presented by

UEFI ARM Update

UEFI PlugFest – March 18-22, 2013

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AGENDA

- economics
- technology
- status
- summary
- questions

ECONOMICS

- What are the ARM numbers?
  - Processors shipped in 2012 : **~8.7 Bu** (~7.9 Bu`11)
  - Processors shipped in total : **>30 Bu**
  - Processor licenses : **~960** (850'12)
  - Semiconductor partners : **310** (290'12)
  - Process technology : **14 – 250 nm**
  - Connected community members : **1000+** (950'12)

ECOMONICS (1000+)

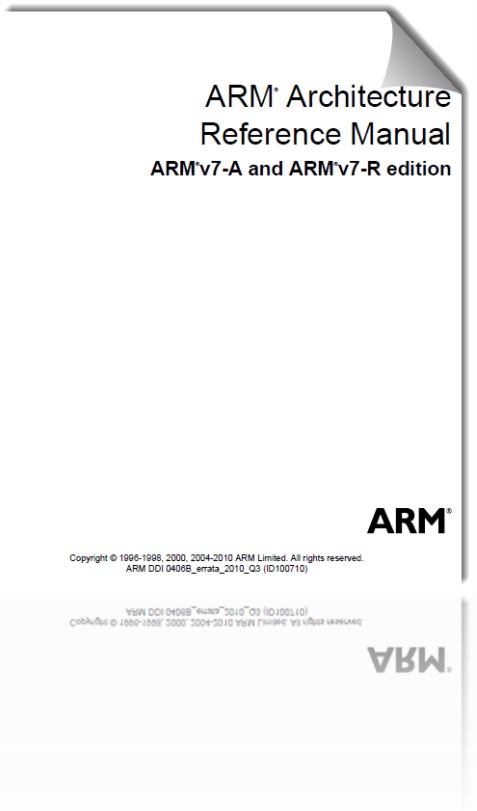
REASONS

- Driving forces for UEFI on ARM
  - Processor and system complexity increasing
  - Support for existing OEMs that are developing ARM processor-based solutions using UEFI
  - Help standardize the boot procedure for ARM processor-based platforms
  - On-going ARM goal is to improve the hardware-software interface for Operating Systems that target the ARM architecture
- Advantages to ARM partners and OEMs
  - Write once per platform and saves costs in boot loader development/engineering
  - UEFI specification written down and peer reviewed
  - Tested UEFI drivers available from 3rd party peripherals providers
  - Provides an environment for manufacturing tests

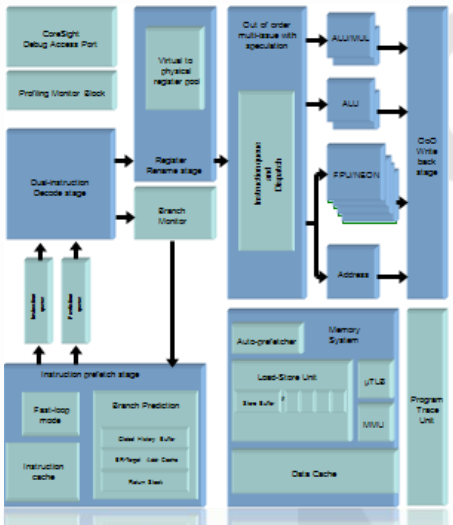
TECHNOLOGY

PROCESSORS

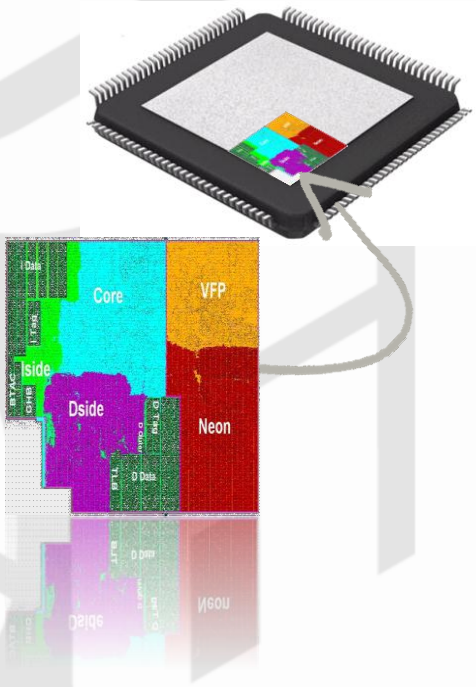
Architecture “ARMv8”



