Zephyr Retro-and-Prospective
Project Growth, Long Term Support, and Linux Interoperability

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Embedded SWE, Meta
Agenda

01  Zephyr Highlights 2019-2023
02  Devices, Members, Growth
03  LTSv2 to LTSv3 Transition
04  Looking forward
01 Zephyr Highlights 2019-2023
Between v2.0.0 and v3.5.0

- 64-bit arch support 😃
- ARM Cortex-R 🏋️, RISCV-64 added 👐
- PPP, 6LoCAN 🌐
- ARMv6-M added 💪
- New TCP stack (tcp2) 🍿
- BLE stack support for Vega Board
- ARMv8-A added 💪
- CANOpen, LoRa, GPIO API rewrite
- Hierarchical Devicetree API 🌳
- k_heap / sys_heap allocator 🍿
- TF-M Framework integration 🌐
- BLE Advertising extensions 🎧
- CMSIS-DSP library added 💪
- Virtual Memory 🍿

- BLE periodic and isochronous advertising 🎧
- tcp2 stack by default 🌐
- LLVM Toolchain Support 🔧
- ISO C99 integer types 🍻
- SPARC arch added ✨
- TLS Support 🍿
- Per-thread runtime stats 📊
- Condition Variables added 🍿
- Demand Paging added 🍿
- 64-bit ARCv3 added ⚡
- Aarch64 split from ARM 🍣
- ARMv8.1-M, Cortex-M55 💪
- Tracing overhaul 🍿
- Power Management 🪐
- Example application (module) 🧩
Between v2.0.0 and v3.5.0 (continued..)

- BLE Audio, Direction Finding, Mesh improvements
- BLE Advertisement PDU chaining
- armclang / armlinker toolchain
- MWDT C/C++ toolchain
- M-Profile Vector Extensions
- Improved thread safety with Newlib for C++ applications ©
- IEEE 802.15.4 address filtering
- USB Device Chapter 9 Definitions
- RISC-V Tightly Coupled Memory (TCM)
- Improved PCIe / MSI-X support
- mDNS Service Discovery
- Thread awareness for OpenOCD
- <zephyr/..> header prefix ©
- Many networking improvements
- Support for sysbuild
- Support for picolibc ©
- Apache Thrift module (GSoC 2022)
- USB-C Device Stack with PD
- DSP Subsystem
- Architecture agnostic Barrier API
- BLE Periodic Adv with Resp
- RTC API added
- Dynamic thread stacks
- Many POSIX API improvements, e.g.
  dynamic POSIX thread stack support
2787 🪰 Fixed!!!
02  Project Growth
Board and Architecture Growth

Boards by Release
cumulative

Architectures by Release
cumulative, does not include sub-architectures

Note: 22 as of v3.5.0, when including sub-architectures
02 Project Growth

Commit and Unique Contributor Growth

Commits per Release

Unique Contributors per Release by email

52635 commits between v2.0.0 and v3.5.0
# Project Growth

## LTSv1 to LTSv2, for Reference

<table>
<thead>
<tr>
<th></th>
<th>1.14.0 (LTS V1)</th>
<th>2.7.0 (LTS V2)</th>
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<td>Contributors</td>
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</table>
03  LTSv2 to LTSv3 Transition
03 LTSv2 to LTSv3 Transition

- Use macros to check
  - `#if ZEPHYR_VERSION_CODE > ZEPHYR_VERSION(3, 2, 0)`
  - `<zephyr/..>` prefix is only a part of it
  - APIs change, things are deprecated, for continuous integration and test, there will be minor adjustments
- Old ZTest API is gone - long live the new ZTest API 👑
- Vast improvements to the kernel, in particular in SMP, eliminating race conditions
- VAST improvements to the RISC-V architecture
- VAST improvements to networking, POSIX, C, C++, Logging,
### Tentative LTSv3 (3.7) Release Date

6-months overlap (my job is not done yet)

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<th>Milestone</th>
<th>3.5</th>
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<th>3.7 (LTS)</th>
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<td>2024/01/12</td>
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<td>2nd Release Candidate (RC2)</td>
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<td><strong>2024/07/26</strong></td>
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04 Looking Forward
Optimistic Predictions

- PSE51, PSE52, PSE53 AEP Support for POSIX
- Significantly better POSIX Spec Conformance / Features
- Improved Thrift Support
- Improved Support for standard features of ISO C and C++
- Rust Language Support
- Minimalistic approach to modules (Lazy Modules)
- Improved Dynamic ELF loader
- Multiple Network IF / Autoconfiguration
- Highly tunable / scalable / performant HTTP Server (GSoC 2023)
- VAST improvements to IEEE 802.15.4 (SubG, TSCH, FIRA, UWB)
- VAST improvements to the Linux <-> Zephyr Interface
Questions? / Feedback