



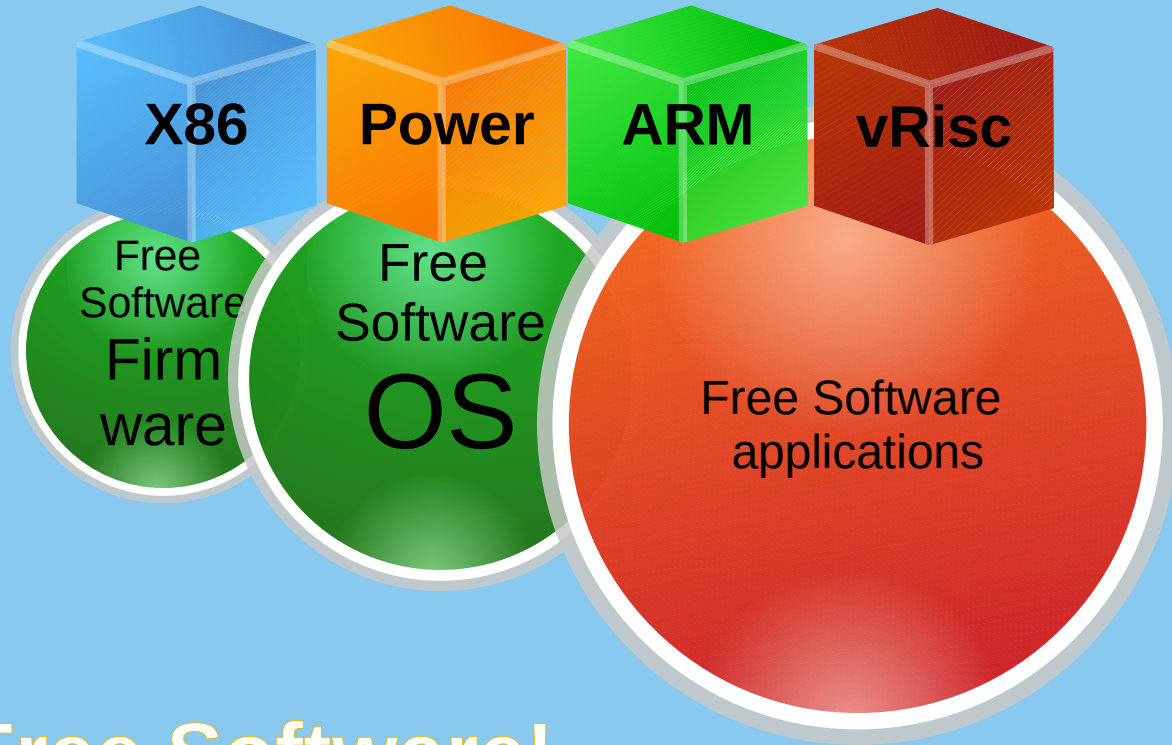
# From the design to reality is here the Community Open Hardware PowerPC Notebook

In 2014 hobbyists dream it, now thanks to donors,  
volunteers and collaborations becomes reality

Roberto Innocenti - Power Progress Community



# free software permits to create hardware with different CPU Architectures



Thanks Free Software!

# Thanks to Free Software Public events

we had the opportunity to share our dream  
and join other dreamer

that want to realize a Open Hardware PowerPC Notebook

Sfsccon from 2018 to 2023 Editions

Linux Days from 2014 to 2023 Editions ( MI,BG,BZ)

Libre Planet 2022

Fosdem 2021

OpenPower Summit 2020 - 2021

BCS 2021

Open Source Summit 2017/2018/2020

GNU/Linux Valencia meeting 2019



# First Project presentation at Linux Day Milan October 2014



# SFSCON 2018 Bolzano first PPC Notebook Presentation



Power Progress Community

64-bit Power Architecture with AltiVec technology  
cores, low-latency backside 2MB L2 cache, 16GFLOPS x core  
DDR3L SO-DIMM  
video card interface  
video in and audio out jacks

M.2 2280 connector

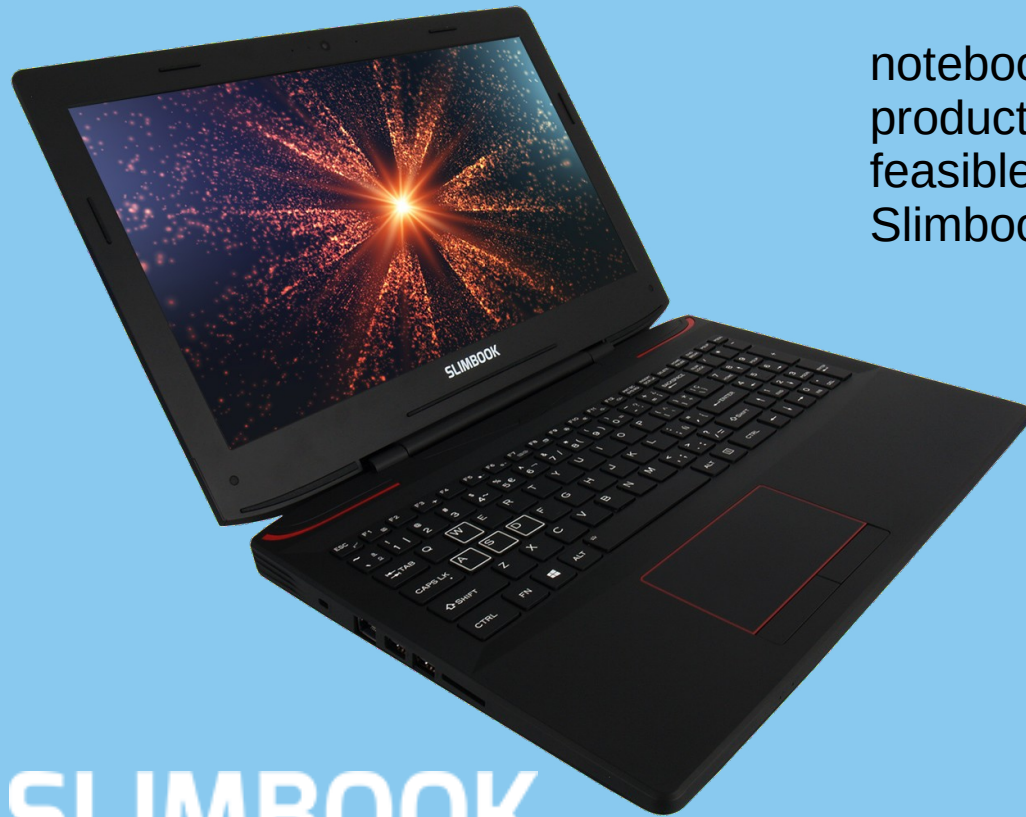
connector

charger and power-management  
book case 15,6"

I will speak at SFSCON



# Thanks to Slimbook we have the notebook chassis



notebook body from scratch for a small production batch was not financially feasible.

