

HP Cluster Platform 6000BL

Based on Intel® Itanium® 2 processors

A member of the HP Unified Cluster Portfolio



Scale out your HPC infrastructure with the fastest blade system available, featuring more processors, greater energy efficiency, and increased cooling capabilities. The HP BladeSystem-based clusters are fully integrated, tested, and ready for the most demanding workloads. HP, the leader in HPC and cluster technology, will help you deploy a cost-effective solution tailored to your exact specifications.



Cut your computing challenges down to size

Constantly expanding compute requirements and increases in cluster node counts are causing multiple challenges for HPC datacenters. Cabling complexity, increased power/cooling requirements, configuration changes, and total cost of ownership are all compounding the typical cluster challenges.

Blade systems help solve these challenges, delivering significant advantages over traditional rack-mount server clusters. Blade servers provide superior manageability, reduce floor space, and minimize cabling. Blades also increase flexibility because they plug into an enclosure which allows easy addition or replacement of individual blades. Additionally, the cost of the solution is typically lower because much of the infrastructure such as power supplies, cooling, and management hardware can be shared among nodes.

Leading the way in HPC blade systems

HP is leading the way in blade server adoption with solutions that ensure higher performance and greater flexibility at lower costs. The HP Cluster Platform 6000BL is part of the HP BladeSystem series—the fastest blade solution available for HPC. Using innovative virtualization, power and cooling, and system management capabilities, the HP BladeSystem exemplifies the HP Adaptive Infrastructure strategy with three industry firsts. The system enables users to wire computing resources once and change them on the fly; it dynamically adjusts power and cooling to reduce energy consumption; and it increases administrative productivity up to tenfold.

The HP BladeSystem offerings are supported in the HP Unified Cluster Portfolio (UCP), a comprehensive, modular package of hardware, software and services for scalable computation, data management, and visualization. The UCP features flexible platforms; a wide range of open source and commercial middleware; a choice of processors, operation systems, and interconnects; and the latest in industry-standard technology. These integrated, customer-ready solutions ensure a variety of choices, simple implementation, and successful results.

Hardware engineered to deliver performance

The HP Cluster Platform 6000BL is based on the HP BladeSystem c-Class infrastructure, which consolidates and packages all supporting infrastructure elements—compute, storage, network, and power—into a single platform that accelerates data center integration and optimization. The Cluster Platform 6000BL features Integrity BL860c server blades with dual-core Itanium processors for outstanding floating point performance.

The HP BladeSystem c-Class enclosure provides extensive connectivity, power, cooling, and manageability options. In the Cluster Platform 6000BL each enclosure holds up to 8 full height Integrity servers plus redundant network and storage switches. It includes a shared, five terabit/second mid-plane for wire-once connectivity of server blades to external networks and shared storage. A pooled power backplane increases power efficiency and ensures that power is distributed as needed to all blades.

The c-Class enclosure features an innovative new cooling technology strategy that uses built-in instrumentation to monitor changes in workload demand and environment. An onboard administrator then adjusts power load and thermal controls automatically to maintain system performance within the constraints of the power and cooling capacity of a data center.

The CP6000BL supports the HP Integrity BL860c with dual-core Intel® Itanium®2 processors and up to 48 GB of DDR2 memory. It also features serial attached SCSI (SAS) hard drives, two built-in dual-port Gigabit NICs, and PCI Express mezzanine slots for multiple I/O cards. Blade servers can be combined with rack-optimized Integrity servers for roles such as the control (head) node, file services, or pre-/post-processing tasks requiring large memory nodes.

A choice of industry-standard interconnect options include the highest performance interconnect available in a blade-based system. The HP 4x DDR InfiniBand Interconnect Switch Module and the InfiniBand HCA both support a 20 Gbps signaling rate in each direction. Users can also choose from a range of industry-standard adapters including Gigabit Ethernet, Fibre Channel, and a PCI Express option kit.

Another benefit of the CP6000BL is its virtualization ability, allowing incredible flexibility for change management. Virtualization provides a pool of resources including compute, storage, and visualization that can be allocated as needed. Servers need only be wired once; subsequent changes can then be made without re-wiring.

Extensive software options

HP Cluster Platforms are designed to support standard cluster deployments using popular open source Linux software stacks or HP-UX. HP complements these deployment options with a set of commercial products, developed and supported by HP or its partners. All HP Cluster Platform software offerings are tested and verified by HP or its partners to run on the platform, enabling rapid deployment and a comprehensive environment for HPC.

HP available software includes a choice of Linux (Red Hat or SUSE subscriptions) or HP-UX 11i. HP Services Care Packs are included with the operating system, providing access to HP's experienced service professionals and hands-on cluster expertise.

The HP Cluster Platform 6000BL can be delivered with the following optional cluster management software products:

- The HP-developed XC System Software integrates leading open source cluster packages with the Linux operating system, HP-MPI, and Platform Computing's LSF. The XC System Software provides a complete turnkey cluster environment for provisioning, administration, and job management. The cluster environment is delivered pre-configured and ready for immediate deployment, resulting in enhanced ease of use and unprecedented levels of productivity.
- HP Cluster Management Utility (CMU) is an efficient and robust tool for the management of Linux-based nodes in HPC clusters and compute farms. A simple graphical user interface enables centralized console management, monitoring, and software installation. CMU enables rapid provisioning and management of multiple images, making it ideal for a site with frequent changes to its software configuration.

