, analysis, and actuation: Relevant for extracting information and knowledge for offering services [2];
- Scalability: The reference architecture is designed to manage very large numbers of devices. If these devices are creating constant streams of data, then this creates a significant amount of data. The requirement is for a highly scalable storage system, which can handle diverse data and high volumes[4];
- Security: One of the most important things to look out while building an IoT architecture, since more often then not devices are collection personal data, which increases the damages when this data is exposed.

0.3 What are the main challenges when deploying an IoT application? Provide a short description of the challenges, and whenever possible a real-world example to illustrate your answers.

The main challenges when deploying an IoT application are:

- Energy efficient secure communication: For a good connection between the object and the system, technologies such as low-power wireless networks that require little implementation are needed to provide this communication, for which security is an important factor.
- Real-time networked Operating Systems: Even thought there are already hardware suitable for implementing the IoT, it's not certain whether device-oriented, real-time networked Operating Systems will ever exist for the different application domains or whether the diversity of real-time Operating Systems will continue. [2]

- Big-data analytics and the human–machine interface: Owing to applications individual characteristics, not much standardization is available yet. [2]

0.4 Using your own words, define the notion of "Web of Things"? Provide possible examples.

The Web of Things (WoT) is a term used to describe the connection between an object and the World Wide Web. One example of this is traffic monitoring. Lets Imagine that a person has to go from point A to point B, and the closest route has an accident. This accident can be detected by cameras on the road that will communicate with the system, via the web, identifying that this road has accident. Finally, others system that calculates the shortest route (time based) will have that in count and, if justified, give a different route for the destination. To conclude, we can identify the camera as real-world object, that communicates with the World Wide Web, providing others systems with relevant information.

Bibliography

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