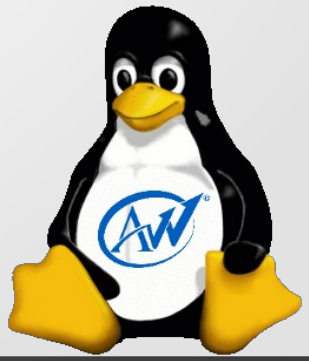
ARM: Allwinner sunxi SoC's
and the community behind it

FOSDEM2014
ULB K.1.105
2014-02-02
11:00 – 11:50

Olliver M. Schinagl
<oliver@schinagl.nl>



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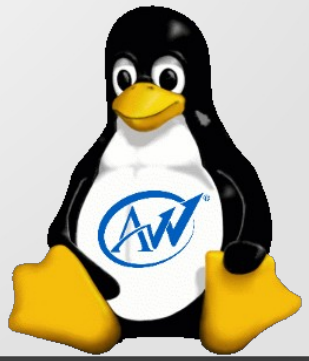
- FEX
- Hardware
- Allwinner SoC's
- Closed blobs
- Demonstration
- How to contribute
- Questions



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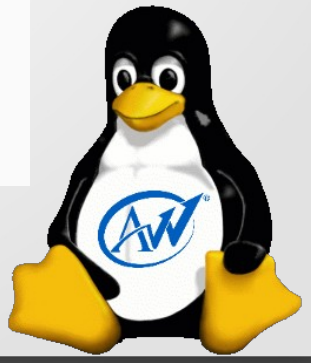
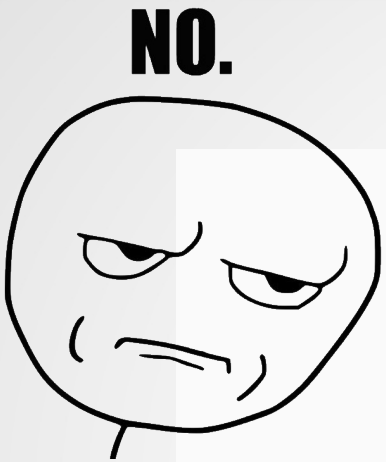
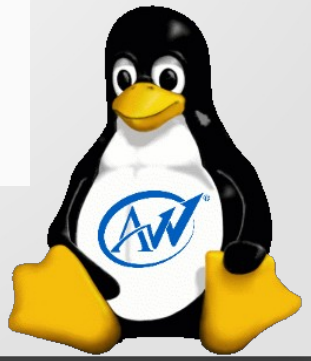


Sunxi is not sushi!





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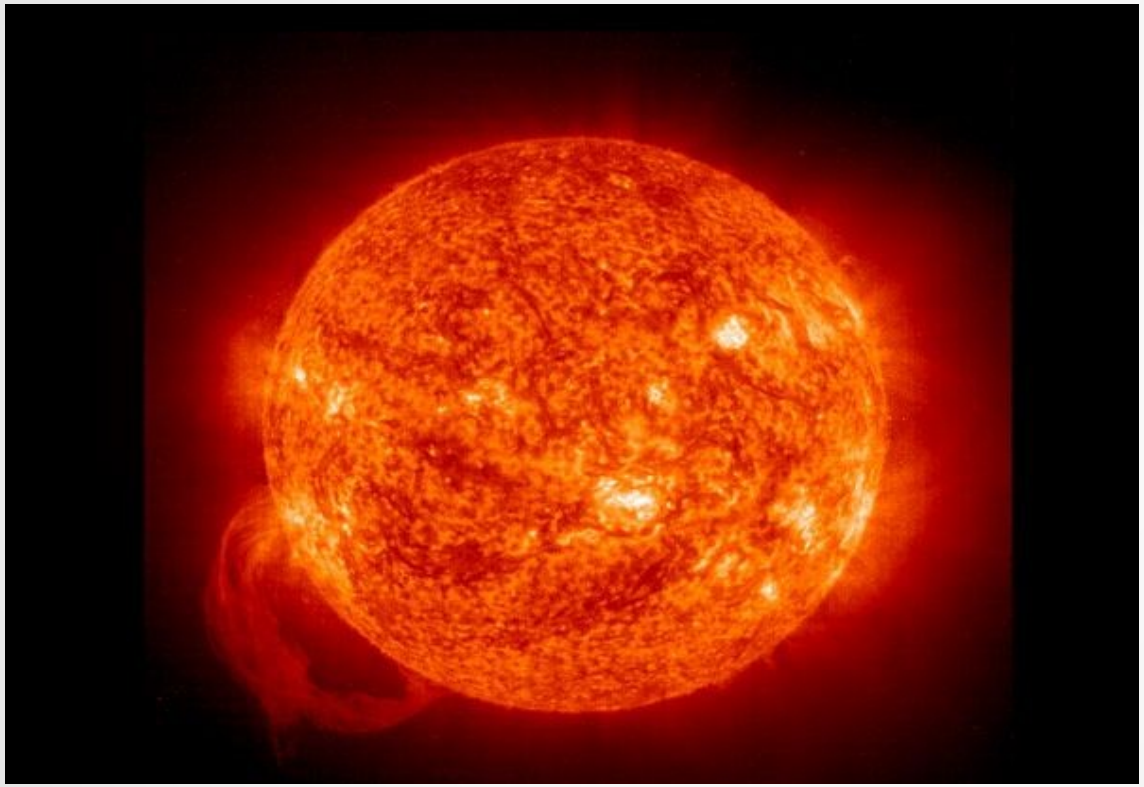


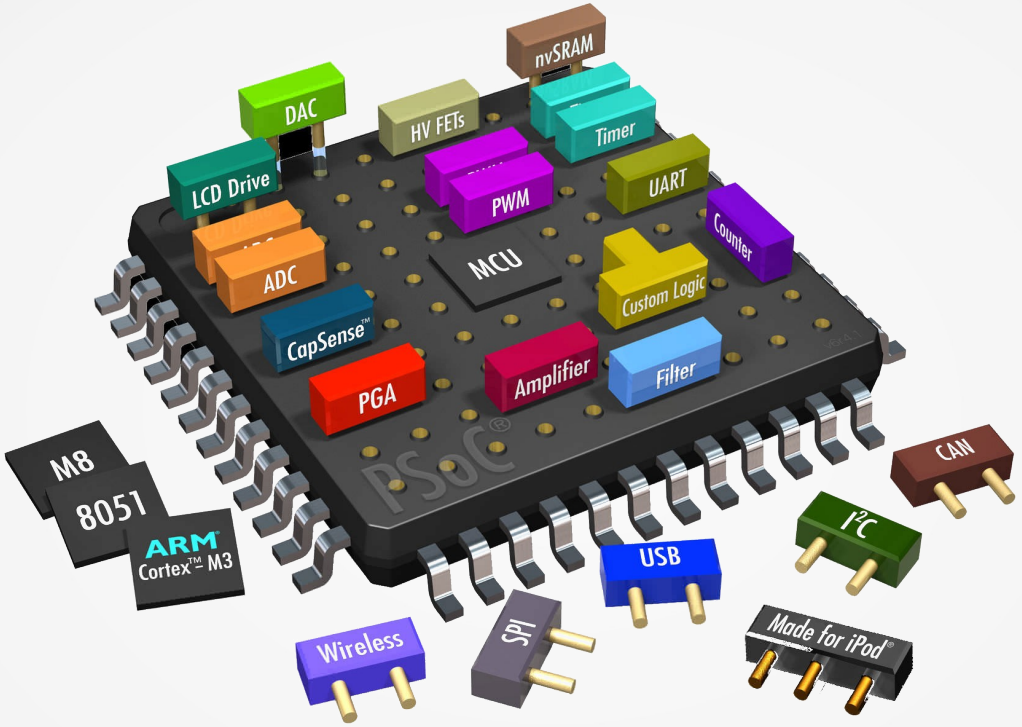
$\Xi\xi$

What is sunxi?

