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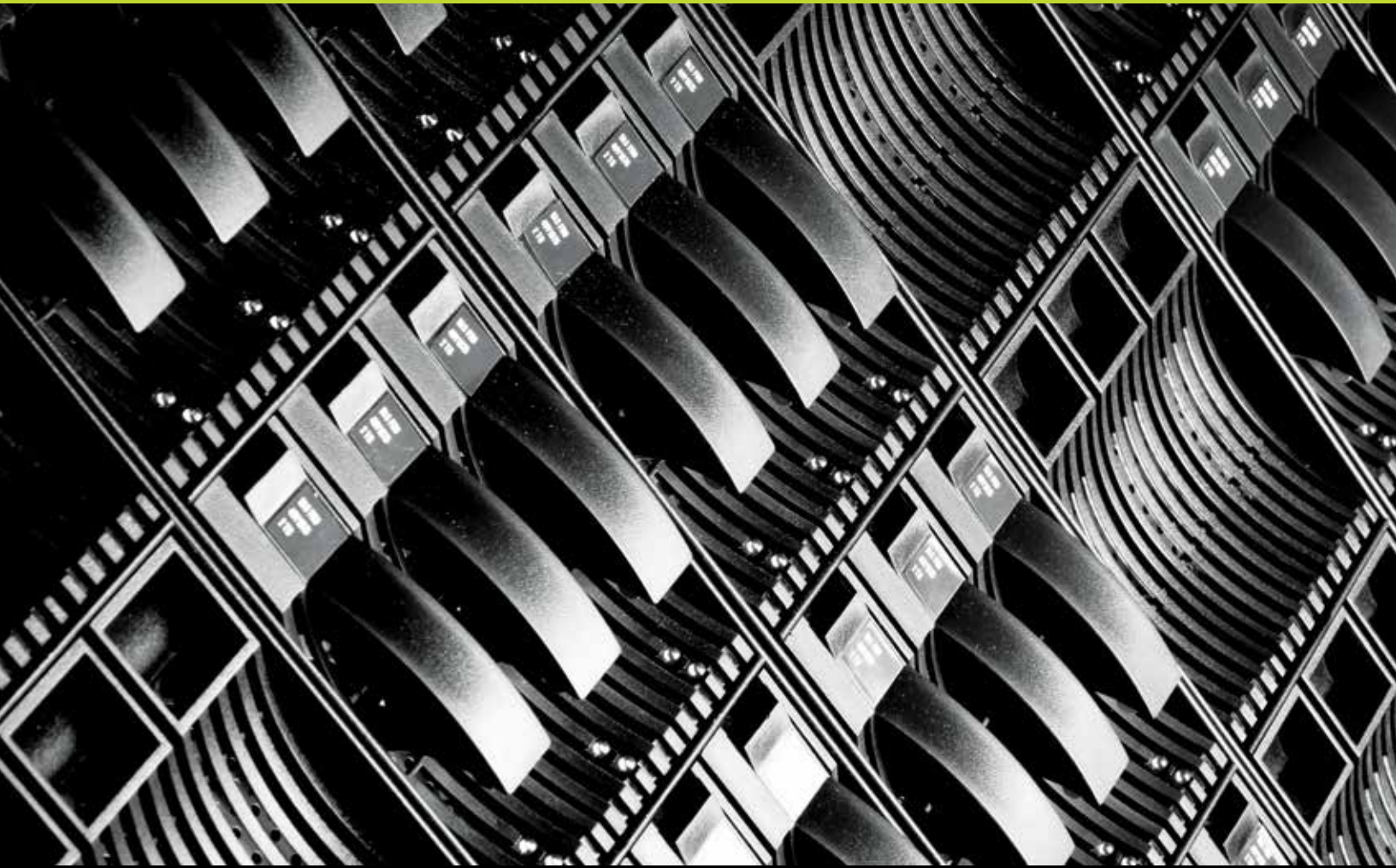
Enterprise Computing Solutions – North America

Intel Technology - HP® X86 Servers
What Sellers Need to Know

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HP Company Overview

Hewlett-Packard (HP) is a multinational company headquartered in Palo Alto, California, that provides information technology to small and medium business, large enterprises, and government. Founded by William (Bill) Redington Hewlett and Dave Packard, HP started in 1939 in a one-car garage producing a line of electronic testing equipment. Walt Disney Productions is counted as one of their first customers. HP's revenue was US$112 billion in 2013.

