Data sheet

HP ProLiant WS460c Gen9 Graphics Server Blade

Boost productivity with high-octane end-user computing

March 2015

The HP ProLiant WS460c Graphics Server Blade is the cutting-edge of high-performance end-user computing. It centralizes workstations in the data center where they can be more securely, easily, and economically managed. The result is improved end-user productivity, reliable operational efficiency and business continuity, and enhanced change management agility allowing for the right GPU performance for the right job.

HP ProLiant WS460c Gen9 Graphics Server Blade
- Delivers the industry's most comprehensive graphics acceleration capabilities for virtual desktop infrastructure (VDI) in a blade form factor
- Delivers up to 70 percent performance increase with the new Intel Xeon E5-2600 v3 12-core processors[1] and enhanced HP DDR4 SmartMemory at speeds up to 2,133 MHz
- Achieves up to 3X improvement in user density[2] for savings in power and space
- HP OneView delivers the Power of One—one infrastructure, one management platform—to transform business economics by accelerating service delivery up to 66X faster while reducing data center costs[3]

Meet user demands for high-performance graphics

The consumerization of IT and bring-your-own-device (BYOD) expectations, along with the explosion of video and multimedia has accelerated the demand for performance-driven remote graphics capabilities. Organizations that rely on high-performance graphics acceleration applications—including financial trading, computer aided design (CAD), Web design, digital content creation, Education, Public Sector, Oil & Gas, and Healthcare—are asking themselves one question:

"How do we enable graphics-accelerated end-user computing that allows workstation-class application performance and visual fidelity accessible from anywhere, at any time, and on any device while also ensuring the protection of corporate information and minimizing management?"

The HP ProLiant WS460c Gen9 Graphics Server Blade now delivers even more performance with new Intel® Xeon® Processor E5-2600 v3 processors and 2,133 MHz DDR4 memory. It is the industry's first bladed technology to support up to six MXM form factor GPUs per blade, lowering the cost per user while enabling remote users to easily complete large model visualizations.

NVIDIA GRID K1 and K2 boards
HP has expanded its comprehensive set of graphics offerings with NVIDIA GRID solutions that, for the first time, support hardware GPU virtualization and multiple GPUs on a single adapter card, providing an excellent end-user experience.

NVIDIA GRID GPU adaptors have an optimized multi-GPU design that helps to maximize user density. GRID K1 boards, which include four Kepler based GPUs and 16 GB of memory, are designed to host the maximum number of concurrent users. GRID K2 boards, which include two higher-end Kepler GPUs and 8 GB of memory, deliver maximum density for users of workstation-class graphics applications.

With GRID, users benefit from the best of both software virtualized and pass through GPU technologies, because the virtual machine (VM) shares the resource of a GPU, but has direct access to the dedicated resources of the GPU.

[1] Intel® performance testing, on platform with two E5-2697 v2 (12C, 2.7GHz), 8x8GB DDR3-1866, RHEL6.3. Platform with two E5-2697 v3 (14C, 2.6GHz, 145W), 8x8GB DDR4-2133, RHEL 6.3, April 2014
[2] Outfits 3X more NVIDIA Quadro K3100M GPUs in the same HP c-Class enclosure space vs. using WS460c Gen9 without expansion blade.
[3] IDC report, January 2014 #246385.

Pass-through GPU

The HP ProLiant WS460c Gen9 Graphics Server Blade delivers the industry's first support for MXM form-factor graphics with up to six GPUs per blade with PCI Express (PCIe) Gen3 x 16 GPU support—all on the proven HP ProLiant Gen9 architecture.

This solution enables a lower cost per seat through multi-tenancy in a virtualized environment while keeping a dedicated GPU per user for performance, and taking full advantage of NVIDIA drivers. This is beneficial to users who utilize high performance graphics applications in multiple industries.

