



**Oniro, a production oriented, reference
operating system for devices big and
small**



Who's Oniro for?

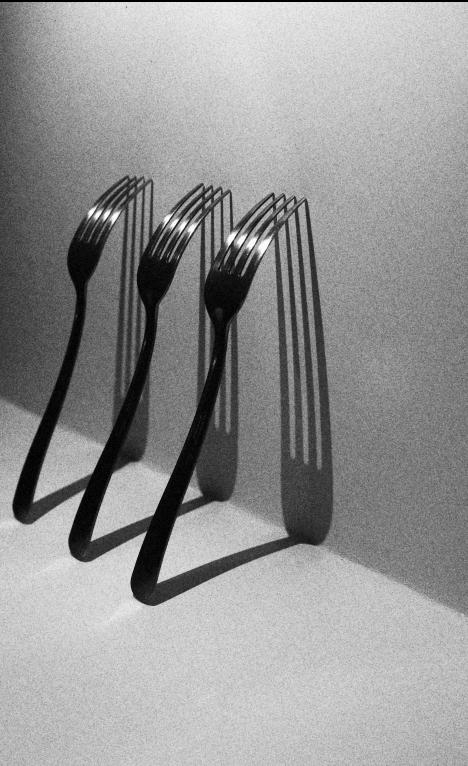


Directly

- End users
- Applications and content creators
- Device makers

Indirectly

- Hardware vendors
- Operating Systems vendors
- System integrators



Dining philosophers?

Devices | End users | Applications

Device makers pain points



- Technology fragmentation, yet similar components (linux, zephyr, java, qt, ...)
- Pre-existing investments: infrastructure, code, tools
- Overspending in a "commodity" (R&D as well as product release operations)
- Underspending in value add



The role and business impact of open source

- Innovation engine
- Developers oriented: code, documentation, tutorials,...
- Faster time to market
- Lower cost of expertise

Production oriented open source



- Roadmap predictability
- Life cycle predictability
- Opinionated defaults: reference images as opposed to collection of libraries
- Continuous Integration, Continuous Deployment, Continuous Validation, Continuous Compliance
- Compliance envelope: production artifacts such as V&V reports, SWBOM
- Bugs and CVEs policies with Service Level Agreements



20% development | 80% maintenance

Oniro is addressing the ice under water



- Production oriented open source
- Shared cost of production oriented operations and activities
- Shared cost of maintenance
- Shared roadmap (components, features, supported VS experimental)
- Choose common opinionated defaults
- Shared cost of CI/CD and compliance envelope
- Immediately usable production artifacts
- Aligned to pre-existing investments

**Save money | No costs of switching |
No lock-in**

Market driven development



- Market analysis
- Requirements grouping
- Work prioritization (20/80 rule, again!)
- Integration, opinionated defaults and blueprints, testing, documenting, compliance artifacts (60/10/10/10/10)
- Infrastructure



Down the hole?

Industry's favored sausage making factory



Bitbake

- Heart of the Yocto Project
 - Broad collection of Linux libraries and software
- Linaro's Ledge project
 - Hardware scalability
- Layered architecture

Oniro's layers

- build system
- oniro recipes
- open embedded core recipes (including linux kernel)
- hardware support
- documentation
- ip policy
- zephyr and freertos
- system OTA
- openharmony

```
d00560544@davidlinux-oryx:~/Projects/eclipse/oniro$ tree -L 1
.
├── bitbake
├── docs
├── ip-policy
├── meta-arm
├── meta-clang
├── meta-freertos
├── meta-freescale
├── meta-intel
├── meta-java
├── meta-ledge-secure
├── meta-openembedded
├── meta-openharmony
├── meta-raspberrypi
├── meta-rauc
├── meta-riscv
├── meta-seco-imx
├── meta-seco-intel
├── meta-seco-rockchip
├── meta-secure-core
├── meta-security
├── meta-ts
├── meta-virtualization
├── meta-zephyr
└── oe-core
    └── oniro
        └── README.md  -> oniro/README.md
```