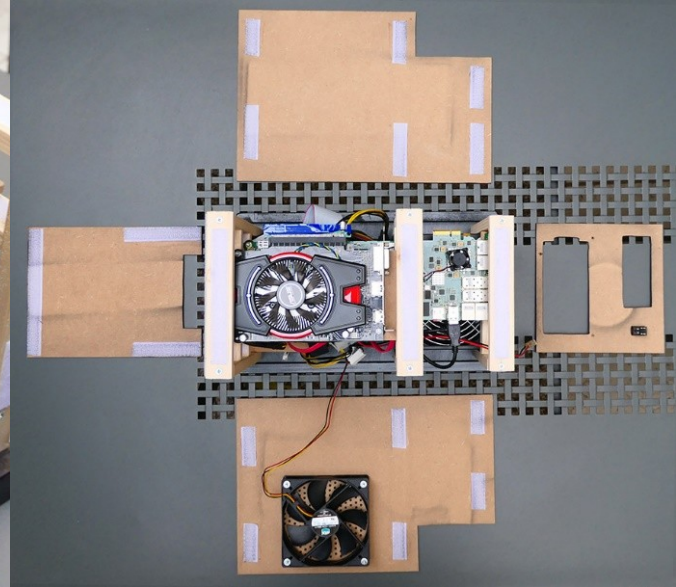
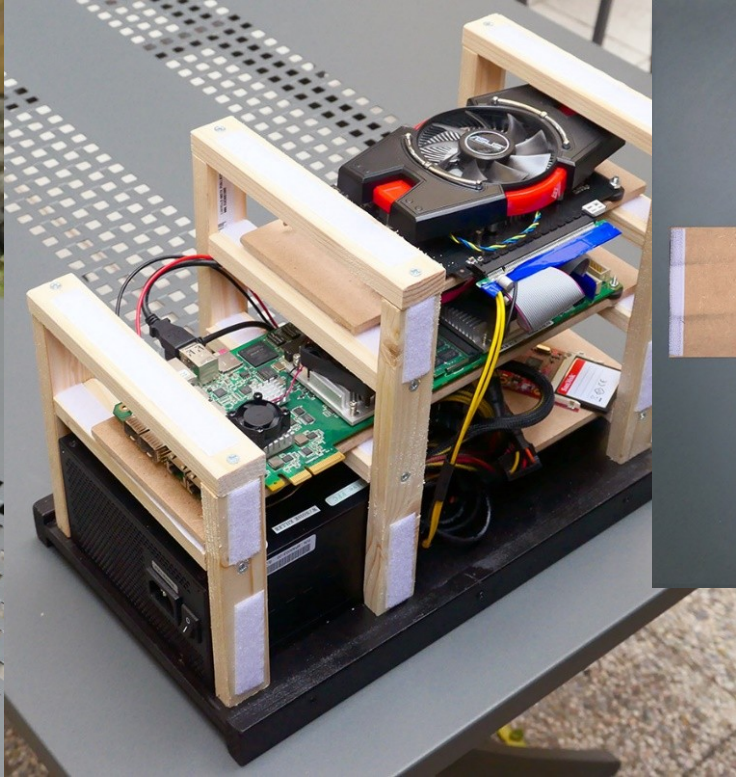
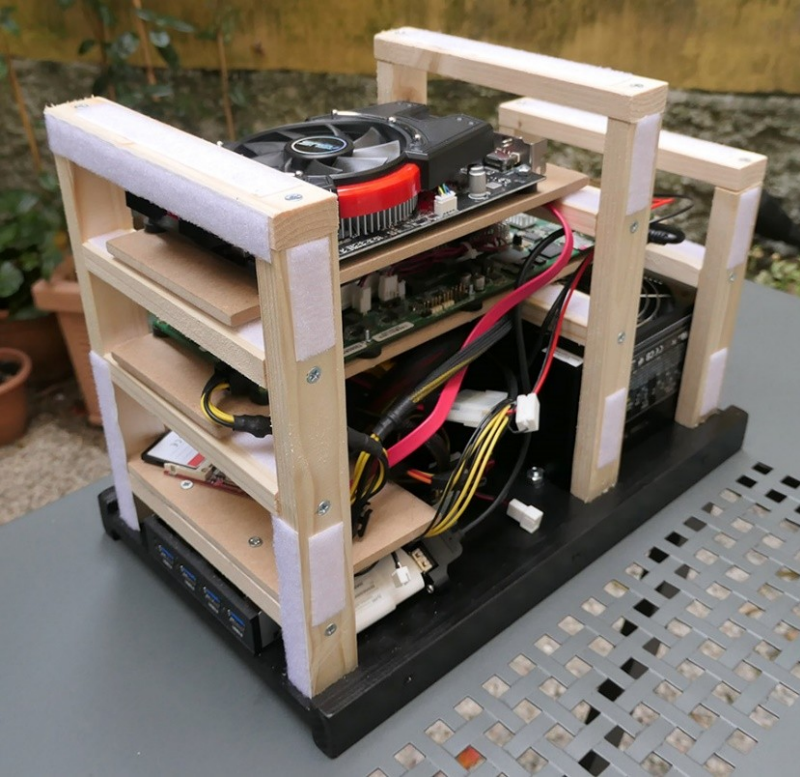
Slimbook provides us the notebook body

**Gaming Oriented**  
Allows us to use **MXM**  
**graphics**

The body of the laptop is actually the entire case, the cooling system, the screen, the keyboard, the backlight, the webcam, the speakers and the battery.