The HP ProLiant WS460c Gen9 Graphics Server Blade provides a local workstation for a high performance PC experience to end users over the network using industry standard remote protocols such as Citrix® HDX 3D and VMware® PCoIP. Initially, the server blade was introduced as a bare metal 1:1 solution, meaning that a client operating system was loaded on the blade for a single user. The HP WS460c G6 systems made a giant leap forward with its industry first ability to virtualize the server blade by connecting a GPU directly to a virtual machine (first supported by XenServer 6). This allowed multiple graphics-accelerated VMs to support a range of needs from media rich PCs to high performance 3D workstations. Now with the Gen9 version, the new graphics offering and GPU density has taken another giant leap forward.

High-performance graphics acceleration—from media-rich PCs to 3D accelerated graphics users

True Virtual GPU

Also known as "NVIDIA GRID vGPU" is the NVIDIA/Citrix/VMware implementation of the technology, True Virtual GPU offers the benefit of GPU scaling like the software virtualized GPU (application programming interface [API] intercept) and provides the performance of a native NVIDIA graphics driver like the pass through models (see figure 1).

This technology is currently implemented by the NVIDIA GRID K1 and K2 products. The GRID GPU is shared between multiple VMs similar to API intercept. However, in this model each VM has direct access to the GPU via dedicated channels managed by the NVIDIA GRID vGPU Manager. Unlike the software virtualized GPU (API intercept) model, the NVIDIA vGPU Manager within the host hypervisor manages the VM to GPU channels, guaranteeing that each VM has a dedicated amount of Video RAM per user and direct access to the GPU. Administrators will have the ability to assign one to eight users per physical GPU depending on their workload needs.

Figure 1. HP ProLiant WS460c Gen9 Graphics Server Blade with NVIDIA GRID configurations
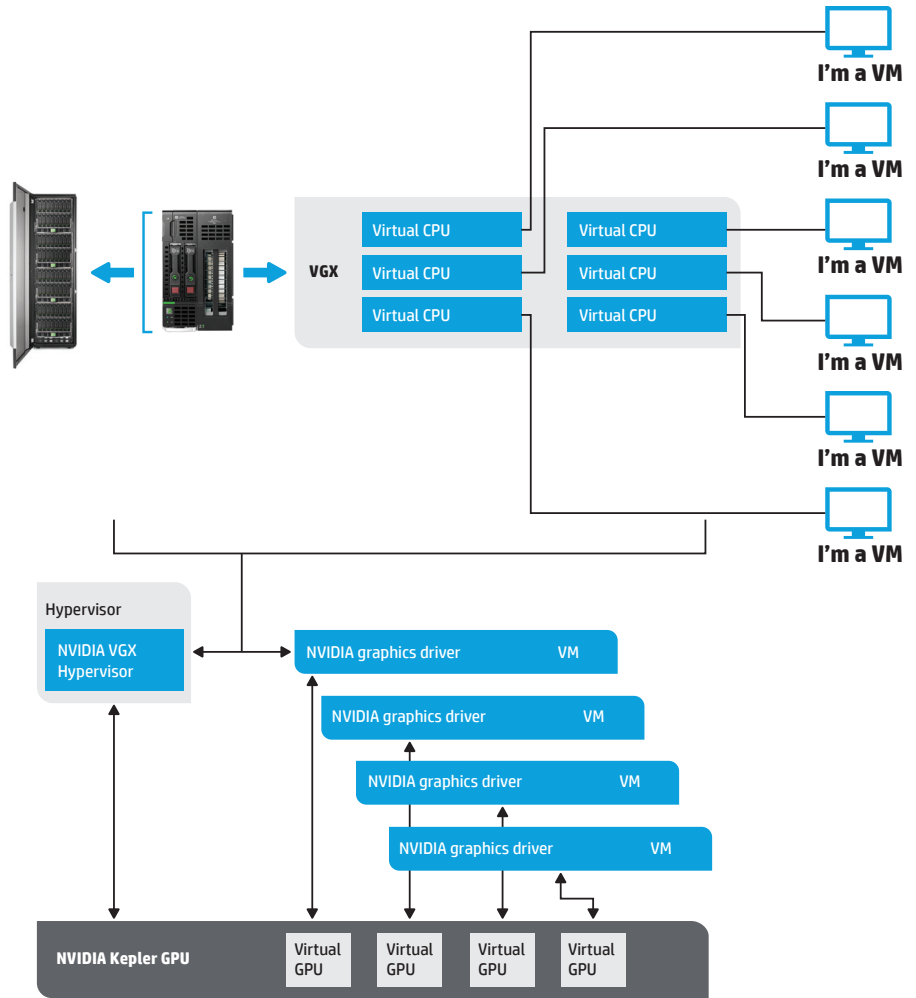
Multi-GPU configurations
The HP ProLiant WS460c Gen9 Graphics Server Blade has two options for the base blade configuration (see figure 2): the single width base blade or double width blade with graphics expansion. The base blade supports up to two MXM style graphics cards installed on the blade mezzanine slots, while the expansion blade allows installation of full size high-end graphics cards.

