



Desktop on an OpenPOWER system? YES!

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- Introduction
- Why?
- Hardware
- Firmware
- OS and User Software
- Challenges



Introduction

- /me works in the Multi-Arch team in Red Hat
- our goal is parity between all arches



Why?

- why not ;-)
- dog-fooding aka test what we produce
- working locally vs. remotely
- it's high-performance and open
- heterogeneity helps quality

Hardware

- <https://openpowerfoundation.org/>
- complex relationship between PowerPC and POWER
- embedded vs. server
- https://openpowerfoundation.org/?resource_lib=power-isa-version-3-0
- IBM with FSP vs. OpenPOWER with BMC
- from full-rack E980 to microATX Blackbird
- pseries and powernv
- hash and radix MMU, KVM - HV and PR, nested KVM



Hardware

- IBM Witherspoon (AC922)
- Winstroon, Inspur, ...
- Supermicro Boston (P9DSU)
- Google/Rackspace/Ingrasys Zaius
- Yadro Vesnin - 8TB in 2U
- Raptor CS Talos II and Blackbird

Raptor Talos II

- further development of OpenPOWER reference design (Romulus)
- <https://www.raptorcs.com/TALOSII/>
- dual-socket EATX/SSI-EEB with schematics on DVD
- proper fan control as main differentiator
- blob-free when without the SAS controller
- NIC firmware being reverse-engineered and re-implemented as open-source
- 1st Power/PowerPC workstation after ~10 years

Firmware

- 2 computers on one board
- BMC - <https://github.com/openbmc> or proprietary
- host - <https://github.com/open-power> or vendor's git (eg. <https://git.raptorcs.com/git/>)
 - SBE
 - hostboot
 - skiboot – implements OPAL runtime services
 - skiroot with petitboot (kexec bootloader)
 - every instruction on CPU comes from open-source



Software

- Linux and FreeBSD, other in development
- ppc64 and ppc64le
- glibc and musl
- ELFv1 and ELFv2 ABI



Fedora

- only ppc64le since F-29
- Everything, Server, Cloud
- desktops installable from Everything
- installation possible from USB in F-30 without workarounds
- <https://copr.fedorainfracloud.org/coprs/sharkcz/talos/>
- <https://copr.fedorainfracloud.org/coprs/sharkcz/talos-kernel/>
- RPMFusion is available



Challenges - hardware

- new keyboard ;-)
- updating FPGA for early adopters
- damage on the bottom of the mainboard
- not all consumer cards work – visit HCL

Challenges - software

- convince upstreams there is new and powerful HW
- unresponsive upstreams
- 64KB vs 4KB kernel page size
- different firmware versions between skiroot and host
- DMA for 3D graphics
- browsers
 - FF works out of the box, JIT for JS in development
 - Chromium ported, so QT WebEngine possible

Challenges - software

- QEMU – ppc64le model
- multimedia codecs optimizations
- conflicting types for SIMD/Altivec – c++ vs gnu++
- faster boot
 - <https://opensource.com/article/19/1/booting-linux-faster>
- “CI as a service” is missing
- ppc64le in anaconda