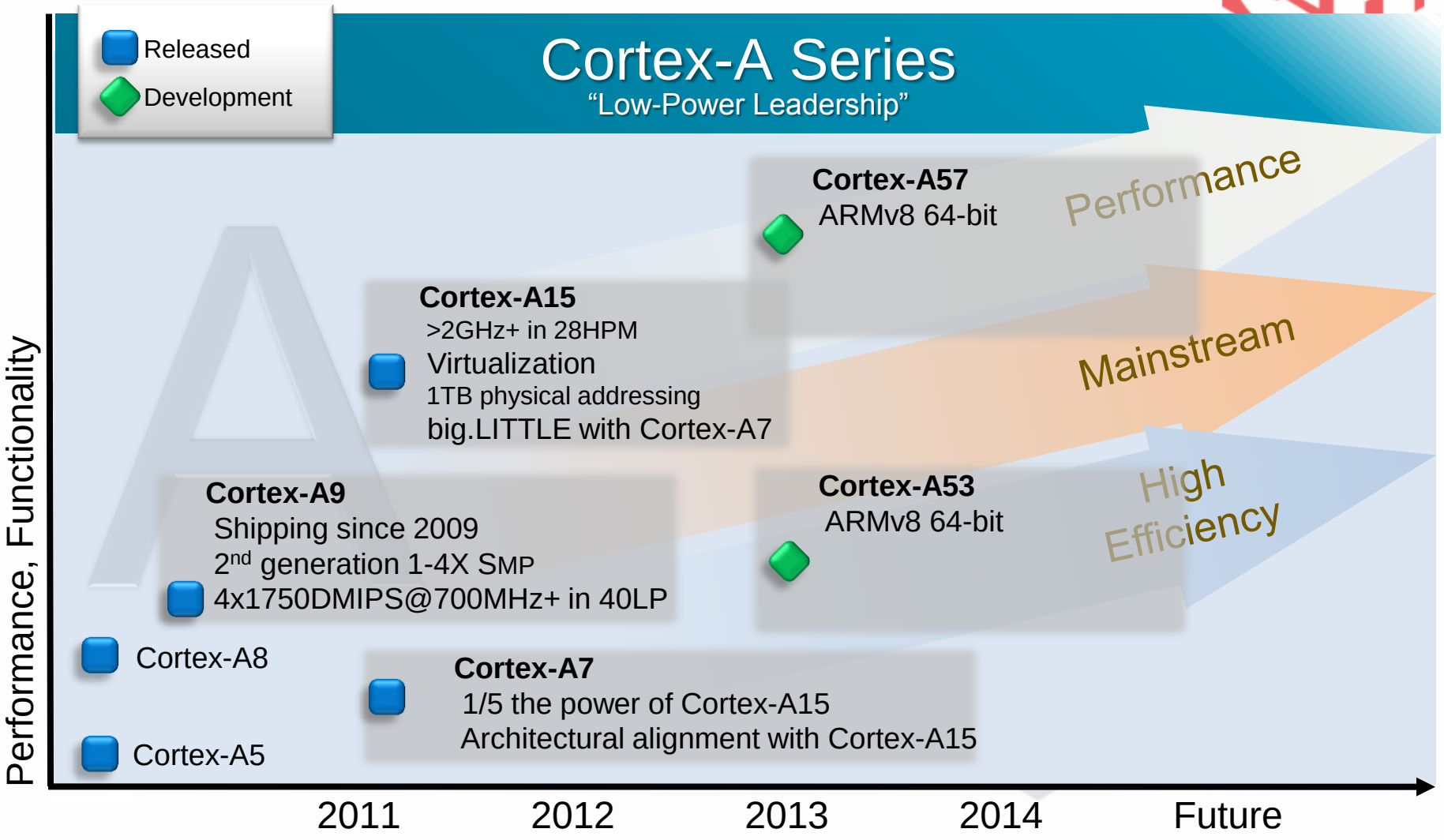
Processor Micro-Architecture “Cortex-A57”



Processor Hard Macro



APPLICATION ROADMAP



NEW

- What new technologies have UEFI implications?

  - **Big.LITTLE** technology provide heterogeneous computing technology providing both high performance and extreme power efficiency – serving dynamic computing demands (32-bit & 64-bit)

  - **Virtualization** includes Large Physical Address Extensions (LPAE), second level of MMU page table translations and support for hypervisors (32-bit & 64-bit)

  - **ARMv8/Aarch64** brings 64-bit support to the ARM Architecture increasing the register file, media instructions, addressing range and cryptography instructions (64-bit)

STATUS

SPECIFICATION

What have UEFI ARM Binding Sub-Team (ABST) been doing?

