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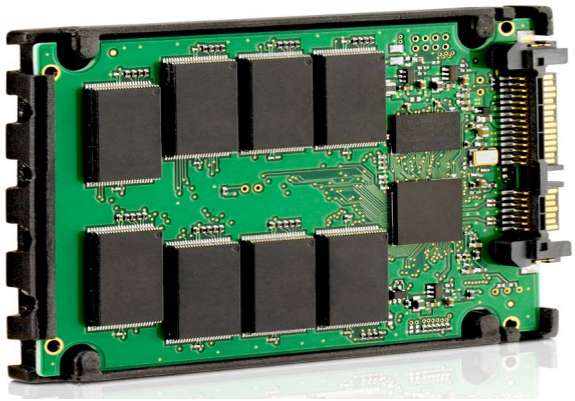
Keeping you informed of the latest ISS technology

HP Solid State Drive technology

Overview

HP solid state drives (SSDs) have no moving parts, which makes them able to operate in more extreme environments than traditional hard disk drives. Available in 32-GB or 64-GB versions from HP, these first generation drives are designed specifically for ProLiant c-Class server blades.

Figure 1-1. HP Solid State Drive for ProLiant BladeSystem servers



Operating environment for HP SSDs

HP server disk drives are available in three levels based on performance: Entry, Midline, and Enterprise. The HP solid state drives introduced in September 2008 represent a level of performance, reliability, and capacity roughly equivalent to Midline server disk drives. More importantly, however, HP server SSDs can deliver this level of reliability in operating environments that are unsuitable for traditional disk drives (Table 1-1).

Table 1-1. SSD operating envelope

	HP server SSD
Operating Temperature	0°-70° C
Operating Shock	1500 g (.5 ms half sine wave)
Vibration	20 g (peak)10 – 2000 Hz
Power Consumption (Active)	Under 2 watts

HP SSD Futures

The HP server SSDs introduced in late 2008 represent the first generation of SSDs for ProLiant servers. In the first half of 2009, HP expects to introduce hot-plug SSDs using standard drive carriers. These drives will be supported across the ProLiant product line.

As is already the case with hard disk drives, HP is working to develop separate classes of SSDs, each designed to meet the specific capacity, performance and reliability requirements for particular applications. Table 2-1 summarizes the current goals for creating Entry, Midline, and Enterprise SSDs in the future as the technology continues to evolve.

Table 1-2. Current goals for classes of HP server SSDs

	Entry / Midline	**Enterprise**
Interface	3 Gb/s SATA	6 Gb/s SAS dual port
Reliability	Optimized for constrained workloads	Optimized for 100% workloads
Latency	<1 ms for 512 byte random writes	<100 us for 512 byte random writes
Maximum capacity	2 times Enterprise SSD	Equal to SFF15K SAS disk drives
Other features	Full memory path error detection Always on write cache with hot removal protection	Full memory path error detection Always on write cache with hot removal protection
Power Consumption (Active)	Under 2 watts	2 – 9 watts

Additional resources

For additional information on the topics discussed in this article, visit:

Resource	**URL**
HP Solid State Storage	www.hp.com/go/solidstate
"Solid state drive technology for ProLiant servers" technology brief	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01580706/c01580706.pdf
HP ProLiant drives (including solid state drives)	www.hp.com/products/harddiskdrives

Meet the Expert— Brian Purcell

Mark Brian Purcell is an HP hardware architect whose job is critically important to the success of AMD-based ProLiant servers. He is responsible for reviewing the future chipset and processor offerings, and he works closely with vendors to evaluate how their products can best be integrated into all HP server products. He also provides feedback to vendors on what features are needed to ensure that HP products meet or exceed customer requirements and expectations. Scot Wurster, Brian's manager, adds "Brian is very willing to help anyone facing a problem. When presented [with] a challenge from marketing, the gears [start] turning in his head. He will come up with a solution to fit the customer's need—usually a couple of different ways to fulfill that need He has a positive 'can do' attitude, and he works very well with other people. He also works closely with AMD, providing product feedback to improve their products' reliability and performance.."