The HP WS460c Gen9 HP Multi-GPU Carrier card allows for up to six GPUs (MXM style) to be installed in the blade, creating three times more GPU density in the same 10U enclosure than similar performance-class graphics in single-width blades.

High-performance desk-side graphics experience
The HP ProLiant WS460c Gen9 Graphics Server Blade delivers an outstanding performance experience across all media rich PC and workstation class users.

• Share advanced media rich workstation or PC graphics remotely, with 2D and 3D multi-display, and full-motion video capabilities

• Drive up to six displays per client device and run multiple computing sessions from each, so professionals have access to the compute and graphics performance they need, on demand

• Meet a full range of graphics users' demands for flexible high-end graphics solutions on client and server OS, both for bare metal and virtualized environments

• See substantial graphics performance gain—from simple Microsoft® Office documents to full blown solid modeling applications—on HP Thin Clients with new graphics pass through capabilities and new hardware-based graphics on HP blade servers

Figure 2. HP ProLiant WS460c Gen9 Graphics Server Blade and Expansion Blade with MXM and Multi-GPU Carrier configurations
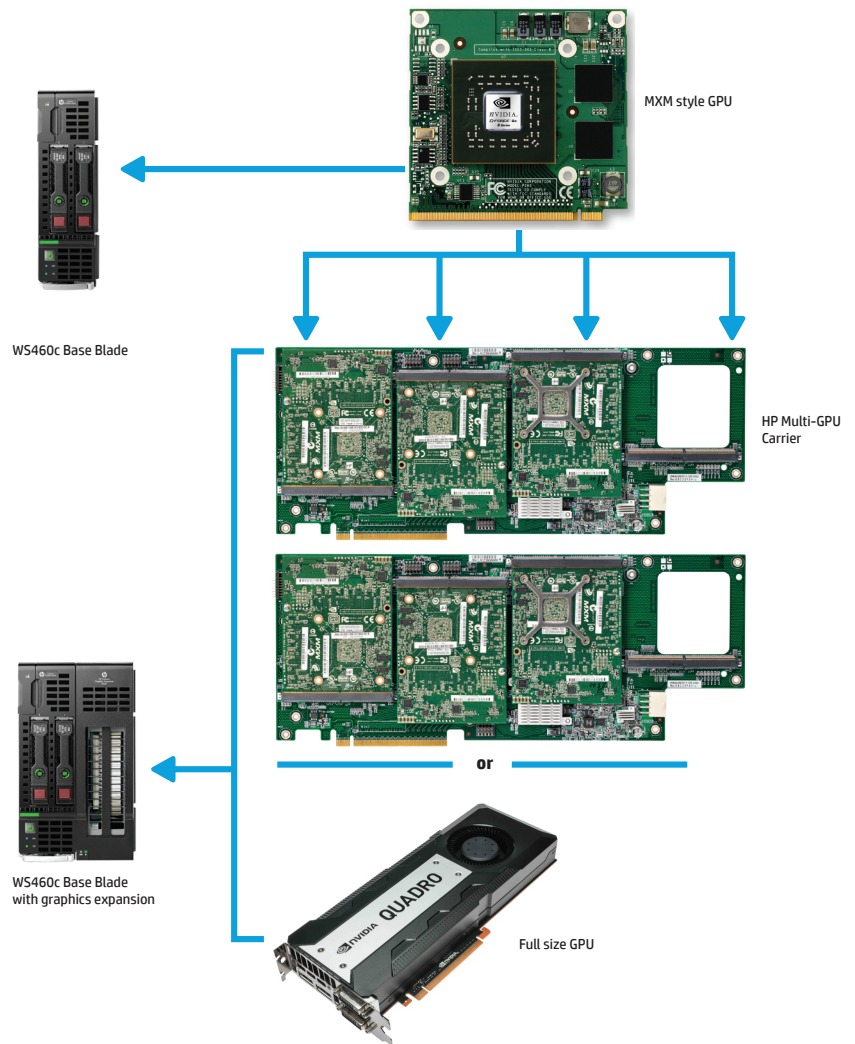
Remote access for greater productivity and flexibility