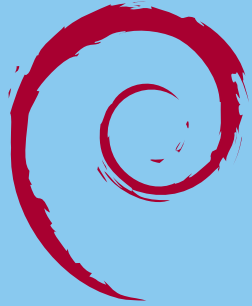
**SLIMBOOK**

**We thanks NXP** to have give us from 2016  
a T2080 rdb Development kit  
*that permit to test us Debian PPC64 BE and Video Card*



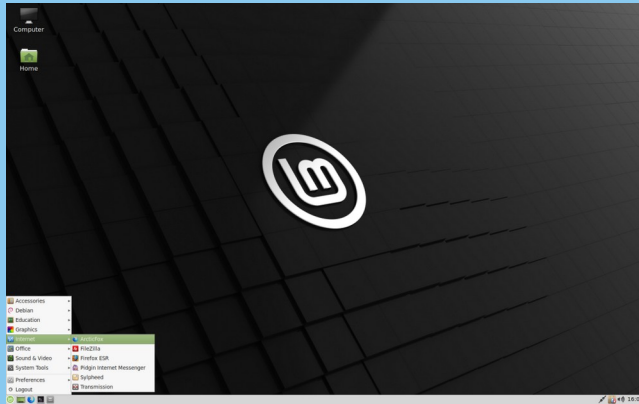


# Thanks PowerPC GNU/Linux distro



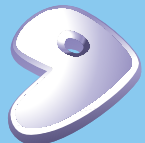
debian

Ppc64 port



MintPPC

<http://mintppc.nl>



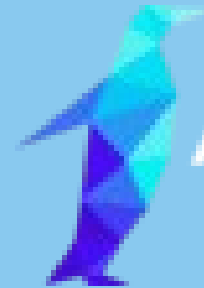
gentoo linux™

<https://wiki.gentoo.org/wiki/PPC>



Fienix

<https://fienixppc.blogspot.com>



Adélie  
Linux

<https://www.adelielinux.org/>



# Project Timeline

2014	powerpc-notebook.org first published
2015	Becomes Open Source Hardware
2016	<b>Established PowerProgressCommunity association</b>
2017	hardware requirements for OSWHPowerPC Notebook
2017-2018	Campaign and Electrical Schematics, Revivo with Scratch
2019-2020	Campaign and Printed Circuit Board design
2020	Campaign and Fast SI bus simulations
2021	Campaign and three Prototypes
2022	Campaign for Hardware Test and Prototypes production
2022	Campaign for CE Certification + MXM video cards + Extra
2023	Prototypes extra costs, u-boot video driver, fix prototype

# 2016: founded the association

- Registered our association needed to ask donations
- Made an signed with Acube the contract to design the Mobo
- Setup the bank account
- Searching a viable solution for the notebook chassis
- The T2080 RDB devkit runs with Video Card



# 2017: Start Donation Campaign

- Setup our platform to collect donations
- Donations started to arrive
- Defined List of hardware requirements
- Debian PPC64 run on our T2080 RDB Devkit
- Start improve PPC64 BE packages

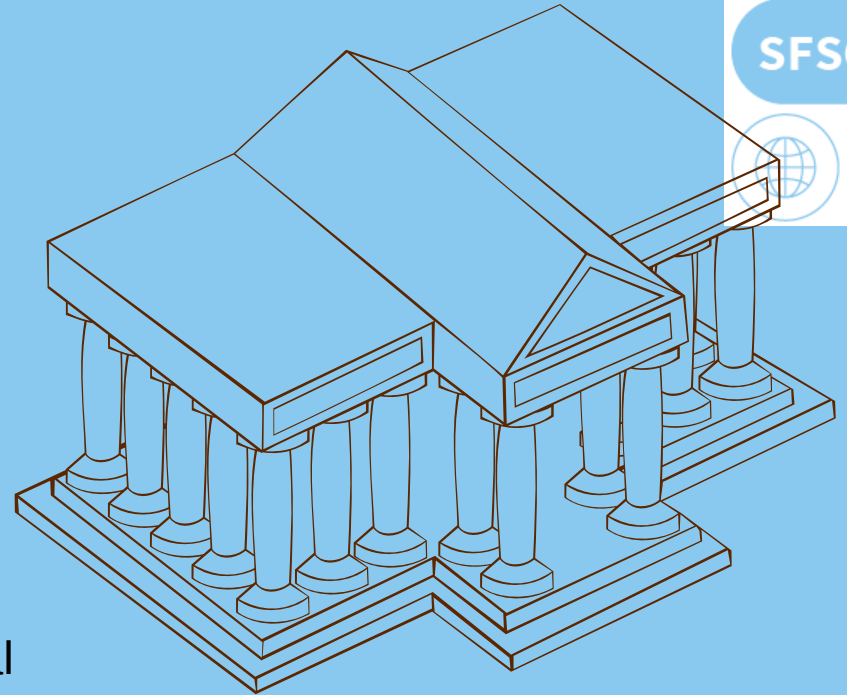
# Power Progress Community



- **Promotion and dissemination of free software**  
*(applications, databases, operating systems, bootloaders, firmware)*
- **Promotion and dissemination of free hardware**
- *(especially, but not exclusively, with PowerPC and OpenPower architectures)*

# Universities and Schools

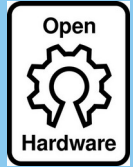
- Active collaboration with Universities and Schools
- to give students the opportunity to
  - design open hardware computers and electronic devices
  - Develop applications with free software licences
  - so that they can gain high-tech, intellectual and educational experience of a high technological, intellectual and collaborative level.



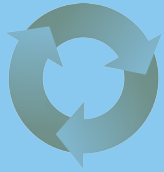
# Solidarity-based knowledge and freedom of choice

- Knowledge in solidarity and in the service of liberation from conditions of constraint and oppression and for freedom of choice.
- Creating social conditions of equal opportunities.
- Dissemination of the conscious use and utilisation of freedom-respecting technologies that do not become an information mine for "surveillance capitalism".
- Dissemination in all sections of the population and especially those far removed from the world of information technology.

# Power Progress Community Missions



Design Open Hardware, accessible to the widest range of people.



Facilitate the re-use of dismissed or low-cost hardware by means of free software.



Encourage people to use free software.



