UEFI Option ROMS and Plug-Ins

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Agenda

- Benefits of native (non-CSM) UEFI Option ROMs
- UEFI Plug-ins – Ways to add value at the BIOS level

Source of this presentation section

- This is a summary of an IDF presentation a few weeks ago
- Some of the material is borrowed from that joint presentation
- Thanks to Intel, Dell and LSI for their contributions

UEFI HII makes for a friendly user experience

- Forms-based model for setup question descriptions
  - Must meet BIOS requirements
    - Scalable UI display support (Server Front Panel to local high resolution monitor).
    - Small encoding size
  - Encoding that is Self Describing
  - Can support scripting
  - Extensible syntax

UEFI provides a simple yet powerful method to describe configuration data

Input and Output Localization

- With Forms, localization Is straightforward

String ID #4	String Representation	H	E	L	L	O		W	O	R	L	D	
	Unicode Encoding	0x0048	0x0045	0x004C	0x004C	0x004F	0x0020	0x0057	0x004F	0x0052	0x004C	0x0044	0x0000

String ID #4	String Representation	H	O	L	A		M	U	N	D	O	
	Unicode Encoding	0x0048	0x004F	0x004C	0x0041	0x0020	0x004D	0x0055	0x004E	0x0044	0x004F	0x0000

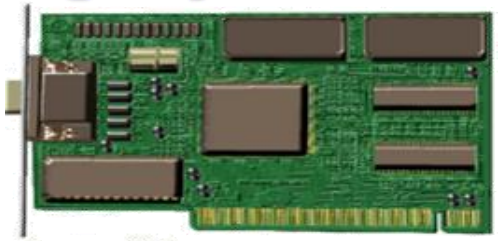
String ID #4	String Representation	你	好	世	界	
	Unicode Encoding	0x4F60	0x597D	0x4E16	0x754C	0x0000

Both input and output localization is supported

Expand platform support

- EBC (EFI Byte Code) allows a single image option ROM to operate on multiple CPU environments
- Maximal compatibility while minimizing binary size impact

Legacy Environment



Binary Image for CPU type x

Binary Image for CPU type y

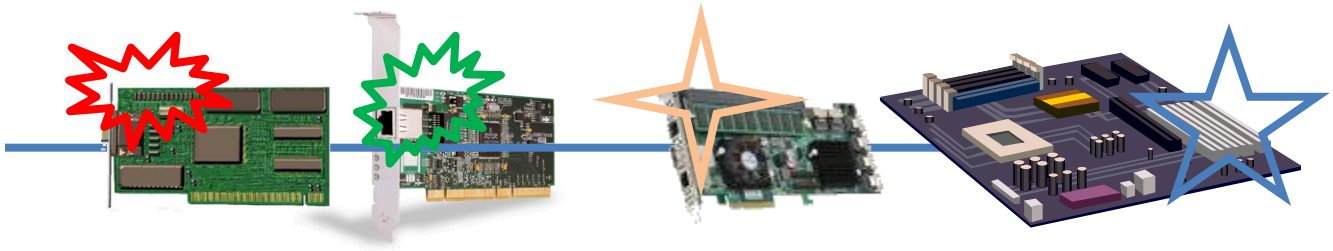
Binary Image for CPU type z

UEFI Environment

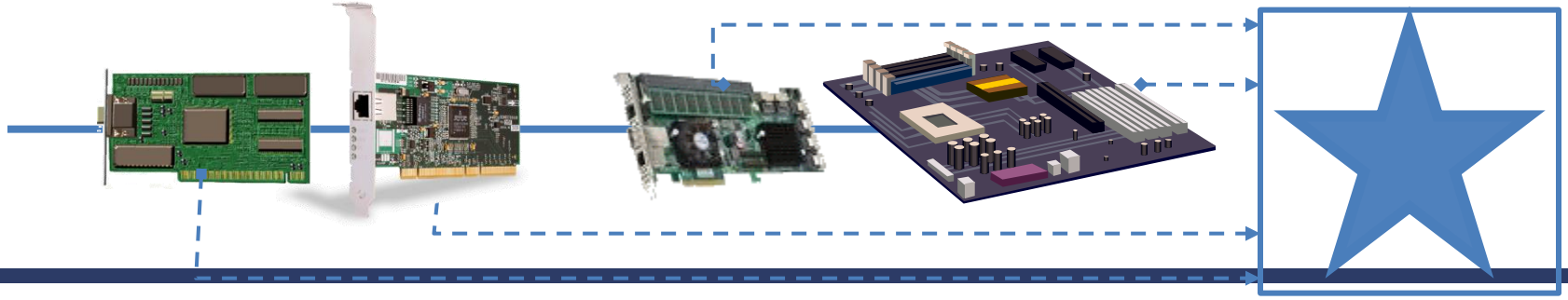
EBC Image for all CPU types running on UEFI

Driver Health Protocol for Reporting

- Issues with Current Error reporting model
  - POST flow interrupted every time
  - Errors on multiple devices could result in multiple system reboots



- Driver health protocol
  - Allows consolidation of all the error reporting and user interaction
  - Allows user to address all of the issues at the same time
  - Avoids multiple reboots



