Publication date : 08/09/2024

Course : Internet of Things, overview

Synthesis course - 2d - 14h00 - Ref. IOB
Price : 2170 CHF E.T.

4,6 / 5

The Internet of Things (IoT) is a major component of digital transformation. IoT is about harnessing the potential of new digital technologies and their impact on improving the real world. The IoT enables services to be offered in many sectors, such as e-health, surveillance, traceability, production line automation and many other areas where technological innovation holds great promise.

Teaching objectives

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

- Assess key aspects of the Internet of Things domain
- Identify the problem and the inherent technical solutions
- Discover the advantages and disadvantages of the Internet of Things domain
- Assess the economic and innovation opportunities offered by the Internet of Things (IoT) field
- Understanding the notion of IoT (Internet of Things) or connected objects
- Identify uses and associated technologies

Intended audience

Toute personne concernée par un projet lié aux objets connectés : chefs de projets, consultants, responsables et collaborateurs DSI…

Prerequisites

Basic knowledge of computer networks.

Practical details

Demonstration

During the seminar, a demonstration will illustrate a practical example of an RFID-based application.

Course schedule

PARTICIPANTS

Toute personne concernée par un projet lié aux objets connectés : chefs de projets, consultants, responsables et collaborateurs DSI…

PREREQUISITES

Basic knowledge of computer networks.

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.

1 Concept of objects and the Internet of Things

- Definition of the term Internet of things (Internet of things, thing to thing, Internet of everything...).
- Concepts, models and principles.
- Connected object concepts (QRCode, RFID Tag, Sensor...).
- Microcontroller architecture: microchip, digital systems (Arduino, ESP32, system on chip...).
- Single-interface, multi-interface/multimode terminal. Wearable terminal.
- Around the connected object's operating system (TinyOS, Contiki, RIOT...).
- Electronics industry and connected objects.
- The challenges of optimized power consumption in integrated circuits.

Demonstration

Connected watch, connected vehicle, industrial sensor, human body sensor...

2 IoT communication features and technologies

- Identifying thing, feeling thing and localization functions.
- Inference, smart thinking and actioning functionalities.
- Communication technologies. PLC (Power Line Communication).
- Short-range radio communication and wireless networks: Wi-Fi, ZigBee, HomeRF, RFID, NFC, WirelessHart, Bluetooth LE...
- Long-range mobile radio communications (LORA, SigFox, LTE NarrowBand, UWB...).
- Notions of gateways and interaction between heterogeneous technologies. MQTT.
- Other technologies: nanotechnology. Robotics, tactile Internet, augmented reality...
- Service scenarios with technology choices.

Demonstration

Service scenarios and technology choices.

3 Internet of Things networking and architectures

- Limits of the IP/Internet model and energy consumption of the Internet of Things.
- Evolution of the IP/Internet model to meet the new needs of the Internet of Things.
- Nano-IP architecture and 6LoWPan architecture. Routing: ROLL. IP compression.
- Naming techniques and object identification. Object name service (ONS).
- Service access architecture, service composition for the Internet of Things.
- Indoor and outdoor geolocation. Object tracking. Traceability and new beaconing solutions.
- New approaches: autonomic communication", information centric network".

Storyboarding workshops

Discuss the main limitations of the IP/Internet model.

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.

4 Application fields and new services

- Surveillance and monitoring: ecology, safety...
- Process automation around the person: home, office...
- Process automation for business and industry: automation of production lines.
- Automation and critical systems (CPS).
- Healthcare process automation: e-management of patient files.
- Automated meter reading (electricity, water, etc.): smart cities.

Demonstration
Demonstrations of the various fields of application.

5 Standardization, industry alliances, IoT Platforms and security

- Standardization of cellular networks (LTE Narrowband...).
- Standardization of IoT networks (OneM2M, ITU, GS1, EPCGlobal...).
- ITU standardization.
- Industrial alliances: AllSeen, OIC, IPSO...
- Communication gateway with heterogeneous technology objects.
- Solution for managing single-hop or multi-hop connected objects.
- IoT and cloudification platforms (ThingWorks, Oracle, Cisco...).
- IoT security. Authentication and access control.
- Encryption and integrity control.
- Security and safety. Data ownership and privacy.

Group discussion
Reflection on different alliances.

6 Internet of Things products on the market

- Connected object products with application scenarios.
- Gateway products (Cisco, Microsoft, SAP, Oracle, etc.).
- Server products for information storage and processing.
- Specific constraints around health information.
- Specific constraints around real-time applications, CAN BUS and embedded systems.

Demonstration
Presentation of market products.

7 Internet of things and big data

- Sizing Internet of Things traffic.
- Data storage architectures.
- Internet of Things data processing in local loops or in the cloud.
- Complexity management algorithms.
- Inference approaches and algorithms.

Example
Example of a big data and Internet of Things application.

8 IoT strategy, innovation and entrepreneurship

- New needs and services.
- Network services for the Internet of Things. Mobile banking and NFC.
- Monitoring system.
- Location-based services, crowdsensing and urban sensing.
- Experimental network platforms: Senslab, IoT Lab, Winlab, Arduino, ESP32, Raspberry Pi...
- The smartphone at the heart of new applications and services.
- Innovation and entrepreneurship: WorldSensing, WiThings, SigFox...

Dates and locations

REMOTE CLASS
2026 : 26 Mar., 19 May, 13 Oct., 24 Nov.