In 2014, HP announced plans to split the PC and printer business from its enterprise products and services business, which will create two publicly traded companies – Hewlett Packard Enterprise and HP Inc.

X86 Server Marketplace

The server market is very dynamic. Web Hosting Geeks published an article entitled, "Has the Worldwide Server Market Rebounded?" that looks at recent trends and the outlook for the server market in the future.

In the U.S., there are five major players in the server market – HP, IBM, Dell, Oracle, and Cisco. Gartner analyst Errol Rasit outlines the opportunities for each vendor in the cbronline. com article, "Top 5 Companies Driving the Server Market 2014." As a side note, Lenovo's purchase of IBM's System x line adds them to the mix in the U.S. market.

Also from an overall market perspective, Richard Fichera, VP and Principal Analyst at Forrester, discusses customer server buying trends as the first of two speakers in the webcast Get Forrester's Perspective on Today's Server Market (29:56 minutes). HP is the sponsor of the presentation and provides an update on their HP ProLiant Gen8 servers.

From a server market share perspective, HP provides an update on their market position in their article, "The Real Story About Server Market Share," which uses IDC quarterly update statistics.

The following HP successes are noted:

> #1 vendor in worldwide server revenue

> #1 vendor in worldwide server shipments for 49 straight quarters (12+ years!)

> #1 vendor in total blade server market with 42.2% share

> HP ProLiant is the x86 server market share leader in both revenue and units for 73 consecutive quarters (18+ years!)

> #1 in Windows revenue and units worldwide with 34.3% revenue share and leads Dell, the nearest competitor, by 6.0 percentage points

Customer Buying Motivations

What is driving the purchase of x86-based systems?

The IDC study, "The Cost of Retaining Aging IT Infrastructure," provides some interesting insight from an IDC server workload study of 1,000+ sites finding:

- 39% of new server acquisitions occurred as part of routine or planned server refresh.

- 33% of purchases were for new application project.

- 28% supported additional compute capacity.

In addition, IDC studies quoted in this white paper found:

- Maintenance/management costs generate twice as much in total IT costs as server acquisition.

- Failure rates begin to climb as servers aged into their fourth year and beyond.

- For every dollar invested in new technology, two and a half times was eventually saved over a period of three years per 100 users using the new system.

- 80% of staff time is spent on maintaining existing infrastructure; 20% is spent on innovation and value-added initiatives.

The cost savings found in this study revolved around several operating expense (OPEX) factors. This is a major selling point for new technology acquisition: hardware maintenance costs rise over time, new systems are more energy (and space) efficient, and older systems require more staff attention due to maintenance required and failures. Upgrading resulted in a return on investment (ROI) of more than 150% over three years. In addition, it found the payback period of the initial investment was 11.7 months.

From an operating environment standpoint, Windows is the dominate operating system for x86-based servers and represents approximately 60% of overall new license shipment volume. While Linux represents 40% of the volume according to the IDC white paper, "Oracle Linux: Engineered into a Business-Class Solution." This study also provides the following insights into the workloads of Linux servers:

- Linux is best known for bringing attributes that historically were associated with UNIX, including scalability, reliability, and portability to x86-based systems.

- Linux servers are the leading Web workload environment.

- The largest growth area for Linux is in the commercial workloads space.

- Linux holds in excess of 90% market share of HPC installations.

- Linux is ported to every major architecture in commercial use, including mainframes, CISC, RISC, x86, and low-end ARM and Atom processors.

- Linux captures approximately 50% of UNIX migrations, with Windows capturing the other 50%.

- IDC Research suggests that UNIX customers are great prospects for migration – in part due to the standardization efforts on Linux and x86 hardware.

Competitive replacements of older technology are also a good opportunity. Older IBM POWER-based UNIX systems are prime targets for replacement. The IDC white paper, "Server Transition Alternatives: A Business Value View Focusing on Operating Costs," was written to promote upgrading to newer POWER technology, but also provides several important points that apply to x86 servers, including:

- Customers can gain a quick ROI after upgrading to newer technology.

- A weakness of older POWER systems is energy consumption – an x86 server strength.

- POWER hardware and software maintenance fees for these servers rise over time, making them expensive to maintain as they get older –another compelling reason for customers to upgrade to new technology.

- Upgrading to newer POWER technology increases productivity for IT staff (reduced OPEX) and avoids hardware, software, and facilities cost requirements – both key value propositions for current x86 technology.

