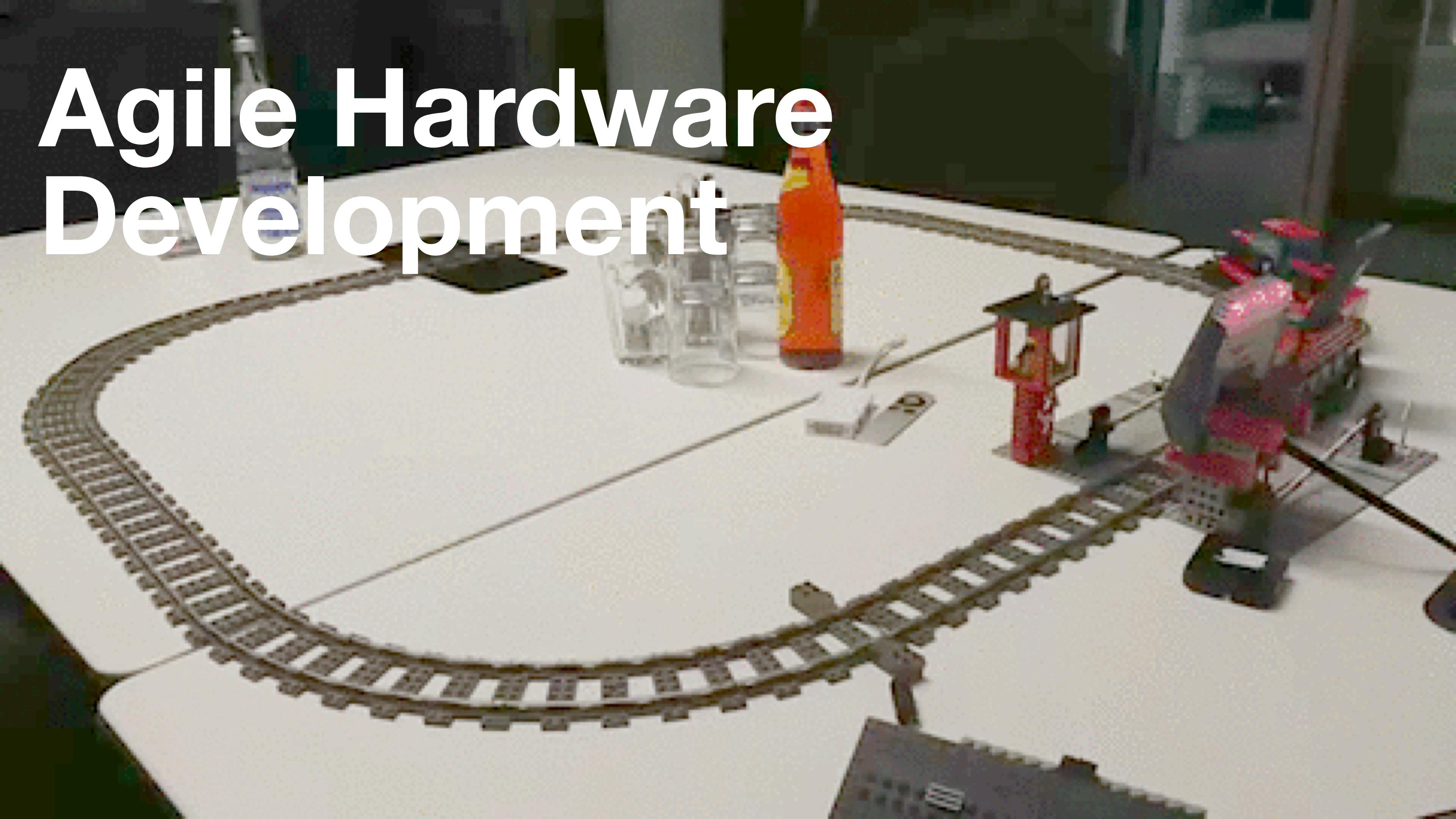


Agile Hardware Development



Agile Hardware Development

if you can do mobile, you can do hardware¹

this presentation is open source: github.com/falkorichter/presentations

¹ Presentation made with DecksetApp 

disclaimer:

All details about hardware in this presentation can be derived from the hardware itself and do not contain any internal company secrets. Additional information was derived from public documentation.

why S2 / swipe?