Brian successfully balances his work and personal life through hobbies such as golf, motorcycles, radio-controlled sailplanes, and coaching his son's (Colin) baseball team. But his most interesting hobby is playing trombone in the HP Houston Jazz Band. Brian has played in the Jazz Band since 1996. Brian's wife of 12 years, Sharon, plays saxophone and directs the band. They also play in their church orchestra. But there's more—Brian has two brothers (Mike and Bill) who also work for HP. Below are excerpts from an interview with Brian.

Name: Brian Purcell
Title: Hardware Architect - Industry Standard Servers, Technology Solutions Group
Years at HP: 14
University/Degree

- Texas A&M University, BS in Computer Engineering (May 1994)
- Engineering Scholars Program

U.S. Patents: 9

Why did you decide to become an engineer?

Brian: While growing up, my curiosity led me to disassemble electrical devices such as Walkmans, radios, etc. My father always told me, "If you break it, you'd better know how to fix it!" When I was eleven, we got our first computer. I quickly learned how to use it, and I developed my programming skills. At fourteen, I developed an algorithm to generate magic squares (in multiples of four). As computer programming became second nature to me, I decided that a blended degree in Electrical Engineering and Computer Science would be perfect!

What is your most interesting research?

Brian: Modifying and applying my father's principle into our system architectures. "If [it breaks], you'd better know [what went wrong and] how to fix it."

I am a huge proponent of embedding logic analyzer functionality within our CPLDs (complex programmable logic devices) to help engineering and service teams quickly determine the source of system behaviors and faults. As a normal part of our system validation and margin testing, we occasionally encounter power and/or thermal faults. It is often difficult or time-consuming to repeat the failure; thus, it is very important that we catch and log the failure on the first occurrence.

This is especially important when our servers have multiple PCAs,where each PCA has multiple, independent voltage regulators. We have to be able to indicate the exact failing PCA or replaceable voltage regulator module. When we can identify the exact component that failed, it improves customer satisfaction.

The embedded logic analyzer functionality has matured significantly over the past few product generations, and it continues to be successfully employed by multiple platforms across both the ISS and Business Critical Solutions (BCS) server teams. The current architecture improves the fault detection capabilities and provides a very detailed system status "snapshot" at the time of failure.

How much customer input goes into the design of your products?

Brian: Customer feedback is very important to us because customers are more likely to purchase HP products if we can meet their requirements. I personally go through several design concepts before I finally settle on the top one or two design recommendations. Some of the questions I always ask are

- Is the solution mechanically friendly to the customer and service person?
- How can we improve the total customer value for the product, extend the server's lifetime, and lower the total cost of ownership?
- How can we "future proof" our product design and provide customers with an upgrade path as technology evolves across the lifetime of the platform.

As the server development model has evolved industry-wide, what adjustments has ISS engineering made to maintain technological leadership?

Brian: There has been a significant paradigm shift in the relationship between product development and how our engineers develop their technical and debugging skills. Prior to the prevalence of ODM (outsourced development model) or JDM (joint development model) product development, our engineering staff gained knowledge through continuous, hands-on experience. During the course of the product development cycle, engineers would naturally progress from fixing simple issues, to debugging basic problems, to understanding various hardware and software interactions, and then to debugging significantly complex issues. Today, the ODM/JDM partner is quite capable of fixing the less complex issues. This leaves HP engineers to debug a higher percentage of complex issues than before, which demands that they understand how all of the software and hardware pieces interact with each other.

The ODM/JDM model gives senior engineers more opportunities for one-on-one mentoring of younger engineers to strengthen their system architecture knowledge and debug skills. This gives younger engineers a deeper understanding of system architecture, and it helps them to continue developing innovative technologies for HP products.

Common SM CLP scripting commands for ProLiant server management

This is the last in a series of three articles that discuss common SM CLP (Server Management Command Line Protocol) scripting commands. Links to the previous articles are listed in "Additional resources" at the end of this article. SM CLP is one of the communication, or access, protocols that can be used with the Systems Management Architecture for Server Hardware (SMASH). This article discusses the SM CLP syntax and properties.

SM CLP is accessed using Secure Shell (SSH). SSH can be interactive (as in a shell) or it can execute in a "command" mode by processing a single command at a time suitable for scripting. The following examples use SSH command mode, using a Windows utility (plink) that provides SSH command line support. Plink and PuTTY executables, source code, and license terms are freely distributed on the web. Other SSH command line utilities should support this functionality in a similar manner.

