About

- Delivering solutions based on GNU/Linux firmware
  - Focused on network edge, network switching, and CPEs
  - OpenWrt, Gentoo, Yocto, etc.
- Continuous participation in Open Source projects
  - Contributions for the Linux kernel, systemd, etc.
Open source switching

○ Network switch
  • Multiport network device with packet switching ASIC
  • Forwards data at the data link layer (layer 2)

○ switchdev
  • In-kernel Linux driver model for switch devices which offload the forwarding (data) plane from the kernel

○ Open Compute Project ONIE
  • Install environment for bare-metal network switches
Challenges and solutions

- Limited mainline platform support
  - Marvell Prestera, NVIDIA Mellanox Spectrum, Microchip SparX-5
- Building a standardized open-source product
  - The Linux Foundation DENT project and community
- Upstreaming work lead by the DENT Upstream Working Group
  - Linux ONIE NVMEM driver by Bootlin
  - Linux Board Support Package (BSP) drivers by Sartura
Linux ONIE NVMEMM support
Linux ONIE NVMEM project

- Organized and funded by the DENT project, completed by Bootlin
- Hardware requirements from the ONIE project
  - "Hardware platform must provide a non-volatile storage (EEPROM, NOR, or NAND) which contains vital product data assigned by the manufacturer"
  - New `TlvInfo` EEPROM format
- Project goal to standardize access to the switch hardware platform data
Linux ONIE NVMEM project

- Project timeframe
  - Started on **August 18, 2022**
  - Status updates from September until December
  - Completed successfully on **January 8, 2023**

- End result
  - Support from Linux 6.3 for parsing information stored in an ONIE-compliant EEPROM or other flash memory
Linux ONIE NVMEM driver

- Pre-requisites
  - Necessary to define and implement concept of “NVMEM layouts”
  - NVEM layout implementation
    - They can add NVMEM cells during runtime (!)
    - Post-processing for endian swapping, or ethernet offset handling, etc.
- Upstream switchdev drivers updated to use new API
Linux switch board-support
Linux switch BSP drivers

- Organized and done by Sartura for the Replica.one build system project
- Working on a variety of platforms and features
  - Delta DPS-920AB PSU driver
  - Microchip PD69200 PoE PSE driver
  - *Delta TN48M CPLD support* (upstreamed)
    - GPIO driver
    - CPLD reset controller
Linux switch BSP drivers

1. [PATCH v10 0/6] Add Delta TN48M CPLD support
2. [PATCH v10 1/6] mfd: simple-mfd-i2c: Add Delta TN48M CPLD support
Planned activities

- Power over Ethernet (PoE) Linux kernel subsystem
  - standardize user-space API, PoE manager daemon
  - allow PoE controllers to be easily implemented
- User-space switch management tooling
  - ethtool, systemd-networkd, wired 802.1x support
- Questions? Ideas? Get in touch!
Open Source Switching: Upstreaming ONIE NVMEM and switch BSP drivers

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