Innovative technologies in HP ProLiant Gen8 servers

Technology brief

Introduction

This technology brief describes several new technologies we have implemented in HP ProLiant Gen8 servers. This generation of servers represents a leap in innovation and it addresses the complex management challenges that IT administrators are facing today. We built HP ProLiant Gen8 servers with more than 150 design innovations and more than 900 patents pending. Our innovations dramatically accelerate application performance and allow administrators to maximize server availability by eliminating common problems that cause failures, downtime, and data loss.

We increased or optimized the performance of all major subsystems in ProLiant Gen8 servers. Our servers use the latest multi-core Intel Xeon E5 processors that provide greater integration and improved bandwidth interfaces (QuickPath Interconnect, memory, and PCI Express), resulting in almost 2x higher overall system performance than previous generation processors.

We are also introducing HP SmartMemory in ProLiant Gen8 servers. SmartMemory is HP Qualified Memory that operates at a 25% faster bus rate than third-party memory at the same voltage. Our SmartMemory also uses 20% less power while achieving the same performance as third-party memory.

HP FlexibleNetwork Adapters for ProLiant Gen8 deliver significant value for our customers. FlexibleNetwork Adapters support the IEEE 1588 Precision Time Protocol (PTP) standard to improve the accuracy and synchronization of time-sensitive transactions. We also embedded a thermal sensor in these adapters to optimize cooling. We implemented Energy Efficient Ethernet (EEE) technology in some adapters to reduce power usage significantly during periods of low data activity.

We offer powerful I/O solutions for demanding storage-centric applications that require performance, capacity, and resilience. HP Smart Array Controllers, HP SmartDrives, HP Host Bus Adapters, and HP I/O accelerators deliver high performance and allow you to grow storage capacity as needed by supporting more drives and RAID levels.

Because power costs can account for more than 50% of a data center's operational expense budget, we developed the most efficient power supplies in the industry: HP Common Slot Platinum Plus Power Supplies and Common Slot 48VDC Common Slot Power Supplies. We also enhanced thermal monitoring with Sea of Sensors 3D technology to analyze internal cooling needs and control fan operation, thereby reducing unnecessary power consumption.

ProLiant Gen8 servers integrate server management, power management, and firmware and system software management into a seamless experience across the server lifecycle. The HP iLO Management Engine is a major innovation that makes such lifecycle management possible, and it is standard on all ProLiant Gen8 servers.

When you deploy ProLiant Gen8 servers in our new Intelligent Series Racks along with HP Discovery Services—HP Power Discovery Services and HP Location Discovery Services—our innovative technologies work together immediately. Before you power on the servers, HP Power Discovery Services maps the power connections for each server and detects common wiring errors that can cause server failures. Power Discovery Services also provides each server's power consumption data to HP Insight Control power management software. This allows you to monitor and control the power consumption of an entire rack of ProLiant Gen8 servers. HP Location Discovery Services eliminates the tedious tasks of manually entering server locations in HP Systems Insight Manager and HP Insight Control.

Processors

We use Intel Xeon E5-2600 series processors in the newly introduced 2-socket ProLiant Gen8 servers and c-Class server blades. These processors use hafnium-based, 32 nm Hi-k metal gate silicon technology and are based on the Intel Core Microarchitecture Sandy Bridge. Xeon E5-2600 series processors in our ProLiant Gen8 servers have two, four, six, or eight cores and operate from 60 W (Xeon LP) to 135 W. These processors feature an integrated northbridge and memory controller. The processors work with Registered (R) DIMMs, Unbuffered (U) DIMMs, Low-Voltage (LV) DIMMs, and Load-Reduced (LR) DIMMs. Table 1 summarizes the features of Xeon E5-2600 processors used in ProLiant Gen8 servers.

Table 1: Intel Xeon E5-2600 processors

	Intel Xeon E5-2600
Cores	2, 4, 6, 8
L1/L2 Cache	32 KB / 256 KB
L3 Cache	2.5 MB/core
Direct Media Interface (DMI)	x4 PCIe Gen2 speed
Integrated PCI Express (PCIe)	40 lanes PCIe 3.0
QuickPath Interconnect links	2
DDR3 Memory controller (Channels/ DIMMs per channel)	4 Ch / 3 DPC
Memory supported	RDIMMs, UDIMMs, LVDIMMs, LRDIMMs
Memory data rates	1600 MT/s
Power	60 W–135 W

The x4 DMI link is a bi-directional chip-to-chip interconnect between the processor and chipset. The link provides a total of 20 Gb/s in each direction, or 2.5 GB/s per unidirectional lane. Integrated PCI Express 3.0 lanes connect directly to the processor for increased performance and efficiency.

