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tianocore

TianoCore, the Open Source UEFI Community

Spring 2017 UEFI Seminar and Plugfest

March 27 - 31, 2017

Presented by Brian Richardson (Intel)

Agenda

- Why is Firmware Important?
- Introducing tianocore.org
- Organization & Workflow
- Key Features & Changes

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Why is Firmware Important?

Why is Firmware Important?

("why you don't want other people messing with your product firmware")

- First code to execute at boot …
  - Initialize the hardware
  - Establish root-of-trust
  - Hand-off to the operating system
- Commonly known as "BIOS"
  - Basic Input Output System
- Critical part of digital infrastructure

Why is Firmware Important?

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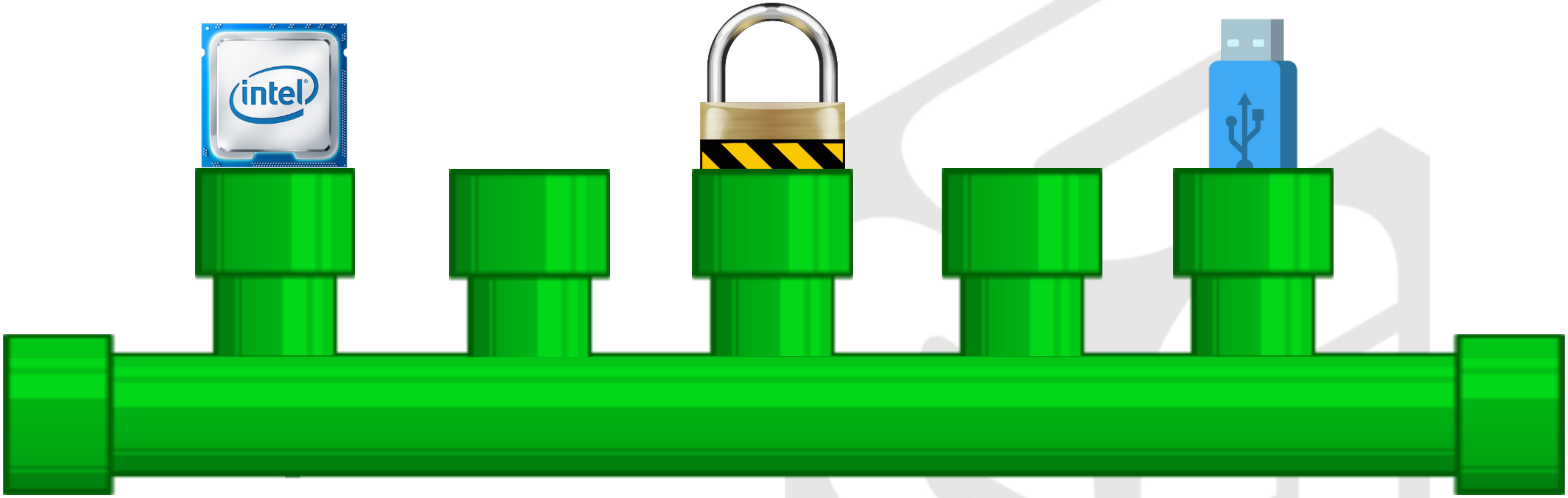