HP ProLiant WS460c Graphics Server Blade customers report that their users love the ability to access their workstation or media rich PC remotely from home or on the road—increasing their productivity. The HP ProLiant WS460c Gen9 Graphics Server Blade paves the way for new business models by removing distance barriers. It accomplishes this with reliable network-enabled access and HP Integrated Lights-Out (HP iLO) management.

• Access resources easily from thin clients, workstations, PCs, and almost any mobile device through Citrix and VMware solutions

• Provide segregated graphics and applications access for remote contractors

• Experience faster load and save times for large data sets or media files sitting in the data center and connected to your high bandwidth data stores

• Increase the ability to maintain a single working data set

• Deliver not only flexible, on demand, high-configuration resources (processor, memory, and graphics) for time sensitive tasks, but also significant hardware utilization levels by using the WS460c Graphics Server Blade as a pooled resource in the data center

• Enable high performance levels and resource utilization through the ability of partner (Citrix, Microsoft, and VMware) protocols to take advantage of the graphics processors delivering a robust user experience

Data center security and control

The HP ProLiant WS460c Gen9 Graphics Server Blade lowers risk by ensuring all data remains in the data center, reducing exposure to your confidential business information.

• Benefit from mission critical security and low latency data access across the workstation environment

• Reduce the risk of company data exposure from loss or theft of local hard drives, removable media drives, data interfaces such as USB and SD cards or even client systems

• Maintain better control over the IT environment by eliminating unauthorized software loads or data removal

• Enable contractors to work on projects without providing access to sensitive data

Business continuity

• Configure redundant N+1 or N+N Power supplies, fans, interconnects, and On Board Administrator management units

• Optimize the use of your existing data center power infrastructure with HP ProLiant Server Dynamic Power management; measure power utilization and set power caps that enable an overloaded data center to add additional servers without the cost of bringing in additional power

• Dramatically improve business continuity with multi-blade and multi-site capabilities

• Run multiple HP ProLiant WS460c Gen9 Graphics Server Blade sessions from a single client and connect to any data center to intelligently balance and shift compute resources in the event of a problem

• Be prepared for incidents such as power loss and catastrophic disasters, with data center computing environments that can be accessed more securely from any location

Common client virtualization platform

Whether your client virtualization strategy is based on VMware, Citrix, or Microsoft, you can resource and manage all your desktop compute needs from a common graphics-enabled virtualization solution—no matter if they are for task workers, productivity users, knowledge workers, power or media rich PC users, or high performance 3D workstation users.

Accelerate IT service delivery with agile infrastructure management

By providing a comprehensive set of management offerings, HP can meet your management needs at every stage of the server lifecycle with three types of solutions:

• On-premise management

• On-system management

• On-cloud management

On-premise—HP OneView, our single, software-defined management platform, accelerates IT service delivery through automated configuration, lifecycle management, and faster virtual machine provisioning, and it helps accelerate the transition to Infrastructure-as-a-Service (IaaS) and hybrid cloud.