For additional information about Intel Xeon E5-2600 series processors, read the HP paper titled "AMD Opteron and Intel Xeon x86 processors in industry-standard servers." It's available at www.hp.com/servers/technology.

Memory technologies

ProLiant Gen8 servers support HP SmartMemory and enhanced memory protection with HP Advanced Memory Error Detection Technology.

HP SmartMemory

IT trends such as server virtualization, cloud computing, and high-performance computing have significantly increased the average memory capacity of servers in the last several years. As a result, DRAM manufacturers are increasing chip component densities to support higher memory capacities. The combination of higher memory demand, component complexity, and availability requirements has increased the importance of system memory. It significantly defines the system's reliability,

performance, and overall server power consumption. Therefore, choosing the right memory is the key to ensure high reliability and performance, and to deliver a faster return on your IT investment.

HP SmartMemory is a unique technology introduced for HP ProLiant Gen8 Servers. Unlike third-party memory, HP SmartMemory has passed the rigorous HP qualification and test process. More important, verification of HP SmartMemory unlocks certain performance and high efficiency features optimized for HP ProLiant Gen8 Servers:

- HP SmartMemory uses up to 20% less power than third-party memory while achieving the same performance. At low voltage (1.35 V), HP SmartMemory operates at DDR3-1333 MHz with one and two DIMMs per channel and at DDR3-1066 MHz at three DIMMs per channel. In comparison, third-party memory requires 1.5 V to achieve the same performance.
- HP SmartMemory performance is 25% higher with Unbuffered ECC (UDIMM) memory and capable of supporting 1333 MT/s up to 2 DIMMs per channel at 1.35V. Third-party memory supports 1066 MT/s bandwidth at higher operating voltage (1.5V).

In addition, HP SmartMemory will provide enhanced support through HP Active Health System and HP iLO (see "Server management-HP iLO Management Engine"). HP SmartMemory is ideal for HP ProLiant Gen8 customers who are looking to extract all the memory performance, dependability, and power savings that ProLiant Gen8 servers are designed to deliver.

HP Advanced Memory Error Detection Technology

Uncorrectable memory errors can cause applications and operating systems to crash, so they are costly in terms of downtime and repairs. The best way to prevent unnecessary DIMM replacements is to filter out superfluous errors and identify critical errors that can lead to a shutdown. You can no longer rely on simple error event counts on systems containing up to 14 trillion memory transistors. With HP Advanced Memory Error Detection Technology, we re-invented a precision system that pinpoints errors that cause downtime.

HP Advanced Memory Error Detection Technology seeks out specific defects that either cause performance degradation or significantly increase the probability of an uncorrectable (non-recoverable) memory condition. By improving the prediction of non-recoverable memory events, this technology prevents unnecessary DIMM replacements and increases server uptime. For more information, read the technology brief "HP Advanced Memory Error Detection Technology." Find it at http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02878598/c02878598.pdf.

Power efficiency and provisioning

We developed HP Common Slot Platinum Plus and 750 W Common Slot -48VDC Power Supplies to be the most efficient server power supplies in the industry. We also added internal thermal sensors— HP Sea of Sensors 3D—to selected PCI Express option cards. Our provisioning tools reduce the uncertainty in determining expected and worst-case power requirements for servers.

HP Common Slot Platinum Plus Power Supplies

HP Common Slot (CS) Platinum Plus Power Supplies have 94% efficiency at 50% utilization, meeting 80 PLUS specifications for Platinum certification. In addition, our engineers increased power factor at lower utilization levels and made improvements to minimize total harmonic distortion (THD). CS Platinum Plus Power Supplies also support HP Power Discovery Services (Intelligent Power Discovery technology) to minimize certain power distribution problems and wiring errors.

