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Keeping you informed of the latest ISS technology

Understanding UEFI

UEFI (Unified Enhanced Firmware Interface) is a specification that defines a new interface and architecture for the system firmware that initializes server hardware subsystems before starting the OS boot process. It is now touted as a long-term successor to the BIOS system, which has been part of the x86 system architecture since its inception. Keep reading to understand more about its strengths and challenges.

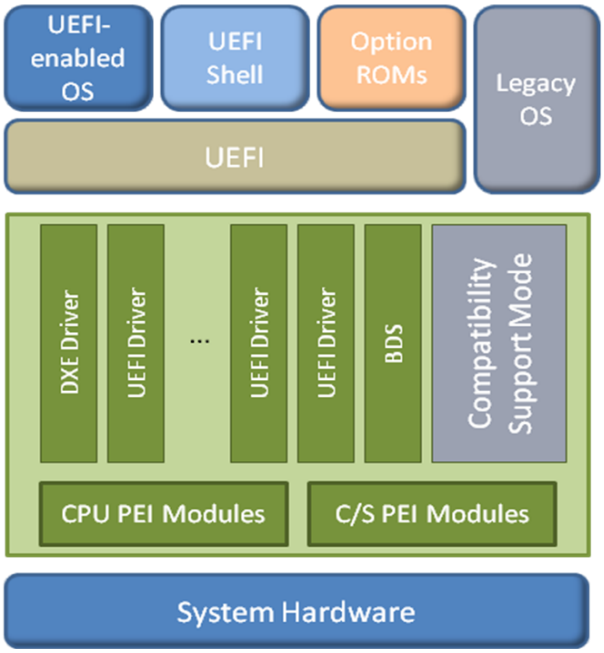
Origins of UEFI

UEFI began as EFI, or the Enhanced Firmware Interface, and it was first proposed for the development of the Intel Itanium-based systems in the late 1990s. Because the Itanium architecture was essentially starting from scratch, there wasn't much downside to defining a new firmware architecture for it. UEFI has grown out of a desire to extend this new firmware architecture to x86-based systems.

UEFI Architecture

UEFI was designed to bring modularity to system firmware by implementing a driver-based approach to platform initialization. Hardware and device chipsets will have a UEFI driver that allows the system firmware to initialize them through a standard API rather than having to program them directly. The UEFI architecture is shown in Figure 1-1.

Figure 1-1. Basic UEFI Architecture



UEFI also establishes its own pre-OS environment, including APIs and services that can be used to create applications for a variety of purposes, including configuration. This is known as the UEFI Shell.

Implications of UEFI

While UEFI is causing a great deal of discussion in the industry, it's important to note where we're at regarding UEFI as well as the customer benefits and challenges of re-implementing system firmware to UEFI specifications.

Remembering the basic purpose of system firmware for the OS

Regardless of whether a server uses the BIOS or UEFI, the system firmware performs several basic functions in system start-up, such as initializing server hardware and starting the OS boot process. Once the OS is fully operational, it doesn't rely much on the system firmware. So, whether the system was initialized using UEFI or the BIOS makes little difference to the OS performance or operational characteristics. Both the BIOS and UEFI provide the ability to create value-added functionality in the pre-boot environment and provide runtime features such as power management that occur below the OS.

Re-writing the system firmware

UEFI requires the entire system firmware to be re-written, which is a significant task. Keep in mind that UEFI does not drive any particular new server features or provide any definitive customer benefits. In addition, the UEFI specification and development tools are evolving, making it beneficial to wait and continue to evaluate the maturity of the UEFI system.

The BIOS-based firmware in HP ProLiant servers has more than 20 years of evolution and testing behind it, making it a very stable platform. HP BIOS-based system firmware also provides important HP-specific functionality, including platform and power management. Producing and testing an entirely new system firmware based on a new architecture demands a slow and deliberate approach.

HP ProLiant servers and UEFI

At HP, we are always evaluating new server technologies, including UEFI. Currently, we believe that the best customer value for ProLiant servers is provided by continuing to use BIOS-based firmware. Going forward we will continue to evaluate and remain involved in the UEFI efforts so that we can determine when and where it may add customer value and provide development flexibility.

Additional resources

Resource	URL
UEFI organization home page	http://www.uefi.org/home/

Quick tip: Changing the iLO Passwords for multiple ProLiant server blades in an enclosure

You can manage HP iLO devices as a group rather than individually to save time and effort. For example, you can update passwords for an entire group of iLO devices using one of our OS-specific, automated setup enablers (Table 2-1). These enablers include the Lights-Out Configuration Utility (CPQLOCFG.EXE), the Online Configuration Utility (HPONCFG.EXE), and a Linux Perl interpreter (locfg.pl) that communicates with iLO. These utilities support script (batch) files, allowing you to configure and manage user accounts on multiple iLO devices simultaneously.