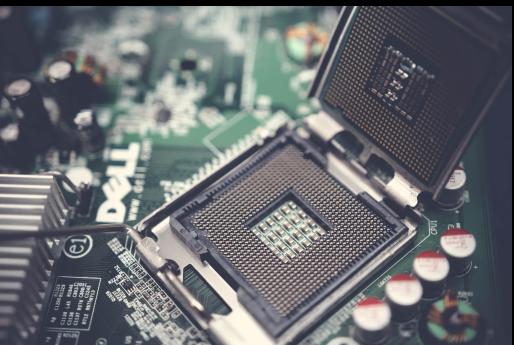
Devices, big and small (a.k.a. "flavours")

- Linux 5.10 for higher end devices (Cortex A, Intel, RISC-V)
- Zephyr 3.1 (default, LF project, used by Linaro's Lite) for lower end devices (Cortex M)
- FreeRTOS (experimental)
- Lite OS (comes with meta-openharmony, used in Huawei's devices)

Hardware support

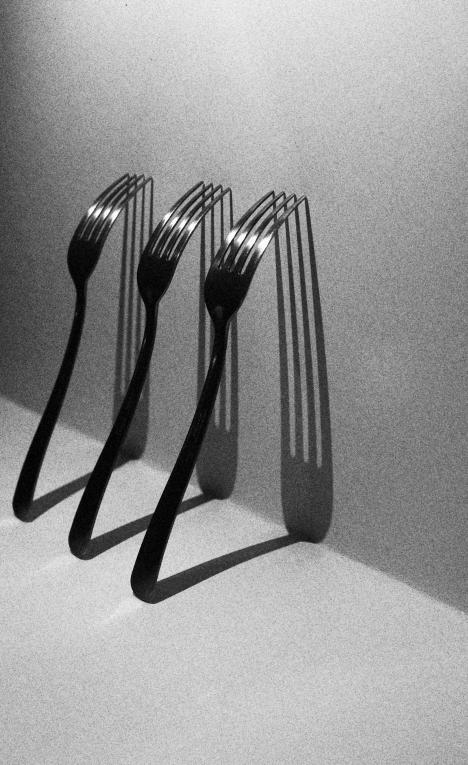
Supported

- Seco's NXP i.MX8 (Cortex A + M), Intel and Rockchip (supported)
- QEMU 32 and 64, Intel, Arm, RISC-V



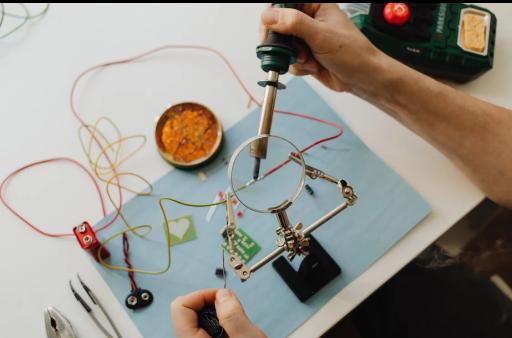
Experimental

- ST Micro, Xilinx (experimental)
- 2 weeks from inclusion to build / testing for YP and Zephyr supported targets



Dining philosophers?