Conclusion

- Yes, it works! It's my primary workstation
- some demo



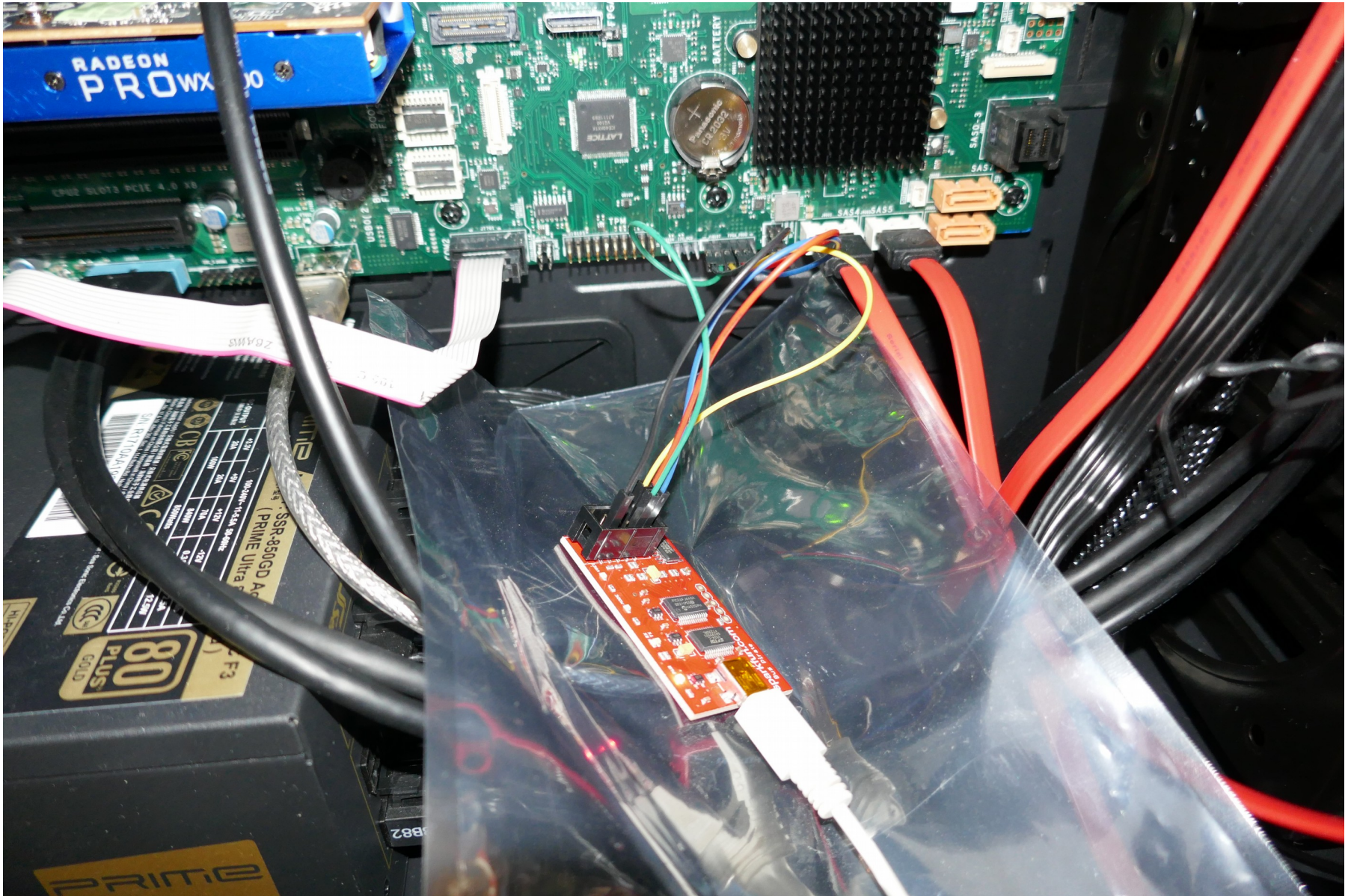
My Talos

- 2x 8-core (unpaired) P9
- 4x16G RAM
- PMC/Adaptec SAS
- Marvell SATA
- AMD Radeon Pro WX4100
- SoundBlaster Audigy FX
- Fedora 28 with XFCE

Links

- <https://openpowerfoundation.org/>
- <https://www.ibm.com/developerworks/community/wikis/form/anonymous/api/wiki/61ad9cf2-c6a3-4d2c-b779-61ff0266d32a/page/1cb956e8-4160-4bea-a956-e51490c2b920/attachment/56cea2a9-a574-4fbb-8b2c-675432367250/media/POWER9-VUG.pdf>
- <https://fedoraproject.org/wiki/Architectures/PowerPC>
- <https://www.raptorcs.com/TALOSII/>
- https://wiki.raptorcs.com/wiki/Main_Page
- <https://openpowerfoundation.org/summit-2018-10-eu/>
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PRIME Ultra	
SSR-850GD Ad	
(PRIME Ultra)	
1000W-14.4kVA Single	
Model	SSR-850GD Ad
Power	850W
Efficiency	80% (230V)
Input Voltage	100-240V
Output Voltage	12V
Output Current	70.8A
Output Power	846W
Power Factor	>0.99
Hold-up Time	22ms
MTBF	>100,000h
Operating Temperature	0°C to 60°C
Storage Temperature	-40°C to 85°C
Humidity	5% to 95% (non-condensing)
Dimensions (W x H x D)	150 x 150 x 86mm
Weight	1.5kg