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Welcome to
STM32WB0 workshop

Workshop team

Introduction

- The purpose of coming hands-on sessions is to demonstrate how to easily start the evaluation and development of a Bluetooth Low energy application on STM32WB0x devices thanks to associated STM32Cube ecosystem

- We will use different ST evaluation kits during this workshop:
  - NUCLEO-WB05KZ (low end Bluetooth Low energy SoC)
  - NUCLEO-WB09KE (mid end Bluetooth Low energy SoC)
  - X-NUCLEO-WB05KN1(Bluetooth Low energy network processor)

Hands-On Agenda

1 — 20 min
Basic Beacon application
BLE Beacon concept & build

2 — 30 min
P2P server application
BLE profile concept & build

15 min
10:30 Break

3 — 20 min
STM32WB0 extended feature
Play with BLE 5.4 PAwR

4 — 15 min
BLE add on
X-NUCLEO-WB05KN1 over Zephyr

5 — 20 min
Test and optimize RF perf
Prepare certification

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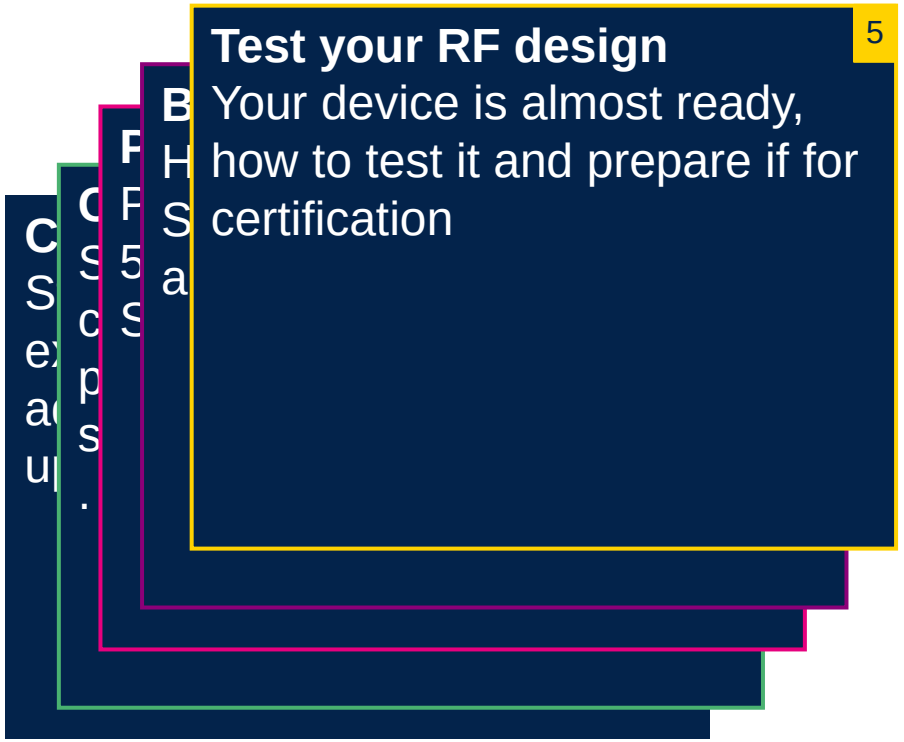
Let’s start enabling Bluetooth Low Energy applications with STM32WBx



1 Basic beacon

2 Create BLE Profile

3 PAwR Advanced feature

4 BLE Add On

5 Test your RF design

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Basic Beacon application
concept & build

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Let’s start enabling Bluetooth Low Energy applications with STM32WBx
Basic Beacon application

Basic 1
Starting from from code example understand advertising concepts build and update a **beacon application**