Devices | End users | Applications

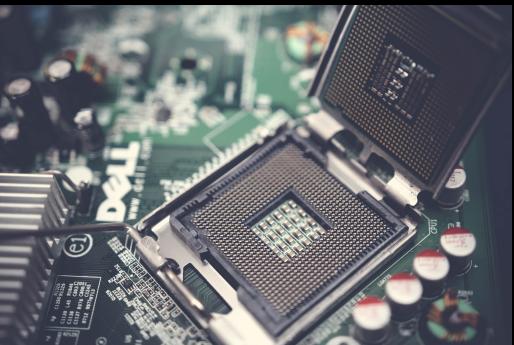


Makers, a special type of end users

- Kick the tires
- Contribute
- Build the brand

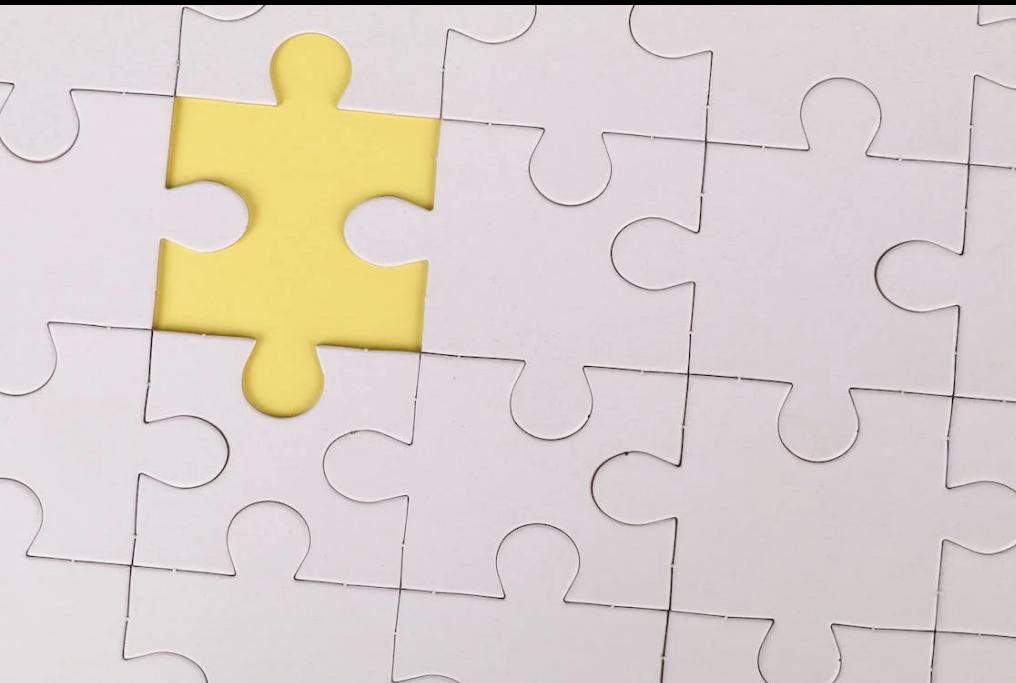
Hardware support

Supported



- Seco's NXP i.MX8 (Cortex A + M Linux + Zephyr), Intel and Rockchip (Linux)
- QEMU 32 and 64, Intel, Arm, RISC-V
- **Raspberry Pi (Linux)**
- **Arduino Nano BLE (Zephyr)**

Interoperability



- Project Matter (protocol)
- OpenThread (transparent gateway)
- OpenHarmony (devices interoperability)
- Podman (containers)
- ModBUS (industrial IoT)
- LVGL / Flutter (UI portability)
- RAUC (SysOTA)

Compliance envelope, verification and validation

- OpenChain and OpenSSF
- Continuous license compliance with dashboard and SWBOM for supported configurations
- LAVA (Linaro Automation and Validation) with central server and peripheral hw labs nodes

Life cycle

- One release / year (update kernels, toolchains, runtime, new hw support)
- Three years maintenance with decreasing level of service (based on severity)
- Extended maintenance, tailored SWBOMs, product testing for working group members

So far so good

- A market centric approach has given us speed and focus
- The industry has done a whole lot of work around individual components
- We have spent most of the time integrating, testing, documenting, releasing
- We have tried to address a technical gap (breadth of devices) and business gap (production oriented open source)



The hard part is ahead ...

- Semantic web and device cooperation
- Device management and updates
- Blockchain decentralized device onboarding and authentication
- Production ready performance
- More blueprints, contributions, supporters, products, users



Thank you

<https://oniroproject.org/resource-center/>

<https://www.linkedin.com/in/dricci/>