Multiple power-capacity options

Having a CS form factor with multiple power capacity options (460 W, 750 W, and 1200 W) allows Platinum Plus Power Supplies to fit a wide range of HP server, storage, and infrastructure products. It also lets you right-size power supplies for multiple equipment configurations so you can use more of your data center's available power capacity.

Improved efficiency and power factor

Due to a design that optimizes the power factor, HP CS Platinum Plus Power Supplies achieve high efficiency at relatively low power utilization, and maintain that efficiency through the demand curve. This provides a consistent expectation of efficiency that is not dependent on utilization.

Minimized Total Harmonic Distortion

As data centers deploy more servers, power supply harmonic currents can potentially limit the maximum attainable utilization. HP engineers designed Platinum Plus Power Supplies to minimize THD across all load conditions to maximize data center utilization.

HP Power Discovery Services

Platinum Plus Power Supplies feature blue connectors that enable HP Power Discovery Services, which includes HP Intelligent Power Discovery (IPD) technology. IPD uses an embedded serial communication link to automatically discover newly deployed HP servers, map their power cords to the power source, verify power redundancy, and help ensure that all power sources are connected correctly. For additional information, read the technology brief "HP power and cooling technologies for the data center." Find it at
http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02018535/c02018535.pdf.

HP -48VDC Common Slot Power Supplies

The telecommunications industry has long used -48 V DC power distribution. Previous-generation HP 1200 W -48V CS Power Supplies operate at 90% efficiency. The latest HP CS 750 W -48VDC Power Supply for ProLiant Gen8 servers operates at 94% efficiency. It also has better power input cabling options and is compatible with a wider range of HP ProLiant servers. For a list of compatible servers, visit www.hpproliantoptions.com.

HP Sea of Sensors 3D

Introduced with ProLiant G6 servers, HP Sea of Sensors provides the data to precisely control the server fans and directly cool specific components, while not overcooling other components. This can reduce fan power consumption up to dozens of watts per server.

HP Sea of Sensors 3D in ProLiant Gen8 servers extends the use of sensors to select PCI Express option cards, FlexibleNetwork Adapters, and FlexFabric Adapters to get a three-dimensional temperature profile in the server. This additional data enables more precise and efficient cooling of ProLiant Gen8 servers. The data is included in the always-on diagnostic information of the HP Active Health System.

Power provisioning tools

HP power provisioning tools include Dynamic Power Capping, HP Enclosure Dynamic Power Capping, and the HP Power Advisor utility. These tools, summarized below, help administrators maximize data center power usage by fitting more IT equipment in the available power and cooling capacity. For a more detailed description, read the technology brief "HP power and cooling technologies for the data center." Find it at
http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02018535/c02018535.pdf.

HP Dynamic Power Capping

Dynamic Power Capping uses sophisticated monitoring and control circuitry to prevent server power from exceeding a preset level. Because Dynamic Power Capping is hardware-based, it can quickly control sudden surges in power consumption by servers and prevent tripping even the fastest circuit breakers used in HP Power Distribution Units (PDUs). You can set a power cap for an individual server from the iLO user interface. For groups of servers, you can set the power caps from the power management module within HP Insight Control.

HP Enclosure Dynamic Power Capping

We designed Enclosure Dynamic Power Capping technology specifically for BladeSystem enclosures. It lets you set a power cap for an HP BladeSystem Enclosure by using Insight Control (version 2.0 or later) or Onboard Administrator (firmware version 2.30 or later). The Onboard Administrator monitors and maintains the power cap for the entire enclosure by adjusting cap levels on individual server blades. As one server blade becomes busy and another becomes idle, the Onboard Administrator adjusts the individual caps to give each server blade the power it needs while maintaining the total enclosure power draw below the cap.

HP Power Advisor utility

The HP Power Advisor utility helps you calculate the expected power use of ProLiant and Integrity servers to determine power distribution, power redundancy, and battery backup requirements. It lets you calculate the power requirements for a single server, a rack of servers, or multiple racks of servers. These calculations are based on data collected through extensive testing of various HP ProLiant and Integrity server configurations, running a particular synthetic workload. You can adjust the calculations to determine server power requirements at different server utilization levels that more closely match your expected workload. Read the "HP Power Advisor utility" technology brief at http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01861599/c01861599.pdf. HP Power Advisor 3.0, available now, includes the ProLiant Gen8 servers.