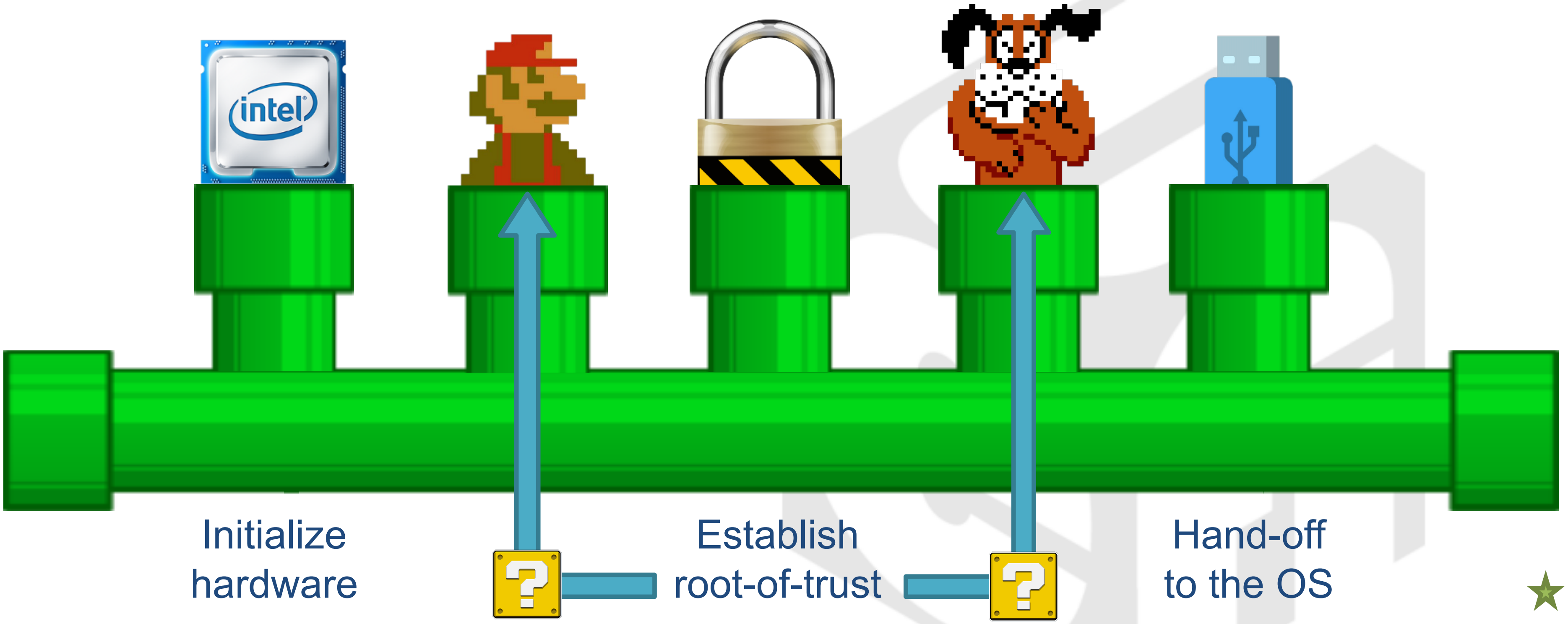
Initialize hardware

Establish root-of-trust

Hand-off to the OS

Why is Firmware Important?

("why you don't want other people messing with your product firmware")



Initialize hardware

Establish root-of-trust

Hand-off to the OS

Improving on BIOS concepts

The Good

- Abstraction for the OS/app layer
- Add-in cards carry firmware drivers (Option ROM)
- Ubiquitous

The Bad

- x86 16-bit model
- Not extensible
- Not standardized
- Not open

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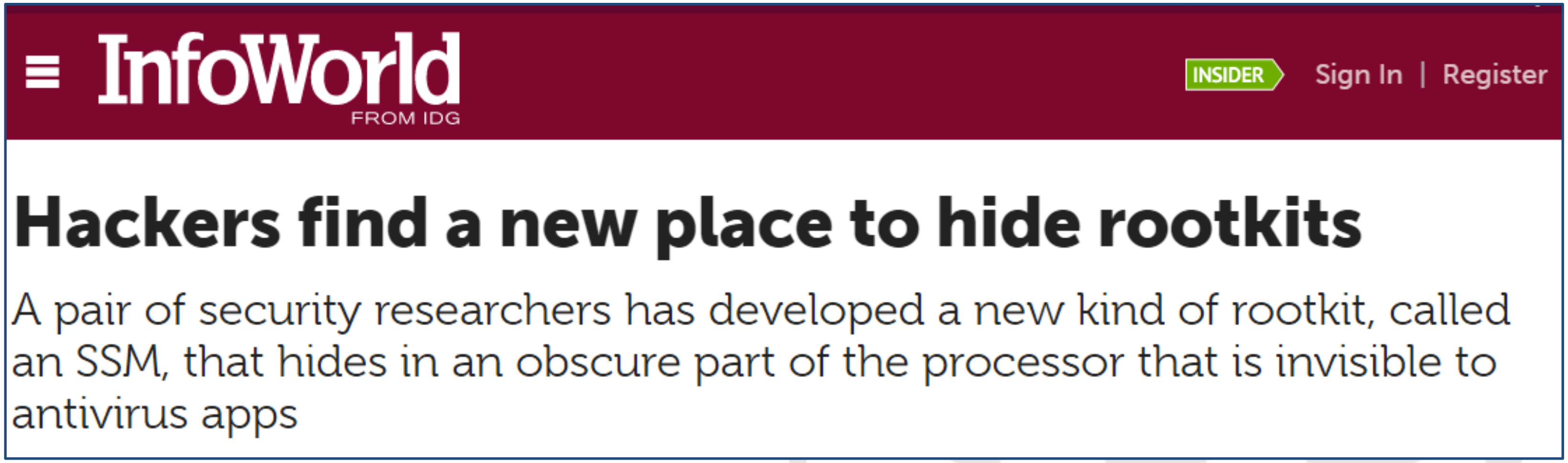
“We have a solution… why don’t we just patch it?”

