Embedded Linux & RTOSes: why not both?

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● First time Linux Plumbers speaker!

● 10yrs+ in IoT
  ○ Nest, Thread Group, OpenThread
  ○ particle.io
  ○ Founder of Golioth

● More experience with RTOSes than Linux
Intentions
Agenda

➔ Board Support
➔ Interfaces, Peripherals & Sensors
➔ “Realtime”
➔ Programming Languages
➔ Distros
➔ Updates: OS, apps & deps
➔ Updates: bootloader
➔ Security: software integrity
➔ Security: confidential computing
Board Support

Linux

Examples
DTS

RTOS

Examples
CMSIS
HALs
DTS (Zephyr)
Interfaces, Peripherals & Sensors

Linux

Examples
Drivers
libusb, bluez
sysfs, chardev

RTOS

Examples
CMSIS, Zephyr Drivers
TinyUSB, NimBLE
Arduino libraries
"Realtime"

Linux

Examples
PREEMPT_RT
RT Crossover

RTOS

Examples
Hard realtime kernels
Programming Languages

Linux

*any* language
Language Package Managers
x86, Arm, RISC-V

RTOS

Examples
MicroPython, JerryScript, WebAssembly
Distros

Linux

- Examples
  - Shared code / portability
  - Learning resources
  - Professional support

RTOS

- Examples
  - Proprietary OS w/ support
  - Cloud provider w/ “sponsorship”
Updates: OS, apps & deps

Linux
- Examples
  - apt, yum
  - containers
  - NixOS

RTOS
- Examples
  - Mender, SWupdate, RAUC, Hawkbit
Updates: bootloader

Linux

Examples
GRUB, U-Boot, coreboot

RTOS

Examples
MCUBoot
Security: software integrity

Linux

Examples
CI/CD scanners
SBOM

RTOS

Examples
Less LoC, Monolithic
Safety-critical certs
SBOM
Security: confidential computing

Linux

Examples
TPM
HSM
SGX, Trustzone

RTOS

Examples
Trustzone
IETF: RATS, TEEP, SUIT
## Summary

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