- **Proposed Aarch64 UEFI Bindings**
  - adding support for the new architecture in the next UEFI specification
- **Virtualization Protocol proposal**
  - solve the way to start an hypervisor from ARM 32-bit UEFI
- **Boot Architecture**
  - Discussions around the standardization of the ARM Boot Architecture

IMPLEMENTATION

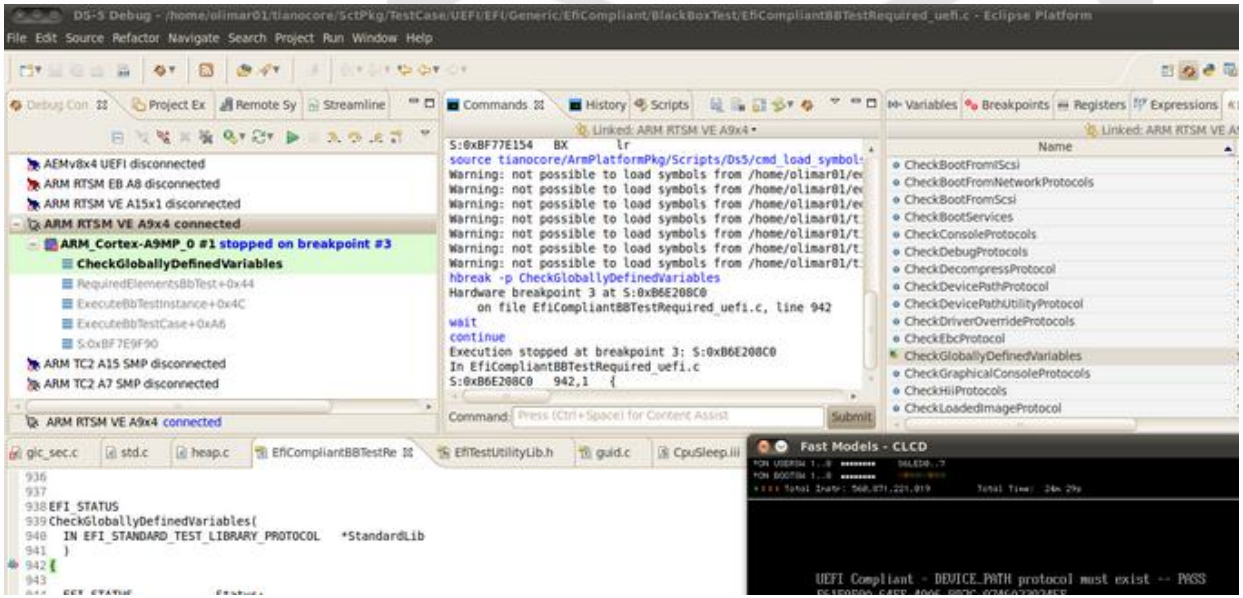
ARM focus:

- Add support for Aarch64 in Tianocore and SCT
  - Public when the Aarch64 UEFI Bindings is approved by USWG
- Implementation of the ARM Virtualization Protocol proposal
  - Linux KVM can be started from ARM 32-bit UEFI
- Focus on aligning the Open Source implementation
  - Tianocore with the UEFI Specification
- Support the Operating System requirements
- Enable the ARM Ecosystem through Open Source contributions

ECOSYTEM[1]

UEFI-in-ARM (the company):

- UEFI is the recommended ARM Boot Loader for Aarch64
- Strong interaction between the UEFI team and the different divisions in ARM (from the Linux kernel team to the compiler team) to enable UEFI



ECOSYSTEM²

UEFI-in-Linaro:

- UEFI Platform bring-up on the Linaro's member platforms
  - ARM Versatile Express (from Cortex A5 to the latest big.LITTLE Cortex-A15 / Cortex-A7)
  - Pandaboard (TI OMAP 4 - Cortex A9)
  - Origen (Samsung Exynos 4 – Cortex A9x4)
  - Arndale (Samsung Exynos 5 – Cortex A15x2)
- Port Grub2 to ARM architectures
- Improve UEFI support to boot Linux kernel

SUMMARY

SUMMARY

- UEFI brings a neutral boot loader capable of booting both open-source and non-open source Operating Systems
- UEFI is a framework that grows and shrinks depending upon requirements
- Specification written down and peer-reviewed
- Lots of validated software already
- Ability to support a 3rd party peripheral ecosystem
- Write-once, validate-once, support all OSes
- Next technology, support for Aarch64 and virtualization

QUESTIONS?

Thanks for attending the UEFI Spring PlugFest 2013

For more information on the Unified EFI Forum and UEFI Specifications, visit http://www.uefi.org

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ARM