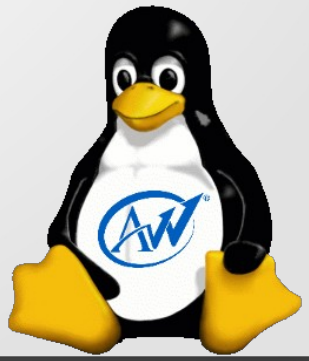
Sun Tzu's THE ART OF WAR

孫子兵法

What is sunxi?



A System on a Chip (SoC)



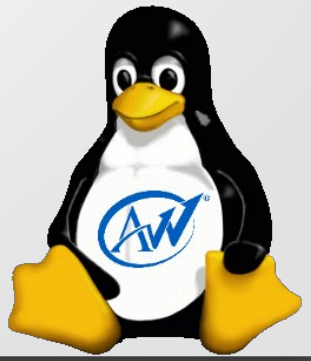
The sun architectures

sun?

sunii

sun3i

sun4i



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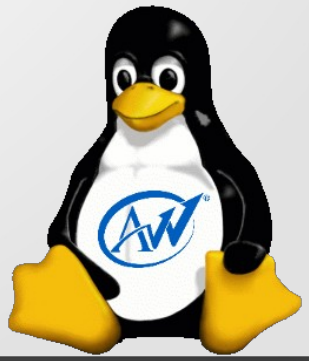
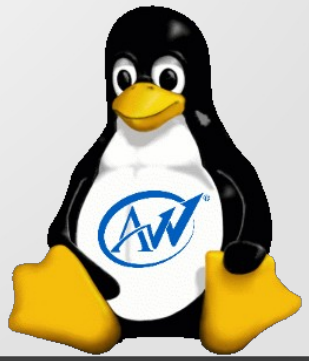


About me

- Linux enthusiast, admin and user for 15+ years
- Sunxi user/dev for 1 ½ years
- Official DTV-Scan-files maintainer
- Small time kernel contributer
- Writing about sunxi (Packt Publishing) ~july



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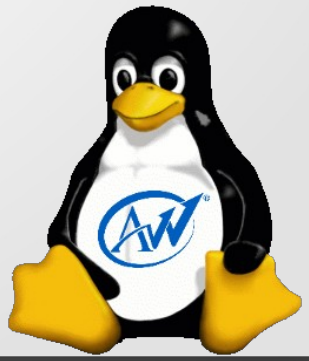
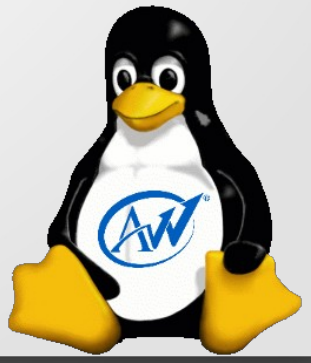


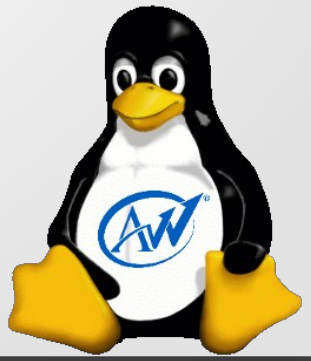
AW History

Allwinner Technology

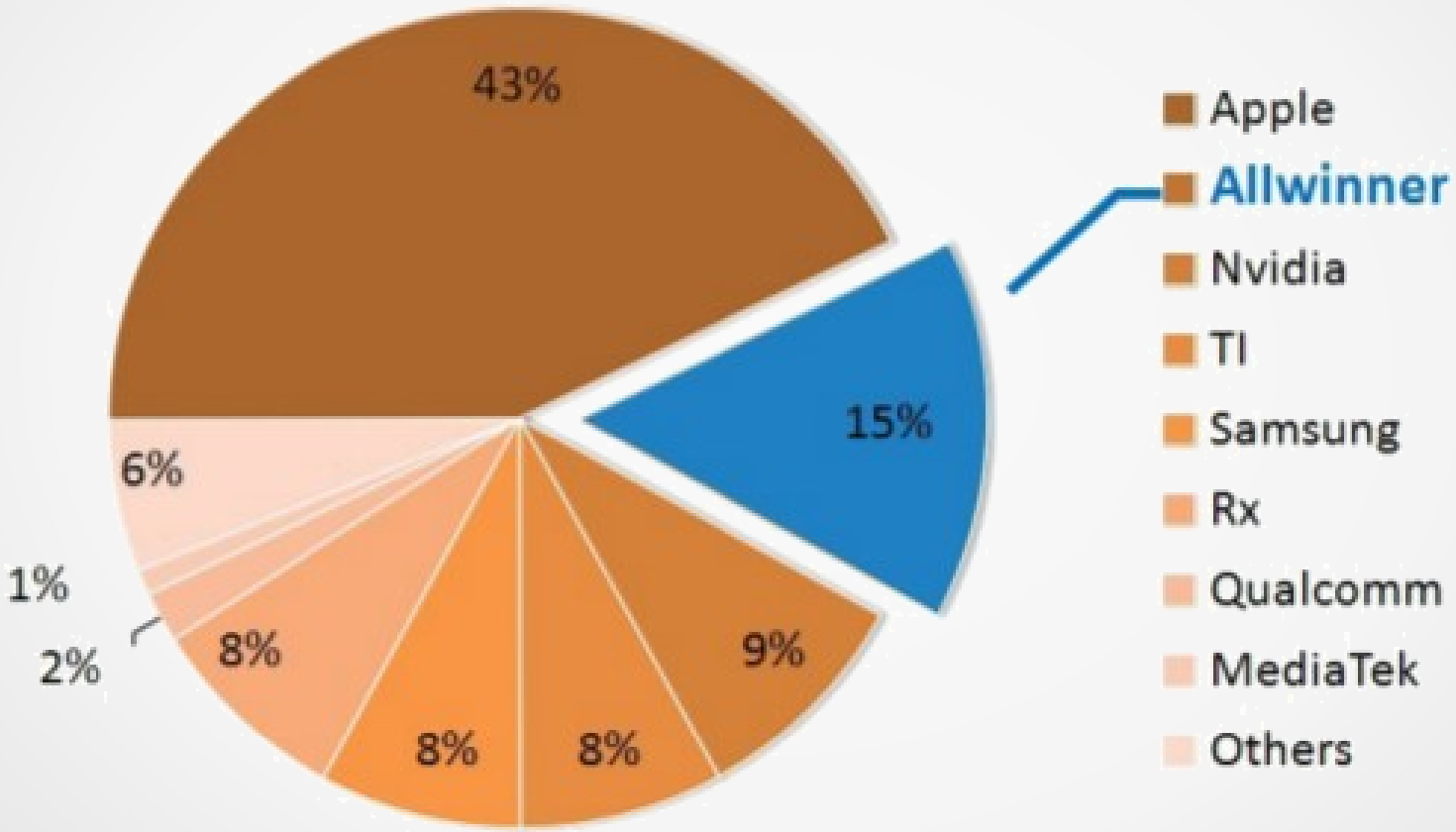


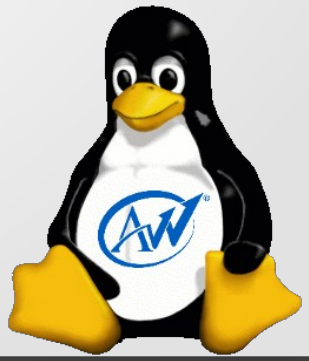
AW Corporate History

- Founded in 2007
- 550 Employees
- 450+ Engineers (50% Master's)
- Zhuhai, Shenzhen, Hong Kong



