Course : Internet of Things, developing connected applications in Java and C++

Practical course - 5d - 35h00 - Ref. IBO
Price : 3040 € E.T.

This training course will enable you to understand the typical architecture of an IoT network and to set up a complete IoT chain, from information feedback from LPWAN-connected sensors to Data Visualization, including Cloud/Big Data collection and operation in Java and C++.

Teaching objectives

At the end of the training, the participant will be able to:

- Define a complete IoT architecture.
- Know the IoT networks available.
- Use different types of sensors and detection devices.
- Prototype using Raspberry/Arduino.

Intended audience
Developers wishing to develop a project around the Internet of Things.

Prerequisites
Good knowledge of Java. Experience of Java development desirable.

Practical details
Hands-on work
A case study will enable the deployment of a complete IoT chain. Elements involving other programming techniques will be provided.

Course schedule

1 Introduction to the Internet of Things

- Basic IoT concepts. Links with M2M. IoT architectures.
- Communication and energy issues.
- Offers and players.

PARTICIPANTS
Developers wishing to develop a project around the Internet of Things.

PREREQUISITES
Good knowledge of Java. Experience of Java development desirable.

TRAINER QUALIFICATIONS
The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

ASSESSMENT TERMS
The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more.
Participants also complete a placement test before and after the course to measure the skills they've developed.

(2) IoT architectures

- General architecture diagram, from sensors to servers.
- Operating systems adapted to IoT (Linux, Raspbian, Win10 IoT...).
- Links with various Clouds (MS Azure IoT...).
- The exploitation and indispensable correlation of data with Big Data tools.
- Data security and confidentiality, respect for privacy.

Storyboarding workshops
Case studies (smart meters, etc.). Installation of dedicated IoT systems.

(3) Networks and proximity detection

- Available technologies: WiFi, Bluetooth, NFC, RFID...
- Exchanges via Bluetooth and WiFi Direct.
- How RFID and NFC systems work. QR codes.
- The possibilities offered by Smartphones.

Hands-on work
Use NFC tags. Use Bluetooth or Wifi direct.

(4) The LPWAN network

- The specific features of IoT networks (distance, equipment positioning, autonomy).
- Characteristics of LPWAN networks. Study of SigFox and LoRaWan. What kind of programming?
- Available offers (operators).
- Securing an IoT network.

Hands-on work
Exploitation de données remontées par un réseau LPWAN et utilisation des capteurs destinés au développement.

(5) Prototyping

- Presentation of Arduino and Raspberry solutions.
- Arduino Harware capabilities (sensors, shields, GPIOs) and embedded programming.
- The environments available on Raspberry and the link with Arduino.
- Choice of operating system and development tools.

Hands-on work
Mise en place d'une solution intégrant un capteur et plusieurs composants parmi ceux présentés.

(6) Software operation

- Software communication platforms (Technicolor Qeo, Google Weave, etc.).
- REST APIs and development tools.
- Solutions for injecting data into a NoSQL BigData database.
- The different Clouds (Google Cloud Platform, ThingPlus...).
- Software tools for securing an IoT solution.
- Data visualization techniques (mobile and desktop).

Hands-on work
Setting up communication from a sensor to a NoSQL BigData database.