Networking

HP FlexibleNetwork Adapters include features that improve performance and energy efficiency and decrease latency. For select ProLiant Gen8 servers, we offer HP FlexibleLOM (LAN-on-motherboard) modules to address rigid and aging infrastructures and provide choices based on your infrastructure needs.

HP FlexibleNetwork Adapters

As part of our expanded Sea of Sensors 3D, FlexibleNetwork Adapters for ProLiant Gen8 servers have an embedded temperature sensor. The sensor reports thermal data to the iLO Management Engine (see "Server management—HP iLO Management Engine") for capture by the HP Active Health System log. This allows the server to manage fan speeds and internal temperatures better and maximize system power efficiency.

HP FlexibleLOM modules

The idea behind LAN-on-motherboard was to provide essential connectivity without the need to consume an expansion slot or mezzanine connector. The implication is that the choice has to be made in the design phase and the decision can't be revisited until the design is changed. With the FlexibleLOM module approach in select ProLiant Gen8 servers, not only can you choose from several different technologies, speeds and features, you're able to do so without sacrificing any of your expected expandability. This also means that if new connectivity technologies come out, you don't

have to wait for the next ProLiant generation to begin utilizing them, and even can upgrade existing deployed ProLiant Gen8 servers if desired. FlexibleLOM modules available for rack servers include 4x 1 Gb Ethernet, 2x 10 Gb Ethernet, 2x InfiniBand, and FlexFabric options.

HP 1 GbE and 10 GbE FlexibleNetwork Adapters for ProLiant Gen8 servers support the IEEE 1588 Precision Time Protocol (PTP) standard, which provides precise timing and synchronization over Ethernet networks, which, when implemented, can ensure that a set of servers all are in lock-step with consistent time. This can be important in certain applications such as financial transactions where multiple systems may be responsible for executing trades and the need is to log each of them in the proper sequence regardless of which system actually processed the trade. FlexibleNetwork Adapters let ProLiant Gen8 servers offload synchronization processes. So, there is minimal impact on processor performance and network bandwidth. Please note that all devices that will be handling traffic carrying the PTP information (for example, network switches) have to be IEEE 1588-compliant to participate in this scheme.

Additionally, some FlexibleNetwork Adapters are Energy Efficient Ethernet (EEE)-compliant. EEE increases energy efficiency by automatically adjusting adapter power consumption based on actual network traffic. During low activity, a FlexibleNetwork Adapter will enter sleep mode and use less energy than it would idling at full power. The adapter lets connected devices instantly re-engage when data transmission occurs. This can reduce adapter power consumption by up to 70%.

HP ProLiant Smart Storage

ProLiant Gen8 servers use HP Smart Array P-Series Controllers and H-Series Host Bus Adapters (HBAs). The servers also accommodate HP IO accelerators, which can drive down costs in high performance computing (HPC) environments.

For more information about ProLiant Smart Storage technology, read the technology brief "Selecting storage controllers: technology considerations." Find it at www.hp.com/servers/technology.

HP Smart Array controllers

We embed HP Smart Array P-Series Controllers on the system board or offer them as low-profile cards. The controllers support the PCI Express 3.0 host interface and the 6 Gb/s SAS or 6 Gb/s SATA storage interfaces.

Technology enhancements for the P-Series controllers include increased performance and Smart Array Advanced Pack (SAAP) 2.0 features. P-Series controllers also support up to 227 drives, Active Health Logging, and Predictive Spare Activation. These controllers use an embedded RAID-on-Chip (ROC).

Predictive Spare Activation technology protects data by automatically servicing a predictive failure drive without degrading the fault tolerance of the RAID logical drive(s). The drive can report a predictive failure before an actual drive failure occurs. Predictive Spare Activation automatically copies the data from a predictive failure drive to a global spare drive. The copy operation reduces the time before the spare drive becomes active. After the copy completes, the predictive failure drive is marked as a drive failure. You can then remove it from the RAID set for servicing.

A new feature of the Smart Array Advanced Pack 2.0 is support for Advanced Data Mirroring (ADM). ADM uses additional drives for redundancy, but data are actively read from and written to the drives. ADM allows triple mirroring of RAID 1 and 1+0 configurations, which provides the highest level of fault tolerance offered by Smart Array. ADM is over 1000 times more reliable than two-drive mirroring.