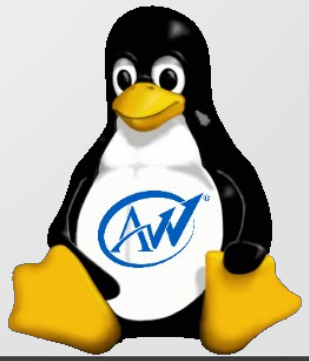
AW 2013 Market Share





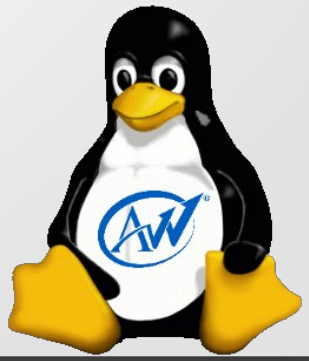
AW Product History

- Initially Power Management Units (PMU) 2007 - 2010
- AXP152, AXP209 and many more



AW Product History

- F-series (sunii?, sun3i) (2010)
- A10 (2011)
- A13, A10s (2012)
- A20 (2013)



AW Marketing

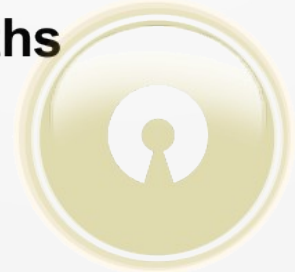
Strengths

SoC Design
Total Solution
Open Source

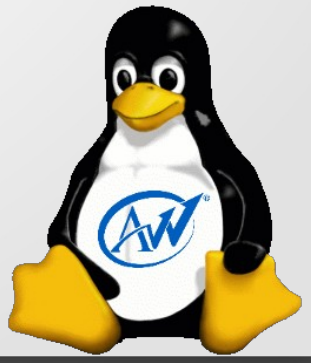
Integrated Circuit Design

Strengths

Total Platform Solutions



Open Source Support



AW Product History

Open Source Projects

Strengths

SoC Design
Total Solution
Open Source

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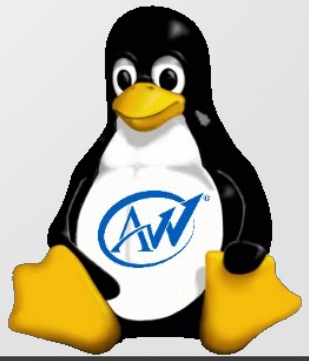
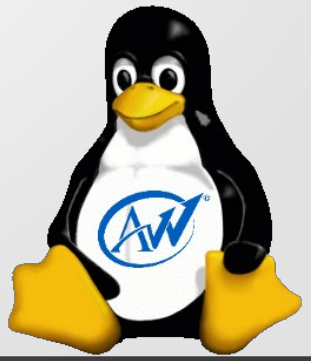
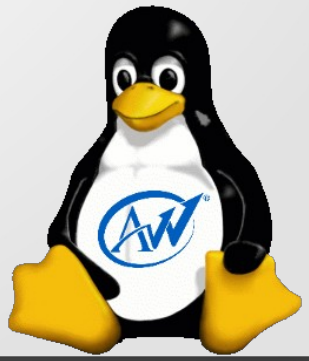


Community History



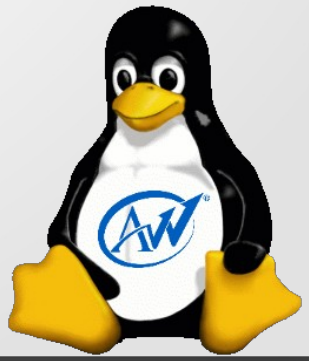
Rhombus-Tech, early-days

- Community gathering around EOMA68 board ~2010
- #arm-netbook @freenode, @lists.phcomp.co.uk



Sunxi-community

- Growing steadily!
- 600+ Mailing list users and ~130 IRC users
- ~20 active developers

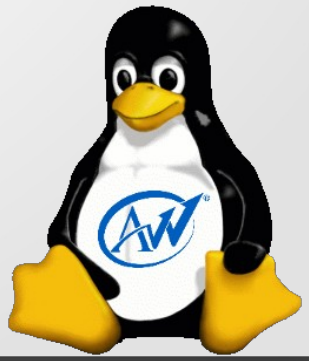


Where to find us

http://linux-sunxi.org

#linux-sunxi @free-node

dev@linux-sunxi.org



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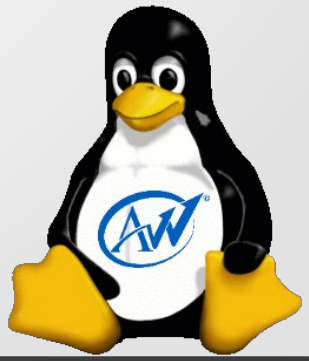
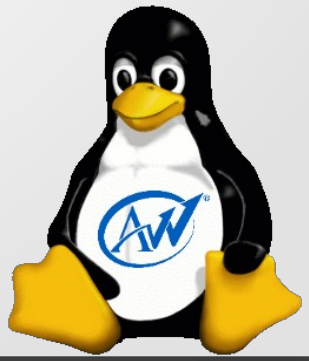


The Bootloader

- U-Boot (lichee) **NAND**-only (requires boot0/boot1)
- U-Boot (sunxi) **MMC**-only
- Barebox
- Coreboot (very early)



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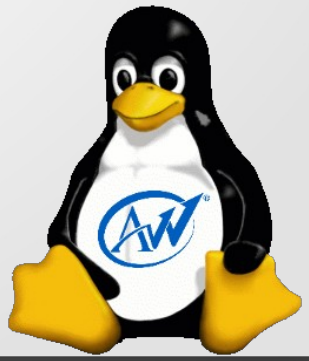
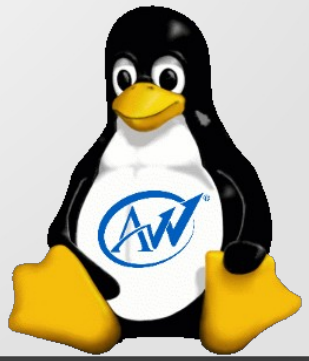


The OS

- Linux
- FreeBSD
- Tizen
- Firefox OS
- Minix



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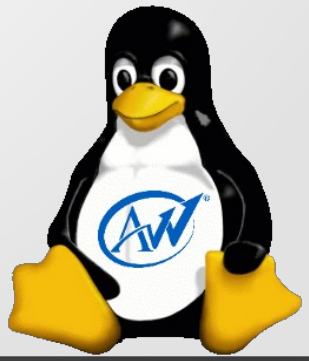
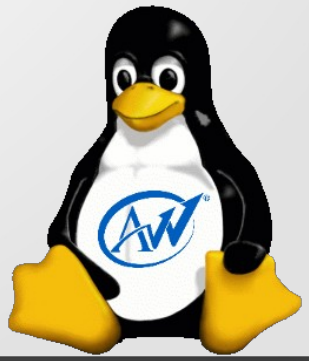


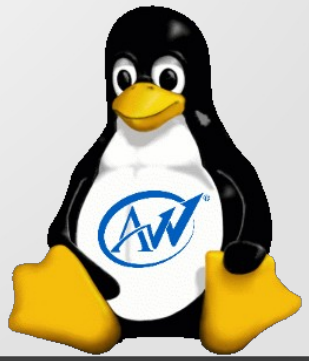
The Distro

- Fedora 18/19
- Linaro (Arm Linux Internet Platform)
- Arch / Gentoo
- Mer / Kali
- Debian / (X)ubuntu (debootstrap)
- (Xen)
- and of course not Android



No Android?