1 Basic beacon

2 Create BLE Profile

3 PAwR Advanced feature

4 BLE Add On

5 Test your RF design

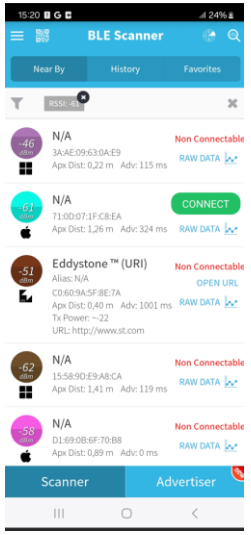
Purpose

- In this part we will show following:
  - Advertising frame and beacon concepts
  - Start from STM32CubeIDE and import Beacon sample code
  - Modify the advertising beacon payload
  - Build and scan results using BLE Scan Bluetooth Low Energy debug App

STM32 CubeIDE

1.16.0

NUCLEO-WB05KZ



BLE Scanner

Download on the App Store

GET IT ON Google Play

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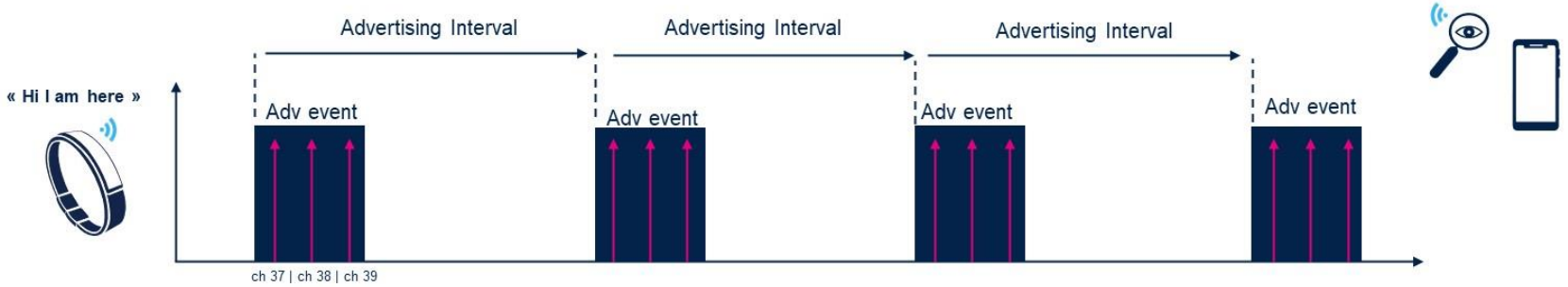
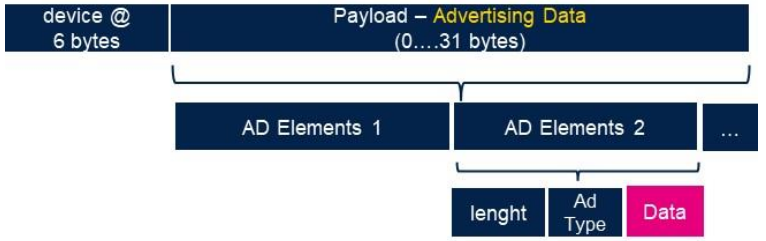
What is a Beacon

- BLE Beacons take advantage of the advertising Bluetooth Low Energy mode to broadcast data out

↳ with periodic timing



↳ with formatted advertising packets.



- Each **type of beacon (Eddystone, iBeacon)** uses a custom advertising data giving it meaning.

