Zero-Touch Platform
Manageability with UEFI

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EFIS004
Agenda

- UEFI Innovation and Value
- Platform Manageability through UEFI
- Using UEFI solutions to simplify configuration management, migration and replication
Agenda

- **UEFI Innovation and Value**
- **Platform Manageability through UEFI**
- **Using UEFI solutions to simplify configuration management, migration and replication**
Intel® UDK2010 enables a common firmware development foundation across the compute continuum.

- Smartphones
- Netbooks
- Notebooks
- TVs
- Gadgets
- Desktop PCs
- Networks
- Data Center / Servers
- Embedded: Auto, Signage, Printers, etc.
Utilize UEFI Full Potential

<table>
<thead>
<tr>
<th>Legacy BIOS</th>
<th>UEFI CSM(^1) only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 0</td>
<td>Class 1</td>
</tr>
</tbody>
</table>

Limited Benefits:
OEMLs/ODMs internal Development Optimization & Code Modularity

NEEI Switch - CSM & UEFI I/F

| Class 2 | UEFI Pure I/F | Class 3 |

Full Benefits:
UEFI Innovation Performance Extensibility Advanced Usability

Build UEFI Class 2/3 UEFI Systems!

\(^1\) Compatibility Support Module – Legacy BIOS interface on top of UEFI
Areas of Industry UEFI-based Value-add & Innovation

**Pre-OS Security & Rich Networking**
- IPV6/IPSec; Authencode signature for firmware modules; Secure updates; TPM & CRTM

**Manageability**
- Enhanced Diagnostics; Intelligent & efficient platform updates; Flexible OS deployment; Consistent look & feel; Improved UI, usability and OOB mgmt capabilities

**Power Management**
- Power metering, power capping, power saving

**Optimized Boot & Modern Look**
- Fast boot and resume response; High resolution graphics; System boot from large drives >2.2 TB

**New Usages – UEFI Applications**
- Access Outlook data in seconds when notebook is off; Pre-boot video advertisement
Agenda

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• Platform Manageability through UEFI
• Using UEFI solutions to simplify configuration management, migration and replication
Zero Touch Solution from
Anand Joshi
Dell Inc.
Customer Problem: Increase System and IT Efficiency

Simplify Server Configuration
- Too many tools
- Easy replications
- Reduce number of reboots

Increase System Availability
- Reduce dependencies on agents
- Simplify Change Management and tracking of changes
- Complex rollback solutions
- Compatibility with standards based server management tools
- Corporate Image Compliance

Simplify Server Deployment
- Reduce time
- Fragility of vendor and home grown tools
- Where are my drives?

Simplify Migration to future offerings

Deployment constitutes 10% of Data center cost.
%cost estimates per Dell marketing survey
UEFI: Making it simple, making it standard

**Easier to configure and deploy**
- Richer configuration (allows for more adapters)
- Graphic User Interface in Pre-boot environment
- Remote upgrade capability of specific firmware components
- Solves out-of-the-box configuration & provisioning issues

**Makes Computers more manageable**
- Creates a common infrastructure for managing all machines
- Enable secure automated management – lower risks of “Rogue” servers or clients on the network

**Network Scalable and Secure Firmware**
- Enhanced networking APIs in the pre-boot network stack
- Richer network authentication (log-on)
- UEFI Certificate Authority for interoperable trust

**Breaks through BIOS barriers**
- Free from architectural limitation - scales technology across all platforms (Server, Desktop, Mobile, and Handheld)
- Access to disk range beyond 2TB – utilization of resources
- Option Rom Decongestion
Lifecycle Controller **powered by UEFI** simplifies the management of deploying, and updating Dell servers by embedding and automating management for increased efficiency of Dell servers and IT personnel.

Bringing the intelligence to the server by **reducing touch points** and unique OS dependent tools, increases uptime, and reduces IT costs.
Lifecycle Controller: How UEFI helps Dell?

- **Abstraction for the Operation System**
  - Well defined API/interface between platform firmware

- **Abstraction for devices and related code**
  - Well defined driver model
  - Protocol based abstraction for range of underlying hardware devices

- **Scalable environment**
  - Protocol definition for contemporary platforms
  - Active standards body

- **Rich Pre-Boot environment**
  - Boot services and protocols through UEFI driver (device / service)
  - File system capabilities
  - Provide enhanced platform capabilities
    - Firmware update, platform configuration, diagnostics and deployment service

- **Open source**
OS Deployment

- Makes use of pre-Boot power of UEFI
  - UEFI based GUI
  - Mouse support
  - Ability to hot plug USB
- Allows user to select the OS
- Extracts drivers from managed store and exposed as an USB key to installer
  - No need for Drivers CD
Configuration

