HP BladeSystem

Family guide

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> HP offers a complete portfolio of hardware, software and services to help you build the perfect BladeSystem—without compromise.

HP BladeSystem: a smarter way to build an infrastructure

For 40 years, infrastructures were built the same way. Lots of boxes, connected with lots of wires, maintained by lots of people.

Universally, whether the infrastructure is large or small, four infrastructure problems emerge:

• **Cost**: high cost to buy, even higher costs to run and maintain

• **Time**: low productivity, down time and slow reaction to new opportunities

• **Change**: inflexible and hard-wired with complex processes and multiple people involved

• **Energy**: inefficient, power-hungry systems create rising electricity costs and air conditioning bills

The HP BladeSystem addresses these challenges by consolidating everything you need in an IT infrastructure from the start; before it grows out of control.

Your server needs are as unique as your company. We know there is no such thing as a one-size-fits-all solution. That's why HP gives you choices.

The biggest difference between blade architectures and those based on traditional servers is the infrastructure and how it's built. Most HP BladeSystem components are nearly identical to the server, storage and network components you are most familiar with today.

We don't believe you should compromise the trusted technologies you rely on today just to gain the advantages of blades. We make sure you can run the same applications and operating systems you want today and tomorrow—connect with everything in your environment now and never sacrifice on performance, reliability or efficiency.

One box, full of possibilities

The HP BladeSystem is an infrastructure in a box. With it, you can build a variety of business solutions that are more affordable, take less time to maintain, use less power and are ready to grow with you. It is simply a better infrastructure.

With a versatile, all-in-one design, you have what you need to build and maintain your infrastructure from start to finish. Inside, you can choose from thousands of applications on a variety of OSs with a combination of server and storage components and a choice of the most popular networking brands and standards including Ethernet, Fibre Channel and InfiniBand.

We build in the networking to help you decrease the number of cables by up to 94 percent.[1] We add a smarter power and cooling system to help you save more than 26 percent on power compared to the IBM BladeCenter[2], without sacrificing features or performance. And we include an interface and software that help you at every step—so one person can do the job of many, with less effort.

And when you are ready, our worldwide community of business technology experts and partners are here to help you build the ideal solution and support plan that is just right for you. We integrate the infrastructure essentials inside the BladeSystem so that before it ever arrives at your door, we've completed a lot of the hard work that you would have had to do on your own.

These eight easy steps are what you need to consider when building your ideal BladeSystem infrastructure solution.

Step 1: choose your OS and applications

Step 2: choose your server blades

Step 3: choose your storage infrastructure

Step 4: choose your interconnects

Step 5: choose your BladeSystem enclosure

Step 6: choose your management

Step 7: choose your power and cooling configurations

Step 8: choose your services

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[1] Comparing all cable requirements of 16 c-Class server blades versus 16 standard 1U servers.

[2] Sine Nomine Associates, "A Comparison of HP BladeSystem with Thermal Logic Technologies to Competitive Systems", February 2007.

Step 1: choose your OS and applications

Just like other HP servers, HP Integrity and HP ProLiant server blades run most of the same operating systems and applications, but with the advantages of a BladeSystem infrastructure. You can mix and match different Integrity and ProLiant server blades in the same enclosure and run many different OSs and applications in one enclosure.

Operating Systems

HP-UX	Supported on Integrity server blades
HP OpenVMS	Supported on Integrity server blades
Microsoft® Windows®	Supported on Integrity and ProLiant server blades
Linux	Supported on Integrity and ProLiant server blades
NetWare	Supported on the ProLiant BL460c server blade

The Integrity certification matrix can be found at **www.hp.com/go/integrity/OSmatrix**.

The ProLiant/Microsoft certification matrix can be found at **www.hp.com/go/proliant/microsoft**.

The ProLiant/Linux certification matrix can be found at **www.hp.com/go/proliant/linuxcert**.

Applications

The number of applications and users you support for your solution will determine the number of server blades you will need for the next step—where you choose your server blades. HP and our channel partners can help you choose the right number of blades with our solution sizing tools and expertise. Active Answers is an online resource with a variety of solutions to help you make the right choice. For more information on Active Answers, visit **www.hp.com/go/activeanswers**.