Eddystone

iBeacon

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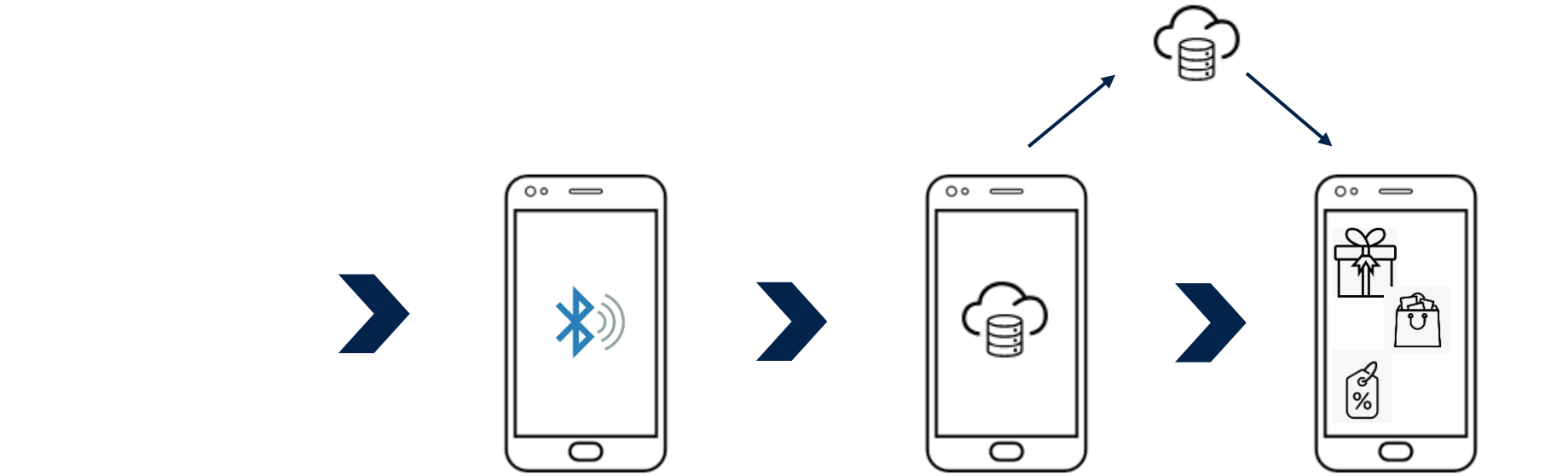
What is a Beacon



Eddystone

iBeacon

STM32Cube capabilities

STM32 CubeIDE

STM32 CubeMX

1	**Example application** complete application running over NUCLEO
2	**Board level** all the hardware is already configured
3	**Chipset level** require to configure your HW (PCB) & your application