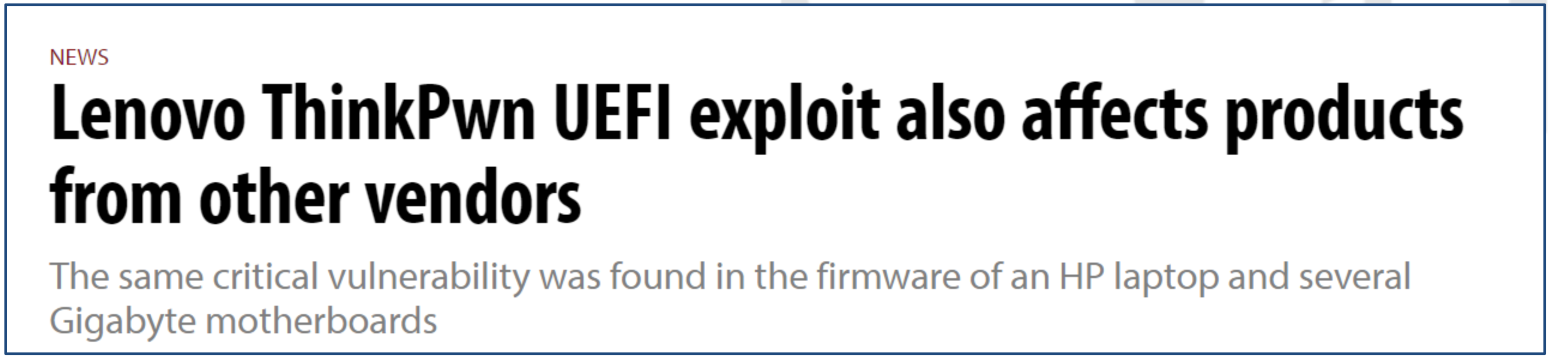
Depiction of Brian’s five year career as an assembly programmer

What Can Mean People Do To Firmware?



Hackers find a new place to hide rootkits

A pair of security researchers has developed a new kind of rootkit, called an SSM, that hides in an obscure part of the processor that is invisible to antivirus apps


NEWS

Lenovo ThinkPwn UEFI exploit also affects products from other vendors

The same critical vulnerability was found in the firmware of an HP laptop and several Gigabyte motherboards

Standards Are Important

… otherwise this might happen

TianoCore, the Open Source UEFI Community

Introducing tianocore.org

tianocore

Supporting EDK II, a BSD open source UEFI implementation, since 2004

Mission

- Improve contribution
- Increase code quality
- Provide regular updates
- More end-to-end solutions

Vision

- A more active EDK II developer community
- Decisions based on community feedback

Latest UEFI Specifications

- Unified Extensible Firmware Interface (UEFI) v2.6
- Advanced Configuration & Power Interface (ACPI) v6.1
- UEFI Platform Initialization (PI) v1.4
- UEFI PI Packaging v1.1
- UEFI Shell v2.2

