Zephyr RTOS Connectivity and Production Training

From a Zephyr prototype to a connected product: Bluetooth LE, IP networking, LoRaWAN, secure firmware updates and continuous testing.

4 days	Intermediate to advanced	On site or remote	English or French
Duration	Level	Format	Language

Overview

This course takes a Zephyr application from a prototype to a connected product. It covers the network stack, Bluetooth LE, LoRaWAN and USB, then the mechanisms a product needs: the MCUboot bootloader and firmware updates, security, testing and continuous integration, and the porting of Zephyr to a custom board.

What You Will Learn

- Connect devices over IP with TLS and MQTT, over Bluetooth LE and over LoRaWAN
- Add USB device and host support
- Integrate MCUboot with signed images and firmware updates
- Use TrustZone-M, TF-M and the PSA Crypto API
- Test firmware with native_sim, Ztest and Twister
- Port Zephyr to a custom board

Who should attend

Firmware engineers who develop connected products with Zephyr.

Prerequisites

The Zephyr RTOS Development course or equivalent experience.

Program

The first half covers connectivity, the second half what a product needs to ship and to be maintained.

Day 1

- The network stack: configuration, interfaces, sockets, TLS and MQTT
- USB device support and USB host

Day 2

- Bluetooth LE: architecture, advertising, GATT services, connections and security
- LoRa and LoRaWAN

Day 3

- Bootloaders and MCUboot: partitions, signed images, swap strategies, firmware updates
- Security: chain of trust, memory protection, TrustZone-M and TF-M, PSA Crypto, secure storage

Day 4

- Testing and continuous integration: native_sim, Ztest, Twister, testing on hardware
- Porting Zephyr to a new board, power management, Zephyr in a Yocto build

Labs and Hardware

Labs run on Nordic nRF52840 DK and STM32 Nucleo boards. Sessions take place on site, in France, Belgium, Switzerland, Germany and beyond, with the hardware provided by LABCSMART, or remotely. Remote attendees work on our build server, each with their own SSH account and workspace, and run the labs on QEMU machines and on real boards. The exercises are drawn from our own client projects. Courses are given in English or French.

Who Teaches This Course

The course is designed and given by the founder of LABCSMART, an embedded Linux and Linux kernel engineer with more than eleven years of industrial experience. He contributes upstream to the Linux kernel for Renesas RZ SoCs, in the PCIe, audio, Ethernet, thermal, DMA and clock subsystems, and wrote two books published by Packt, *Linux Device Driver Development, Second Edition* (2022) and *Mastering Linux Device Driver Development* (2021), presented on our publications page.

Plan a session for your team. Every course is made of independent modules. A team can drop the modules it does not need and add others in their place, and we also build courses on demand around a given SoC, board or project. Contact: contact@labcsmart.com, https://labcsmart.com/company/contact/. Course page: https://labcsmart.com/training/zephyr-rtos-connectivity/