This study also highlights the importance of power and cooling costs. It notes that these costs grew eight times as fast a server acquisition costs. In addition, costs for maintenance and management, viewed as a category, grew four times as fast as server acquisition costs. Both of these areas are key selling points of x86-based systems. Customers looking to control these expenses make good prospects for selling new x86 technology.

Competitive conversions from HP Itanium or HP PA-RISC-based HP-UX systems and Oracle SPARC-based Oracle Solaris systems pose a ripe opportunity for sellers. The SUSE white paper, "The Case for Migrating from Itanium/HP-UX to x86/SUSE Linux Enterprise Server," provides a detailed discussion of the features and technology differences between HP-UX and Linux environments. SUSE covers Oracle Solaris to SUSE features and technology differences in the white paper, "The Case for Migrating from SPARC/Oracle Solaris to x86/SUSE Linux Enterprise Server." As an additional reference, the SUSE white paper, "Modernize Your Data Center," covers IBM POWER/AIX conversions to x86/SUSE Linux Enterprise Server.

HP ProLiant Servers

The HP ProLiant Gen9 portfolio is designed to improve economics with more compute per watt per dollar to meet the demands of today's IT needs. Leveraging the advancements of the HP ProActive Insight Architecture for automation and management,

HP ProLiant Gen9 includes the following innovations:

- Integrated Lifecycle Automation – Eliminates tedious tasks

- Dynamic Workload Acceleration – Turbo-charges application performance

- Automated Energy Optimization –Maximizes the use of space, power, and cooling in servers and infrastructure

- ProActive Insight Experience –Redefines the server experience

- System Architecture and Design –Makes servers intuitive

Features of the HP ProLiant Gen9 Systems

- HP Smart Socket guides – Simplified access and easy processor updates

- HP SmartDrives – Simplified monitoring, reduced data loss, and better serviceability

- HP SmartMemory – Improved performance, manageability, efficiency, reduced downtime, and lower energy costs

- HP Flexible Network adapters – Easy configuration and fast serviceability

- <u>HP iLO 4 management</u> – Complete set of embedded management features supporting the lifecycle of the server; speeds time-to-deployment, provides proactive notifications, and streamlines management

- <u>HP OneView</u> – Accelerated IT service delivers through automated configuration and lifecycle management, faster virtual machine provisioning, and accelerated transition to Infrastructure-as-a-Service (IaaS) and hybrid cloud.

Operating and Virtual Environments Supported by HP's x86 Servers

Operating Environments	Virtualization Environments
Microsoft® Windows™	VMware®
Red Hat® Linux	KVM
SUSE® Linux	Microsoft Hyper-V™
Canonica®l Ubuntu	Citrix® Xen™
Oracle® Linux	
CentOS™	
Oracle Solaris™	
NetWare/OES™	

Note: The operating systems and virtualization suppport matrix contains complete details.

The HP x86 server portfolio can be broken down into several market segments. Some models in each category cross-market segments due to their versatility. The following are the basic segments along with client requirements and the basic solution areas they are designed:

Segment	Client Requirements	Solutions	ProLiant Solution	Form Factor
Blades	-Integrated infrastructure -High density and performance -Single Management Interface -Superior redundancy	Virtualization, Cloud Enterprise level workloads, Grid computing Infrastructure applications Analytics	<u>ProLiant BL Series</u>	BladeSystem
Scalable Systems	Highest density Lowest cost Highest performance GPU support	High-performance computing Technical computing Cloud Scale-out data centers	<u>ProLiant SL Series</u> <u>Apollo Systems</u> <u>MoonShot System</u> <u>HP Clustered Platforms</u>	Rack Mount Rack Mount Rack Mount Rack Mount
Rack/Tower	General purpose computing Dense floating point calculations High-performance computing	Virtualization Cloud Web servers Infrastructure applications High-performance computing Technical computing	<u>ProLiant ML Series</u> <u>ProLiant DL Series</u>	Tower Server Rack Mount

HP ProLiant Rack and Tower Servers

HP ProLiant ML Series (tower) and DL Series (rack) servers are available in a variety of models to support different compute needs and workloads. The HP ProLiant Rack and Tower Servers Family Guide is a comprehensive overview of the product line.