kiekmo

digital foosball table

VW emil

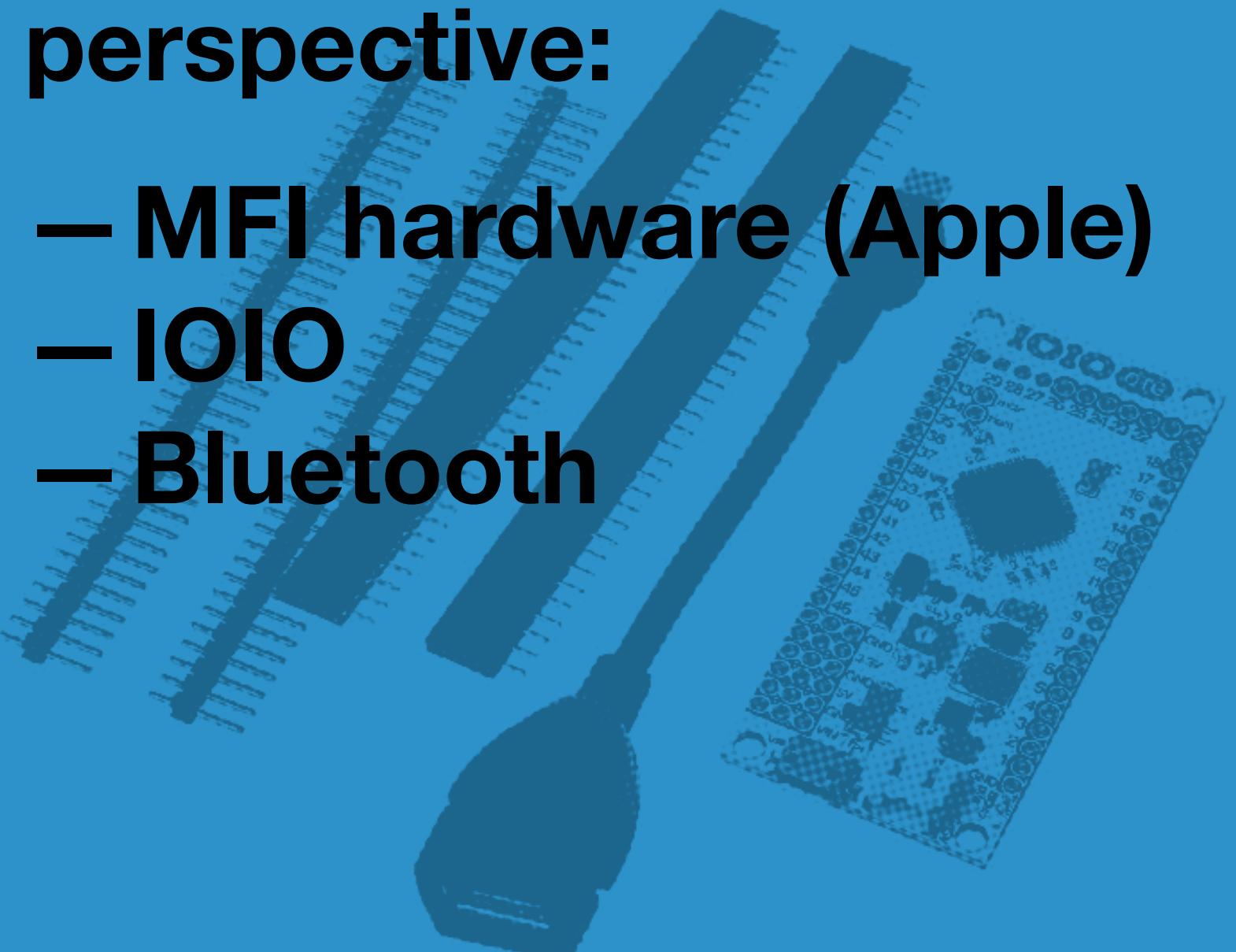
java / kotlin | swift

#s2-iot



highlights in history of IOT from a mobile perspective:

- MFI hardware (Apple)
- IOIO
- Bluetooth



Made for
iPhone | iPad | iPod

Made for
iPhone | iPad

Made for
iPhone

Bluetooth

<insert angels singing here>

Wifi

<insert angels singing here>

agile Development

- continuous delivery
- kiss²
- collective code ownership
- ...

