Embedded Linux Device Drivers

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Agenda

- About Embedded Systems
- Hardware Specifics of Embedded Systems
- Embedded Linux
- Linux Device Driver Architecture
- Workshop
Embedded Systems

- Dedicated function
- Based on microcontrollers
- Optimization
- Variety of applications
Hardware Specifics

- On-Chip peripherals
- Many CPU architectures
- Word length 8 to 32 bit
- Cheap development boards
- SoC
Peripherials

- Serial Communication Interfaces
- Synchronous Serial Communication
- Universal Serial Bus
- Networks
- Fieldbuses
- Timers
- Discrete IO (GPIO)
- Analog to Digital / Digital to Analog
Embedded Linux

- Purpose-built
- Lightweight and optimized
- Kernel and minimal userspace
- Buildroot
- Initramfs
Linux Device Drivers

- The Role of the Driver
- Classes of Devices
- Memory mapping
- Interrupt Handling
- Time routines
Workshop

- Raspberry Pi
- Protoboard
  - Some LEDs
  - Push Buttons
  - 7 segment display
- Buildroot (rpi-buildroot)
- Custom Linux Kernel module
Workshop sources

- https://github/ICBTech
- git clone https://github.com/icbtech/rpi-buildroot
- git clone https://github.com/icbtech/BalCCon2k14
Buildroot

- make raspberrypi_defconfig
- make nconfig
- make

- Internet connection required (first build)
- Takes 15 minutes on Core i7 3770
Questions?

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