On-system—On-system management provides embedded tools and scripting tools on all HP servers that increase server administrator productivity and simplify the server management experience. On-system management portfolio includes Unified Extensible Firmware Interface (UEFI), HP Intelligent Provisioning, HP iLO, HP Smart Update Manager (HP SUM), Service Pack for ProLiant (SPP), Scripting Tools (Scripting Toolkit for Linux® and Microsoft Windows®, HP Scripting Tool for Windows PowerShell, and the HP RESTful Interface Tool).

On-cloud—HP Insight Online is a cloud-based infrastructure management and support portal providing fast problem resolution and easy access to the information you need to support your IT environment. You can use the Insight Online dashboard to track device health, service events and support cases, view device configurations, create custom reports, and proactively monitor HP contracts and warranties. You can also use the HP Insight Online dashboard in the HP Support Center Mobile App to stay up to date while on the go.

Technical specifications

HP ProLiant WS460c Gen9 Graphics Server Blade

Compute	Intel Xeon Processor E5 2600 v3 series, 4/6/8/10/12/14/16/18 cores
I/O expansion slots	x 16 PCIe 3.0 Type A (supports Type A mezzanine cards) (expansion slot 1) x 16 PCIe 3.0 Type B (supports Type A and Type B mezzanine cards) (expansion slot 2)
HP Smart Socket Guide	Yes
Memory	(16) DDR4, up to 2,133 MHz (512 MB max)
HP SmartMemory	Yes
Graphics cards	NVIDIA Quadro K3100M, GRID K2, K1, Quadro K6000, K5000, K4000; HP Multi-GPU with three NVIDIA Quadro K3100M
Storage	Standard HP Dynamic Smart Array B140i with choice of HP Smart host bus adapter (HBA) H244br, or HP Smart Array P244br for performance or additional features
HP SmartDrive	Yes
FBWC	1 GB DDR3-1,866 MHz, 72-bit wide bus at 14.9 GB/s on P244br
Networking	One (1) 20 Gb 2-port FlexFabric FLB, 10 Gb 2-port HP FlexFabric FLB, or 10 Gb 2-port Ethernet FLB
HP FlexibleLOM	Yes
On-premise management	HP OneView and HP iLO Advanced for BladeSystem
On-cloud management	HP Insight Online with enhanced mobile app
On-system management	HP iLO, SPP, HP SUM, Scripting tools (Scripting toolkit for Linux and Windows, HP Scripting Tools for Windows PowerShell, and HP RESTful Interface Tool)
Power and cooling	Enclosure based (94 percent Platinum)
3D Sea of Sensors	Yes

Technical specifications (Continued)

