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# Course : Radio solutions for the IoT

*Synthesis course - 2d - 14h - Ref. RAD*
*Price : 2020 CHF E.T.*

Referred to by their initials, machine-to-machine (M2M) and the Internet of Things (IoT) are two very similar concepts, with a wide variety of applications in the automotive, healthcare and enterprise sectors. This overview course explores the radio solutions available to enable objects to communicate with each other.

## Teaching objectives

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

- Understand the radio solutions available to enable objects to communicate with each other
- Have a synthetic and comparative vision of radio connectivity technologies
- Understanding multiple technologies and communications (BLE, LoRa, Sigfox, NB-IoT, Zigbee, 6LoWPAN...)

## Intended audience

Telecom engineers, network and telecom consultants, network and telecom service architects, telecom managers.

## Prerequisites

No special knowledge required.

## Course schedule

### 1 Machine to Machine and the Internet of Things

- Definition of the term Internet of Things (IoT, Internet of Things, Thing to Thing, Internet of Everything...).
- Definition of Machine to Machine (M2M, MtoM, etc.).
- Areas of use (health, agriculture, industry, construction, home automation, parcel tracking, etc.).

**PARTICIPANTS**

Telecom engineers, network and telecom consultants, network and telecom service architects, telecom managers.

**PREREQUISITES**

No special knowledge required.

**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 From M2M to IoT

- Basic concepts and principles.
- From current M2M markets to future IoT prospects.
- M2M and IoT requirements.
- Radio and wired LAN and PAN protocols.
- WPAN, WLAN and WMAN standards: limitations for the M2M and IoT markets.

## 3 M2M and IoT network architecture

- Interfaces, equipment and associated protocols.
- The main procedures.
- The consumption of objects.

## 4 IoT radio solutions

- Short-range personal networks.
- Low-speed long-distance networks.
- Cellular networks.

## 5 Standards for M2M, IoT

- Open Source and proprietary standards.
- WPAN solutions: ZigBee and Bluetooth LE (Bluetooth low energy)/WLAN: WiFi LE 802.11h or WiFi Halow.
- LP-WAN solutions - Low Power Wide Area network.
- LTN UNB (Sigfox), LTN OSSS (LoRa, LoRaWAN): radio interface, performance, network architecture and protocols.
- Spread spectrum and operation of LoRa's MAC layer.
- From GSM, GPRS to EC-GSM: concepts, radio interface, performance, network architecture, protocols and procedures.
- From LTE, LTE-A, LTE-M to D2D, NB-IoT: radio interface, performance, network architecture, protocols and procedures.
- 5G and the massive integration of connected objects in "Global Connectivity".

## 6 V2V/V2X extension

- V2V (Vehicule-to-Vehicle), V2X (Vehicule-to-Everything): concepts and principles.
- From WiFi 802.11p (G5) to LTE-V2X (5G).
- C-V2X (Cellular Vehicule-to-Everything).

## 7 Data transport

- IPV4 and IPV6.
- Compatibility of IP protocols with low-power IoT objects.
- The IoT Gateway model.
- 6lowPAN, an end-to-end IP version for low-power objects.
- Multi-hop and connected object networks.
- Stand-alone, infrastructure-free IoT solutions.

## 8 Outlook for M2M and IoT standards

- Comparison of different standards.
- M2M and IoT initiatives and projects.
- 4G and 5G for a world of connected objects.
- IoT, M2M and Quality of Service (QoS)?

**TEACHING AIDS AND TECHNICAL RESOURCES**

• The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
• At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
• A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

**TERMS AND DEADLINES**

Registration must be completed 24 hours before the start of the training.

**ACCESSIBILITY FOR PEOPLE WITH DISABILITIES**

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at psh-accueil@orsys.fr to review your request and its feasibility.

- M2M and IoT market vision.

## Dates and locations

**REMOTE CLASS**
2026 : 19 Mar., 25 June, 8 Oct., 17 Nov.