The CPQLOCFG utility is a Microsoft® Windows®-based utility that lets you configure and manage multiple iLO devices from one client device. You can launch the CPQLOCFG utility from HP SIM for Group Administration or run it independently from a command prompt for batch processing. The CPQLOCFG utility passes Remote Insight Board Command Language (RIBCL)/XML scripts to the iLO. RIBCL scripts are OS-independent. The sample script to change iLO passwords is shown in Figure 2-1. Always read the firmware support information in the sample script to customize the script for the intended firmware and version.CPQLOCFG.EXE version 3.0 or greater supports all versions of iLO.

The HPONCFG utility provides host-side configuration and management in Windows and Linux® environments. It lets you access only the iLO device on the host system where it is running. The advantage of using HPONCFG is that it doesn't require you to log in to iLO (the host OS provides the security), and you don't need to know the iLO's network address. The HPONCFG utility for Linux is an RPM package file (hponcfg.rpm) and works similarly to the HPONCFG utility for Windows.

For Linux environments, you can also use Perl scripts to securely and remotely access iLO devices for configuration and management. Sample scripts are available in the *HP Integrated Lights-Out Management Processor Scripting and Command Line Resource Guide*. You can use the sample scripts "as is" or customize them.

Table 2-1. HP iLO script resources

	Windows Client	Linux Client	Within the system (1:1)	Over the network (1:many)
Lights-Out Configuration Utility (CPQLOCFG.EXE)	✓			✓
Lights-Out Online Configuration Utility (HPONCFG.EXE)	✓		✓	
Perl script (locfg.pl)		✓		✓
Lights-Out Online Configuration Utility (hponcfg.rpm)		✓	✓	

The CPQLOCFG.EXE and HPONCFG.EXE utilities, and the scripting guide, are available from our website at the links found in "Additional resources." To download the utilities, click on the appropriate link and select your operating system.

Figure 2-1. RIBCL XML sample script for changing iLO passwords

```
<!-- RIBCL Sample XML Script for Integrated Lights-Out                 -->
<!-- Run using user credentials with configure user privilege.         -->
<!-- Sets local username account password to newPassword               -->
<!-- Note: Check out the iLO Scripting and Command-Line Resource guide -->
<!-- for examples on other commands and on variable substitution.      -->

<RIBCL VERSION="2.0">
<LOGIN USER_LOGIN="Administrator" PASSWORD="password">
<USER_INFO MODE="write">
<MOD_USER USER_LOGIN="username">
<PASSWORD value="newPassword"/>
</MOD_USER>
</USER_INFO>
</LOGIN>
</RIBCL>
```

Additional resources

Resource	URL
CPQLOCFG.EXE and HPONCFG.EXE Select your operating system and download the utility.	www.hp.com/support/ilo3
HP Integrated Lights-Out Management Processor Scripting and Command Line Resource Guide	http://bizsupport1.austin.hp.com/bc/docs/support/SupportManual/c02250417/c02250417.pdf
HP Integrated Lights-Out 3 User Guide	http://bizsupport1.austin.hp.com/bc/docs/support/SupportManual/c02063196/c02063196.pdf

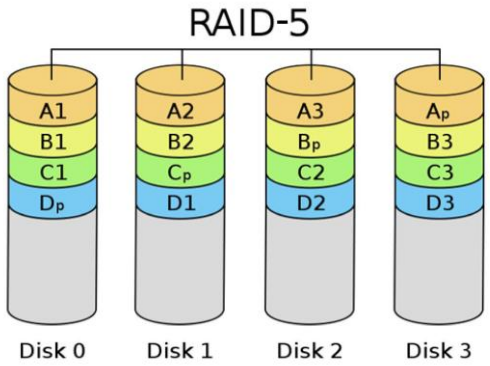
Changing terms from stripe size to strip size with HP Smart Array utilities

If you have dealt with HP Smart Arrays, you are familiar with the term "stripe size". It's one of the parameters you set when configuring a new logical drive. During the next year, you will find the term "stripe size" replaced with "strip size" in Smart Array-related configuration utilities and documentation. Is something really changing here? Not really, only the terminology is changing. But before explaining the reason for the change, let's quickly review some RAID basics.

Stripe size versus strip size

An array consists of two or more physical drives that are configured together through a RAID controller to appear as a single logical drive to the OS. To improve overall performance, RAID controllers break file data up into discrete chunks called "strips" that are distributed one after another across the physical drives in the arrays. In Figure 3-1, each individual unit – A1, B1, or B2, for example – represents a strip. For a given array, the strip size is configurable, typically between 64 KiB and 256 KiB.

