

**software project telematics [1]  
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# RIOT ON ARM CORTEX 0 AND NORDIC BLUETOOTH LE

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# Hardware

- ARM Cortex M0 processor [2]
  - ▢ Smallest ARM processor
  - ▢ Low power consumption
  - ▢ 32bit
- low energy bluetooth mod nRF51822 [3]
  - ▢ For 2.4 GHz ultra low-power wireless applications



**Source:** Nordic Semiconductors

# Project tasks

- Porting RIOT [4] to our hardware
- Get the Bluetooth LE module running
  - ▮ Access and read registers of that module
- Communicate between 2 boards
- Optinal: Integration in a wireless sensor network (WSN)

# Outline - Introduction

- Get overview of documentation
  - ▮ Cortex M0 [2]
  - ▮ nrf BLE [3]
- Get in touch with RIOT [5]
- Installing toolchain for building code for Cortex M0
  - ▮ Starting with buildroot [6]

# Outline – Porting RIOT

- Recompile / adjust RIOT modules for processor
- Build cycle
  - ▮ Add features
  - ▮ Compile binaries
  - ▮ Flash to board
  - ▮ Check for errors
- First programming: using onboard LED's
- Using UART for debugging

# Outline – nRF BLE support

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- Access and read nRF registers
- Bluetooth communication between boards
- Embedding boards into wireless sensor network

# Links

- [1] [http://mi.fu-berlin.de/inf/groups/ag-tech/teaching/2014\\_SS/P\\_19517g\\_SWP\\_Telematik/index.html](http://mi.fu-berlin.de/inf/groups/ag-tech/teaching/2014_SS/P_19517g_SWP_Telematik/index.html)
- [2] <http://infocenter.arm.com/help/index.jsp?topic=/com.arm.doc.dui0497a/index.html>
- [3] <https://www.nordicsemi.com/eng/Products/Bluetooth-R-low-energy/nRF51822-Development-Kit>
- [4] <https://github.com/RIOT-OS/RIOT/wiki/RIOT-Platforms>
- [5] <https://github.com/RIOT-OS/RIOT/wiki#wiki-start-the-riot>
- [6] <http://buildroot.org/docs.html>