- No community android
- Replicant/Cyanogen WiP
- AW SDK Android
  - Violating blobs (touchscreen mostly)
  - Violating bootloader (but not needed)



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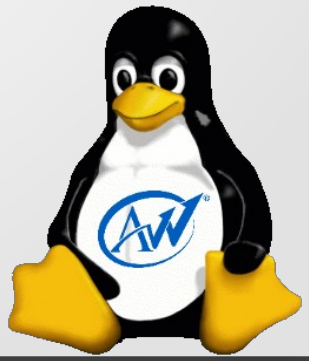
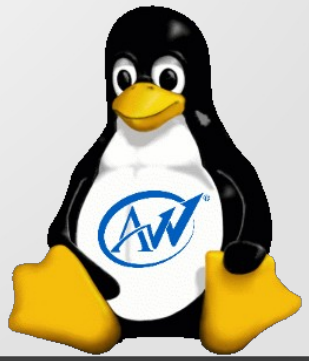


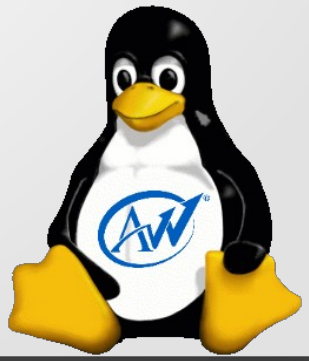
The Kernel

- Lichee
  - 3.0
  - 3.3
  - 3.4 with a sprinkle of 3.8
- Sunxi
  - (stage)-3.0
  - (stage)-3.4
  - experimental-3.10
  - mainline



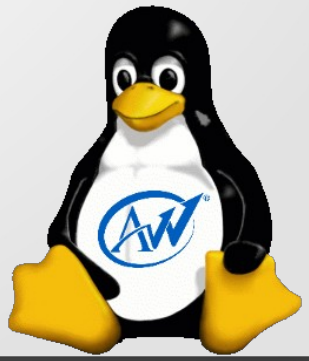
Sunxi-3.0

- DEPRECIATED
- Possibly still needed – touschreen blobs!



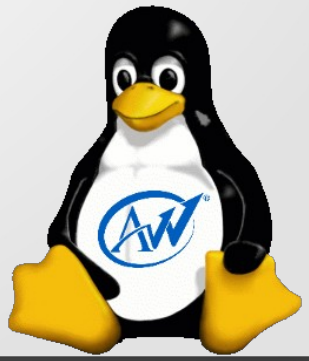
Sunxi-3.4

- Mostly in 'maintenance state'
- Patches backported from lichee kernels and upstream
- Lots and lots and lots of bugfixes
- Minimal cleanups



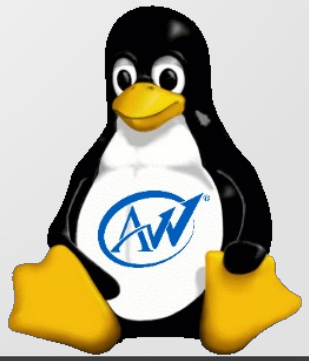
Experimental-3.10

- Long Term Support (LTS)
- Android 5.0 likely
- Actual mainline support
- Later patches backported
- Features! (KVM, CMA, etc)



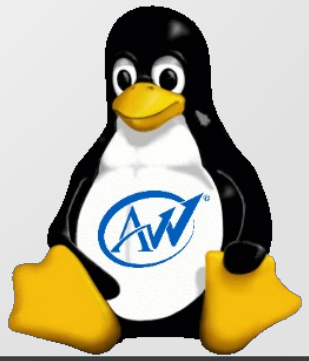
Mainline

- All community work!
- Upstream
- sunxi-devel
- sunxi-next



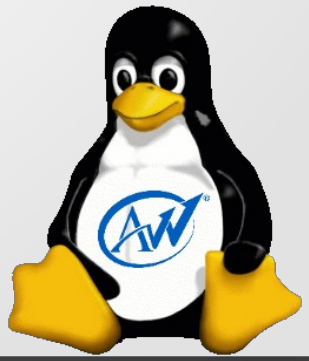
Mainline support

- CPU
- Interrupt Controller (AW (sun4i/sun6i) / GIC (sun7i))
- Timer
- RTC
- Watchdog
- Ethernet
- I^2C



Mainline status

http://linux-sunxi.org/Mainlining_Effort



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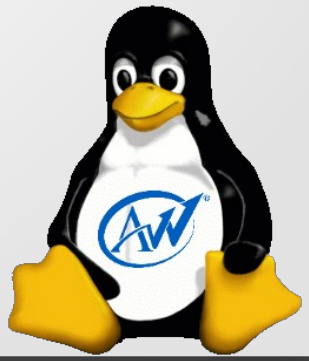
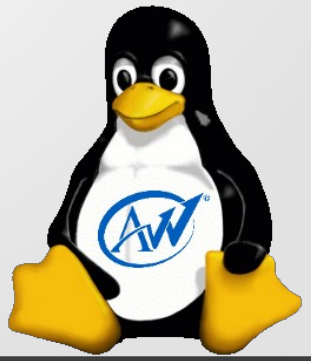


FEX

- ini-style config
- driver parses ini to configure itself
- No Magic!
- Might predate device tree
- Origins in Melis, AW's OS before Linux
- Still important
- Replaced by DT in mainline
- A happy couple in experimental-3.10



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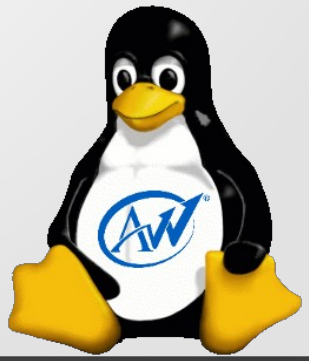
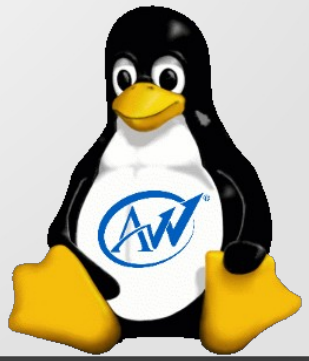
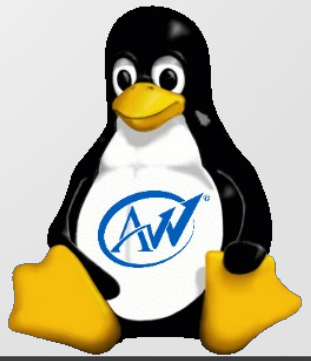


Hardware

- Various development platforms (even OSHW!)