- Displays complete system configuration in single window
  - HII based configuration
  - Localization support
- Provides a unified look and feel for system configuration
  - System BIOS, NIC, Storage etc.
  - No separate configuration utilities
  - Configure all at once, reduce reboots
Run & Manage: Firmware update

- Based on UEFI Firmware Management protocol (FMP)
- OS agnostic way of updating system firmware – BIOS, network and storage adaptors etc.
- Get current info using FMP
- Access the catalog over rich UEFI based network stack

Platform Update
Select Updates (Step 3 of 3)
Apply Updates

Available Updates

<table>
<thead>
<tr>
<th>Component</th>
<th>Current</th>
<th>Available</th>
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<tr>
<td>Dell 32 Bit Diagnostics, v.5132A0, 5132.4</td>
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<td></td>
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<tr>
<td>Dell OS Drivers Pack, v.6.2.0.9, A00</td>
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<td>6.3.0.9</td>
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<td>Tools</td>
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<td>1.3.0.350</td>
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<tr>
<td>BIOS</td>
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<td>12.3.0-0025</td>
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<tr>
<td>Broadcom NetXtreme II Gigabit Ethernet - 00:22:19:57:38:09 (Embedded 1-1)</td>
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<td>Broadcom NetXtreme II Gigabit Ethernet - 00:22:19:57:38:08 (Embedded 2-1)</td>
<td>5.0.12</td>
<td>5.0.13</td>
</tr>
</tbody>
</table>

System may reboot after selected updates have been applied.
Run & Manage: System Inventory log

- Collects system inventory every boot
  - Hardware
    - Memory, PCI devices, Disks, Fan, PSU etc.
  - Firmware
    - Firmware versions using UEFI FMP
  - Configuration
    - HII based configuration is offlined
- Collected Inventory is logged in the managed store
Run & Manage: Remote management

- UEFI pre-boot drivers log Inventory and offline HII data on the managed store
- Access Lifecycle Controller through WSMAN interface provided by iDRAC
  - WSMAN Profiles
    - SW Inventory and update
    - BIOS configuration
- Dell Management Console use WSMAN to interact with Lifecycle Controller
- Management operations (Update, Configuration) are staged remotely and executed in UEFI pre-boot
  - OSagnostic, No OS agents
  - No need for custom tools
  - Reduce downtime, maintenance window
Service: Part replacement

- UEFI pre-boot collects and logs inventory
  - Hardware, Firmware, Configuration
- If Inventory collector detects that a part has been replaced
  - PERC, NIC, PSU etc.
- New part gets updated to previous firmware and/or settings from Lifecycle Controller
Summary

• UEFI enables Dell to reduce touch points in system management
• UEFI simplifies and standardizes management of deploying, and updating Dell servers
• All shipping Dell PowerEdge servers support UEFI
• More information on Lifecycle Controller
  [http://www.dell.com/embeddedservermanagement](http://www.dell.com/embeddedservermanagement)
Agenda

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Pre-Boot Solutions in UEFI

• UEFI offers the building blocks for a new generation of platform management tools

• Now to look at solutions based on UEFI ...
  – What extensions can be added to UEFI to manage the platform more effectively?
  – How can UEFI be leveraged for diagnostics?
  – What management problems can be solved across different types of platforms using UEFI?
  – How are UEFI pre-boot solutions used to solve problems on today’s platforms?

• Can these solutions have parity with OS apps?
  – EDK and UEFI Shell are good starting points
  – UEFI can be further extended for developers
  – Graphic libraries for pre-boot, networking, parsing, ...
AMI’s PreBoot Extensions for UEFI

- Look at AMI’s Graphical Execution Environment (GEE) as an example
- AMI GEE is a set of libraries for rapid development of UEFI pre-boot apps
  - C/C++ libraries built on UEFI specifications
  - Goes beyond UEFI shell interfaces

**UEFI applications extend and complement OS-based management tools**
Pre-Boot Application Examples

**OS-Independent Platform Management**

- Manage Firmware Updates (local and network sources)
- Diagnostics Operate in UEFI (even when OS fails to boot)

**Centralized firmware updates, system configuration and diagnostics**

- Graphical HII Browser (enhanced BIOS setup)
- Assist OS Provisioning (driver discs & BIOS settings)
Simplify IT Management with UEFI

Factory CD/DVD Replacements

- Always part of the system
- The disc doesn’t get lost/misplaced
- Doesn’t rely on a DVD drive

Remote Management Scenarios

- Administrators access the UEFI pre-OS services installed on the remote platform
- Use Intel® vPro™ technology, IPMI BMC or other network-based access methods

Bare Metal Provisioning

- Full platform configuration prior to OS installation (or if OS needs to be reloaded)
- Include tools to generate OS driver discs and simplify OS deployment

Reduce Unnecessary Returns

- Launch diagnostics from UEFI even when the OS cannot start (corrupted, hacked)
- Recover or reinstall the OS from the UEFI pre-boot environment
Using UEFI on Today’s Platforms

Configuration Management
Simplify system configuration in a centralized interface, with no dependencies on the OS (updates, diagnostics, config, ...)