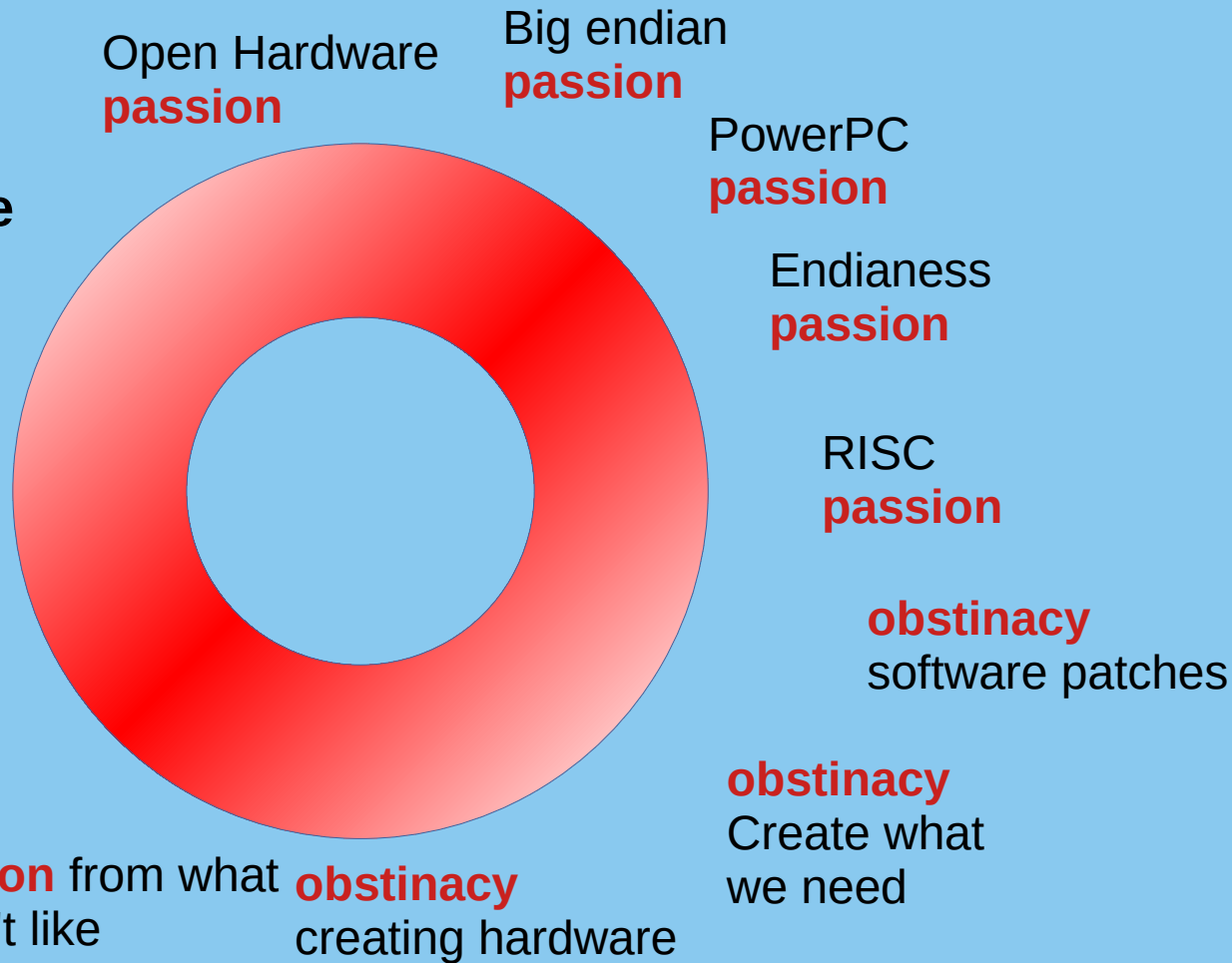
Open Science: practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, reuse, redistribute, reproducible data and methods

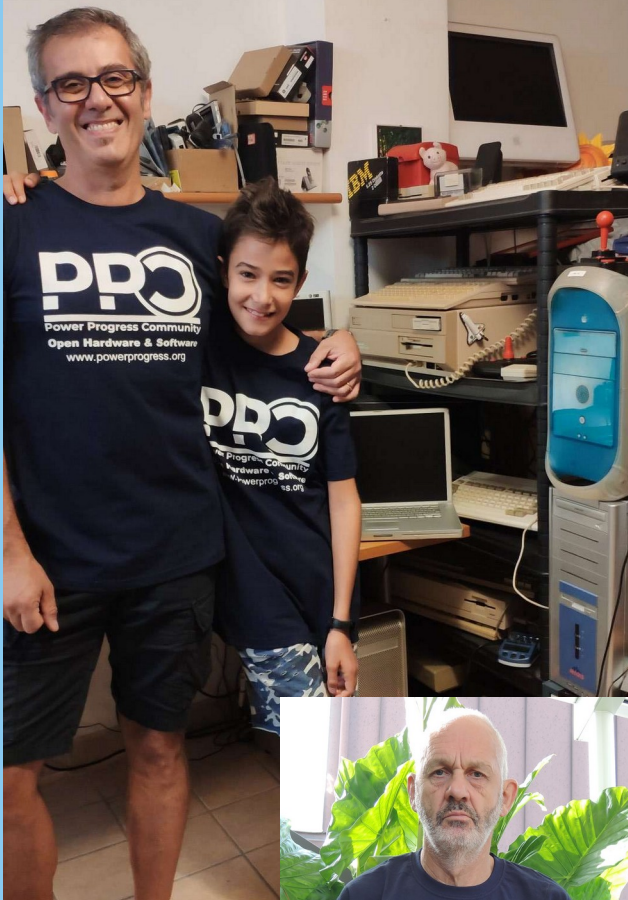
# Our DNA

- The association is run by hobbyists that work for fun on the project on their spare time, no one is getting paid, only the funded electronic engineers
- We have a very flexible business plan, no tight time-to-market strategy
- We can afford to run a donations campaign for an unlimited amount of time, and that is not allowed by any crowdfunding platform.