OSHW: Olimex Lime



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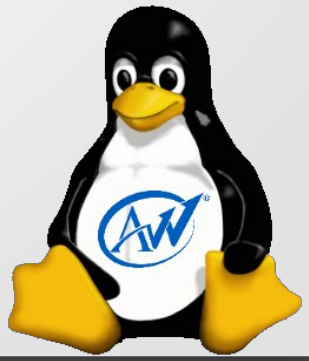
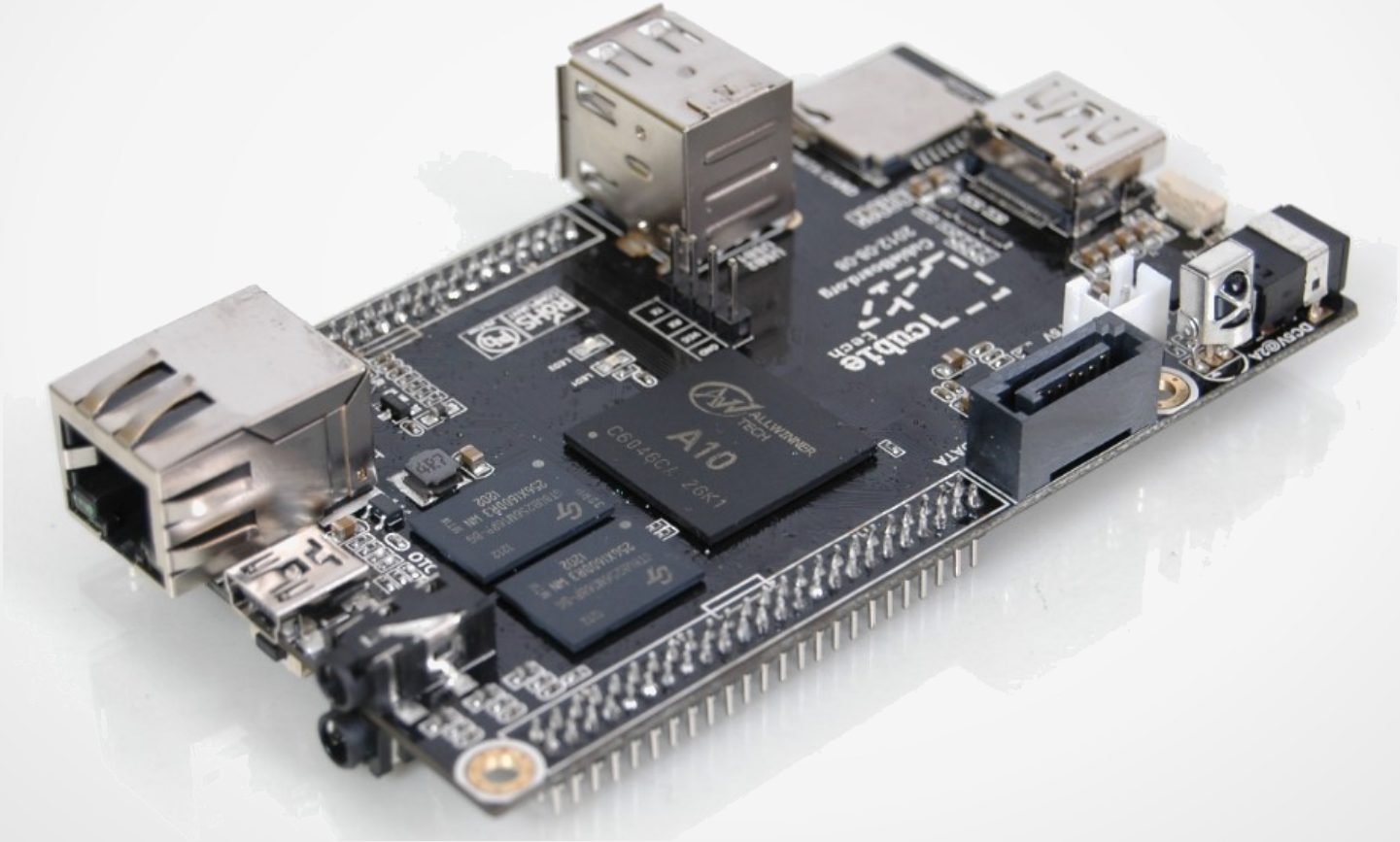
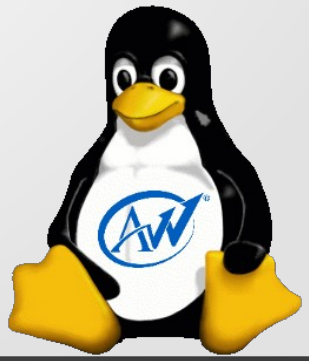
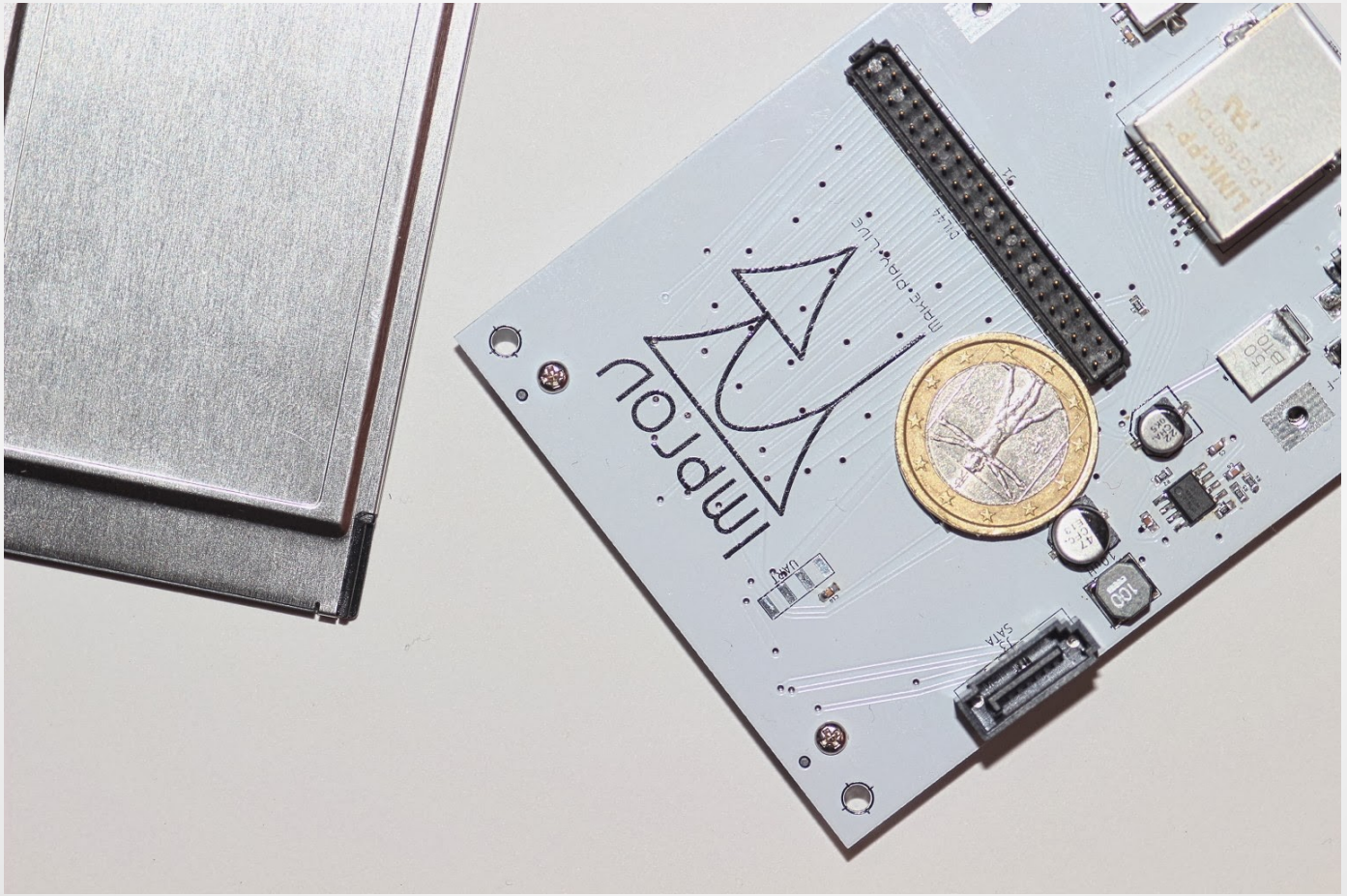


Open Schematic HW: Cubietech



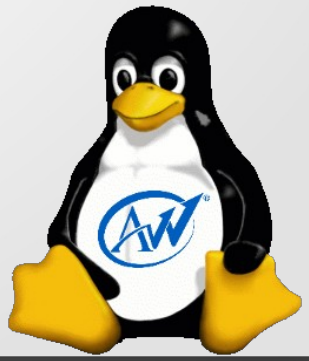


Could be OSHW: EOMA68



Hardware

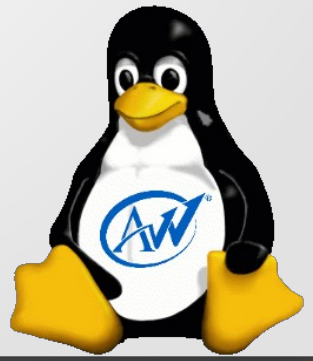
- Various development platforms (even OSHW!)
- Gigantic number of consumer tablets/sticks!



Consumer hardware

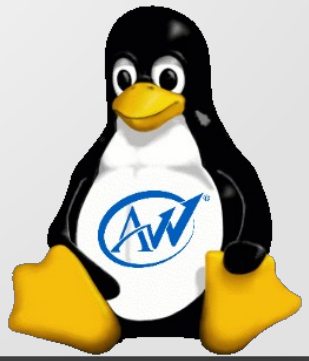
ET.Q88 Allwinner A13

Reliable Crown seller – Aliexpress NO.1
ET's Store specializes in consumer electronics,
with 8 years, we are committed to
provide the best products and services!