The SM CLP organizes commands into different functions— targets, properties, and verbs.

- Targets refer to the grouping of related objects, such as the host server (system1) or iLO, the "management access point" (map1). Targets can be subdivided into smaller groups using a folder-style naming convention—all the subordinate targets are presented in the output from the "show" verb.
- Properties represent related attributes for the given target.
- Verbs represent the actions that can be taken on a given target and property.

The following examples specify user credentials on the command line. If user credentials are not specified, iLO 2 prompts for account credentials, interrupting the process. iLO 2 also supports SSH key-based authentication.

Retrieve properties of the host system

The following example illustrates how to retrieve the properties of the host system using the show system1 command. Administrators can access specifics within system1 by appending subordinate targets, such as system1/firmware1, to reference the host ROM version.

```
C:\Program Files\putty>plink -ssh -l admin -pw password ilo2system.corp.net show system1
show system1
status=0
status tag=COMMAND COMPLETED


/system1
  Targets
    firmware1

<output abbreviated for readability>

  Properties
    name=ProLiant DL380 G5
    number=0005PBN153
    oemhp server name=Exchange 01
    enabledstate=disabled
    oemhp powerreg=auto

<output abbreviated for readability>

  Verbs
    cd version exit show reset set start stop
```

Retrieve iLO properties

The following example shows how to retrieve the iLO properties (map1 properties in CLP terminology) using the show map1 command.

```
C:\Program Files\putty>plink -ssh -l admin -pw password ilo2system.corp.net show map1
show map1
status=0
status tag=COMMAND COMPLETED


/map1
  Targets
    firmware1
    accounts1

<output abbreviated for readability>

  Properties
    name=iLO 2 Advanced
    license=<license key>
  Verbs
       cd version exit show reset set oemhp ping
```

Additional resources

Visit the following websites for additional information on the topics discussed in this article:

Resource	URL
HP Integrated Lights-Out	www.hp.com/go/ilo
DMTF SMASH information	www.dmtf.org/standards/mgmt/smash/
Common SM CLP scripting commands for ProLiant server management, Part 1	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01579481/c01579481.pdf
Common SM CLP scripting commands for ProLiant server management, Part 2	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01581852/c01581852.pdf

QuickTip — Using Fabric Manager software to configure switches

This QuikTip addresses licensing requirements, installation, and downloads for Fabric Manager (FM) software. This information applies to Cisco MDS 95xx Fibre Channel Switches.

FM software license not always necessary

Here are the facts about FM license requirements:

- A license is not required to install Fabric Manager Basic for the MDS.
- A license is only applicable for Fabric Manager Enterprise.
- Fabric Manager is free software as long as only one fabric is managed at a time. Because a fabric can have multiple switches, all of them may be managed without the FM Server Package license.

FM software installation

FM software can be installed using the CD that comes with the switch, or it can be downloaded from the HP Web site. Here is the link to the latest downloadable Fabric Manager software (MDS Management CD) for Cisco switches: http://h20000.www2.hp.com/bizsupport/TechSupport/SoftwareIndex.jsp?lang=en&cc=us&prodNameId=1849158&prodTypeId=12169&prodSeriesId=1849157&swLang=13&taskId=135&swEnvOID=54

Note
When the install CD is used, it also installs postgresql as the DB for the FM server.

Recently published industry standard server technology papers

Title	URL
"iSCSI technologies in HP ProLiant servers with multifunction network adapters" technology brief	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01600624/c01600624.pdf
"Solid state drive technology for ProLiant servers" technology brief	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01580706/c01580706.pdf
HP Flex-10 technology	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01608922/c01608922.pdf
"Implementing Microsoft Windows Small Business Server 2008 on HP ProLiant servers" integration note	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01479108/c01479108.pdf
"Serial Attached SCSI storage technology" technology brief	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01613420/c01613420.pdf
"HP VMWARE ESXi management environment" integration note	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01570108/c01570108.pdf

Industry standard server technical papers can be found at www.hp.com/servers/technology.

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