Processor and memory

Processor type	Intel Xeon E5-2600 v3 Series
HP processor	**Eighteen-core processors** Intel Xeon E5-2699 v3 (2.3 GHz/18-core/45 MB/145 W) **Sixteen-core processors** Intel Xeon E5-2698 v3 (2.3 GHz/16-core/40 MB/135 W) **Fourteen-core processors** Intel Xeon E5-2697 v3 (2.6 GHz/14-core/35 MB/145 W) Intel Xeon E5-2695 v3 (2.3 GHz/14-core/35 MB/120 W) Intel Xeon E5-2683 v3 (2 GHz/14-core/35 MB/120 W) **Twelve-core processors** Intel Xeon E5-2690 v3 (2.6 GHz/12 core/30 MB/135 W) Intel Xeon E5-2680 v3 (2.5 GHz/12 core/30 MB/120 W) Intel Xeon E5-2670 v3 (2.3 GHz/12 core/30 MB/120 W) Intel Xeon E5-2650L v3 (1.8 GHz/12-core/30 MB/65 W) **Ten-core processors** Intel Xeon E5-2660 v3 (2.6 GHz/10-core/25 MB/105 W) Intel Xeon E5-2650 v3 (2.3 GHz/10-core/25 MB/105 W) **Eight-core processors** Intel Xeon E5-2667 v3 (3.2 GHz/8-core/20 MB/135 W) Intel Xeon E5-2640 v3 (2.6 GHz/8-core/20 MB/90 W) Intel Xeon E5-2630 v3 (2.4 GHz/8-core/20 MB/85 W) Intel Xeon E5-2630L v3 (1.8 GHz/8-core/20 MB/55 W) **Six-core processors** Intel Xeon E5-2643 v3 (3.4 GHz/6-core/20 MB/135 W) Intel Xeon E5-2620 v3 (2.4 GHz/6-core/15 MB/85 W) Intel Xeon E5-2609 v3 (1.9 GHz/6-core/15 MB/85 W) Intel Xeon E5-2603 v3 (1.6 GHz/6-core/15 MB/85 W) **Four-core processors** Intel Xeon E5-2637 v3 (3.5 GHz/4-core/15 MB/135 W) Intel Xeon E5-2623 v3 (3 GHz/4-core/10 MB/105 W)
Processor core	4, 6, 8, 10, 12, 14, 16, and 18
Maximum processor speed	3.5 GHz
Processors per 42U enclosure	128 (single-width form factor); 64 (double-width form factor)
Cache memory	45 MB (1 x 45 MB) shared L3 cache 40 MB (1 x 40 MB) shared L3 cache 35 MB (1 x 35 MB) shared L3 cache 30 MB (1 x 30 MB) shared L3 cache 25 MB (1 x 25 MB) shared L3 cache 20 MB (1 x 20 MB) shared L3 cache 15 MB (1 x 15 MB) shared L3 cache 10 MB (1 x 10 MB) shared L3 cache

Technical specifications (Continued)

Memory type	HP SmartMemory DDR4 Load Reduced DIMMs (LRDIMMs) or Registered DIMMs (RDIMMs)
Memory options	32 GB DDR4 2,133 MHz RDIMMs at 1.2 V 16 GB DDR4 2,133 MHz RDIMMs at 1.2 V 8 GB DDR4 2,133 MHz RDIMMs at 1.2 V
Maximum memory	512 GB (16 x 32 GB) up to 2,133 MHz at 1.2 V RDIMM
Storage	
Maximum internal storage	Hot Plug SFF SAS 2.4 TB (2 x 1.2 TB drives) Hot Plug SFF SATA 2.0 TB (2 x 1.0 TB drives) Hot Plug SFF SAS SSD 3.2 TB (2 x 1.6 TB drives) Hot Plug SFF SATA SSD 1.6 TB (2 x 800 GB drives)
Number of hard drives	Supports up to two (2) HP Hot Plug SFF SAS/SATA/SSD drives
Storage controller	HP H244br HBA or HP Smart Array P244br, depending on model
Graphics	
Graphics adapter	**Mezzanine cards** NVIDIA Quadro K3100M **Graphics expansion blades** NVIDIA GRID K2, K1, Quadro K6000, K5000, K4000, HP Multi-GPU with three NVIDIA Quadro K3100M
Deployment	
Form factor	Half-height blade (single and double width)
Rack height	10U: up to 16 ProLiant WS460c Blades or 8 with expansion module (single width)
Networking	6U: up to 8 ProLiant WS460c Blades or 4 with expansion module (single width)
Operating systems	**Client operating systems** Windows® 7 Professional/Enterprise (64 bit) Windows® 8.1 Professional/Enterprise (64-bit) Red Hat® Enterprise Linux 6.5 or later (64 bit only); HP Supported, partner certification pending **Server operating systems** Citrix XenDesktop® 7 or later, XenServer 6.5 or later VMware Horizon View 6 or later, vSphere 5.5 or later Windows Server® 2012 R2 (64-bit) Standard, Enterprise, and Data Center editions (for Citrix XenApp)
Warranty	3-year parts, 3-year labor, 3-year onsite support
QuickSpecs URL	h18000.www1.hp.com/products/quickspecs/15103_div/15103_div.pdf

HP Thin Clients

The flexible performance and easy ownership of industry leading thin client solutions from HP deliver rich user connectivity to client virtualization or cloud computing environments while meeting the most rigorous environmental requirements. Designed with the latest, standards-based operating systems and hardware, leading client virtualization software, and a robust set of manageability tools, HP Thin Client solutions help simplify IT while providing outstanding connectivity and flexibility.