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Organization & Workflow

Organization

Andrew
Fish

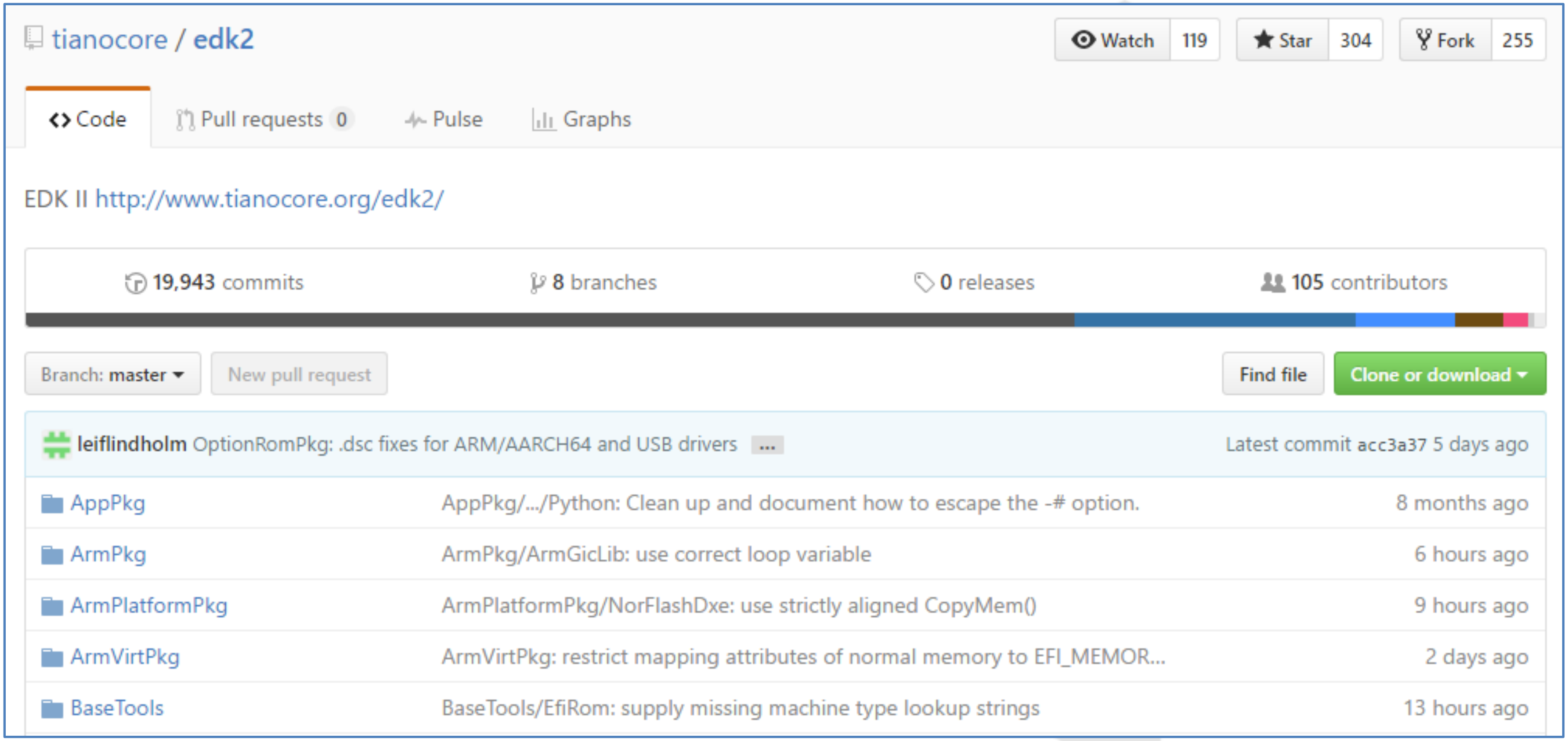
Michael
Kinney

intel

Leif
Lindholm

Linaro

Workflow – based on git



tianocore / edk2

