

Open Hardware, Open Silicon, Open Firmware, and beyond Dr Allison Randal



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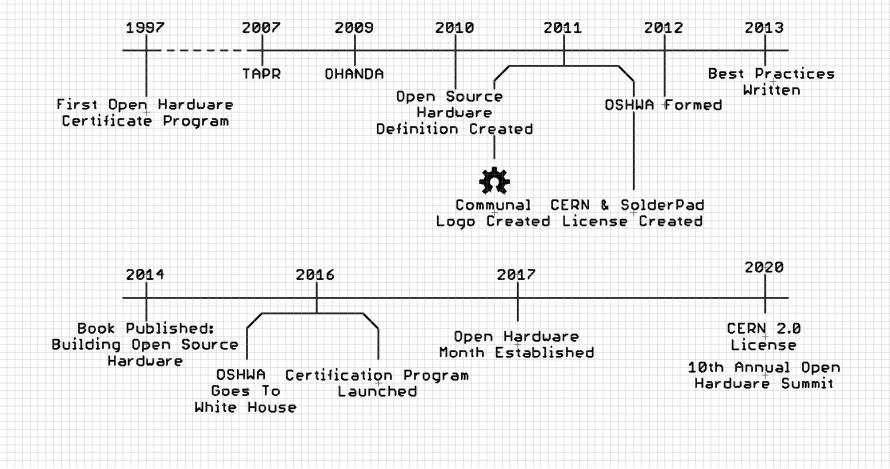
What is Open Hardware?











Source: OSHWA (CC-BY-SA)









"Open Source Hardware (OSHW) is a term for tangible artifacts — machines, devices, or other physical things — whose design has been released to the public in such a way that anyone can make, modify, distribute, and use those things."

Open Source Hardware (OSHW) Definition 1.0









What can you do? (rights)

- use
- study
- modify
- redistribute









What is released?

- Anything needed to exercise those rights
- "Source" takes different forms for hardware
- "Available Components" if some part isn't open, must at least be available









Benefits

- Open Innovation
 - Share knowledge, experiences, best practices, and code/design/implementation work
 - Leverage innovation ecosystems
- Transparency: open technology, open design, open development, open community, open governance
- Public Good: non-exclusive and non-rivalrous
- etc...









Operations/Workloads
Operating System

Kernel

Drivers
Combilers, Testing &
Verification Tools, etc...

Hardware









Open Source Software Licenses Applications/Workloads

Operating System

Kernel

Drivers

Firmwar€

Devices/Machines

Boards

Chips/Components/SOCs

ISA

Microarchitecture

Programming Languages, Compilers, Testing & Verification Tools, etc...







Applications/Workloads Operating System

Software Licenses

Open Source

Documentation or Content Licenses, etc...

Open Source Hardware

Licenses, Open Source

Software Licenses,

Kernel

Drivers

Firmware

Programming Languages, Compilers, Testing & Verification Tools, etc.

Devices/Machines

Boards

Chips/Components/SOCs

ISA

Fabrication/Manufacturing Languages, Specifications, Hardware Description Mechanical Files, Schematics, CAD

Verification Tools, etc. Emulators, Testing &

Details, Simulators,

Microarchitecture







Operating System

Kernel

Drivers

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ISA

Microarchitecture

e.g. Firefox on Windows









Operating System

Kernel

Drivers

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ISA

Microarchitecture

e.g. Zoom on Linux









Operating System

Kernel

Drivers

Firmware

Devices/Machines

Boards

Chips/Components/SOCs

ISA

Microarchitecture

e.g. Linux with proprietary graphics drivers









Operating System

Kernel

Drivers

Firmware

Devices/Machines

Boards

Chips/Components/SOCs

ISA

Microarchitecture

e.g. Linux with proprietary firmware









Operating System

Kernel

Drivers

Firmwar ϵ

Devices/Machines

Boards

Chips/Components/SOCs

ISA

Microarchitecture

e.g. Linux with coreboot









Operating System

Kernel

Drivers

Firmware

Devices/Machines

Boards

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ISA

Microarchitecture

Open Hardware Certification









Operating System

Kernel

Drivers

Firmware

Devices/Machines

Boards

Chips/Components/SOCs

ISA

Microarchitecture











Operating System

Kernel

Drivers

Firmware

Devices/Machines

Boards

Chips/Components/SOCs

Open Standards

ISA

Microarchitecture









Operating System

Kernel

Drivers

Firmware

Devices/Machines

Boards

Chips/Components/SOCs

ISA

Microarchitecture

Open Silicon









Operating System

Kernel

Drivers

Firmware

Devices/Machines

Boards

Chips/Components/SOCs

ISA

Microarchitecture

Open Silicon









Operating System

Kernel

Drivers

Firmware

Devices/Machines

Boards

Chips/Components/SOCs

ISA

Microarchitecture

Tools









Tuesday

 11:15am: Open Radio Station: carrier-grade Open Source vRAN hardware

1pm: Silicon Commons/Open Titan

1:30pm: Sonata/CHERI

2pm: Open source code linting for chip design and verification

2:30pm: RISC-V

4pm: Herald V2 modular open source wearable

4:30pm: Hardware In-the-Loop Test Operating Platform

5pm: Testing in a Box

5:30pm: Making Chips work with Open Source

Wednesday

11:30am: OpenUK and UN Data Centre Challenge

12pm: Open Source Data Centres

12:30pm: Data center industry innovation

2pm: Strengthening Open Science Hardware Adoption

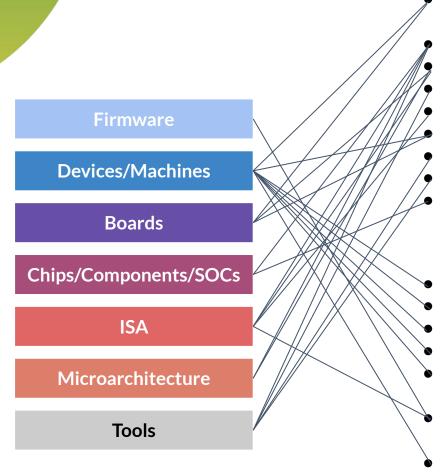
2:30pm: OpenRAN - a new approach to building mobile

networks

3:15pm: Screenly's Journey: Raspberry Pi to x86, BIOS,

Coreboot, RISC-V

3:45pm: Achieving DC Sustainability Through Open Hardware









Thank you

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Presents





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