HP ProLiant BL Series

The HP BladeSystem helps streamline and accelerate IT operations by converging compute, storage, network, management, and virtualization into one federated and automated infrastructure. HP's product portfolio includes HP BladeSystem Enclosure, HP ProLiant server blades, HP Virtual Connect and networking, Storage, along with management infrastructure and services.

HP ConvergedSystem

HP ConvergedSystem are purpose-built and designed to handle specific workload requirements. This software and hardware solution uses HP ProLiant systems as the hardware base. Currently there are six systems in the HP ConvergedSystem portfolio:

- HP ConvergedSystem for Virtualization

- HP ConvergedSystem for Big Data

- HP ConvergedSystem for HP OneView

- HP ConvergedSystem for Client Virtualization

- HP ConvergedSystem for Collaboration

- HP ConvergedSystem for Cloud

HP Scalable Systems

HP's Scalable Systems have a flexible design to meet Hyperscale needs, and the deliver leading-edge performance and efficiency for scale-out workloads, including high-performance computing (HPC) and big data. HP's scale-out portfolio includes HP ProLiant SL server series, HP Apollo family, HP Moonshot System, and HP Clustered Platforms.

HP ProLiant SL Server Series

The SL series includes the SL4540 Gen8 Server purpose-built for big data with up to 3 server nodes and up to 60 large form factor drives, the density-optimized SL210t server for web services and high-performance computing, and the ProLiant SL6500 Scalable system for high-performance computing and extreme density environments.

HP Clustered Platforms

HP Cluster platforms provide a broad choice of processors, cluster interconnects, and middleware to provide a powerful foundation for applications needing dense or modular configurations. Product offerings include HP Cluster Platform 3000, HP Cluster Platform 4000, and HP Cluster Platform 3000/4000SL. HP Clustered Software delivers a comprehensive software environment on either Windows or Linux to provide a tested, integrated solution.

HP Apollo Systems

HP's Apollo Systems are targeted for high-performance computing (HPC) workloads and deliver breakthroughs in rack-scale performance while providing the flexibility to tailor the system to meet workload needs. Systems include the air-cooled HP Apollo 6000 System and the water-cooled HP Apollo 8000 System.

HP ProLiant Moonshot System

HP Moonshot is designed to power infrastructure needs with workload optimized compute modules that use less space, lower power consumption, and reduce complexity. It is engineered, tested, and integrated for workload-specific performance. Compute cartridges are available for web serving, hosted desktops, video transcoding, application delivery, real-time data processing, and more. The Moonshot chassis supports 45 server cartridges and shares power, cooling, and network uplinks and switches. It is highly dense allowing 10 chassis per rack; and, with a quad core cartridge, it can provide the equivalent of 1,800 servers in a single rack. The HP Moonshot management software provides comprehensive capabilities, such as workload provisioning, along with health and power monitoring. The Moonshot Information Library provides detailed solution information.

HP Infrastructure Management Software

HP infrastructure management is delivered through a comprehensive portfolio of server management solutions, including:

Support Management

HP Insight Online is a cloud-based infrastructure management and support portal available through the HP Support Center that provides a personalized dashboard for simplified tracking of IT operations and support information. The Insight Online dashboard can be used to track service events and support cases, view device configurations, and proactively monitor HP contracts and warranties.

Converged Management

HP OneView is based on a unique architecture – an online management tool that speeds IT service rollouts and helps actively prevent error-induced downtime through a template-based, software-defined approach to management. HP OneView acts as an automation hub that performs infrastructure configuration and management tasks at the request of other applications. HP OneView is:

- Converged – Manages across compute, storage, and networking and provides a 50 percent reduction in tools to learn, manage, deploy, and integrate

- Software-defined – Template-based to guarantee that infrastructure is deployed and managed consistently

- Automated – Deploy a VMware vSphere cluster in five steps with HP OneView REST application programming interfaces (APIs).

HP Insight Control is a Windows-based central management server (CMS) that manages server nodes running both the Windows and Linux operating systems. It provides the same functionality as HP OneView, only HP Insight Control runs on the customer's server.

HP Virtual Connect Enterprise Manager delivers centralized connection management and workload mobility for HP Blade Servers that use Virtual Connect modules to access LANs, SANs, and converged network infrastructures.

Embedded Management

HP Integrated Lights-Out (iLO) Management is a complete set of management features that speeds time-to-deployment, maximizes server and application availability through proactive notification, and dramatically accelerates time-to-resolution when issues arise.