## Power Progress Community founders and the core team



# 28 October 2023 Linux Day Milano

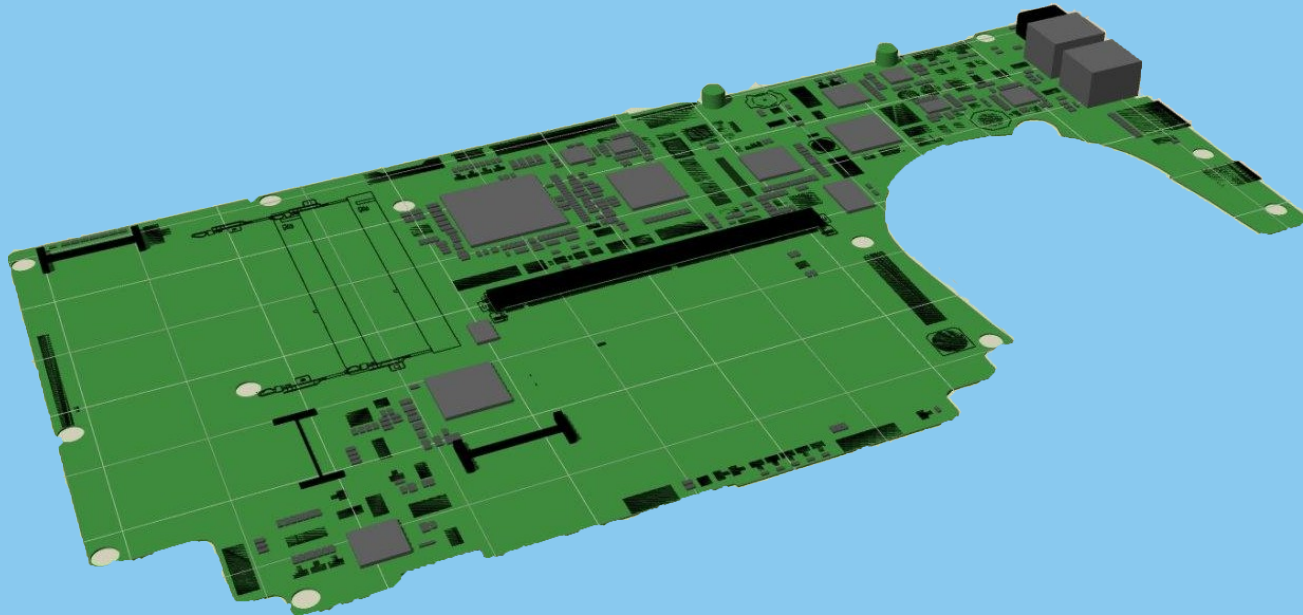
Association members  
at our expositon space:  
Roberto, Antonio,  
Enrico, Riccardo and  
Stefano



Our Speech in the same day

# 2019 - 2020: PCB design

- Agreement with Slimbook regarding the notebook body
- Electrical Schematics design completed
- Collected the donations to design of Printed Circuit Board
- The Printed Circuit Board design is completed



# 2021 with Global Component Shortage

June 2021

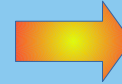
**AMD MXM order opening,  
Delivery November 2021**

July 2021

**40 out of 2000 components  
missing**

August 2021

**Some energy management  
components cannot be found**



**Motherboard redesign**

September 2021

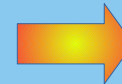
**Increase in component prices**



**Increase campaign donation  
target**

October 2021

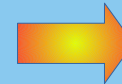
**HDMI connector and some  
components not available**



**Search for alternatives**

December 2021

**End of life AMD MXM,  
Some components still  
missing**



**Search for other  
manufacturers**

# 2022 with Global Component Shortage



July 2022

**New electrical schematic published**

August 2022

**new pcb design published**

August 2022

**End of life AMD MXM,  
Alternative manufacturer search**



**Purchased 2 AMD MXM TUL cards**

September 2022

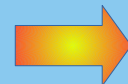
**4 missing components found at stellar prices**



**Cost 3600 more , bought**

October 2021

**HDMI connector and some components not available**



**Slimbook provides us with HDMI connectors**

# The 2023 Chip Programming, FPGA CPLD towards u-boot

January 2023

**Electrical testing of prototypes**

March 2023

**Programming Voltage Switching Regulators  
(TPS544B20RVFT)**

May 2023

**programmed CPLD - Lattice LCMXO640C-3TN100C FPGA  
to manage all those external peripherals connected**

July 2023

**Jtag Debugger → shipped to Max Tretene with one  
prototype**

October 2023

**Programming SRAM, NAND, NOR for boot, fix CPLD, fix  
Flash programming, how to set RCW**

# 24 October 2023 at NXP Days Milano



Sandro ( Mas Elettronica ) Roberto ( PPC) Enrico ( Acube Systems)



*What is*



# OpenPOWER™



**2013**

Launched

**350+**

Global Members

Mission: To accelerate adoption of [OpenPOWER ISA](#) and [open technology](#) at large.

- To drive technology innovation through specifications, compliance tests, and product SIGs
- To grow overall ecosystem and members
- To facilitate community engagement and visibility



OpenPOWER Foundation is a non-profit serving its member companies and the open hardware industry

Fully open sourced POWER ISA in [2019](#)

# What is OpenPOWER?



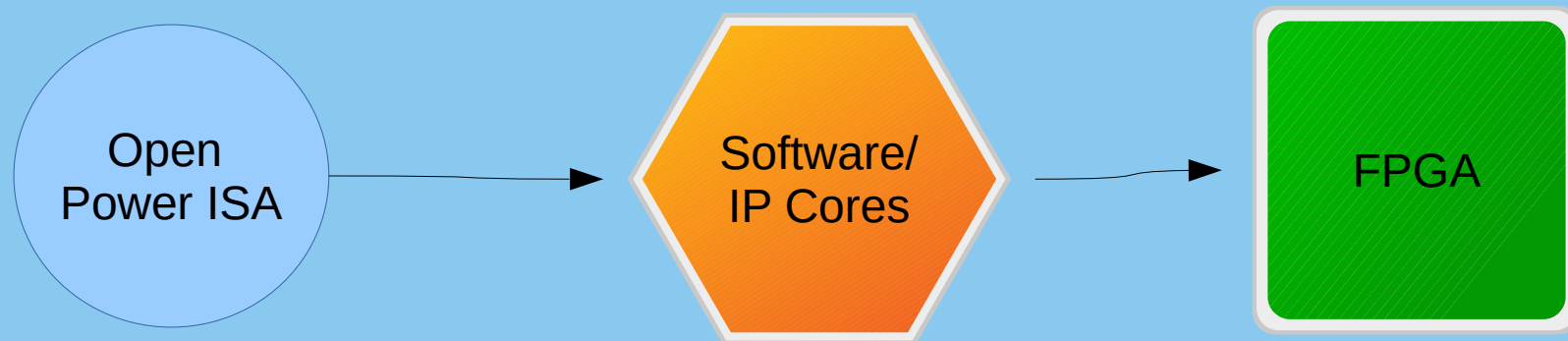
OpenPOWER is a high performance RISC-based free and open Instruction Set Architecture...

