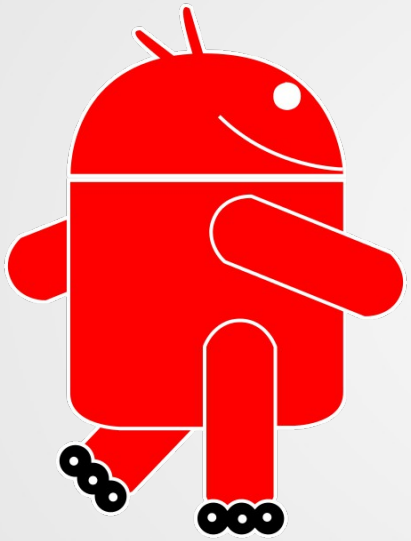
ARM devices and your freedom



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Wednesday 9th July 2014

RMLL
MONTPELLIER 2014
Le libre et vous !
15èmes Rencontres Mondiales
du Logiciel Libre
Du 5 au 11 juillet 2014

ARM devices?

What is ARM?

- Instruction set
- ARM core (CPU)
- System on a Chip (SoC)

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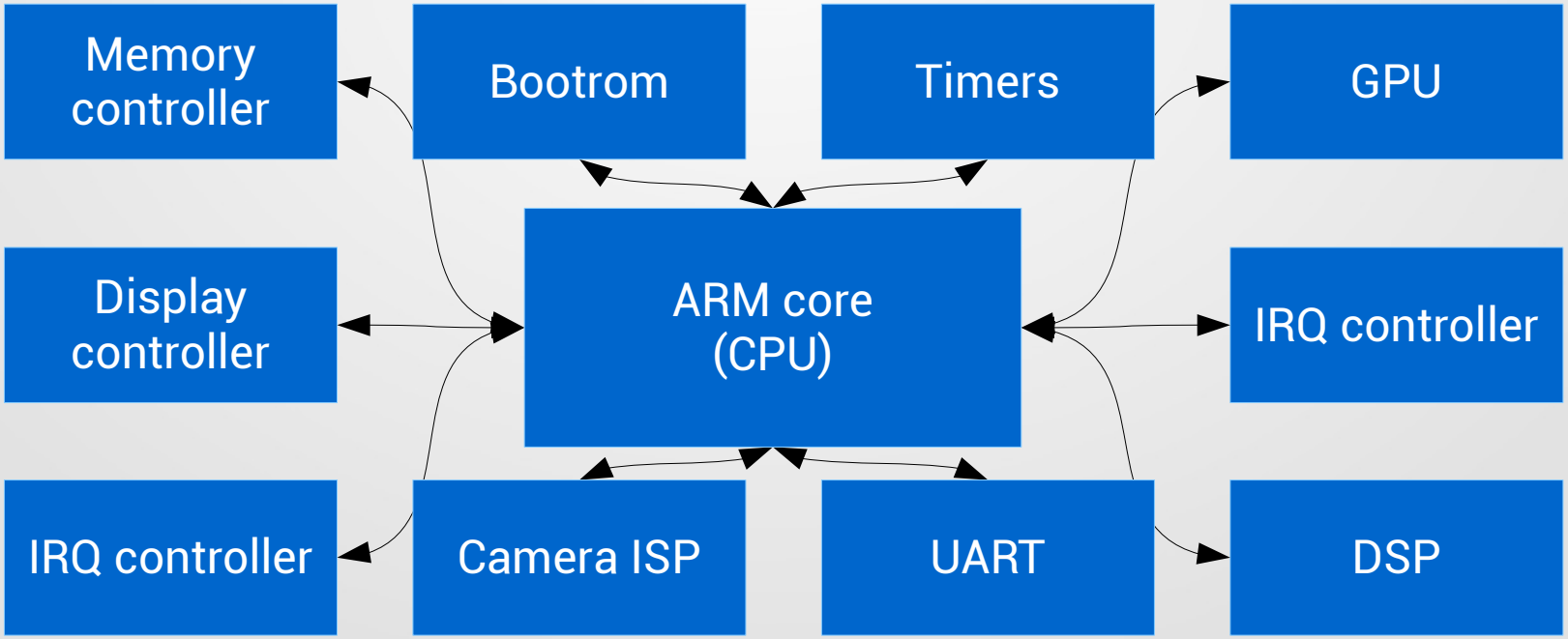
A glance at a SoC:



ARM devices?

ARM devices:
- SoC
- RAM
- Storage
- I/O
- Misc integrated circuits

Telephony-enabled devices:
- Modem

ARM devices?

