



The Mulle platform & Internet of Things

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Internet of Things (IoT)

- **networked embedded system**
- **wireless communication**
- **small size**
- **low power consumption**

The Mulle

- low-power platform for IoT

- **Renesas M16C 16-bit MCU at 10 MHz**
- **31 kB RAM, 384 kB flash**
- **On board temp. sensor and accelerometer**
- **High density expansion port**
- **analog and digital I/Os, SPI, I²C, UART, timers, interrupts, etc ...**

The Mulle

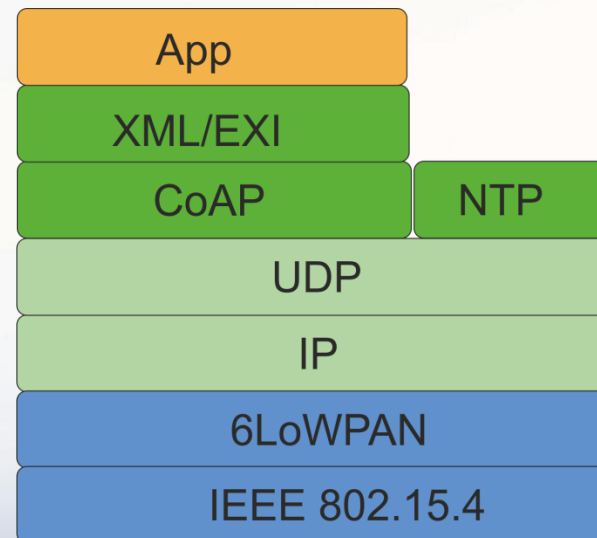
- low-power platform for IoT

- **only 26x24 mm**
- **4 μ A in sleep**
- **used in research, education, and commercially**

IoT Networks

- Communication architecture

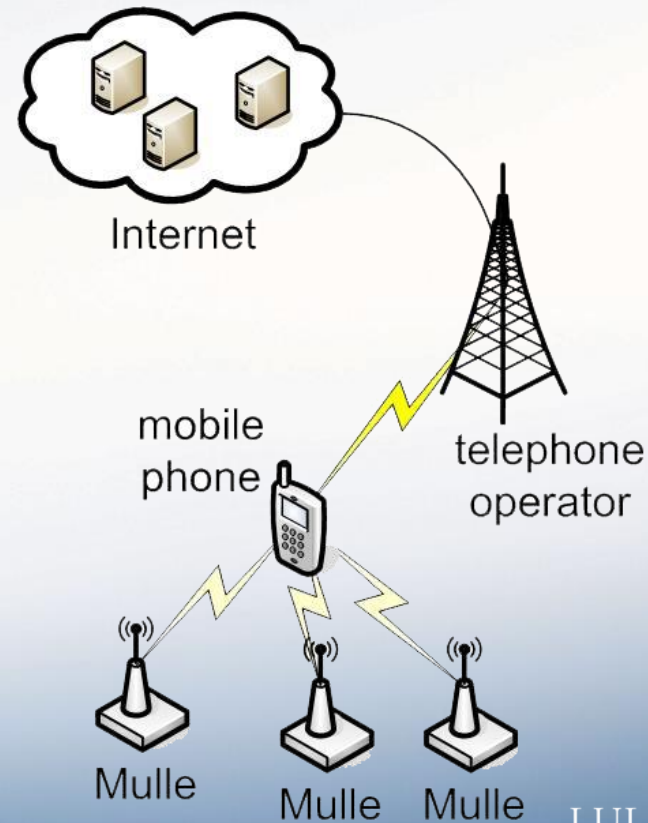
- **IP all the way**
- **6LoWPAN**
- **CoAP / EXI**



Mobile IoT Networks

- Communication architecture

- **World-wide mobility**
- **Interoperability**
- **Standard protocols**
- **Consumer devices**



Applications

- **Patient monitoring, sports monitoring**
- **Industrial monitoring and control**
- **Home automation**
- **Safety and security**

Research areas

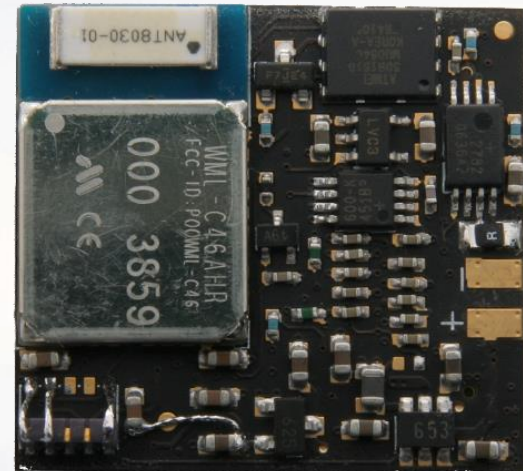
- **Industrial Internet of Things (IoT)**
- **Mobile IoT networks**
- **Service Oriented Architecture (SOA)**
- **Low-power design**

Research areas

- **Interoperability**
- **Mobility**
- **Wireless sensors in harsh environments**

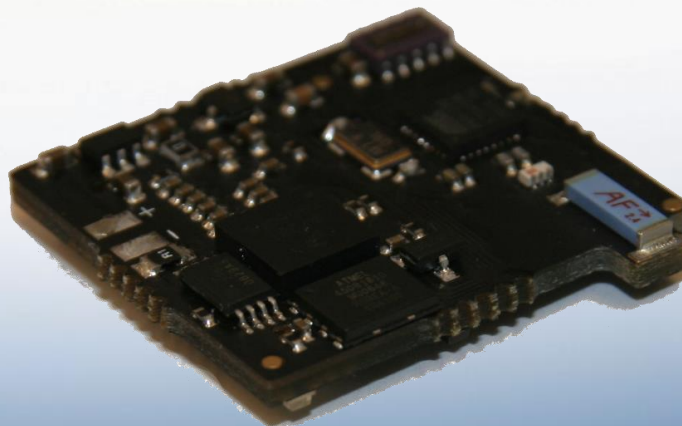
Mulle v3.2

- **Personal- and Body area networks**
- **Bluetooth 2.0 + full IP stack**
- **HCI, L2CAP, SDP, BNEP, RFCOMM, PPP**
- **TCP/IP, UDP, ICMP**
- **DHCP, NTP, OLPv2, HTTP**



Mulle v5.2

- **Wireless sensor networks / Internet of Things**
- **IEEE 802.15.4 at 2.45 GHz**
- **TinyOS**
- **Contiki**



Mulle v6.2

- **Internet of Things**
- **IEEE 802.15.4 at 868 MHz**
- **Contiki**
- **TinyOS**

Contact

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