Configuration Replication
Collect common configuration parameters so the system configuration is easily cloned

Configuration Migration
Transfer common configuration parameters across multiple systems with minimal effort

Full configuration management can be performed in pre-boot using UEFI
Configuration Management

• Replace the “factory DVD” with an *always available UEFI pre-boot solution*
  – Available for local & remote platform management

• Applications like AMI Provisioning™ use AMI GEE to address the following in the pre-OS space ...
  – Platform update
  – Platform configuration
  – Platform diagnostic
  – OS installation & recovery
  – Manufacturing support

*Use UEFI pre-boot for consistent and persistent platform management*
Replication versus Migration

Replication: Duplicate Configuration Across Identical Platforms

- Identify and map common parameters across platforms
- Generate platform configuration scripts, load locally or via network
- Apply configuration across systems (in the field or manufacturing)

Migration: Apply Common Configuration To Different Platforms

Common Goal: seamless migration of parameters across platforms

- Identify and map common parameters across platforms
- Generate platform configuration scripts, load locally or via network
- Apply configuration across systems (in the field or manufacturing)

UEFI simplifies configuration replication and migration
Management Across Platforms

• By leveraging UEFI standards, AMI GEE solutions easily scale across different hardware
  – Higher performance Intel® Xeon® servers can integrate UEFI applications with IPMI solutions
  – Desktop & mobile Intel® Core® platforms leverage Intel® vPro™ technology for remote access to UEFI pre-boot applications like AMI Provisioning
  – Embedded platforms based on Intel® Atom™ processor use UEFI pre-boot solutions for server and workstation class management on lower-cost platforms

• Complement existing management solutions using UEFI pre-boot across all product lines
  – Intel technologies add value at different price points
Demo – Pre-Boot in UEFI

AMI Provisioning
Key Points from AMI

- UEFI applications extend and complement OS-based management tools
- Full configuration management can be performed in pre-boot using UEFI
- Use UEFI pre-boot for consistent and persistent platform management
- UEFI simplifies configuration replication and migration
- Use UEFI to present consistent solutions across all price points

Complement the UEFI and UEFI Shell with robust pre-boot management solutions
Summary

• UEFI enables platform innovation for Modern IT
  UEFI simplifies and standardizes management of deploying, and updating Dell servers

• UEFI enables robust pre-boot management and provisioning solutions
Additional sources of information on this topic:

• Other Sessions – Next Slide
• Demos in the showcase – #160
• Additional info in the SSG community – EFI Booth
• More web based info:
    Lifecycle Controller
    http://www.delltechcenter.com/page/Lifecycle+Controller
• Book on topic:
  – Beyond BIOS 2nd edition - Intel Press
# IDF 2010 UEFI Fall Sessions

**Sept. 13, 2010 Moscone Room 2006**

<table>
<thead>
<tr>
<th>EFI#</th>
<th>Company</th>
<th>Description</th>
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<tr>
<td>S001</td>
<td>Intel, IBM, HP</td>
<td>Introducing the New Intel® UEFI Development Kit: Industry Foundation for Platform Innovation</td>
<td>11:00 AM</td>
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<td>S002</td>
<td>Intel, LSI, Dell, Phoenix</td>
<td>UEFI Advancements for Independent Hardware Vendors</td>
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<td>S003</td>
<td>Intel, WindRiver</td>
<td>Boot Loader Solutions for Intel® Atom™ Processor Based Embedded Devices</td>
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<td>Intel, Dell, AMI</td>
<td>Zero-Touch Platform Manageability with UEFI</td>
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<td>S005</td>
<td>Intel, IBM, Insyde</td>
<td>Beyond DOS: The UEFI Shell – a Modern Pre-boot Application Environment</td>
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<td>Q001</td>
<td>All</td>
<td>UEFI Q &amp; A session with all Speakers</td>
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Vouchers available in session room and UEFI Technology Showcase booth #160
Intel® UDK2010 Available on tianocore.org

Intel® UDK2010
Open Source
UEFI Development Kit


http://www.tianocore.Sourceforge.net
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