

Technology beyond the IoT

1. Hardware

- Embedded Devices
- Embedded hardware/software with Sensors/Actuators
- Hardware (Arduino Raspberry Pi, Intel Edison, mBed, Beagle Bone Black and Wireless SoC,

2. Integrated development environment (IDE) and Software

- Enables developing device software, firmware and APIs
- Eclipse IoT Stack, Sense, ThingWorx, EvryThng,
- Software (RIOT OS, Thingsquare Mist firmware, Eclipse IoT)

3a. Embedded Devices/M2M Communication Protocols

- CoAP, RESTful HTTP, MQTT, XMPP
- Communication (RFID, NFC, 6LowPAN, UWB, ZigBee, Bluetooth LE, Power-line Ethernet, LPWAN)

3b. Network Protocols

- ZigBeeIP, RPL, IPv4, IPv6, UDP
- WiFi, WiMax, 2G/3G/4G/5G)

4. Software Platforms

- Internetnetwork Cloud Platforms
(Xively, Nimbits, TCS Connected Universe Platform, openHAB, AWS IoT, IBM BlueMix, CISCO IoT, IOx and Fog, EvryThng)
- Server

5a. Analyzing and Visualising

- Analyzing data, streaming data, events streaming data
- Descriptive, Prescriptive and Predictive Analytics
- Data Visualisation

5b. Analytics & Machine Learning

- Learning ability to learn continuously from data, and the ability to drive actions/Applications/Business Processes
- Machine learning algorithms, for example, GROK from Numenta Inc.

Steps behind the IoTs

1. Device platform consisting of device hardware and software.
2. Microcontrollers (or custom chips)
3. Software for device APIs and web applications

..... Steps behind the IoTs

4. Connecting and networking,
5. Server and web programming,
6. Cloud platform for storage and computing, and
7. Data Analytics, Visualization and Machine Learning

Summary

We need Five Technologies for the IoT

(i) Device platform

(ii) Device hardware and software Technology

(iii) Connecting Network Technology

Summary

(iv) Cloud Platform or Server

(v) Analytics, data visualization,
Machine Learning

End of Lesson 4 on Technologies behind the IoT