Flash backed write cache (FBWC) is now standard on most Smart Array Controllers. FBWC uses a large capacitor and flash memory instead of battery power to hold write cache data. FBWC provides

lifetime data retention should the power go out. When the server is powered back on, FBWC writes the data to the drive. FBWC is available in 512 MB, 1 GB, or 2 GB modules.

Smart Array P-Series controllers support the following tools:

- Active Health Logging
- Array Configuration Utility (ACU)
- ACU-CLI (command line interface)
- SNMP agents
- Web-Based Enterprise Management (WBEM) providers

HP SmartDrive

For our ProLiant Gen8 servers, we designed the HP SmartDrive for improved drive density, drive status indication, and serviceability. The compact drive carrier design enables a 50% increase in spindle count.

The drive's front bezel includes a blue backlight for locating a specific SmartDrive selected from within the storage software. An icon-based display reports the drive's status. A "do-not-remove" LED helps prevent a drive failure whenever anyone tries to remove the wrong drive. Other serviceability improvements include authentication, failure logging, and integration with the HP Active Health System.

HP Host Bus Adapters

HP SAS HBAs address the need for low-cost direct-attached storage, single-domain JBODs, tape drives, libraries, and shared storage arrays. H-Series SAS HBAs for ProLiant Gen8 servers are low-profile cards or an adapter embedded in the system board. The H-Series HBA supports 6 Gb/s SAS, SATA, or SSD. It also supports shared external storage and multi-LUN tape libraries or external tape.

HP IO Accelerators

HP IO Accelerators are available for ProLiant DL and BL servers. For ProLiant Gen8 servers, we will be moving to 25nm NAND technology that will improve performance.

The HP IO Accelerator takes application performance to another level by moving storage closer to the CPU. The HP IO Accelerator has a latency of about 30 microseconds compared to 100 milliseconds for array controllers.

The HP IO Accelerator greatly increases performance for the following applications:

- Enterprise resource planning (ERP)
- Exchange
- SharePoint
- Business Intelligence and data warehousing
- Virtualization
- Multimedia
- Medical imaging

Management technologies

In every HP ProLiant Gen8 server, we integrate management and support software technologies into a seamless experience across the server lifecycle, including:

- Server management—HP iLO Management Engine
- Power monitoring and management—HP Systems Insight Manager 7.0 and HP Insight Control power management software
- Firmware and system software management—Service Pack for ProLiant and HP Smart Update Manager 5.0

Server management—HP iLO Management Engine

HP iLO Management Engine is a set of embedded management technologies that comes standard on all ProLiant Gen8 Servers. These technologies support the complete lifecycle of the server, including initial deployment, ongoing management, service alerting, and remote support (coming soon).

HP Agentless Management

The HP iLO Management Engine enables base hardware monitoring and alerting capability without the complexity of OS-based agents. And it's available the moment you connect a power cord and Ethernet cable to the server. HP Agentless Management Service is an optional add-on utility that provides OS configuration data and additional subsystem coverage.

HP Active Health System

The HP Active Health System is a diagnostic tool that continuously monitors and records every change in server hardware and system configuration. The Active Health System assists in diagnosing problems and rapidly resolving system failures.

Until now, a system issue without an obvious root cause required using multiple diagnostics tools to investigate the cause. These diagnostic tools may provide the necessary information, but you can only run them after an issue has developed. Another concern is that the tools often analyze subsystems individually instead of collectively. HP Active Health System removes these limitations.

HP Active Health System runs on iLO, so there is no impact on server performance. Active Health System logs every change in hardware and system configuration, variations in temperature and voltage, and every alert. HP support engineers can use this log to solve even the most elusive, intermittent issues in a lot less time. More important, you will spend less time resolving issues.

HP Intelligent Provisioning

HP Intelligent Provisioning provides out-of-the box, single-server deployment and configuration. To develop Intelligent Provisioning, we combined the best parts of SmartStart, ProLiant Support Packs, and HP Smart Update Manager. Then we enclosed them in an intuitive user interface and embedded them in a NAND flash chip on the motherboard.

