AArch64 planning

The next generation of ARM

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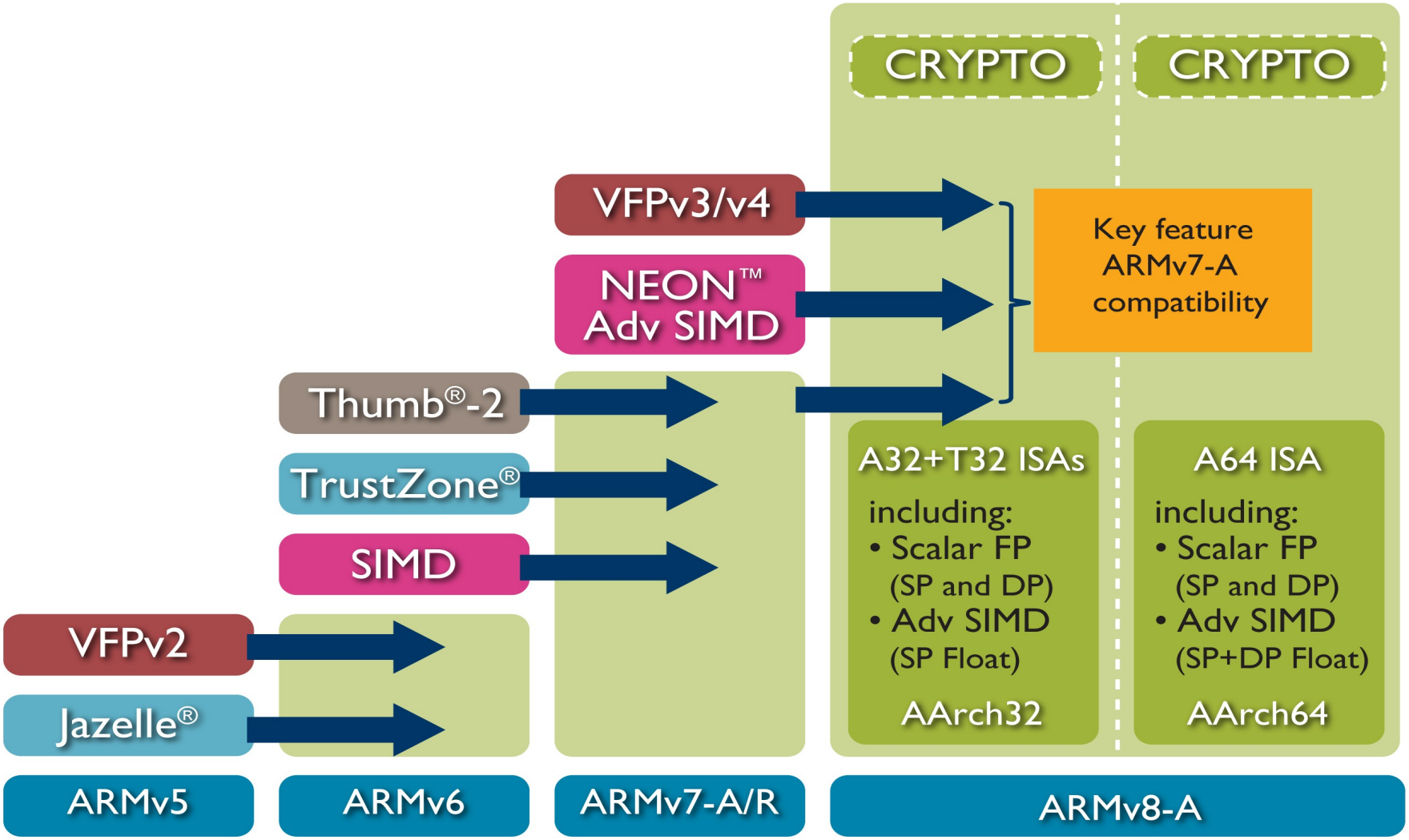
Agenda

- ARMv8 summary
- Roadmap
- Demo!
- Bootstrapping
- Take notes in gobby please!
  - `gobby.debian.org`
  - `debconf12/bof/aarch64`

ARMv7-A => ARMv8-A development



ARMv8 summary

- First 64-bit ARM® CPU
- Runs old and new instruction sets:
  - Older 32-bit (AArch32) ARM & Thumb® ISAs, just like v7
  - New 64-bit (AArch64) ARM ISA
  - VFPv3 & v4
  - ARM® NEON™ SIMD

32-bit compatibility

- Support for existing v7 features:
  - Advanced SIMD (ARM NEON)
  - Security extensions (TrustZone® Technology)
  - Virtualisation
  - LPAE

AArch64 ISA

- Designed to feel similar to AArch32
- Fixed-length 32-bit instructions
- 5-bit register specs → 31 GP registers
  - 64-bit registers
  - SP/PC not GP
  - Dedicated zero register

More new features

- Much improved SIMD
  - 32x128-bit registers
  - Better support for FP modes
- New load-acquire/store-release instructions
  - Strong fit to C++11/C1x SC Atomics

Roadmap

- ARMv7 will continue
  - Cortex™-A9, Cortex-A15, Cortex-A7 etc...
- ARMv8 still under development
  - Architecture announced Q4 2011
  - Working with partners now
  - Specs release expected late 2012
  - Hardware 2013 onwards

Further information

- `arm.com/architecture`
  - ARM TechCon™ talk and architecture overview
  - Instruction set overview
  - All new instructions including assembler syntax
  - AArch64 ABI documents

Demo!

- AArch64 running in a “Fast Model”
- Debian-based system

Bootstrapping

- Toolchain
  - ARM working on GCC, binutils, etc.
  - `svn://gcc.gnu.org/gcc/branches/ARM/aarch64-branch`
- Kernel
  - Available soon, on LKML Fri 6th July
- Bootstrap userland
  - Cross-build base system
  - Test using models for now

Bootstrapping (2)

- Linaro support for distros
  - Basic rootfs using OE
  - Toolchain
  - Bug tracker for sharing work
- “Enterprise” distros starting work
  - ARM server market

AArch64 in Debian

- Cross-bootstrap
- Switch to real hardware
- Debian-ports
- Ready for Wheezy +1?
- Who wants to help? :-)

Thanks

And all the community!

http://www.einval.com/~steve/talks/Debconf12-aarch64/