- With 30 year proven computing history
- Completely driven by open collaboration through the foundation
- Enabling freedom of design across all domains and industries
- Including reference design, tools, and resources to de-risk development



**POWER OpenISA are real option  
with FPGA, ASIC**

# Open Power ISA test FOSS on FPGA softcore



- No need wait “real production hardware”
- Test FOSS software compiled for Power on FPGA



Solid Silicon Corporation is a fabless silicon company developing standardized, sovereign, future-proof silicon, which gives developers the ability to own, control, and trust their computing devices down to the silicon.

<https://www.solidsilicon.com>



To provide a high-performance power processor family for vector instruction computing

<https://redsemiconductor.com/>



A small Open POWER ISA softcore written in VHDL 2008. Aiming to be simple and easy to understand, it was selected for inclusion in the Efabless Open MPW Shuttle programme.

<https://github.com/antonblanchard/microwatt>



PowerISA 3.0 entirely free core, is being manufactured by TSMC 180 nm via Imec's MPW Shuttle Service in collaboration with Chips4Makers and LIP6 at the University of Sorbonne <https://libre-soc.org/>

# Open Hardware PowerPC Notebook

based on Powerboard Tyche

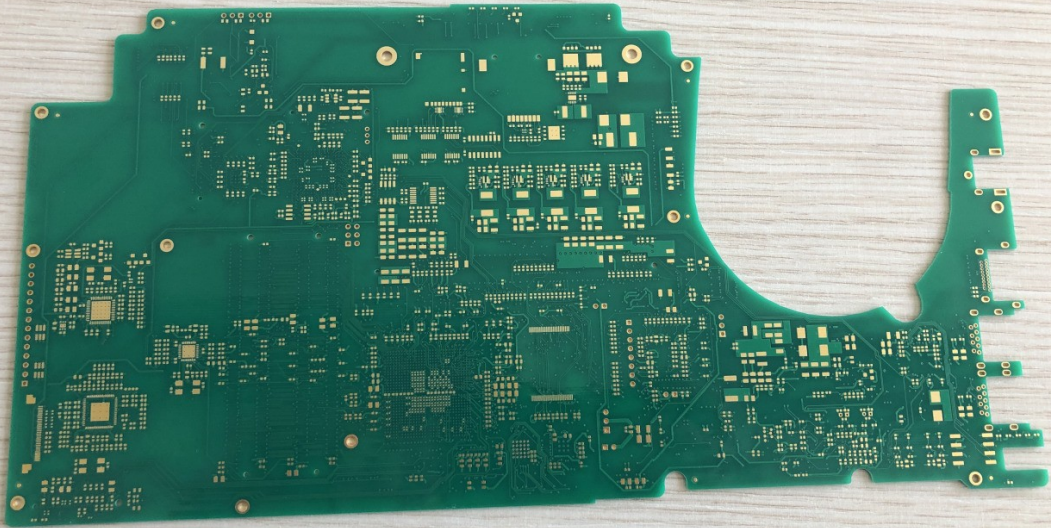
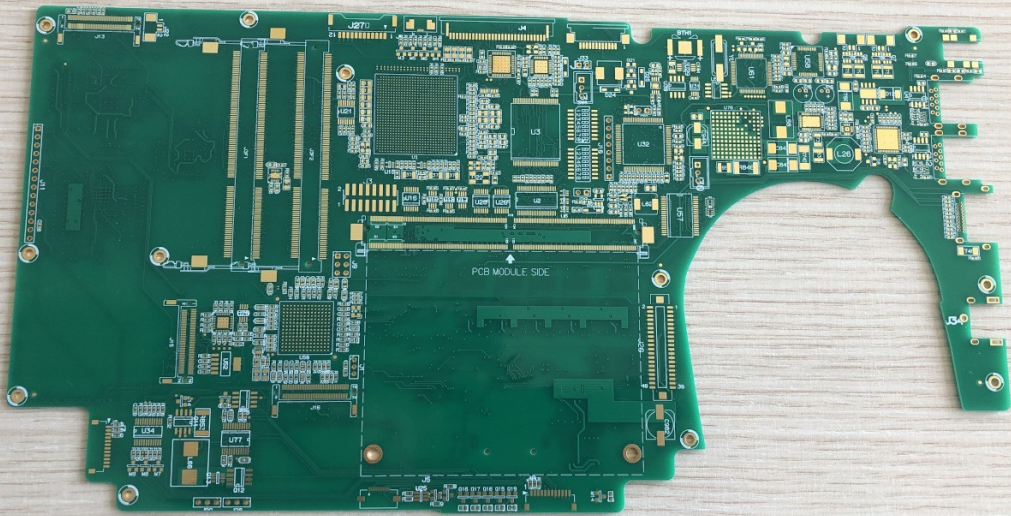


Tyche who governed the fortune and prosperity of a city in classical Greek mythology