All of the appropriate tools, drivers, and agents you need to set up, deploy, and maintain your system are there when you power up any ProLiant Gen8 server. You no longer need system and firmware CDs. You only need the OS and application discs. This makes deploying ProLiant Gen8 servers up to three times faster than deploying previous-generation servers. If some time passes before you deploy a Gen8 server, you can use the built-in update manager to access HP.com or your local repository, and download the latest updates. You can use this same update function to maintain your system.

Embedded HP Remote Support (coming soon)

In every ProLiant Gen8 server, we will be enabling HP iLO to access HP Insight Remote Support software. HP Insight Remote Support Software delivers secure 24/7 support for HP servers and storage. We can remotely monitor your systems for hardware failures using secure technology that's been proven at thousands of companies around the world. In many cases, our proactive monitoring and alerting can help you avoid problems before they occur. Insight Remote Support can start working for you after a few keystrokes on a single activation screen.

For more information, go to www.hp.com/go/iLO.

Management and power monitoring

We enhanced our monitoring and management tools—HP Systems Insight Manager 7.0 and HP Insight Control power management software—for ProLiant Gen8 servers.

HP Systems Insight Manager 7.0

We enhanced HP SIM for ProLiant Gen8 servers in regards to health monitoring, alerting, and version control.

Health monitoring and alerting

On ProLiant Gen8 servers, HP SIM will discover the iLO Management Engine and its host server without software agents. You do not need to install Insight Management agents or WBEM providers. The iLO Management Engine will detect core error conditions within the server and report those error conditions as SNMP alerts to HP SIM or other management consoles. The iLO Management Engine detects and reports error conditions for the following components:

- Embedded Smart Array controllers
- CPU
- Memory
- Power supplies
- Fans
- Thermal sensors

Version control

For previous-generation servers, the Version Control Agent (VCA) was responsible for determining whether the server is out of date with its assigned baseline. A baseline is a set of software and firmware that has been tested to work together on a particular server. That required a VCA on every server. On ProLiant Gen8 servers running HP SIM 7.0, users can assign the software and firmware versions that should be installed. The software column of the SIM system list indicates the status of the ProLiant server compared to the assigned baseline.

HP Insight Control power management software

For ProLiant Gen8 servers, we enhanced Insight Control power management:

- We added the Intelligent Power Discovery solution to BladeSystem enclosures attached to HP Intelligent PDUs. Insight Control power management will now automatically discover the power connections for the enclosures. For BladeSystem enclosures, you will no longer have to manually create and edit the rack in HP SIM and Insight Control.
- We upgraded Insight Control power management to help you identify unused or under-utilized servers that waste data center resources. Insight Control power management will generate a report summarizing system power consumption by CPU utilization and the age of the system. This enhanced report will aid in planning the retirement or repurposing of under-utilized servers.

- We let you import physical and power topology configuration updates into Insight Control power management from other data center infrastructure management (DCIM) tools, such as HP Asset Center. Before, you could import only initial configurations.

Firmware and system software management

In complex data centers, as well as environments with only a few servers, updates to deploy new features and bug fixes can be disruptive. We are addressing this industry-wide need to reduce update complexity and frequency with the release of HP Service Pack for ProLiant (SPP) and HP Smart Update Manager version 5.0. Together, these new management tools give you more flexibility, less downtime, and better overall operating stability. In addition, we provide 12 months of technical support from the month that we release the SPP.

Service Pack for ProLiant

An SPP is a comprehensive release set of systems software (drivers, agents, utilities) and firmware for all HP ProLiant SL, ML, and DL 300-, 500-, 700-, and 900-series servers and BL series servers, as wells as select DL 100 series servers. Each SPP contains firmware and software components that have undergone interdependency testing to ensure operational reliability. Each SPP supports deployment of servers running Microsoft Windows, Linux, and VMware operating systems.

An SPP includes a PXE bootable ISO and six subsets broken out by operating systems and ProLiant server types. Each subset includes software and firmware components required for specific users, so you can have a customized solution and faster downloads.

We will typically release three to five SPPs per year to coincide with HP ProLiant server releases. Occasionally, we will need to release firmware, software components, or both with critical fixes outside an SPP release. These are known as hot fixes. You do not have to update your servers with a hot fix unless it affects your server's configuration.

Firmware, software, hot fixes, and associated Customer Advisories for HP ProLiant servers and HP BladeSystem enclosure components will be available from the consolidated SPP download page (www.hp.com/go/spp).