UEFI OpROM Benefits Summary

- Faster Time to Market & Cost Savings
  - Modern/well defined and documented architecture
  - Code in C and not assembly
  - Do it once using EBC
- Richer Capabilities
  - Support for > 2.2 TB and latest Hard Disk technologies
  - Unified Interfaces across Option ROM Code
  - Cleaner and Portable Solutions: UEFI Drivers and Utilities
  - Support for Hybrid Systems - UEFI and Legacy BIOS
  - Ability to quickly implement new features and additional OEM requirements
  - UEFI provides direct access to all of (64-bit) Memory
- Enhanced Usability
  - HII allows IHVs to focus mainly on Functionality and Content rather than carrying own GUI so that:
    - OEMs can maintain their own look-n-feel across their platforms through their HII Browser
  - Easier Localization Support

Agenda

- Benefits of (non-CSM) UEFI Option ROMs
- **UEFI Plug-ins – Ways to add value at the BIOS level**

Plug-Ins: Added Value for PCs

- Plug-Ins are added value for PCs installed by:
  - The OEM
  - The End User

- What plug-ins do we use today?
  - For MP3 players, it's earphones, power supplies, etc.
  - For PDAs & Smart Phones, it's app store software
  - For PCs, plug-ins extend functionality too

Plug-Ins: Added Value for PCs

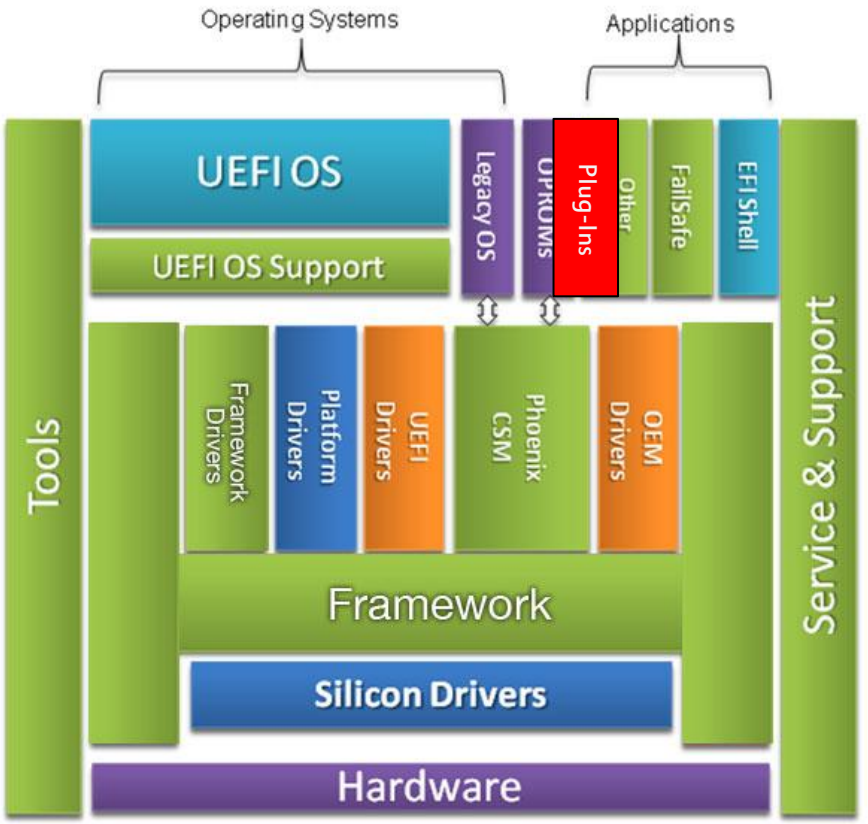
- OEM Plug-Ins:
  - Likely to exist in source code form
  - Require technical integration into the BIOS in some way (source, adaptation, etc.)
  - Integrated as part of system test
- User Plug-Ins:
  - Need seamless binary installation
  - Lots of issues (security, storage, configuration, compatibility, etc.)
  - Must just work without any “system test” on the user’s part

Plug-Ins: Added Value for PCs

- In the legacy BIOS days, plug-ins made hardware operational– ROM BIOS extensions (OpROMs)
- Today's add value is less about new hardware options, and more about other things:
  - Virus/Malware Protection
  - Enterprise Management
  - OS Installation
  - Geo-Fencing
  - Instant-On environments
  - Diagnostics

UEFI is Making Value-Add Plug-Ins Feasible

- All new systems shipping with some form of UEFI
- Phoenix creating UEFI solutions for all new silicon solutions
- Green H: Formal packaging of executable entities, run-order, flow control
  - Does away with hooking and patching



Types of Plug-ins

- There can be several types of UEFI plug-ins that run in different environments
  - Bootware
    - Applications that run in the pre-OS environment (in what is traditionally the BIOS environment)
  - Autonomous Computing
    - UEFI applications that run in parallel with the OS
  - Invisible Computing
    - Applications that run while the system is perceived by the user to be “off” (in S3, S4 or S5)

Summary

- We believe:
  - Plug-Ins are going to take off, as the role of the BIOS/Pre-Boot is standardized and stabilized
  - Importance of Plug-Ins will increase
    - Allows for differentiation and expandability in otherwise closed systems
  - IBVs, ODMs, OEMs, and SVs will pave the way for plug-In manufacturers to add value:
    - First at the source code level as they sell to OEMs
    - Finally at the binary level as end users install their own plug-ins

Questions?

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