Figure **3-1.** Strips and stripes for a typical RAID 5 logical drive



A stripe, on the other hand, is the collection of one set of strips across the physical drives in a logical drive. A stripe's size is not configured. It is a product of the strip size, the number of physical drives in the logical drive, and the RAID level. In Figure 3-1, a stripe is represented by each color band across the physical drive set. If the strip size in this logical drive is 256 KiB, then the stripe size is three times that, or 768 KiB. The parity strip – represented by Ap, Bp, etc. in Figure 3-1 – is not considered part of the stripe's size although it is part of the structure. The stripe size for a RAID-5 and RAID-6 array is the same, even though there is twice as much parity data.

Changing terms to strip size

HP Smart Array utilities have traditionally used the term stripe size as a configuration parameter when, in terms of standard RAID definitions, it's the strip size that's actually being configured. In order to differentiate between the two, HP documentation has sometimes referred to the RAID stripe as the "full stripe". But starting soon, HP Smart Array utilities, including ORCA and ACU, will be migrating to the use of the standard RAID terms of strip size and stripe size. This change will be incorporated over time as new releases of the utilities are required. So don't be surprised someday soon when you open the ACU to find that you are setting the strip size and not the stripe size.

Additional resources

Resource	URL
Home page for HP Smart Array controllers	http://h18004.www1.hp.com/products/servers/proliantstorage/arraycontrollers/index.html
Storage Networking Industry Association online dictionary	http://www.snia.org/education/dictionary/

Meet the Expert—David Engler

David Engler is a Design Engineer in Enterprise Servers and Storage (ESS). Over his 13-year career, David has gained very diverse engineering knowledge due to his involvement with most of the HP ProLiant server platforms, ranging from the 1U DL360 server to the 5U ML570 server. His responsibilities focus on solving customer issues regarding current storage and server products and applying those solutions to future products.

Jeoff Krontz, David's manager, says, "David has a breadth of experience that allows him to provide valuable engineering and problem-solving insight across the ISS product portfolio. He has an excellent track record of resolving issues quickly to minimize customer downtime and manufacturing interruptions, both of which increase customer satisfaction."

Jeoff wishes he could clone David's passion for engineering. "David works tirelessly on solutions because he enjoys the challenge," says Jeoff, "not because it's his job."

Name: David Engler
Title: Design Engineer – ESS
Years at HP: 13
University/Degree: University of Houston / BSEE
U.S. Patents: 8

Where the passion began

After graduating from Johnson City High School in Central Texas, David attended the University of Houston to major in Electrical Engineering. Working in research labs while attending UH, he was able to relate the practical to the theoretical. He developed a passion for engineering when he realized that it was the best way to merge his creativity with a stable professional career. Shortly after he started working as a software engineer, he decided that hardware engineering was better suited to his goals and talents.

Trying to pass it on

David has a son, Chris (17), who also wants to be an engineer, and a daughter, Lauren (12), who does not. But to bring their talents together, he wants them to help in restoring his classic Ford Mustangs: a 1965 V8 coupe (Chris' favorite) and 1969 convertible (Lauren's favorite). They also join him in outdoor activities—running, riding bikes and motorcycles, and camping (see photo above at McKinney Falls State Park in Austin, TX).

His favorite accomplishment

His favorite accomplishments and inventions came early in his career with Compaq. They involved HD TV and rear projection TV development. Within ESS, his favorite inventions are associated with hot-plug system memory. Still, he gets the most satisfaction from applying his diverse skills across many engineering disciplines. On his own, he is working on an ultrasound-based golf caddy that can follow a golfer around the course as well as a prototype blood/saline analyzer for post-operative heart surgery patients.

Where he gets his ideas

Given the current product development model in the industry, HP engineers strive to design important server and storage features that customers need. These features are not always intuitive to engineers, so they have to engage customers whenever possible. David has found that the quarterly HP ISS Technology Tours are a great way to get important feedback from customers. He uses this feedback to solve customer issues and to plan features in future server and storage architectures. This is one reason why HP leads the industry in power efficiency, power management, and server management solutions.

Recently published Industry-Standard Server technology papers

Title	URL
HP BladeSystem c7000 Enclosure technologies	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00816246/c00816246.pdf
Technologies in HP ProLiant G7 c-Class server blades with AMD Opteron™ processors	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02239274/c02239274.pdf
Ethernet technology for industry-standard servers	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02475134/c02475134.pdf
The Intel® processor roadmap for industry-standard servers, 11th edition	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00164255/c00164255.pdf
Implementing RemoteFX on HP ProLiant DL/ML 370 G6 Servers	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02478570/c02478570.pdf
Implementing Microsoft Windows Server 2008 R2 Service Pack 1 Beta on HP ProLiant and Integrity servers	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02478548/c02478548.pdf

HP Industry Standard Server technology papers can be found at www.hp.com/servers/technology

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