For a complete list of supported servers, review the HP Service Pack for ProLiant Server Support Guide for each SPP release. For a list of the contents of the SPP, see the HP Service Pack for ProLiant Release Notes or the contents report. All of these are available at http://www.hp.com/go/spp, and then click the link for SPP Documentation.

HP Smart Update Manager 5.0

HP Smart Update Manager (HP SUM) 5.0 is the SPP deployment engine. HP SUM 5.0 has a simple, intuitive user interface that guides you through repository definition, device discovery, analysis, and updates. It provides comprehensive information on available updates, criticality, and interdependencies. It simplifies the firmware and software update process. It lets you schedule online updates, and improves reliability of the deployment and installation process. It is also scriptable through its command line interface and input file functionalities.

HP SUM 5.0 does not permanently install agents or software on the target servers. It uses SOAP (Simple Object Access Protocol) to push the update utilities from the HP SUM instance to the target server to execute the discovery, inventory, and scheduling of the correct components to be downloaded. After the update, HP SUM removes all software used during the update and creates a log of everything that occurred.

HP SUM 5.0 offers several advantages:

- It improves the efficiency of ProLiant server, BladeSystem server, and BladeSystem enclosure updates by preloading only what is needed and enabling online components.
- It lets you schedule updates and reboots to occur at convenient times and gives you the option to maintain multiple repositories to apply updates consistently.
- It provides faster online updates for enclosures through improvements in Onboard Administrator and Virtual Connect update times.
- It supports HP CloudSystem.

HP rack technologies

Our latest generation of racks has higher airflow efficiency and is deeper to accommodate ProLiant Gen8 servers. They are also designed for implementing HP Discovery Services.

HP Intelligent Series Rack

The elegant design of the next-generation HP Intelligent Series Rack (Figure 2) complements the design of ProLiant Gen8 servers and facilitates its industry-leading airflow efficiency. The rack provides 81% airflow capacity (compared to the capacity with the doors open).

We increased the standard depth of Intelligent Series Racks from 1000 mm to 1075 mm to improve cable management for ProLiant Gen8 servers. The extra space between the back of the servers and the rear doors also enables better air movement and higher cooling efficiency.

We increased the dynamic loading of the Intelligent Series Rack to a total of 2,300 lb. per rack—300 lb. more than our previous generation racks. This adds to our ability to preload racks at our Factory Express centers and then ship them to your site fully loaded and ready to go.

Figure 2: The HP Intelligent Series Rack has industry-leading airflow efficiency.

HP Discovery Services

HP Discovery Services technology includes Power Discovery Services and Location Discovery Services.

Power Discovery Services

ProLiant Gen8 servers and HP Intelligent Series Racks support Intelligent Power Discovery (IPD). IPD components include:

- One or more Intelligent Power Distribution Units (iPDUs), each with a management module and six or twelve monitored C-19 outlets
- One or more Intelligent Extension Bars, each with five monitored C-13 outlets
- IPD power cords with embedded RS-232 data lines
- HP Common Slot Platinum Plus Power Supplies with IPD connectors that support serial communication

When you connect these components as shown in Figure 3, the iPDU automatically detects and communicates with each server's iLO Management Engine before the servers are powered on. The

iPDU and the iLO devices exchange identity data—host name, IP address, serial number and more—through the IPD power cords. This allows the iPDU to track the servers plugged into each of its outlets. The iPDU provides this information to HP Insight Control power management software. You can use IPD securely because it does not use RFID or other signal emitting technology.