HP Smart Update solution (HP SUM / SPP) simplifies HP ProLiant server firmware and driver maintenance using HP Service Pack for ProLiant (SPP) or HP Smart Update Manager (HP SUM).

HP Intelligent Provisioning assists in the initial provisioning and deployment of HP ProLiant servers by providing all the needed drivers and software tools pre-loaded on the server.

Unified Extensible Firmware Interface (UEFI) BIOS mode delivers enhanced security benefits for HP ProLiant Gen9 servers and provides a standard set of interfaces between the system firmware, the operating system, and various system components.

HP RESTful Interface Tool stands for "Representational state transfer (REST)" and is a popular protocol for service-oriented architectural style. HP RESTful API provides a modern programmable interface and lightweight data model specification.

HP Scripting Toolkit for Windows and Linux offers a flexible scripting toolkit to automate steps in deployment of HP ProLiant server configurations, which facilitates the rapid and speedy deployment of high volumes of servers.

HP Scripting Tools for PowerShell include a powerful set of utilities that can be used to perform various configuration tasks on HP servers, resulting in a simplified and consistent infrastructure management experience for Microsoft's Windows PowerShell.

High Availability

HP ServiceGuard for Linux is a high availability and disaster recovery software for Linux environments.

Hyperscale and Service Provider

HP Insight Cluster Management Utility (iCMU) is a customizable and robust hyperscale cluster lifecycle management framework and suite of tools that manages large High-Performance Computing (HPC) and large-scale data analysis environments.

Intel Server Processors

Many of HP's x86 servers are based on Intel processors. New technology generations provide improved performance and/or reduced power. As Intel fellow Mark Bohr explains in his video, "14nm Transistor Explained – Following the Path of Moore's Law," the reduction in transistor size from 22nm to 14nm provides better performance and less overall power consumption. The technical presentation, "Advancing Moor's Law in 2014 – The Road to 14nm," provides additional details of the benefits of 14nm transistors.

The latest version of Intel's server processors is Haswell, which was developed on a 22-nanometer process and is the successor to Ivy Bridge. Intel has a "tick-tock" strategy – an innovation cadence in microprocessor manufacturing and microarchitecture with new advancements every other year.

The next generation of processors in 2015 will be Broadwell, Intel's fifth-generation Core processor, and will ship in the first quarter of next year. In the second half of 2015, users will be able to buy the newer Skylake architecture, which will bring wire-free computing and significant performance upgrades. Intel's next generation 10nm Cannonlake microarchitecture will arrives in 2016. The Cannonlake microarchitecture being a die shrink and is regarded as a "TOCK" as interpreted through the Intel Tick-Tock model, hence it will replace the Skylake platform utilizing the benefits of the same processor architecture on a smaller 10nm node.
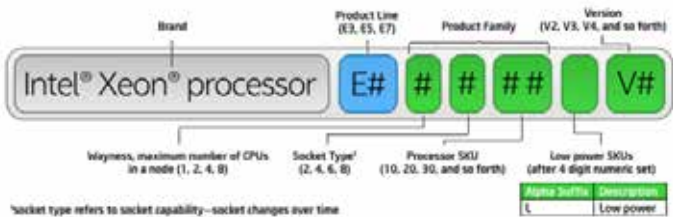
Intel Mainstream Platforms Comparison Chart

	Intel Ivy Bridge Platform	Intel Haswell Platform	Intel Broadwell Platform	Intel Skylake Platform	Intel Cannonlake Platform
Processor Architecture	Ivy Bridge	Haswell	Broadwell	Skylake	Cannonlake
Processor Process	22nm	22nm	14nm	14nm	10nm
Processors Cores (Max)	4	4	4	4	TBA
Platform Chipset	7-Series "Panther Point"	8-Series "Lynx Point"	9-Series "Wild Cat Point"	100-Series "Sunrise Point"	200-Series "Union Point"
Platform Socket	LGA 1155	LGA 1150	LGA 1150	LGA 1151	TBA
Memory Support	DDR3	DDR3	DDR3	DDR4 / DDR3	DDR4
Thunderbolt	Yes	Yes	Yes	Yes "Alpine Ridge"	Yes
Launch	2012	2013-2014	2015	2015	2016

Intel Server Processors

Intel provides guidance on selecting the proper processor based upon workload in the Intel Xeon Processor-Based Selection Guide. View an explanation of Intel's processor naming conventions in the illustration below. For expanded details, see About Intel Processor Numbers.

