Introduction & Update

UEFI Spring Plugfest – May 8-10, 2012
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Agenda

- background
- terminology
- status
- sct
- eco-system
- hints and tips
background
Facts

• Processors shipped in 2012
  – 7.9 Bu (4 Bu in 2009, 6 Bu in 2010)
• Processors shipped in total
  – 30+ Bu
• Processor licenses
  – 850+
• Semiconductor partners
  – 290+
• Process technology
  – 20nm – 250 nm
• Connected community members
  – 950+
Connected Community 950+
.terminology
Terminology

Architecture “ARMv7A”

Processor Micro-Architecture “Cortex-A15”

Processor Hard-Macro Implementation
Introducing UEFI on ARM

• 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 test
Introducing UEFI on ARM

- UEFI ARM Binding Sub-Team (ABST) was formed in 2008
  - Apple, ARM, HP & Microsoft are the current public members
  - UEFI Specification focuses on ARMv4 to ARMv7A
  - ABST is starting to work on virtualization and ARMv8 (Aarch64) bindings

- Specification 2.3.1 released - includes the ARM Bindings
  - Specifies the state of the processor & system post UEFI initialization
  - Defines the Runtime & Pre-Boot Services ABI (post boot services)

- Verification Tests
  - Oct’11 SCT 2.3 have been updated to support ARM

- ARM-UEFI supported commercially
Public Implementations

• Tianocore EDK2 project contains ARM platform support
• ARM Holdings now maintain the ARM packages
  – Since February 2011
  – With contributions from Apple, HP, Linaro, etc...
  – ArmPkg - Architectural and standard ARM peripheral support
  – ArmPlatformPkg - ARM standard development board support
  – Plus some other ARM related packages
• Future ARM development board support provided by Linaro
  – Specifically by the Linaro ARM Landing Team
• Linaro can potentially support boards for other member companies
  – Would be supported by their Landing Team
ARM Platform Status - EDK2

• ARM Hardware Platforms
  — BeagleBoardPkg (OMAP3530 SoC – Cortex A8)
  — ArmPlatformPkg/ArmVExpressPkg (ARM Versatile Express Board)
    • Cortex A9x4

• ARM Fast Model Support
  — ArmPlatformPkg/ArmRealViewEbPkg (ARM RealView Emulation Board)
    • Cortex A8 & Cortex A9x2)
  — ArmPlatformPkg/ArmVExpressPkg
    • Cortex A9 MPCore and A15 MPCore
ARM Platform Status - Other

• Other ARM-based Platforms exist outside of the EDK2 repository

• ARM Development Platforms
  – ArmPlatformPkg/ArmVExpressPkg
    • Cortex A5
    • Cortex A15x2 (Limited Hardware Availability)
  – ArmPlatformPkg/ArmTuscanPkg
    • Cortex A9x2
    • PCI Bus with SATA and USB 2.0 controllers

• Other Platforms
  – SamsungPlatformPkg/OrigenBoardPkg
    • Based on Cortex A9x2
.sct
ARM UEFI SCT Implementation

• Initial port was completed in August 2010
• ARM Holdings own ARM UEFI SCT implementation
  – Initially only available as a patch from UTWG documents area
  – Now integrated with main SCT package and available in UEFI member documents area
      NOTE: Replace this URL with new one if UTWG releases another version of SCT before taipei plugfest.

• Builds in both Windows and Linux environments
  – Primary toolchain is ARM CC (formerly RVCT)
  – ARM GCC also supported
• ARM SCT binary is tested on Beagleboard and ARM Versatile Express Platforms
• Can extend SCT build framework to write platform specific unit test cases
.eco-system
Growing Eco-system
Hints & Tips (1)

• When writing a UEFI driver ensure you are not making the assumption you are running on a ARM Platform!
  – Risks are that your driver could not work on another platform even if it is a ARM-based platform (e.g.: different memory map or architectural controllers)
  – Benefit is you can reuse and test your driver on a wider range of devices

  – **Hint 1:** UEFI Specification provides methods to access architectural components
  – **Hint 2:** Avoid making your UEFI driver dependent on EDK2 Libraries
Hints & Tips (2) – Use cases

• **Architectural Timer:** On ARMv7, it exists at least two different timers (... and actually many exist!)
  – ARM SP804 DualTimer: Memory mapped controller
  – ARM Architectural Timer (used in the latest ARM Application Processors)
  – The solution is ...
    use UEFI Boot Services *(see section 6 of the UEFI Spec)*

• **Cache Management:** difficult for engineers working on ARM architecture (compare to other architectures)
  – The solution is ...
    stick with the UEFI Specification and use the Boot Services function `AllocatePages()` *(see section 6 of the UEFI Spec)*
Getting started

- Recommend obtaining a Cortex A8 development board
  - Available from [http://beagleboard.org](http://beagleboard.org)
- Recommend getting a copy of “Beyond the BIOS”
- UEFI Learning Center
  - [http://www.uefi.org/learning_center/](http://www.uefi.org/learning_center/)
- Intel UEFI Information
Getting started

• Source tree can be found on SourceForge
  – EDK2 Source Tree
  – BeagleBoard UEFI wiki
  – Samsung Platform wiki
• Linaro (Boot Architecture)
• Linaro (ARM Landing Team)
  – [http://www.linaro.org/members/arm/ve_12.03#tab3](http://www.linaro.org/members/arm/ve_12.03#tab3)
Summary

- UEFI brings a neutral boot loader capable of booting both open-source and non-open source Operating Systems
- BSD-like license allows for security and specialized code to be hidden and not released
- UEFI is a framework that grows and shrinks depending upon requirements
- Specification written down and peer-reviewed
- Lots of validated software already written for the PC industry e.g. PCI probing
- Ability to support a 3rd party peripheral eco-system
- Write-once, validate-once, support all OSes
Questions?
Thanks for attending the UEFI Spring Plugfest 2012

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

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