Hardware

- Various development platforms (even OSHW!)
- Gigantic number of consumer tablets/sticks!
- Very easy to hack on, always unbrickable!
  - Always boots from MMC first
  - 'FEL'-mode can inject over USB



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- About me
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- Demonstration
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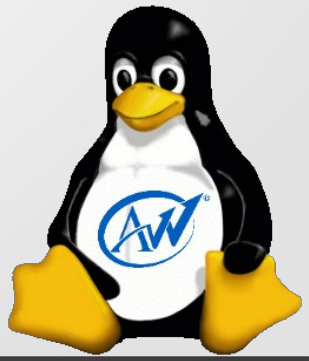
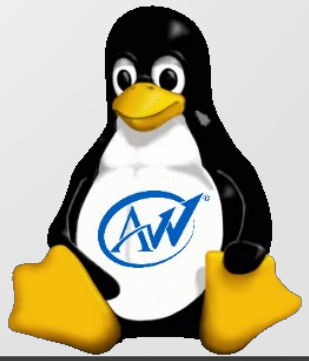
- Questions



SoC's

- Various generations now



That is sunxi!

A10
sun4i

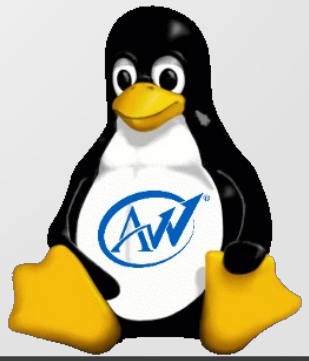
A10s
sun5i

A13
sun5i

A20
sun7i

SoC's

- Various generations now
- Open source drivers for most components
- Theoretically FSF endorsable



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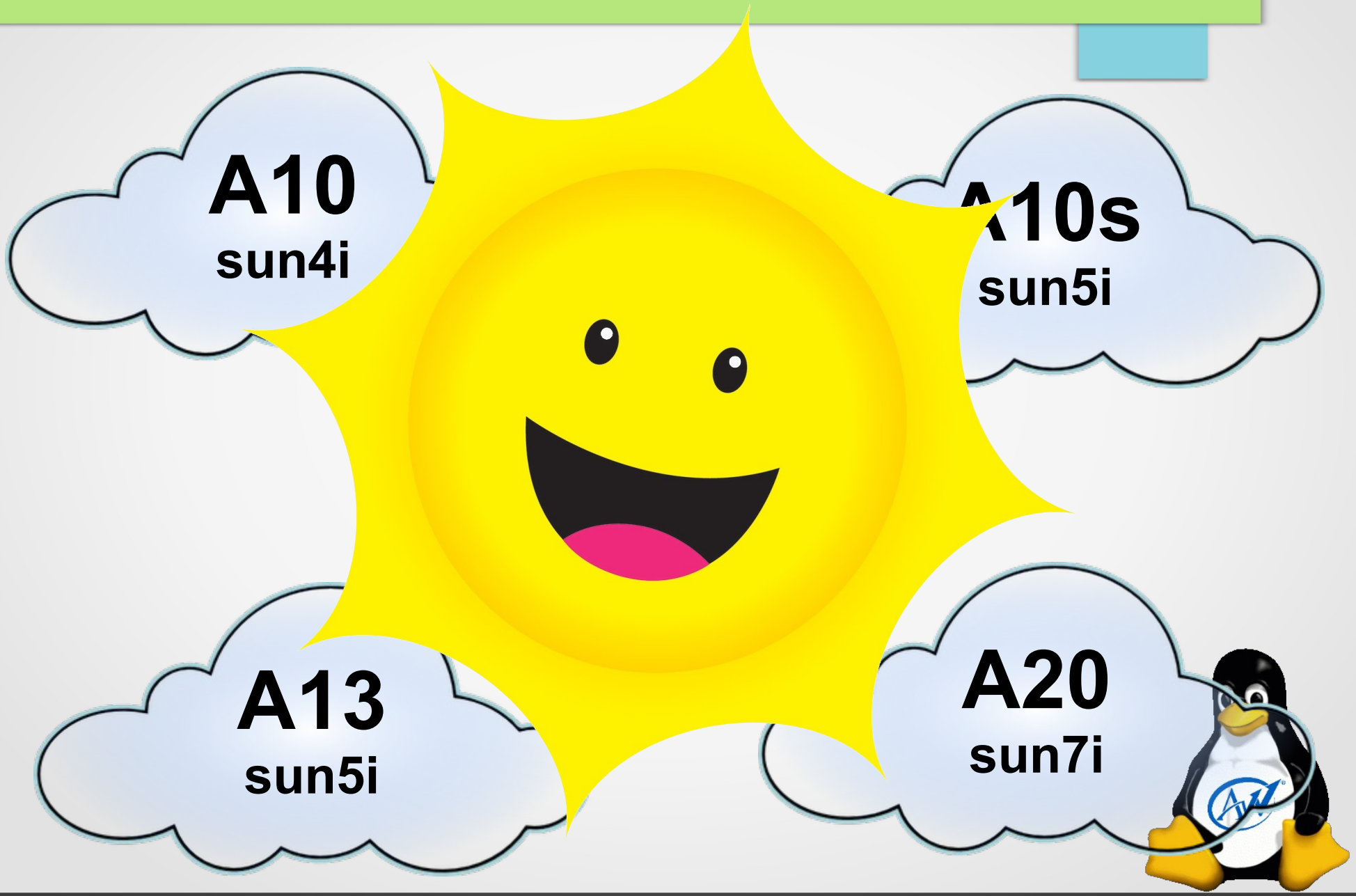
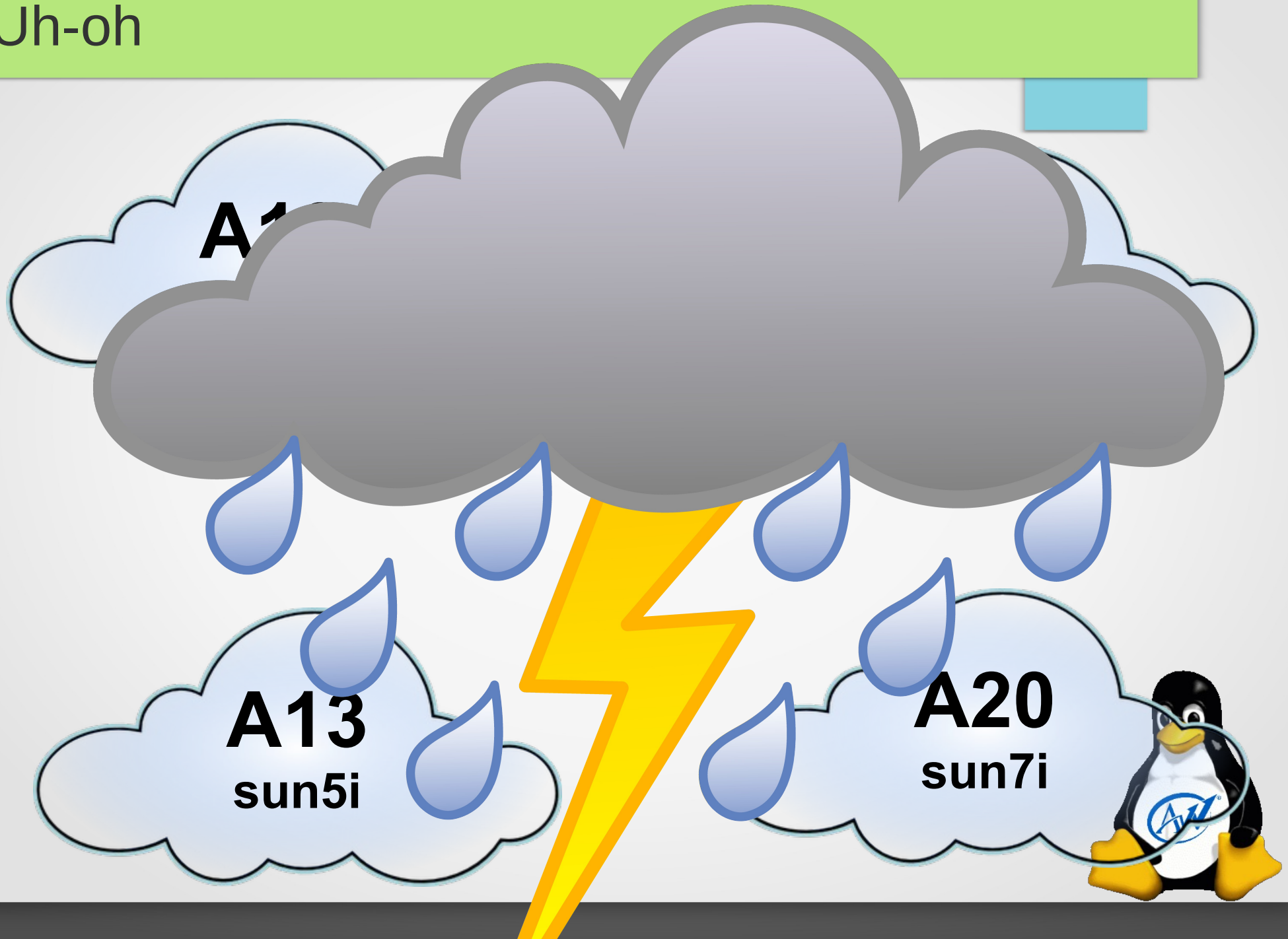
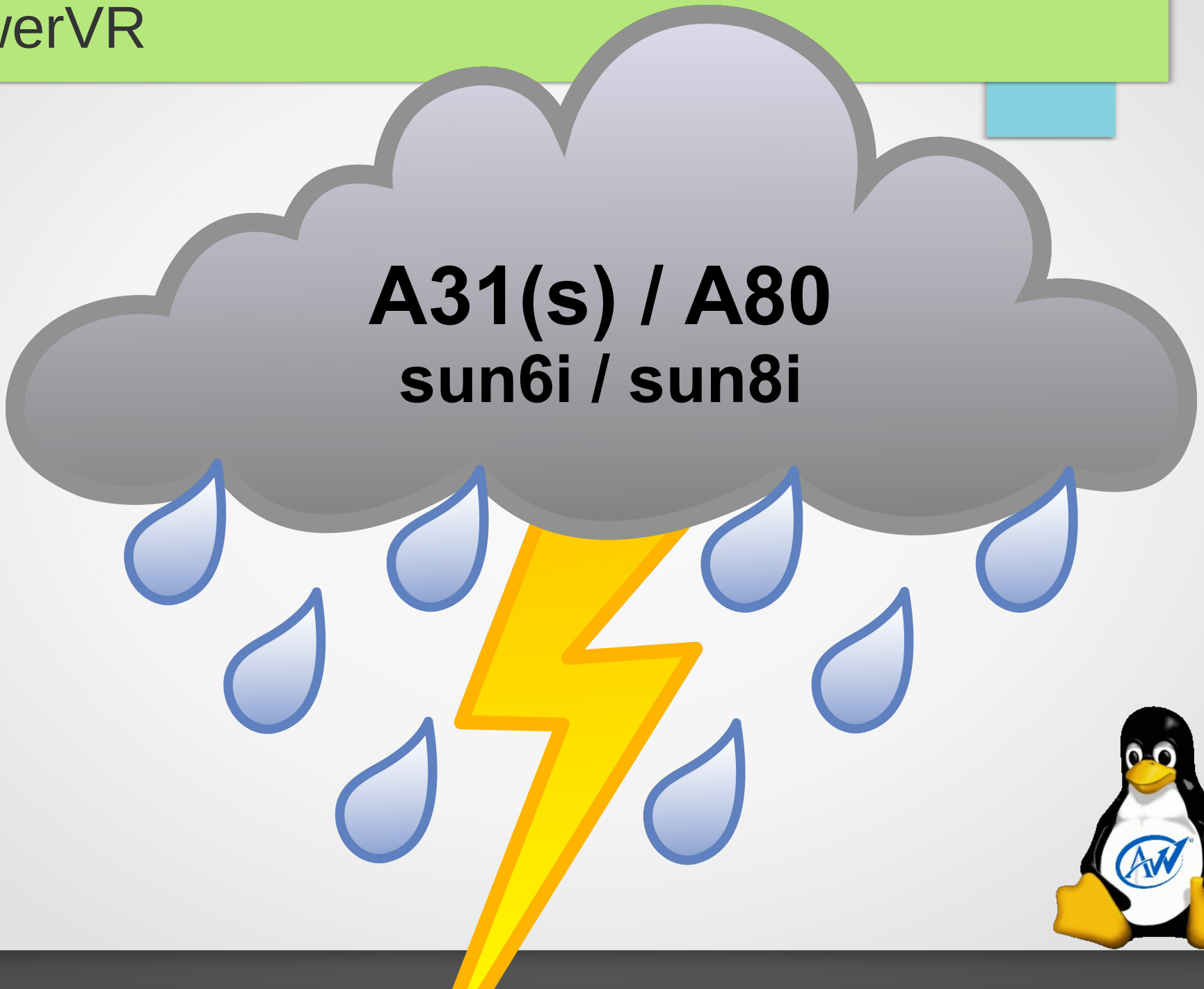