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Intel Atom Processor

The Intel Atom is a line of ultra-low-voltage microprocessors. The current version of these processors uses the Silvermont microarchitecture. The family of processors designed for use in servers is the 64-bit Avoton family, which uses a 22nm manufacturing process.

The brand names for these processors are:
- Two core model: **C2350**
- Four core models: **C2550** and **C2530**
- Eight-core models: **C2750** and **C2730**.

The Atom also has families of processors designed and targeted for smartphones (Merrifield, Moorefield), tablets, netbooks, hybrid devices (Bay Trail), and network and communication infrastructure (Rangeley).

More Intel Inside

In addition to the processors, Intel produces a line of Solid State Drives (SSDs) to provide enterprise SSDs to data centers for extreme data throughput. Intel's Data Center SSD Products can provide SSD capacities up to 2.0TB. The Intel Solid State Drive Data Center Family for PCIe Brief provides additional information. Also see a summary of the Intel Data Center SSD product lines in the chart below:

Intel Data Center Product	Capacity (GB)	Sequential Read/Write (max MB/s)	Random 4KB Read/Write (max IOPS)	Form Factor	Interface
DC P3700 Series	400 /800 / 1.6TB / 2.0TB	2,800 / 2,000	460,000 / 175,000	2.5-inch and HHHL AIC	PCI Express Gen 3
DC P3600 Series	400 / 800/ 1.2TB /1.6TB /2.0TB	2,600 / 1,700	450,000 / 56,000	2.5-inch and HHHL AIC	PCI Express Gen 3
DC S3700 Series	100 /200 /400 /800	500 / 460	75,000 / 36,000	2.5 and 1.8 inch	SATA 6 Gb/s
DC S3500 Series	80 / 120 / 160 / 240 / 300 /340 /400 /480 600 / 800 / 1.2TB / 1.6TB	500 / 460	75,000 / 15,500	2.5 and 1.8 inch M.2	SATA 6 Gb/s

In addition, Intel provides high bandwidth I/O adapters. These adapters use the latest technology to provide enterprise class communications for the data center. Intel Ethernet Converged Network Adapters and 10 Gigabit Server Adapters portal provides product information and additional details.

Competitive Landscape

DELL®

Dell's PowerEdge Servers are offered as PowerEdge towers, PowerEdge Racks and Dell Shared infrastructure. Dell OpenManage portfolio provides system management capabilities. Dell boasts their PowerEdge VRTX is the first IT integrated IT solution designed specifically for remote-office. Dell's press release "Dell Introduces its Most Advanced Server Portfolio to Address Broadest Range of Business Computing Needs" from September 8, 2014, provides the latest update on Dell's portfolio.

IBM®

IBM offers their IBM Power Systems line of servers as a solution for large enterprises. The latest systems are designed with their POWER8™ architecture whose designs are available for licensing under the OpenPOWER Foundation. POWER8 is designed to be a massively multithreaded chip with each of its cores capable of handling eight hardware threads simultaneously, for a total of 96 threads executed simultaneously on a 12-core chip. For external communication, POWER8 uses the CAPI port (Coherent Accelerator Processor Interface), which is layered on top of PCI Express 3.0. POWER8 comes in two variants, one 6-core and one 12-core version, each fabricated using a 22nm process.

IBM Power Systems are the primary non-x86 based competitor to HP's x86 servers. Find below a few competitive notes on x86 vs. Power architectures.

> Simultaneous multithreading (SMT) is a technique for improving overall efficiency by providing multiple independent threads of execution to better utilize resources provided by processor architectures. Intel refers to this feature as hyper-threading and multithreading by other vendors. Intel Xeon processors offer two threads per core. IBM Power 7 processors provide four threads per core, while the IBM POWER8 processors provide eight threads per core. Applications must be written to take advantage of this feature. In a competitive situation when matching processor throughput with IBM Power systems, multiple Xeon processor may need to be configured to match threading throughput.

> Many organizations have adopted a standard for server virtualization. Intel x86-based systems support VMware vSphere, Citrix Xen Server, Microsoft Hyper-V, and KVM for virtualization. IBM Power-based systems support only the IBM proprietary PowerVM and a version of KVM named PowerKVM for virtualization. Many customers have standardized around VSphere, Xen, or Hyper-V, meaning they must adopt a new virtualization technology in order to adopt IBM Power system.