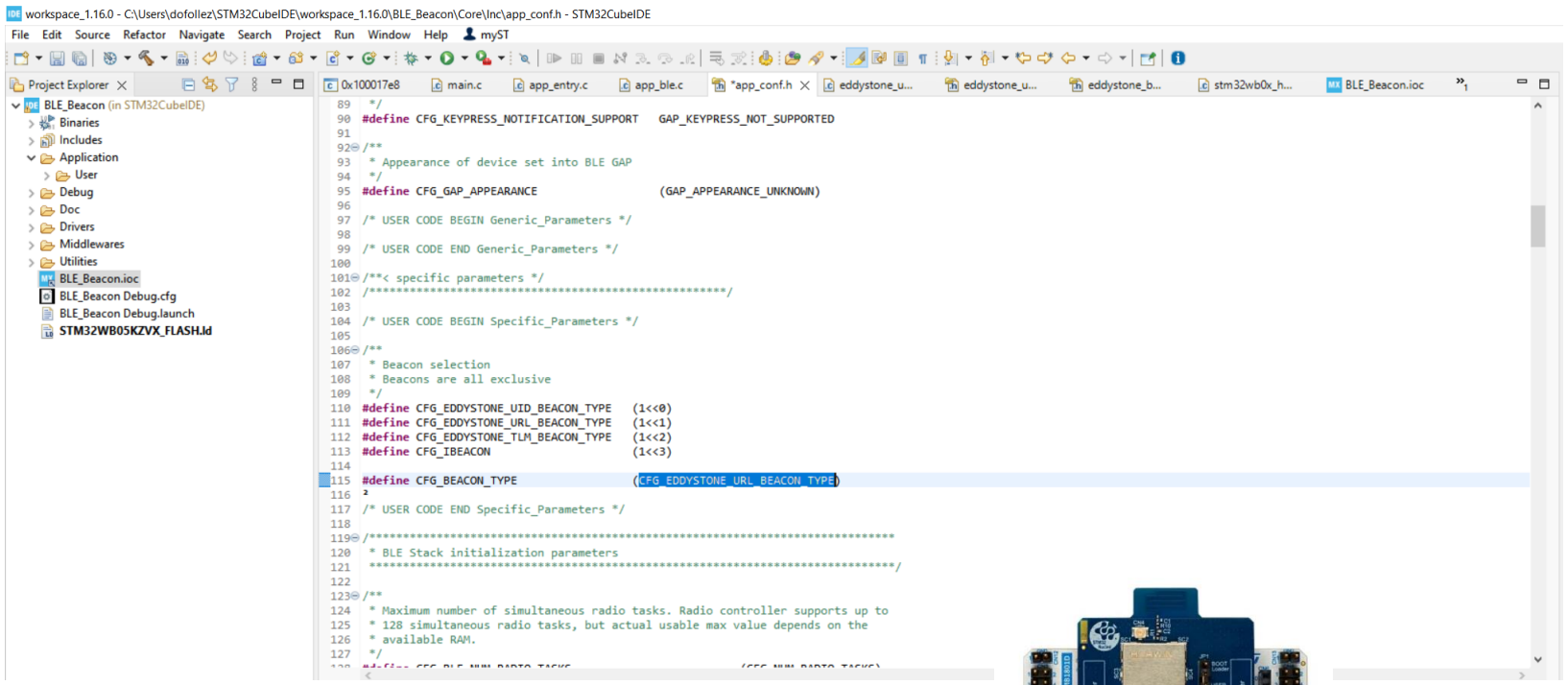
Low Power debug Tips

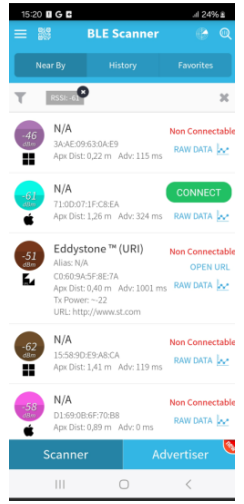
STM32WB0 Tips

- STM32WB0x application like BLE_Beacon configures the STM32WB0 series device to enter Deepstop mode when allowed.
- When the STM32WB0 series device is in Deepstop mode, the SWD port is disabled. Therefore, **SWD access is disabled, and the chip cannot be accessed.**
- In this context, the user can activate the device UART bootloader by setting the PA10 pin to a high value and perform a reset cycle of the device (keeping PA10 at a high value).

1. Set back JP1 in « bootloader position »
2. Press reset button
3. Flash & et JP1 « User Flash »

Build BLE Beacon from code example





BLE scanner

NUCLEO-WB05KZ

STM32 CubeIDE

STM32 CubeMX

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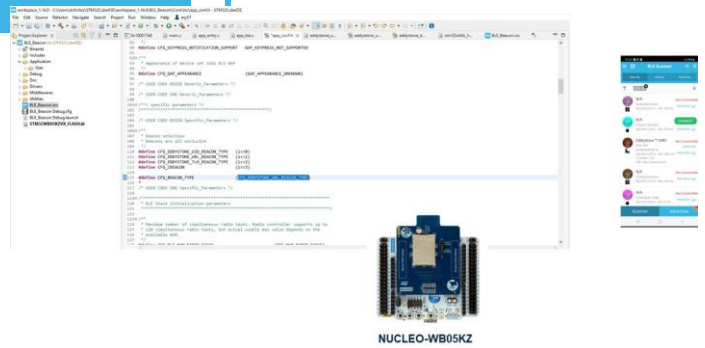
Takeaways

Easily build a beacon application over STM32WB05

Streamlined project development thanks to STM32Cube



STM32WB0 ideal for energy-sensitive wireless applications

Typical Beacon Power consumption figures over STM32WB05 : **5.1 µA average** 28 bytes, every 3 secs, 3.3V, +0 dBm

Thank you

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