



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 Goliath
- 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



Examples

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, c/oreboot

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

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