> Organizations have also standardized on Windows for their servers. IBM Power Systems only support their proprietary AIX operating environment along with Red Hat, SUSI, and Ubuntu Linux. IBM no longer offers a product that runs Windows with the sale of their System x brand to Lenovo.

> When compared to IBM's Power systems dedicated to Linux, HP ProLiant servers offer more internal storage.

> Generally, IBM Power-based Linux systems will have a higher cost of ownership (hardware and software acquisition costs along with any services charges incurred) over three years when compared to HP ProLiant servers. A calculation based upon relevant configurations and individual sales situations should be completed to verify this assertion.

Systems Based on POWER8 Technology

Model	Form Factor	Processors	Max Cores	Operating System	Max Memory	Virtualization
S812L	2U rack	1	512GB	Red Hat Linux™ , SUSE™ Linux, Ubuntu™ Linux	12	IBM PowerVM™, IBM PowerVM Linux PowerKVM®
S814	4U rack	1	512GB	IBM AIX™, IBM i™, Red Hat Linux , SUSE Linux, Ubuntu Linux	8	IBM PowerVM, IBM PowerVM Linux, PowerKVM
S822	2U rack	2	1024GB	IBM AIX, IBM i, Red Hat Linux, SUSE Linux, Ubuntu Linux	20	IBM PowerVM™, IBM PowerVM Linux PowerKVM®
S822L	2U rack	2	1024GB	Red Hat Linux, SUSE Linux, Ubuntu Linux	24	IBM PowerVM Linux PowerKVM
S824	4U rack	2	1024GB	IBM AIX, IBM i, Red Hat Linux, SUSE Linux, Ubuntu Linux	24	IBM PowerVM Linux PowerKVM
S824L	4U rack	2	1024GB	Red Hat Linux, SUSE Linux, Ubuntu Linux	24	IBM PowerVM, IBM PowerVM Linux, PowerKVM
E870 1 or 2 Nodes	7U rack	8 (4 per node)	2TB or 4TB	IBM AIX, IBM i, Red Hat Linux, SUSE Linux, Ubuntu Linux	40 or 80	IBM PowerVM, IBM PowerVM Linux, PowerKVM
E880 1,2,4 Node	7U rack	16 (4 per node)	4TB, 8TB or 16TB	IBM AIX, IBM i, Red Hat Linux, SUSE Linux, Ubuntu Linux	48, 96 or 192	IBM PowerVM, IBM PowerVM Linux, PowerKVM

LENOVO ®

Lenovo provides a line of x86 computer systems that includes laptops, tablets, desktops, all-in-ones, workstations, servers, and storage. Lenovo's line traditionally focused on rack servers and towers with their ThinkServer® tower servers and ThinkServer rack servers. With the acquisition of IBM's System x® line, Lenovo's server line is expanded to not only include System x tower servers and System x rack servers, but also into new areas for Lenovo with System x high density servers, System x blade servers, and System x enterprise servers.

The System x product line boasts X6 architecture that provides X6 modular book technology, integrates flash memory technology, and provides for features on demand.

FUJITSU®

Fujitsu provides a diverse product line with x86, UNIX and Mainframe servers. Fujitsu SPARC servers use the SPACRC64™ processor and run the Oracle Solaris (UNIX) operation system. Fujitsu's x86-based lineup includes the PRIMERGY Blade Servers, PRIMERGY rack server, PRIMERGY tower servers, and PRIMERGY Scale-out servers. In addition, Fujitsu has the high-end x86-based PRIMEQUEST systems designed for business-critical and mission-critical computing.

Oracle®

Oracle provides a portfolio of servers that include SPARC and x86 systems. Oracle SPARC servers run the UNIX-based Oracle Solaris operating systems. Sun Server X4 series are rack-mounted servers. The Sun Blade x86 Modules provide a blade solution; and the Sun Netra x86 Servers provide carrier-grade servers for communications deployments.

Cisco®

Cisco focus their offerings around blade, rack and integrated systems. Cisco Unified Computing Products (UCS) offerings include Cisco UCS Invicta , Cisco USC M-Series Modular Servers, Cisco USC B-Series Blade Servers, and Cisco USC C-Series rack servers. System management is provided by Cisco UCS Manager, Cisco UCS Central and Cisco UCS Director.