HP t620 Series Thin Clients give you a powerful and seamless desktop experience, enhanced security, and premium client virtualization. You can customize your thin client with everything you need using the configuration options and expansion capabilities that best fit your business and help ensure an ideal end-user experience.

Available port options include VGA, Serial, or fiber network interface card (NIC)—and additional legacy serial and parallel ports on the PLUS chassis. Enjoy easy connections to your peripherals with eight USB ports and front and rear audio jacks to support cleaner multimedia installations. Low-power AMD embedded systems-on-chip—which combine the CPU, GPU, and I/O controller onto a single die—help enable small and quiet solutions for a low total cost of ownership in thin-client operations utilizing VDI. AMD's 2D and 3D graphics capabilities provide stunning visual experiences for thin clients and support up to two high-resolution displays from a single highly integrated processor.

And for an even more powerful thin client, see the information in the left sidebar to learn more about the HP t820 with quad-core Intel processors and the ability to drive up to seven monitors.

Check out the HP t820—HP's most powerful thin client solution

• Experience super-fast performance, robust security protection, simple management, and monitor flexibility

• Eliminate efficiency barriers with Intel® Core™ i7 4770S 2.9 GHz quad core CPU

• Keep your business data safe—lock down sensitive information and meet compliance standards with robust encryption and security options including fiber NIC, Trusted Platform Module (TPM), and Intel vPro technology

• Multitask seamlessly with multiple open applications on up to seven full HD monitors using optional AMD Radeon HD 7650A MXM Graphics Card and HP Multi-Stream DisplayPort 1.2 Hubs

Customize your IT lifecycle management, from acquisition of new IT, management of existing assets, and removal of unneeded equipment. **hp.com/go/hpfinancialservices**

HP Factory Express provides customization and deployment services along with your storage and server purchases. You can customize hardware to your exact specifications in the factory—helping speed deployment. **hp.com/go/factoryexpress**

Gain the skills you need with ExpertOne training and certification from HP. With HP ProLiant training, you will accelerate your technology transition, improve operational performance, and get the best return on your HP investment. Our training is available when and where you need it, through flexible delivery options and a global training capability. **hp.com/learn/proliant**

HP Technology Services

When technology works, business works
HP offers a very comprehensive suite covering the entire services lifecycle with predefined, fixed price, and custom consulting services.

Recommended HP Care Pack Services
• Three-year, HP 24x7, four-hour response, hardware support, onsite service

• Three-year, HP 24x7, four-hour response HP Collaborative Support

• HP ProLiant Server Hardware Installation Service

Related HP Care Pack Services
Three-year, HP 24x7, four-hour response Proactive Care or three year, HP six-hour, onsite, call to repair HP Collaborative Support HP Proactive Select Service.

All support services come with HP Insight Remote Support, providing 24x7 remote monitoring, proactive notifications, and problem resolution.

Coverage
For HP ProLiant servers, care pack services provide coverage for HP branded hardware options qualified for the server, purchased at the same time or afterward, internal to the enclosure, as well as external monitors up to 22 and tower UPS products; these items will be covered at the same service level, and for the same coverage period as the server unless the highest supported lifetime and/or the highest usage limitation has been exceeded. Coverage of UPS battery is not included; standard warranty terms and conditions apply.

Learn more at
hp.com/go/bladeworkstation

Sign up for updates
hp.com/go/getupdated

Share with colleagues   Rate this document