Uh-oh

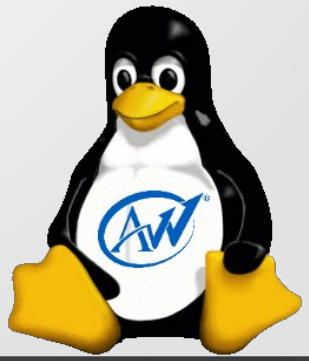


PowerVR



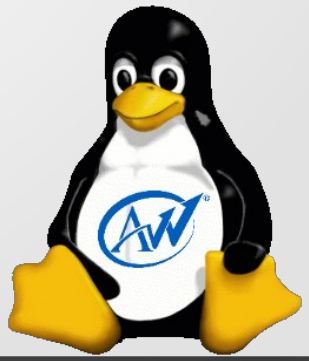
SoC's

- Various generations now
- Open source drivers for most components
- Theoretically FSF endorsable
- But PowerVR → No A31(s), A80 support



A23 status

- Only 1 dev with a tablet
- SDK without bootloader source
- No memory init
- Mali (Lima)



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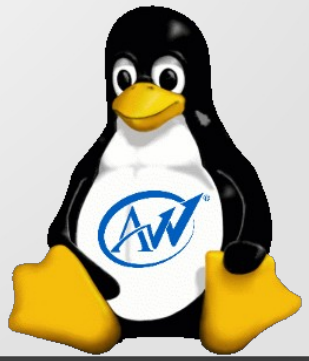
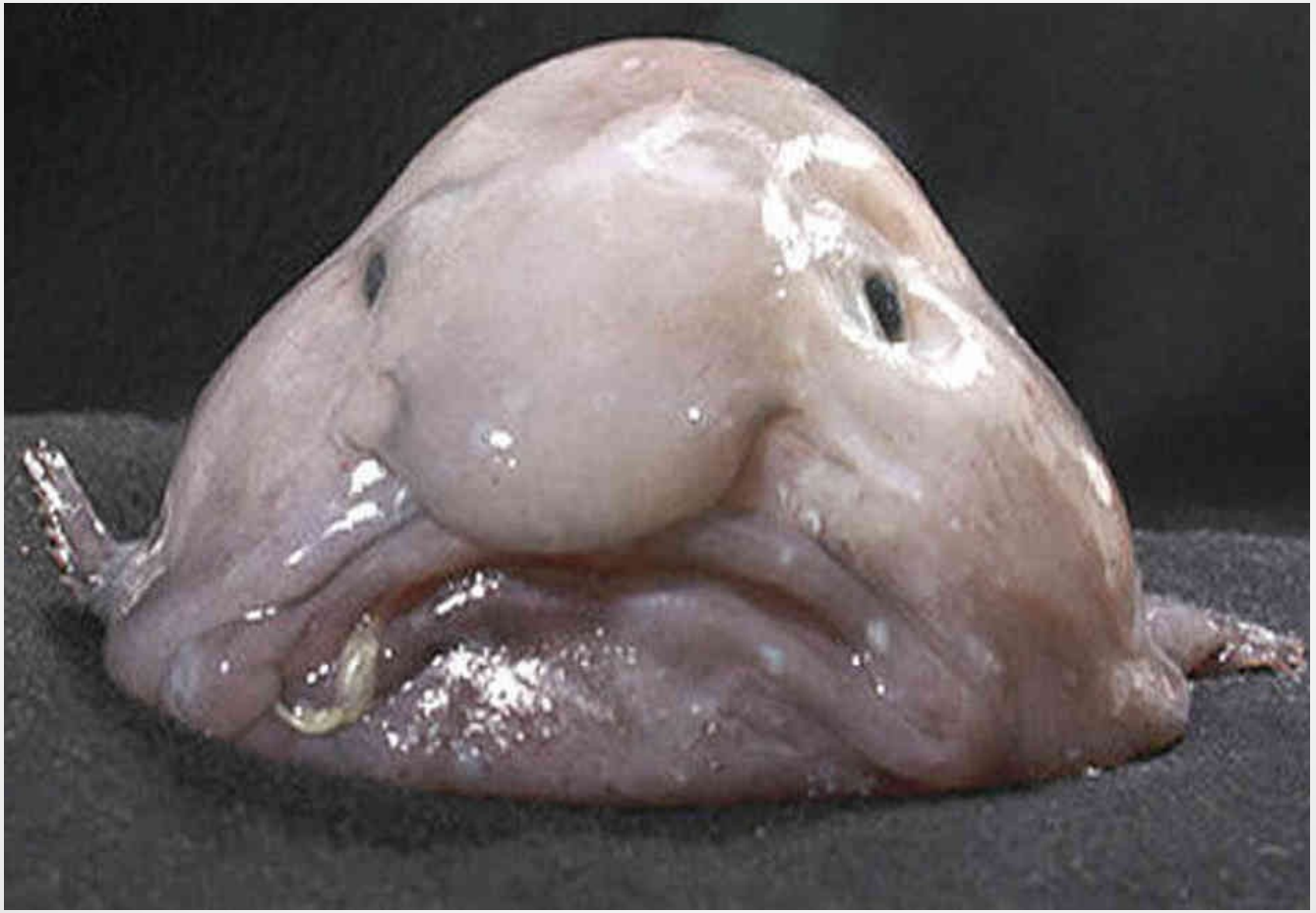
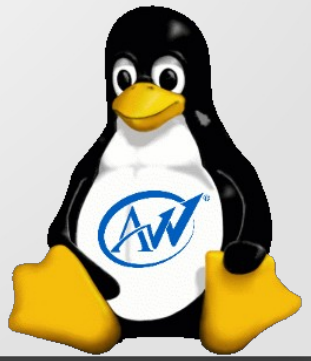


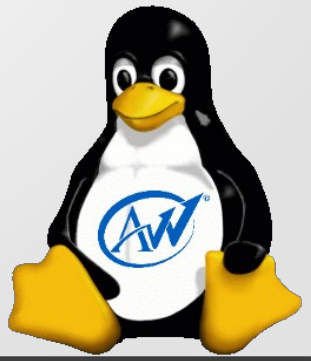
Closed blobs





Closed blobs

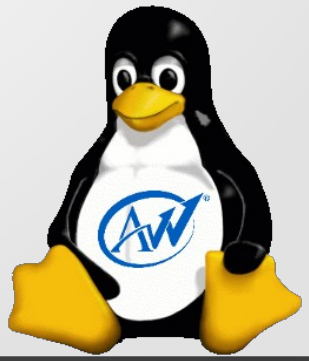
- Mali (GPU, 3D)



Limare

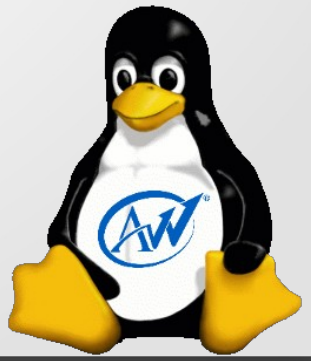
Closed blobs

- Mali (GPU, 3D)
  - Lima: Luc, Graphics dev room H.1301; 15:00 – 15:50
  - Shadercompiler: Connor, /\, 16:00 – 16:50
  - sunxi-KMS: Luc, /\, 17:00 – 17:20



Closed blobs

- Mali (GPU, 3D)
  - Lima: Luc, Graphics dev room H.1301; 15:00 – 15:50
  - Shadercompiler: Connor, /\, 16:00 – 16:50
  - sunxi-KMS: Luc, /\, 17:00 – 17:20
- GPS (but debugging symbols in the KO)
- Not the touchscreen! Resistive internal one is mainlined
- Boot ROM (BROM)
- CedarX (APU/VPU)



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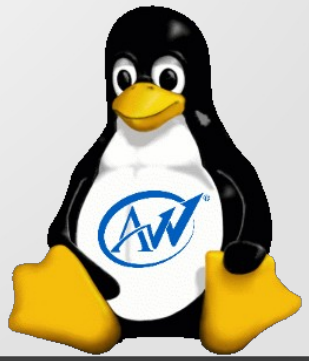
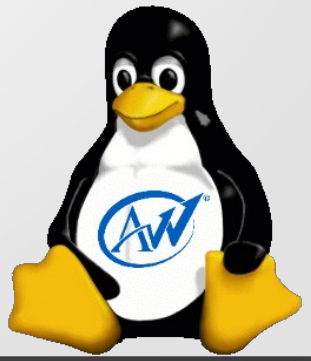


DEMO

Demonstration Time!



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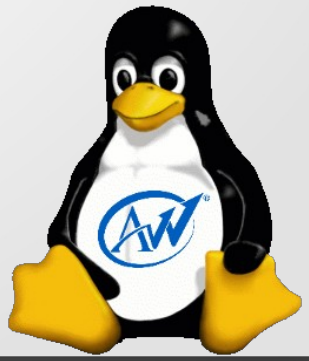
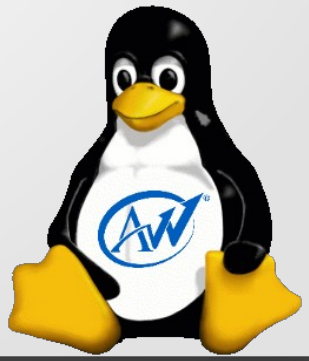


How to contribute

- Documentation! (Wiki mostly)
- New Device How to
- (Help) porting OS's and bring it to the community
  - AOSP
  - Cyanogen / Replicant
  - Firefox OS
  - Ubuntu Touch
- Kernel patches! 3.4, 3.10 and mainline!



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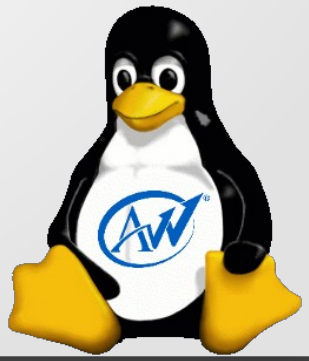
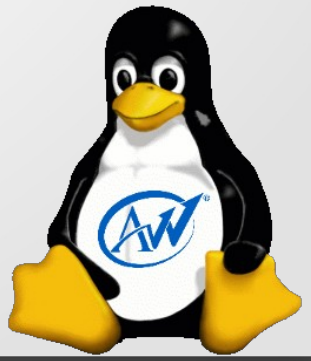
Questions