

WORKSHOP

Edge Computing and Data Collection for Industrial IoT



About this Workshop

This workshop focuses on Industrial IoT. And You will learn how to get started with your **Industry 4.0 project**. It is designed to enable operators, engineers and system integrators to optimize and improve industrial processes with IoT.

It will discuss the **basics of Industrial IoT**, the **basic infrastructure of an IoT application** and will provide hands on experience on getting data from industrial machines, sending them to the cloud and monitoring the data in real-time.

The workshop also explains **how to connect legacy and current machines to IoT infrastructure** and get meaningful insights on the operations using trusted industrial tools and platforms.

Additionally, the workshop discusses the **fundamentals of the IoT Cloud service, communication protocols, edge computing**, and the best practices in applying over-the-air updates.

All of the features mentioned above are available on our secure Cloud service, the **zCloud**, which consists of a Device Manager, a Data Manager, a Data Storage manager and a Visualization Engine. Moreover, the workshop discusses the fundamentals of data storage on an IoT cloud service, and how to make clear and easy-to-use dashboards.

The workshop wraps-up with a complete example of an IoT application, done by Zerynth Engineers.

What is included



ON-DEMAND LESSONS

The workshop includes 16 video lectures to teach the different aspects of integrating and using Industry 4.0 machines.



3 LIVE ONE-ON-ONE CALLS WITH AN IOT EXPERT

Each workshop participant has the opportunity to schedule 3 video calls with a Zerynth engineer to ask questions related to the training lessons or examples included in the workshop. Each call is around 30 minutes.



ZCLOUD (1 YEAR INCLUDED)

- **zDeviceManager (development plan)** device and data management software to securely register, organize, monitor, and remotely manage IoT devices.

Development Plan:

- Duration: 1Y
 - Number of devices limit: Up to 50
 - Traffic: 2 GB/Device/Year
- **zStorage 5gb per 1 device** - data storage service for IoT devices.
 - **zDashboard (bronze plan)** - data analytics and dashboarding tool.
One dashboard for one admin user.



THE HARDWARE MATERIALS NEEDED FOR THE HANDS-ON SECTION



- 4ZeroBox
- Clamp-type alternating current sensor
- Temperature sensor
- Reed Switch
- RS485 to USB interface to be used as a PC based RS485 peripheral simulator

What you will learn

1. The Industry 4.0 paradigm, OT vs IT networks, IoT architecture (sensors, devices, gateways...).
2. Introduction to microcontroller peripherals and the basic workflow of an IoT application.
3. The hardware and software features of the 4ZeroBox.
4. How to acquire digital and analog data from industrial machines.
5. What is edge processing? how can we benefit from it? How can we apply it in our application?
6. Real use cases benefits of conditions and jobs and tags.
7. What is the over-the-air firmware update? How to do it safely, and how to issue it over Wifi and Ethernet.
8. Introduction to zStorage and zDashboard.
9. How to make clear and powerful dashboards that monitor the data in realtime.
10. The system architecture and the code components of a complete end-to-end Industrial IoT application.

Prerequisites

- Basic Knowledge of Python programming language.
- Basic knowledge of electronics, hardware circuits and peripherals of a microcontroller.

Table of Contents

Industrial IOT and Industry 4.0.

- Introduction to Industrial IOT (IIOT).
- Applications and industries in IoT.
- The Industry 4.0 paradigm, OT vs IT networks, industrial network. configuration, gateway and sensor nodes in Industrial IOT.

The Zerynth Suite.

- Introduction to the Zerynth platform.
- Introduction to the Zerynth SDK.

The 4ZeroBox.

- Introduction to the 4ZeroBox hardware, features, and peripherals.
- Getting started with the 4ZeroBox and acquiring industrial data from machines.

Interfacing with Industrial digital sensors.

- Introduction to digital Sensors in Industrial IOT.
- Introduction to digital interfaces in the 4ZeroBox and running examples on digital data acquisition.

Interfacing with RS485 protocol.

- Introduction to RS485 protocol.
- Examples of writing and reading data via RS485 protocol using the 4ZeroBox.

Interfacing with Industrial analog sensors.

- Introduction to analog sensors in Industrial IOT.
- Introduction to analog interfaces in the 4ZeroBox and running examples on analog data acquisition.

Edge processing and filtering of acquired data.

- Introduction to edge processing, examples of filtering and applying edge processes on the data.

Zerynth advanced programming.

- How to use threads, timers, and lock.
- Examples of data storage with SD card and TSlog.

Introducing the Zerynth Device Manager.

- Basics of communication protocols, MQTT, HTTPS.
- Introduction to the Zerynth Device Manager, features, use cases.
- Workspace configuration, tags, fleets and the Zerynth Device Manager conceptual model description.

- Visualizing the data inside the Zerynth Device Manager.
- Introduction and demonstration of examples for Jobs and, Conditions.
- Introduction to Firmware Over the Air (FOTA) updates, its technical details and the benefits of using it.
- Issuing Firmware Over the Air (FOTA) updates using the Zerynth Device Manager via Ethernet and Wifi.

Integrate and Build a dashboard with zStorage and zDashboard.

Showcase an Industrial application running 4ZeroBox, ZDeviceManagement, zStorage and zDashboard.

How to get this workshop

This workshop is exclusively
available on RS Components

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About Zerynth®

Zerynth helps companies easily get their industrial processes digitized and bring innovative connected products to the world.

The Zerynth IoT Platform is a full set of hardware-software tools designed by IoT experts to enable the digital transformation in a fast, flexible and secure way.

Founded in 2015, Zerynth has grown steadily. Today Zerynth is composed of 30+ team members with deep IoT expertise and industry knowledge thanks to over 3000 successful IoT implementations in companies across many industries. Headquartered in Italy, Zerynth provides support globally thanks to an extensive network of partners in Europe and pan-global locations.



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