² Keep it simple, stupid

iterate on hardware ?

iterate on software 

problems when iterating on hardware

- knowledge (hardware)
- tools (electronics design, os)
- manufacturing (price + speed)

news

- Maker movement* meets *Agile Craftsmanship* meets *Rapid electronic production* capabilities meets *China*
- [jlpcb / aisler.net](#)
- open (source) hardware
 - [tindie.com](#) - store for open hardware
 - [kicad](#)
- platforms
 - raspberry pi / ESP / NRF
 - [micropython](#)



product Detail

Product File

Price

Order Status

Operate

jlpcb

019-0

Order Number: Y1-2619181A

€34.89

Product Details

Build Time: 6 days

PCB Batches

€34.89

W20190710362057

Merchandise Total: €34.89

Shipping Charge: €21.48

Order Total: €56.37

Shipped

Shipping Method:

DHL Express

Worldwide

Reorder

Order Details

Invoice

50 pcb (business cards)

8534009000

Y1 50

€0.6979

019-04-18

W20190418280979

PCB Prototype

Order Number: Y1-2619181A

20 pcs €12.93

Product Details

Build Time: 2-3 days



Gerber Viewer

Merchandise Total: €12.93

Shipping Charge: €0.00

Order Total: €12.93

Shipped

Shipping Method:

DHL Express

Worldwide

Reorder

Order Details

Invoice

v2_Y1

Quality Complaint

Production Progress

prototype manufacturing

order PCB

order parts

apply solder paste

hot air

repeat

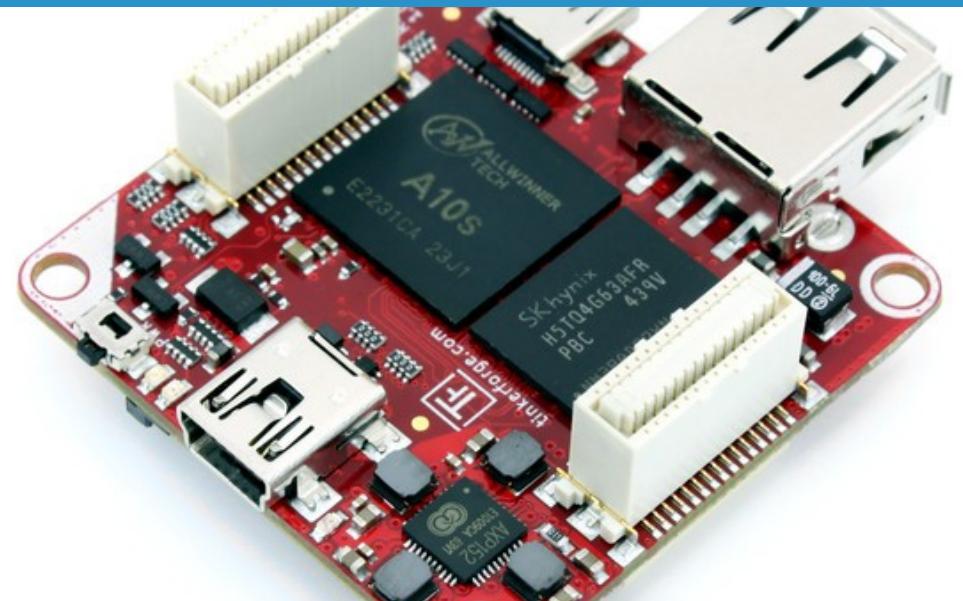
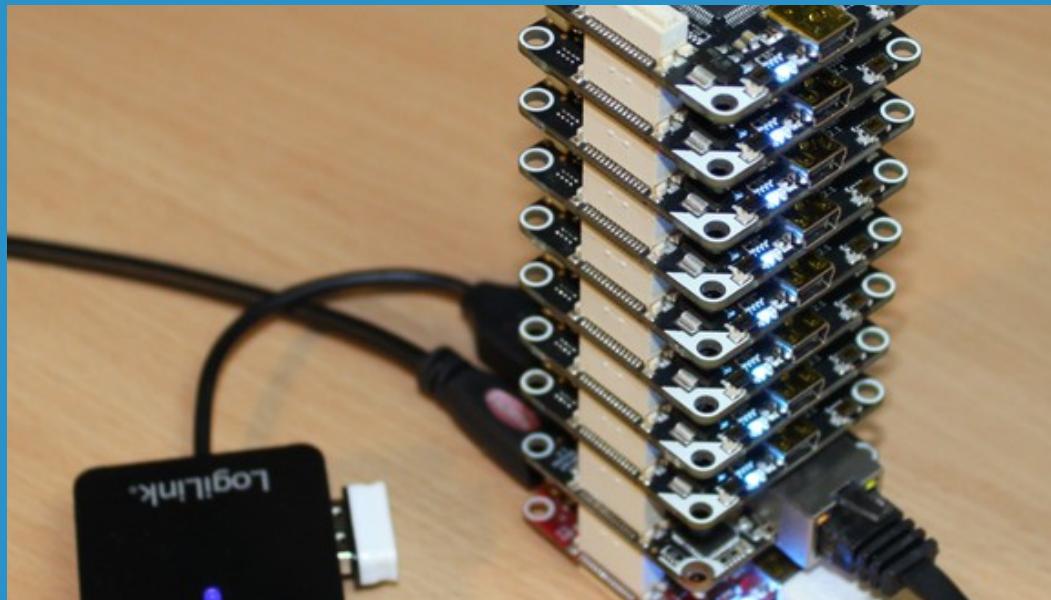