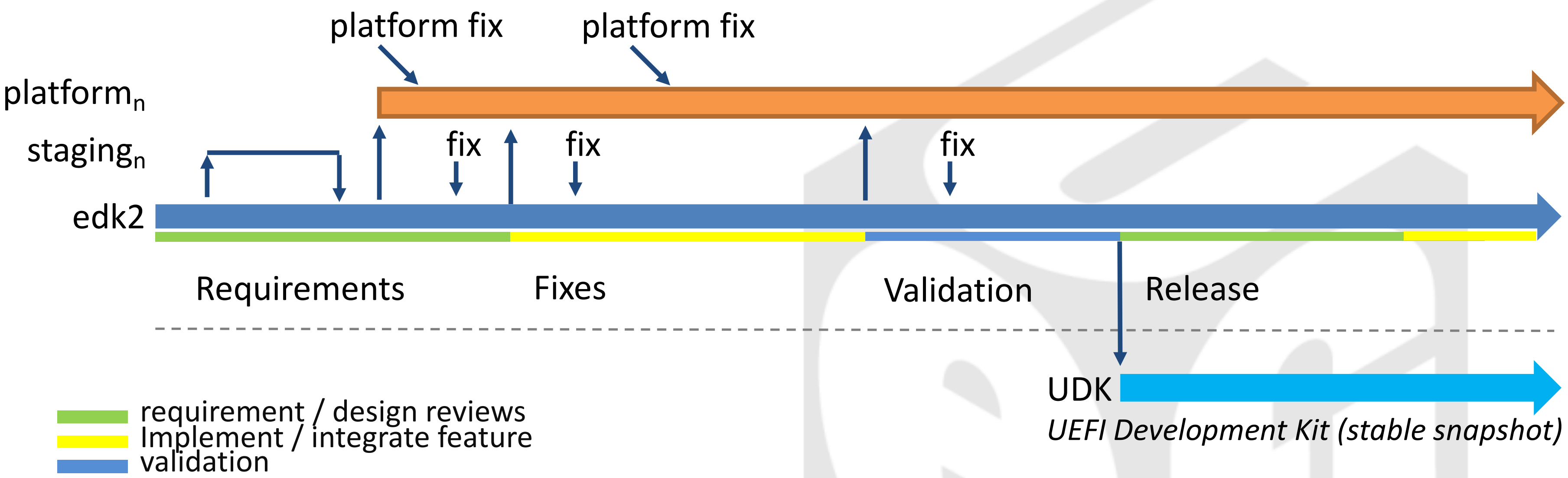
EDK II http://www.tianocore.org/edk2/

19,943 commits | 8 branches | 0 releases | 105 contributors

leiflindholm OptionRomPkg: .dsc fixes for ARM/AARCH64 and USB drivers ... Latest commit acc3a37 5 days ago