Different devices, different use cases:

- Single Board Computers (SBCs)
- Plug Computers
- Home theater PCs
- Routers

Mobile devices:

- Phones
- Tablets
- Digital audio players
- Laptops

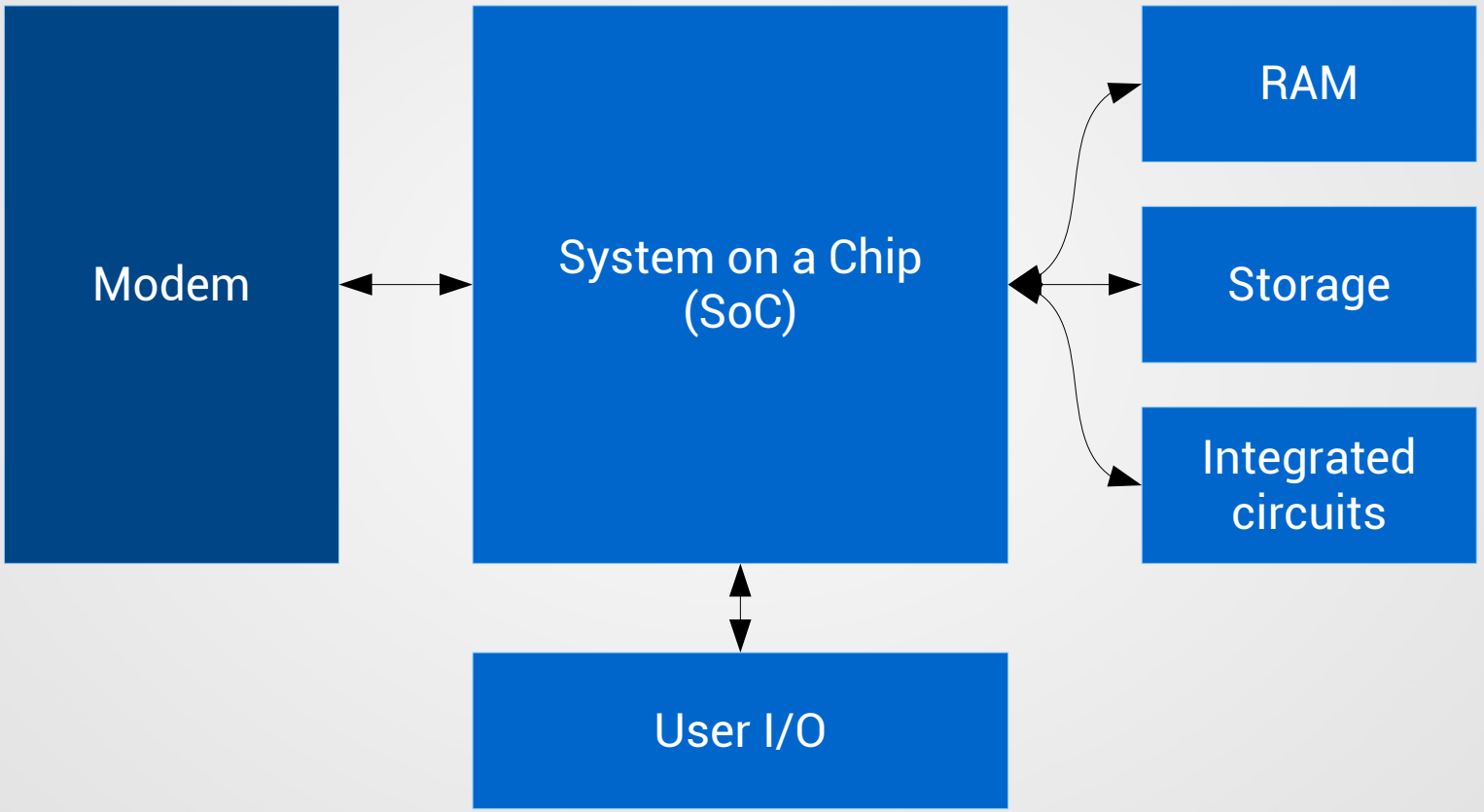
What about freedom?

In computing, freedom is about:
- Not having usage restrictions
- Having access to knowledge
- Modifying, improving
- Helping your community

All about values!

Freedom in hardware:
- No usage restrictions: possible
- Access to knowledge: datasheets
- Modifying, improving: no so much
- Helping your community: more or less

ARM devices?



Hardware-side overview

Hardware freedom

Hardware freedom denied!
- PCBs can be free hardware
- Chips, not so much

Reasons:
- Technical
- Societal, distribution of wealth

Should we accept it?
- RMS does it
- Up to you

Software freedom

Free software is what we're all about!