	Feature	Benefit
Simplicity	Integrated, customer-ready solutions	Enables cost-effective, rapid deployment
	All software is tested and verified by HP and/or partners to run on the HP Cluster Platforms	Provides a comprehensive environment for high performance computing
	Clusters are built to uniform, worldwide specifications	Eases and lowers costs of implementation and use
Agility	Broad choice of processors, interconnects, and middleware	Provides a wide range of hardware/software to meet specific needs
	Intel® Itanium® 2 processor-based servers with extensive parallelism	Superior 64-bit performance for complex applications
	Supports HP StorageWorks Scalable File Share and HP Scalable Visualization Array	Provides complete solution—computation, visualization, and data management in an integrated package
Value	Fully integrated with HP warranty and support	Provides industry-leading expertise for reduced TCO
	Partnerships with leading suppliers of software development tools	Offers customers a powerful set of tools for developing cluster applications
	Optional on-site systems software support, applications development and optimization, and clusters training	Enhances the HP Cluster Platforms to achieve best possible results

- HP ClusterPack for HP-UX is an integrated software solution that provides a single point of access for system administrators, system resource control and monitoring, and distributed workload management. Because ClusterPack is based on the HP-UX operating system, it comes with a long list of supported and highly tuned ISV application codes which are required for most industrial and academic usage.

To ease the burden of supporting applications across multiple interconnects and platforms, HP offers HP-MPI, a high performance and production quality implementation of the Message-Passing Interface (MPI) standard. HP-MPI supports multiple interconnects, allowing a single executable to transparently and dynamically take advantage of the highest performing interconnect available on the cluster. Also offered is HP's Mathematical Software Library (MLIB), a collection of high performance math libraries to accelerate the performance of technical applications on Integrity systems.

To complete the software development portfolio, HP is allied with leading suppliers of software development tools to test and qualify a comprehensive portfolio of compilers, libraries, debuggers, and other HPC tools. A comprehensive list of development tools for the Cluster Platform 6000BL is available at the Unified Cluster Portfolio web site (www.hp.com/go/clusters).

Scalable storage

Recent technology advances in computational performance has outpaced capabilities in scalable storage. HP has solved these challenges with the revolutionary offering in the UCP—the StorageWorks Scalable File Share (SFS), based on Lustre technology. HP SFS is a powerful file server that reliably scales I/O bandwidth across dozens to thousands of distributed compute nodes.

Tuning and customization with HP Services

Complement the HP CP6000BL with HP custom services. Over the years, HP and their partners have implemented best practices associated with component choice, integration, power and thermal requirements, and maintainability. Service options include on-site systems software support, applications development and tuning, and clusters training. In addition, customers can choose to have their own software installed and tested in HP factories—all with support from the HP Consulting and Integration Services team.

The modular design and flexible options of the HP CP6000BL allows customers to choose all or part of the UCP portfolio with corresponding service and support. Customers can choose a full solution from HP—a fully supported and unified software and hardware product. Alternatively, customers can purchase a combination software and hardware solution, with software certified and supported by HP software partners and hardware supported by HP.

HP Cluster Platform 6000BL

Specifications

Platform	HP Integrity BL860c server	HP Integrity rx2660 server	HP Integrity rx3600 server	HP Integrity rx6600 server
Node type	Compute or Control	Control or Utility	Control or Utility	Utility
Processor	Intel® Itanium® 2 Dual-core 1.6 GHz/18 MB cache Dual-core 1.4 GHz/12 MB cache Single-core 1.6 GHz/6 MB cache	Intel® Itanium® 2 Dual-core 1.6 GHz/18 MB cache Dual-core 1.4 GHz/12 MB cache Single-core 1.6 GHz/6 MB cache	Dual-Core Intel® Itanium® 2 1.4 GHz/12 MB cache 1.6 GHz/18 MB cache	Dual-Core Intel® Itanium® 2 1.4 GHz/12 MB cache 1.6 GHz/18 MB cache 1.6 GHz/24 MB cache
Processors/Cores per node	2P/2C or 2P/4C	2P/2C or 2P/4C	2P/4C	2P/4C or 4P/8C
Maximum memory per node	48 GB	32 GB	96 GB	192 GB
Disk/Media bays	2 Serial Attached SCSI Small Form Factor (SFF)	8 Serial Attached SCSI SFF	8 Serial Attached SCSI SFF	16 Serial Attached SCSI SFF
Expansion Slots	Up to 3 mezzanine choices: 4 Gb FC, and InfiniBand	3x PCI-x or 2x PCI-e/1x PCI-x	8x PCI-x or 4x PCI-e/4x PCI-x	8x PCI-x or 4x PCI-e/4x PCI-x
Form factor	8 full-height blades per 10u enclosure	2U	4U	7U
Cluster interconnect	InfiniBand 4X DDR Gigabit Ethernet			
Management network	10/100 network or Gigabit Ethernet			
SAN Storage in cab	Optional MSA1000 Storage subsystem mounted in cabinet as part of cluster			
Operating System options	Linux: Red Hat Enterprise Linux; SUSE SLES, HP-UX 11i v2 (up to 128 nodes,)			
Operating environment tools	Linux: HP-MPI and HP MLIB HP-UX: HP TCOE including HP-MPI, HP MLIB			
Cluster management software options	HP XC Cluster Software HP Cluster Management Utility (CMU) ClusterPack for HP-UX			
Services	HP Enhanced Services available for HP Cluster Platforms. HP offers on-site field installation. HP software support available for operating systems and HP software options.			
Warranty	Standard hardware warranty on platforms, based on underlying components			

© 2006 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein. Intel, Itanium, and Xeon are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft and Windows are U.S. registered trademarks of Microsoft Corporation. Linux is a U.S. registered trademark of Linus Torvalds.

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

4AA1-2426ENW, 05/2007

