Endian Technologies AB

FOSS North 2019 Zephyr Hackathon

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Slides available at
https://github.com/endiantechnologies/zephyr-hackathon

About Endian

- Relatively new to Zephyr (who isn’t?)
- Several active projects using it, more to come!
- Multiple drivers and patches in upstream pipeline

Why Zephyr?

- What Linux did to servers, smartphones, super computers and SBCs, Zephyr wants to do to MCUs
- Incredible community support
- Feature rich
- Well structured, well documented code base

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State of the project

- First LTS release ever (**v1.14**) approaching
- General disarray for a while
- Lots of API changes (read: breakages)
- Mostly stabilized now
- New features added constantly
- **Things are moving REALLY fast**

Goals of the day

- Be curious
- Learn from each other
- Hack your heart out
- **Have fun!**

About the hardware

Nordic Semiconductor shipped a box of **nRF52840-DK**s!

- Cortex M4, 64 MHz
- 256 kB RAM, 1 MB flash
- 2x UARTs, 8x ADC, USB, SPI, I2C, ..
- Multiple low-power radio protocols supported
- Extremely power efficient
- On-board J-Link debugger

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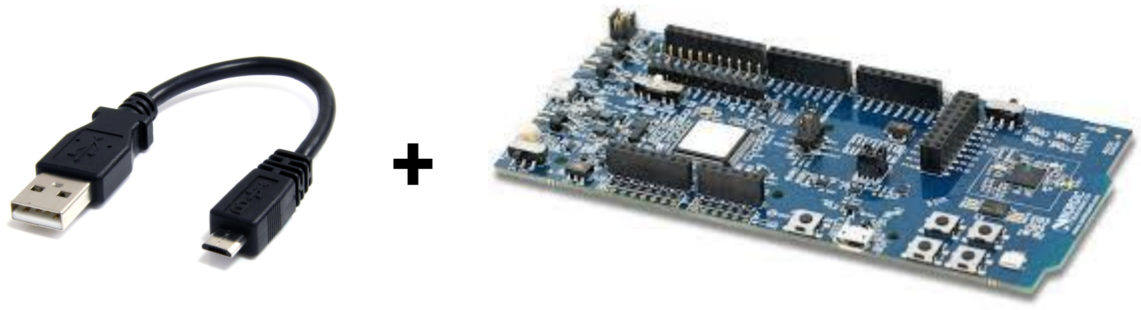
About the hardware

You can both power and flash the board using the provided micro USB cable



The same cable also gives you both a debugging interface and a serial console!

Getting started

https://github.com/endiantechnologies/zephyr-hackathon

- some notes to guide you along
- a sample application that lets you
  - read battery voltage and control LEDs via BLE
  - print to console via J-Link
- a html file showcasing WebBluetooth

Warning: Code not necessarily production grade :P

Getting started - install dependencies

Setup is always a hassle...

Option #1:

- **https://docs.zephyrproject.org/latest/getting_started/getting_started.html**
- Prepare for lots of apt-getting
- You *may* need to backport some stuff

Option #2:

- Use **Dockerfile** and **build.sh** from hackathon repo to get set up quickly

Getting started - fetching sources

New meta-tool: **west**

```
pip3 install --user west
# export PATH=$PATH:$HOME/.local/bin
# pip3 install --user setuptools
mkdir ~/zephyrproject && cd ~/zephyrproject
west init .
west update
```

Check out src:

```
cd zephyr
git checkout -b my-branch v1.14.0-rc3
```

Getting started - get flash tools

You will need

- Segger J-Link tools
  https://www.segger.com/jlink-software.html
- Nordic command line tools
  https://www.nordicsemi.com/Software-and-Tools/Development-Tools/nRF5-Command-Line-Tools

Follow **README.md** in hackathon repo and you'll be ok!

Don't hesitate to ask for help :)

Getting started - compile a sample

```
. zephyr-env.sh
export ZEPHYR_TOOLCHAIN_VARIANT=cross-compile
export CROSS_COMPILE=/usr/bin/arm-none-eabi-
export ZEPHYR_BASE=$PWD
cd samples/basic/blinky
mkdir build && cd build
cmake -DBOARD=nrf52840_pca10056 ..
make  # -j$(nproc)
```

...or...

```
docker run -it -v $PWD:/zephyr
(docker) $ /zephyr/./build.sh samples/basic/blinky
```

Getting started - tips and tricks

- Keep the docs in handy!
  https://docs.zephyrproject.org/latest/
- Important files:

  ```
  $PROJECT_PATH/prj.conf
  $PROJECT_PATH/build/zephyr/include/generated/*.h
  include/kernel.h
  boards/arm/nrf52840_pca10056/nrf52840_pca10056.dts
  ```
- Zephyr test suite and sample directory = invaluable
- Data sheet is massive, but nice to have
  https://infocenter.nordicsemi.com/pdf/nRF52840_OPS_v0.5.pdf

Getting started - tips and tricks

- Take the time to setup JLinkGDBServer
- Use `__ASSERT()` liberally to check your assumptions
- Check the compiler output and try not to ignore too many warnings :)
- Raise your hand if you’re confused!

GLHF!!!

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