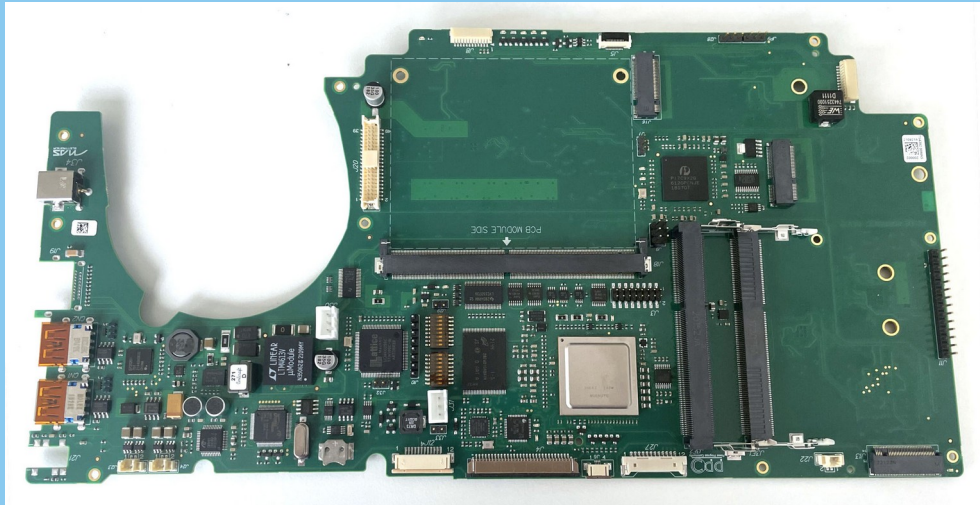


# 2021 PCB Dummy 2 layer Powerboard Tyche

designed for Slimbook Eclipse  
body



# 2023 Powerboard Tyche Prototype





# Our Open Source Hardware Path

**Objective:** Certification of Oshwa

<https://certification.oshwa.org/>

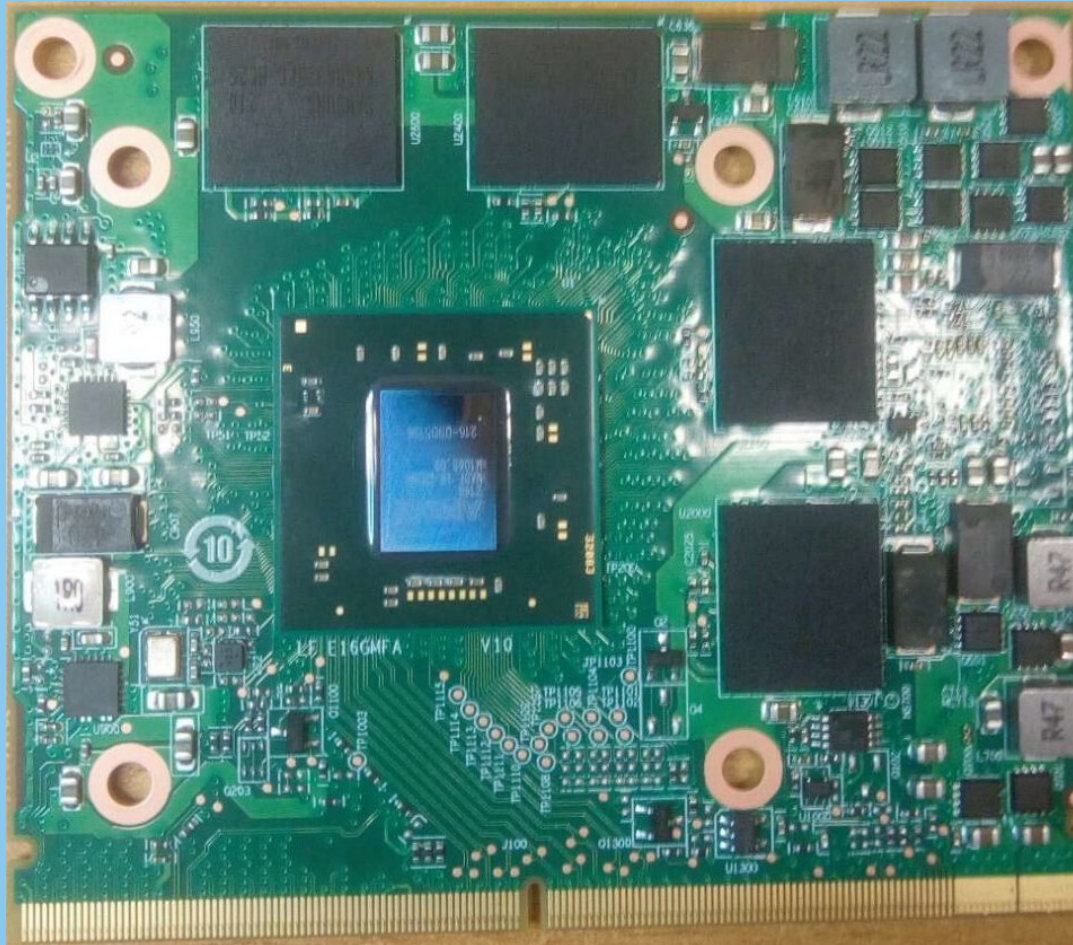
## Steps taken:

- Advice from the NYU Technology Law and Policy Clinic to make the project as open hardware as possible.
- Contact with Chip manufacturers for authorization to distribute the project as Open Hardware
- Publication of the electrical schematic ( Orcad source) with Cern 1.2 License
- Publication of PCB source ( Mentor Expedition) and export in Altium and Kicad



open source  
hardware

# 2022: Video card MXM AMD Embedded Radeon E9174 TUL



As of 2022, only the E9174 remained available, which has 4GB of ram and is manufactured by TUL.

Bought 2 pieces for prototypes.

# One of the prototypes is here!

- 1)The prototypes (3) were produced in December 2022 , ( they cost about 1200 Euros more each for the 4 throttling components)
- 2)Hardware Tests and programming and fixes are in progress
- 3)In the meantime, the donation campaign is still open to raise funds for the new prototypes new release, for the development costs for u-boot, and for the design of the cooling pipes