Benchmarks

- HP Server Benchmarks Application – Provides the ability to search for benchmark briefs by any combination of solutions, benchmarks, or products

- New HP ProLiant DL380 Gen9 Server Achieves Overall World Record for Two-Processor Servers on Two-Tier SAP® Sales and Distribution (SD) Standard Application Benchmark

- New HP ProLiant DL360 Gen9 Server Achieves World Records on SPECvirt_sc2013 Benchmark

- New HP ProLiant ML350 Gen9 Server Wins Five Records on SPECjbb2013 Benchmark

White Papers

- IDC: The Business Value of Blade Infrastructure – This analyst report discusses the challenges of IT complexity and how these challenges lead to business inefficiency. It presents Jeb Scaramella's analytics perspective along with how blade systems and management tools addresses these IT challenges.

- IDC: Business Risk: Effective Technology Protecting Your Business – IDC looks at customer-based studies and how to mitigate business risk and avoid unplanned downtime.

- IDC: Support for today's converged and integrated environments and highly virtualized architectures – This paper discusses how HP OneView provides important management tools for systems management.

- IDG: Rethinking IT to Drive Business Value – This paper highlights voice-of-the-IT-buyer research and provides insights on the challenges and opportunities for IT to drive innovation.

- HP: HP Insight Online – Learn how to easily monitor the IT environment with the proactive device management tool HP Insight Online.

- HP: HP iLO – This is a discussion on why customers prefer HP ProLiant because of built-in HP Integrated Lights-Out (ILO).

- HP: HP Insight Online direct connect architecture and security model – This white paper provides an understanding of HP's automated support infrastructure for HP ProLiant servers and HP BladeSystem enclosures.

- Forrester:The Total Economic Impact of HP BladeSystem – Forrester Research conducted a survey of why customers chose HP BladeSystem.

- IDC: Business Value of Blades Infrastructure – This white paper examines how seven enterprises and mid-size companies were able to reduce their annual IT cost by 58% by migrating to a blade platform.

Selling Resources

- <u>IDG Interactive Infrastructure Optimization Assessment Tool</u> – This tool allows the selection of up to three areas of infrastructure optimization and compares inputs to 300 enterprise decision-makers.

- <u>HP Server Management for Dummies®</u> – This is a "Dummies" series ebook that addresses HP server management.

- <u>HP ProLiant Training and Education</u> – This portal contains training and education courses, curriculums, and links to certification courses.

- <u>HP ExpertOne Training and Certification</u> – Here you can learn by product or by solution, and find learning path and certification program descriptions.

- <u>HP HPC Library</u> –Key documents and multi-media about High-Performance Computing can be found here, including documents, brochures, case studies, we casts, and podcasts.

- <u>Eight Steps to Building and HP BladeSystem</u> – This is a step-by-step guide to building your ideal HP ProLiant BladeSystem infrastructure solution.

- <u>Intel Product Information and Comparison Tool</u> – This tool includes detailed product information on Intel processors, chipsets, boards, kits, servers, solid state drives, networking, I/O, and software that includes a reference of products by code names.

- Power consumption is an important factor when considering a new server purchase. The following are the power calculators for major server vendors:
    - <u>Cisco – UCS Power Calculator</u>
    - <u>Dell – Data Center Capacity Planner</u>
    - <u>HP BladeSystem Sizer</u>
    - <u>HP ProLiant Power Calculators</u>
    - <u>HP Power Advisor</u>
    - <u>IBM System Energy Estimator for Power Systems</u>
    - <u>IBM System x Power Calculator</u>
    - <u>Oracle Sun Power Calculators</u>

Are You Five Years Out?

Most people live in the present. The world of now. But a handful of us work in a unique world that doesn't quite exist yet—the world of Five Years Out.

Five Years Out is the tangible future. And the people who live and work there know that new technologies, new materials, new ideas and new electronics will make life not only different, but better. Not just cheaper, but smarter. Not just easier, but more inspired.

Five Years Out is an exciting place to be. So exciting that, once you've been there, it's hard to get excited about the present. Because we know what's coming is going to be so much better.

Five Years Out is a community of builders, designers, engineers and imaginers who navigate the path between possibility and practicality. Creating the future of everything from cars to coffeemakers.

Are you one of them? Then you're probably working with us.

In Person

800 544 7674
Call to talk or set up a face-to-face meeting
with one of our knowledgeable representatives.

Online

arrow.com
Visit our website for everything from the
latest news to line card information.

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