- Software is everywhere, in nearly every chip
- Hardware implementations exist too
- Thin threshold (sometimes easier, sometimes not)

Firmwares:

- Often read-only
- Sometimes programmable (tools, FPGAs)

Should we care?

- The RMS standpoint
- Again, that's your freedom

Free systems and responsibility

Telephony-enabled devices

When there is a modem…
… there is trouble

- Modems always run proprietary software
- Bring up the CPU (Qualcomm)
- Bad for privacy
- Modem isolation
- All-in-one chips

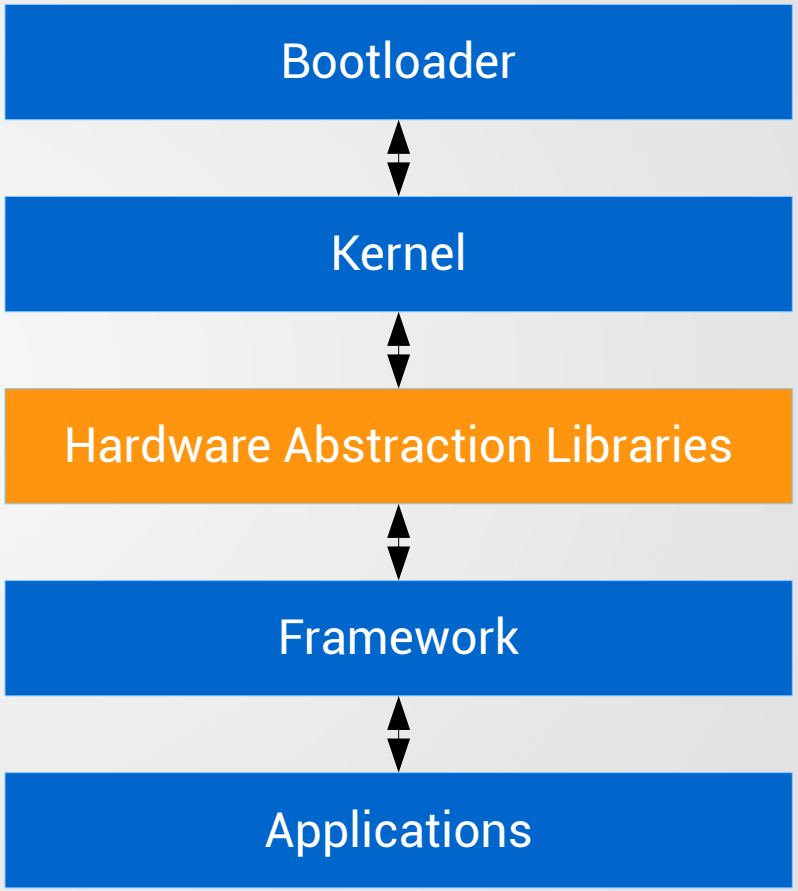
Software freedom

What software runs on a SoC:

- Bootloader(s)
- Kernel
- HALs, common libs
- Applications

Where is knowledge held?

- Kernel
- HALs



Bootloaders

- Free bootloaders exist
- Depends on the platform
- Signed bootloaders, private keys

Bootloaders, kernel

- Free bootloaders exist
- Depends on the platform
- Signed bootloaders, private keys

- Linux kernel is free and copyleft
- Rarely signed
- Rarely proprietary modules
- Mainline

Hardware Abstraction Layers

- “User-space drivers"
- Critical for hardware support

Problems:

- Graphics acceleration, 3D
- Sometimes VPU
- Sometimes a lot more (mobile devices)

Operating systems

GNU/Linux-based systems
- More or less free systems
- Debian
- Fedora
- *MeeGo*
- Tizen

Android-ish systems:
- Proprietary
- Community
- Firefox OS
- Ubuntu Touch

Specific systems:
- OpenWRT
- Rockbox

Fully free systems?

GNU/Linux-based systems:
- No general system!

Android-ish systems:
- Replicant

Specific systems:
- LibreWRT
- Rockbox

Hardware platform

- Many different SoCs
- Different components
- Different specifications
- Unequal regarding freedom

Devices:

- SoC
- Other chips: firmwares, proprietary HALs

Replicant

Learn more about Replicant:
- Website: http://www.replicant.us/
- Wiki/tracker: http://redmine.replicant.us/

Get in touch with us:
- Forums
- Mailing list
- IRC channel: #replicant at freenode

During the LSM/RMLL:
- Free Your Android Workshop (TD011, Polytech building)

That's all Folks!

Text and schematics:

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