open source hardware for prototyping:

buy, connect, done

github.com/Tinkerforge

<show some hardware> how it works



pi compute module

- industrial raspberry as a module
 - see **Companies using the RPI Compute module**
- powerful, small, not cheap
- plug and play
 - develop software on prototype, swap into final

by <http://www.embest-tech.com/>

hardware

Slice - Compute Module-based media player

- <http://www.fiveninjas.com/slice>
- <https://www.raspberrypi.org/blog/creating-and-kickstarting-slice-the-compute-module-based-media-player/>

gumstix gepetto

- <https://store.gumstix.com/products>
- <https://www.gumstix.com/raspberry-pi-family/>

<show some hardware> gepetto

Search the Infocenter:

Scope: All topics

Contents

nordic semi conductos

bluetooth

many open source samples

uart

OpenSK: rust anyone?

- [Bluetooth low energy examples](#)
- [BLE Central & Peripheral](#)
- [BLE Peripheral](#)
- [BLE Secure DFU Bootloader](#)
- [Experimental: IoT Examples](#)
- [Cryptographic examples](#)
- [DFU bootloader examples](#)
- [Direct Test Mode](#)
- [Hardware peripheral examples](#)
- [IEEE 802.15.4 examples](#)
- [NFC examples](#)
- [Nordic proprietary protocols](#)
- [User Guides](#)
- [API Reference](#)
- [Data Structures](#)

Software Development Kit > Previous versions of nRF5 SDK > nRF5 SDK v15.3.0 > Examples > Bluetooth low energy

nRF5 SDK v15.3.0[Copy URL](#)[Download offline documentation](#)

Nordic UART Service Client

This example requires one of the following SoftDevices: S132, S140

Important: Before you run this example, make sure to program the SoftDevice.

The Nordic UART Service (NUS) Client Application is an example that implements the Nordic UART Service Client over BLE. In the example, the development board serves as a GAP central and a GATT client.

The application scans peripheral devices and connects to a device that advertises with the NUS UUID in its advertisement report. After connecting, the application enables notifications on the device that delivers the Nordic UART Service.

Note

This application will connect to only one device that delivers the NUS. If the application cannot find the NUS in the device discovery, it will not disconnect. This makes it possible to use more GATT clients at the same time.

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Accept

the last mile

ESD protection³

stay < 48V, go to a lab

Certification

"spurious emissions"

pre-certification helps

case

cables + connectors (avoid, use
standards)

mass production

³ electrostatic discharge protection



nobody wants naked electronics:

- **bopla**
- **apra plast**
- **takachi**

<talk about embedded world 2018>

- 3D print, injection mold...

sample sensorberg

- pi compute module
- poe
- expandability (keypad, lockers)
- secure: **Security-Sheet.pdf**

where to go to:

- embedded world**
- electronica**
- maker faires**
- chaos congress/camp**

sources for inspiration:

- sparkfun**
 - new products yt**
- adafruit**
 - new products yt**

overflow