IoT

A simple guide on starting with IoT

Sergio Rabin
Power Micro Controls

Introduction

Don't want to bore the reader with long presentations or videos on IoT, at least for now, so we are going to look at the parts of an **end-to-end IoT Platform** and the criteria to select each part.

Of course there may be other ways or criteria to select IoT parts that would be as valid as ours, but this is what we think is best from our point of view.

Our selection is centered on mesh network technology which allows to create a sensor network without limits.

Parts of an end to end IoT Platform

We recognize the following parts:

A) Sensors
B) Sensor Wireless Interface (when the sensor has no integrated wireless interface)
C) Sensor Concentrator - Bridge
D) Gateway
E) Edge Server - MicroServer
F) Visualization Platform

Sensors

Aside of the sensor element itself and signal conditioning circuit, it should include a wireless connection using standard IEEE 802.15.4 for low power, reliability and compatibility with other wireless IoT networks.

2.4 Ghz frequency band to avoid interference and compatibility.

Sensor should form part of a mesh network so they can relay messages and thus cover a wide area. Some nodes will act as repeaters - routers others will be sensors only End Devices.

Powered by a power supply or battery depending on the application. Must not be forgotten that battery should be replaced after a while, typical one-two years, a huge amount of sensors, implay to dispose a huge amount of batteries.

Protocol

We think OpenThread protocol or a variant of it will be the future standard.

The working group formed by big companies are planning to use something similar as its an IPV6 based protocol but suitable for low power applications.

More information on this can be found here: https://www.connectedhomeip.com/

At the end sensors should include a wireless interface with an open wireless protocol to insure present and future compatibility.

The “logic” protocol or how the packages are formed are not so important as a sensor concentrator or edge servers can manage any format.

Sensor wireless Interface

Standardizing the sensor wireless connections is central to IoT platforms. This allows to integrate legacy sensors to the new standard IoT sensor networks and platforms.

Several interfaces are being developed so as to integrate existing sensors to the new IoT Platforms.

Digital, analog and communication interfaces must be used as to standardized all sensor to the same wireless sensing networks.

Converters from analog or ethernet to wireless IEEE 802.15.4 will be used to standardize sensing IoT Platforms.

Sensor concentrator - bridge

In order to separate sensor networks for security and reliability a sensors bridge may be used. Sensors send data to the concentrator which in turn sends sensors data to an edge server or gateway.

The bridge may allow to connect the sensor network to other hardware “opening a door” to other connections like bluetooth to control or configure a sensor using a smartphone.

Where transmitting sensor data over a long distance is required a 800 - 900 Mhz bridge can be used.

Bridging different sensor networks is an optional feature to be used.

Gateway

The gateway simply connects the wireless sensors to a server on the Internet or other network which collects the sensors information for further analysis and visualization thru the IoT Platform.

The data can be packed in different formats as the platforms has enough processing power to process the data in different formats (JSON, MQTT, etc).

The Gateway is similar to the bridge , however normally it will connect to an IoT server or Platform.

Edge Server - MicroServer

This Edge Server is located near the sensors network and will allow to collect , display and process sensors data locally. It can even provide a basic visualization platform.

The main IoT platform will access the Edge Server, retrieve sensor data for further processing.

Edge server also acts as a backup for a certain amount of data

Visualization Platform

Here comes the Complex or Simple selection depending on the requirements.

The Platform can be as complex or as simple as you want. From a simple server running php scripts to a complex platform with AI capabilities and variants in between.

The interesting part is that anyone can build an IoT platform based on standard web-like design tools like php, html, javascript.

You can view a simple php based visualization - Graphics example here:

http://www.powermicrocontrol.com/index.php?file=iot&function=iot_demo

Contact Us

Fill free to contact us and ask any question, for free, at least for now ;)

http://www.powermicrocontrols.com/contactus.html