Open System Firmware
Introduction

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Agenda

- Background (David)
- Intro to OpenEDK2 (Devender)
- Intro to LinuxBoot (Ron)
- Intel and Open Source Firmware (Reddy)
Background

- System firmware aka BIOS
  - Gives life to your silicon
- Goal is to get to the OS – Simple, right?
- Basic steps:
  1) Silicon initialization - CPU, DRAM controller, "uncore" logic
  2) Probe/init peripherals
  3) Load target OS
  4) Runtime service availability (e.g. RAS handlers)
- Increasing complexity over the years
  - Drivers, networking, crypto, apps
  - Millions of lines of code
  - **System firmware has basically become an OS**
This has created a few problems...

- **Complex and important part of the software stack**
  - Also runs at highest level of privilege
- **Must integrate into company's SW architecture**
  - Tools, telemetry, security, error handling, repairs, etc.
- **But who's looking at it?**
  - Much of it has remained stubbornly closed
- **Not many people work on this code**
  - This is a real problem for large companies with datacenters full of hardware
  - Must support multiple generations of servers, networking gear, etc. from many vendors
- **Nothing magic about system firmware, but somehow it's remained obscure**
Open System Firmware

- Late 2016: Talks began for an open source firmware effort within OCP
- Goals were laid out to enable:
  - **Innovations and customizations** in the system firmware stack
  - Closer **collaboration** with suppliers/vendors
  - **Better** error handling, diagnostics, remediations
  - Continuous **integration and testing**
  - Readily **auditable and traceable** code, integration with authentication devices.
  - Better coordination with firmware for ASICs, BMCs, rack management, etc.
  - **Open tooling**
  - **Faster deployment**
- Two main work streams lead by Devender Goud (Microsoft) and Ron Minnich (Google)
Open System Firmware

- Many advantages, some of which we're still discovering
- We have OSF implementations booting various systems already
- We're deploying it now
- Working toward having all new OCP servers capable of running OSF at launch
  - Should happen within 1-2 generations
- We'd love to get more of the community engaged!
  - Hardware vendors, IBVs/ISVs, OCP hardware users big and small

Next: OpenEDK2 intro with Devender
OpenEDK2 (placeholder for Devender)

Key Goals:
• Make complete OSF tree open with Silicon vendor’s binary modules.
• Support multi-silicon architectures (Intel, AMD, ARM) and multi-OS (Windows and Linux).

Development Progress:
• MSFT/Intel delivered initial open EDKII based tree to support Mt.Olympus HW
• Open EDK II based tree boot optimizations on Mt. Olympus
• **https://github.com/tianocore/edk2-platforms/tree/devel-MinPlatform/Platform/Intel/PurleyOpenBoardPkg/BoardMtOlympus

• Porting of standard features like FW update tool interfaces, setup options, Security features and IPMI interfaces – WIP
• Optimize solution for Cloud use models Performance, Reliability, Serviceability, Scalability and Deployability – WIP: look for ASD collaboration later on
• Link to OpenEDK2 build instructions: ….

Next Steps:
- Roadmap of OpenEDK2 workstream support …
LinuxBoot (placeholder for Ron)

Technical content is desired
Open, collaborative in nature, Material must be relevant to an open source community
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Intel (placeholder for Reddy)

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Call to Action

• Check out the OCP Experience Lab!
• Get in touch with your silicon vendors!
• Join OCP OSF conference calls
  • Details: [https://www.opencompute.org/projects/open-system-firmware](https://www.opencompute.org/projects/open-system-firmware)