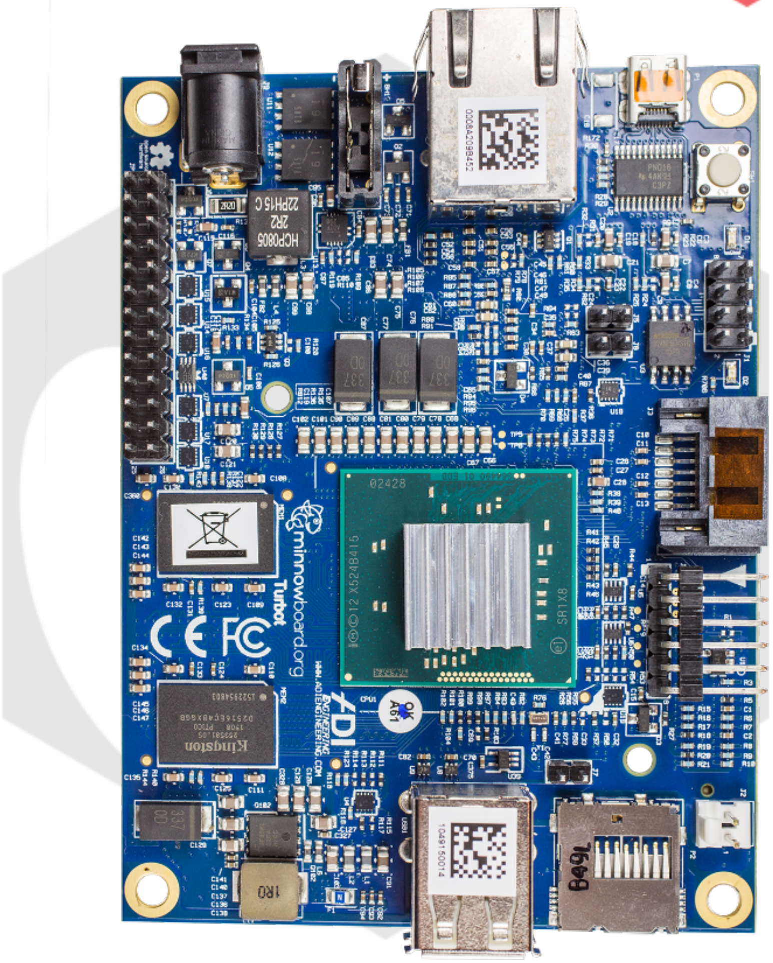
AppPkg	AppPkg/.../Python: Clean up and document how to escape the -# option.	8 months ago
ArmPkg	ArmPkg/ArmGicLib: use correct loop variable	6 hours ago
ArmPlatformPkg	ArmPlatformPkg/NorFlashDxe: use strictly aligned CopyMem()	9 hours ago
ArmVirtPkg	ArmVirtPkg: restrict mapping attributes of normal memory to EFI_MEMOR...	2 days ago
BaseTools	BaseTools/EfiRom: supply missing machine type lookup strings	13 hours ago

Release Management



Platforms

- Usable example code
  - Simplifies validation
  - Greater visibility for impact of changes
- Simulator platforms
  - OVMF (for QEMU)
- Cheap, public platforms
  - MinnowBoard Turbot
  - Intel® Galileo
  - More in the pipeline



Staging Branch Workflow

- https://github.com/tianocore/edk2-staging
  - Branch maintainers sync to edk2/master
  - Use edk2 review to submit branch to master
- Main branch is focused on product quality

bugzilla.tianocore.org

- For core/platform issues & requests
- Security issues follow a special process https://github.com/tianocore/tianocore.github.io/wiki/Reporting-Security-Issues
  - Never use e-mail to discuss a security issue
  - Use Bugzilla (“Tianocore Security Issues”)
  - *Never use e-mail to discuss a security issue!*

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Key Features & Changes

UEFI FAT License

- Very big deal for Linux, ovmf & aavmf
- As of March 2016, Microsoft removed the ‘use clause’ from UEFI FAT sources
- **`FatPkg/FatBinPkg`** now under ‘2-clause BSD’ with no use restriction

LLVM/Clang & GCC

- EDK II now enables link time optimization (LTO) for LLVM Clang 3.8 & GCC 5.3
  - Good example of community collaboration
- Enables a platform for code analysis tools
  - Ex: http://clang-analyzer.llvm.org/
- Validated on Linux

Binary Sizes vs VS2015

EDK II
OVMF
x64

Release Mode	GCC5	CLANG38
PEIFV	26%	-15%
DXEFV	4%	-4%
FvMainCompact	2%	0%

Intel®
Galileo
IA32

Release Mode	GCC5	CLANG38
FVRECOVERY	5%	6%
FVMAIN	5%	16%
FvMainCompact	9%	15%

Plans for the future

- Improve website structure and content, including wiki & gitbooks
- Added open test cases for edk2 https://github.com/tianocore/edk2-staging/tree/edk2-test
- More emphasis on open platforms https://github.com/tianocore/edk2-platforms
- Releases on a regular cadence

Summary

- Firmware is critical to today's digital infrastructure
- TianoCore supports open source UEFI development using EDK II
- Recent improvements include a move to github and compiler optimizations
- Future improvements will improve code quality and open platform availability

Thanks for attending the Spring 2017 UEFI Seminar and Plugfest

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

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