Figure 3: The iPDU communicates with each server's iLO Management Engine before you power on the servers.
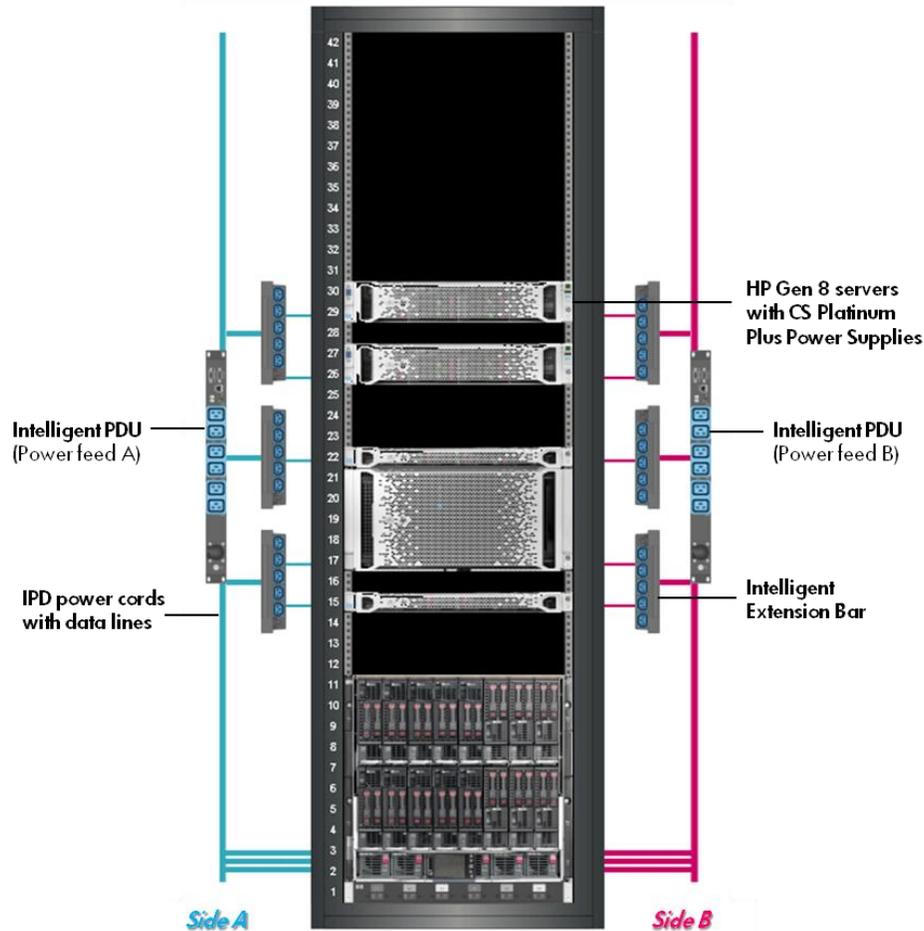
Insight Control power management can discover and communicate with iPDUs to retrieve the power topology and power measurement data. It lets you visualize, monitor, and control the power topology of a complete rack system from a central console, either locally or remotely.

Location Discovery Services

Location Discovery Services technology automatically reports server locations to HP SIM and Insight Control, eliminating this tedious manual task for server administrators. Administrators will be able to use the location information and system data with HP Asset Manager to obtain more precise and complete asset data.

Rack-level thermal mapping

Insight Control power management gathers data for correlating the location of ProLiant Gen8 servers with power usage, system and rack temperature data, and workloads. You can use this information to

manage the placement of servers and workloads better. This includes avoiding thermal alarms and moving workloads from hot spots where cooling is insufficient to systems with excess cooling. Moving workloads to eliminate hot spots can prevent over-provisioning of cooling and lead to much higher data center efficiency.

Conclusion

As you have read, the new technologies and capabilities in HP ProLiant Gen8 servers represent a leap in innovation. These servers combine the latest Intel Xeon E5 series processors, high-performance HP SmartMemory, HP FlexibleNetwork Adapters including FlexibleLOM modules, ProLiant Smart Storage options, and seamless server management capabilities to deliver enormous value to our customers. In addition, ProLiant Gen8 servers feature industry-leading power management software and the most advanced firmware and system software management update process available today.

All of these technologies work together within the elegant design of our Intelligent Series Racks to provide the best user experience of any ProLiant servers to-date.

For more information

Visit the URLs listed below for additional information.

Resource description	Web address
HP iLO Management Engine technologies	http://h18004.www1.hp.com/products/servers/technology/whitepapers/management.html
Storage device performance factors in the application layer	http://h18004.www1.hp.com/products/servers/technology/whitepapers/proliant-storage.html
Selecting storage controllers: technology considerations	http://h18004.www1.hp.com/products/servers/technology/whitepapers/proliant-storage.html
Technology considerations for selecting of a direct attached storage solution	http://h18004.www1.hp.com/products/servers/technology/whitepapers/proliant-storage.html

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