# Be in your organization, institution, company, city one of first protagonist, beta testers using OSHW PowerPC Notebook

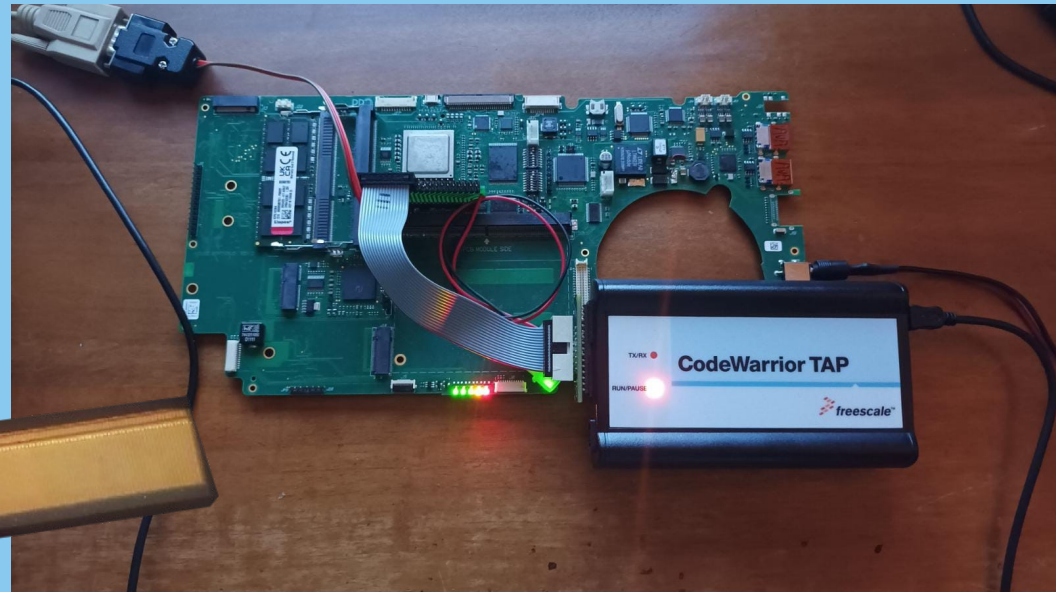
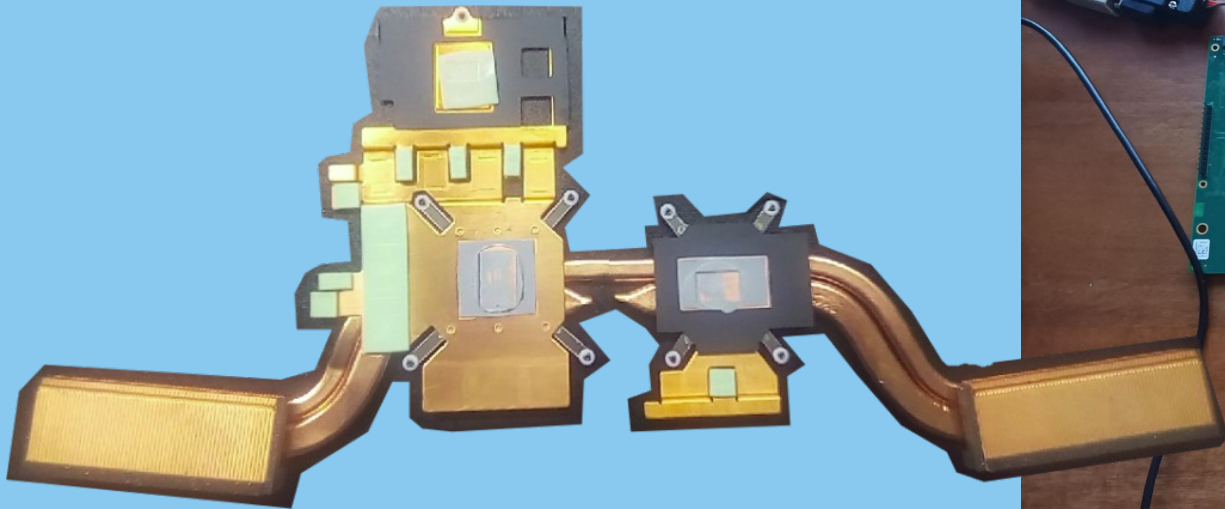


# Donation Campaigns

	<b>1</b> Electrical Schematics 2 July 2017 - 7 June 2018	€ 12.600
	<b>2</b> PCB Printed Circuit Board 12 October 2019 - 8 September 2020	€ 19.000
	<b>3</b> Fast SI bus simulations 9 September 2020 -12 December 2020	€ 5.000
	<b>4</b> 3 prototypes 12 December 2020 - 22 October 2021	€ 13.500
	<b>5</b> Hardware Tests 23 October 2021 – 28 January 2022	€ 14.000
	<b>6</b> CE Certifications 29 January 2022- August 2022	€ 12.500
	<b>7</b> MXM video card + Prototypes extra cost August 2022 – November 2023	€ 5375
	<b>8</b> Driver u-boot,fix protipi,progettazione pipe July 2023	€ 16000

# Current Donations Campaign

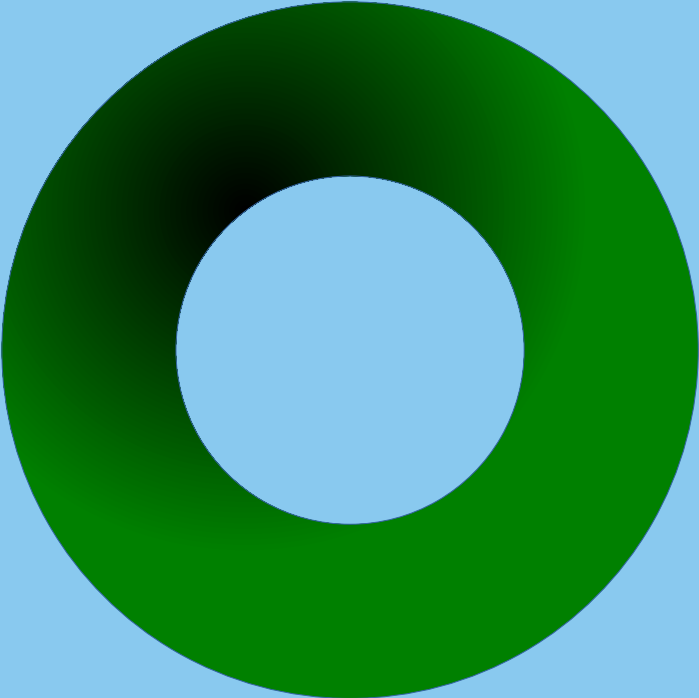
- Readon driver development for u-boot latest version
- Update cpld (FPGA managing peripherals)
- Debug and fix board to start u-boot
- Device tree for u-boot
- Design and production of new heat sink tubes



# Powerboard Tyche Update design



- possible removal of the Marvell Sata3 controller ( cost and space reason)
- Remove the sim slot
- Change on the position of few connectors
- Change of few holes for chassis screw
- Remove one not needed Flash Memory
- Other mechanical changes needed to fix perfectly on Smarbook Eclipse Chassis

- 
- be protagonists
  - discovered interesting people
  - collaborated with other interesting people
  - Our action count
  - more agile to overcome difficulties
  - accept Complexity
  - Open hopes
  - Harmony with others
  - Good use of energies
  - Realized what was not there



# The open space of POSSIBILITIES

- Open ISA , open instruction set
- The OpenPower Foundation ecosystem
- Power Architecture Softcore
- Collaboration with Slimbook
- Support from many - also very generous - donors
- Relations with other free software project groups
- Opportunities to make our project known at events



# Our Resources



**Association**

<https://powerprogress.org/>

**Association Forum**

<https://forum.powerprogress.org>

**PPC Notebook updates**

<https://powerpc-notebook.org/>

**Wiki PPC Notebook**

<https://wiki.powerpc-notebook.org>

**Forum PPC Notebook**

<https://forum.powerpc-notebook.org>

**Survey to collaborate**

<http://survey.powerpc-notebook.org/>

**Our Repositories**

<https://gitlab.com/power-progress-community/>



**Thank You!**  
**Q&A**