To make sure we support the applications you rely on today as well as the new ones you will rely on tomorrow, we created the HP BladeSystem Solution Builder Program. This program brings together a worldwide community of technology and service providers that collaborate with HP and each other to define, deliver and deploy application solutions as well as create new technology for the HP BladeSystem. To learn more about the BladeSystem Solution Builder Program, visit **www.hp.com/go/solutionbuilder**.

Step 2: choose your server blades

Build and configure each server blade with the right features to fit your needs, without compromise.

Server blades

	HP ProLiant BL460c An ideal choice for customers looking for flexibility, performance and reliability in an enterprise-class server blade.	**HP ProLiant BL465c** An ideal choice for customers looking for flexibility, performance and reliability in an enterprise-class server blade.	**HP ProLiant BL480c** For more memory, drives and I/O expansion, the BL480c is a workhorse server for more demanding applications and databases.
Number of processors	1–2	1–2	1–2
Maximum number of cores	8	4	8
Processors supported	Dual- and Quad-core Intel® Xeon® processors: up to 3.0 GHz	Dual-core AMD Opteron™ processors up to 3.0 GHz	Dual- and Quad-core Intel Xeon processors: up to 3.0 GHz
Cache	Up to 8 MB L2 (2 x 4 MB)	Up to 2 MB L2 (2 x 1 MB)	Up to 8 MB L2 (2 x 4 MB)
Maximum memory	32 GB	32 GB	48 GB
Network ports	2	2	4
Drives supported	Up to 2	Up to 2	Up to 4
Maximum internal storage	292 GB	292 GB	584 GB
I/O expansion	2 PCIe Mezzanine Expansion Slots	2 PCIe Mezzanine Expansion Slots	3 PCIe Mezzanine Expansion Slots
Form factor	6U or 10U enclosure	6U or 10U enclosure	6U or 10U enclosure
Warranty (parts/labor/onsite)	3-year/3-year/3-year	3-year/3-year/3-year	3-year/3-year/3-year
HP related offerings			
Services*	3-year, 24x7, same-business-day, 4-hour response Proactive BladeSystem Service	3-year, 24x7, same-business-day, 4-hour response Proactive BladeSystem Service	3-year, 24x7, same-business-day, 4-hour response Proactive BladeSystem Service
Storage	StorageWorks All-in-One SB600c storage blade solution	StorageWorks SB40c storage blade	StorageWorks Ultrium 448c tape blade
Options	4 Gb Virtual Connect Fibre Channel Module GbE2c Layer 2/3 Ethernet Blade Switch	NC373m PCI Express Dual-port Multifunction Gigabit Server Adapter QLogic- or Emulex-based Fibre Channel Mezzanine	NC325m PCI Express Quad-port Gigabit Server Adapter 1/10Gb Virtual Connect Ethernet Module
Software	Insight Control Environment for HP BladeSystem	Insight Control Linux Edition for HP BladeSystem	Insight Control Linux Edition for HP BladeSystem

*All blades within a single HP BladeSystem enclosure must be at the same service level.

For a complete list of supported options, please visit www.hp.com/go/productbulletin.

Step 2: choose your server blades

Build and configure each server blade with the right features to fit your needs, without compromise.

For different computing needs, HP now offers more than servers. We also offer workstation and virtual desktop blade solutions.

Server blades

	HP ProLiant BL680c Ideal for hosting larger databases, applications and many virtual machines, the BL680c delivers no-compromise performance and expansion in the densest 4P server blade form-factor available.	**HP ProLiant BL685c** Ideal for hosting larger databases, applications and many virtual machines, the BL685c delivers no-compromise performance and expansion in the densest 4P server blade form-factor available.	**HP Integrity BL860c** Reliability, security and virtualization capabilities of Integrity servers and the mission critical reliability of HP-UX coupled with the economics and efficiency of BladeSystem.
Number of processors	1–4	1–4	1–2
Maximum number of cores	16	4	4
Processors supported	Quad-core Intel Xeon processors up to 2.4 GHz	Dual-core AMD Opteron processors up to 3.0 GHz	Dual-core Intel Itanium® processors up to 1.6 GHz
Cache	Up to 8 MB L2 (2 x 4 MB)	Up to 2 MB L2 (2 x 1 MB)	Up to 18 MB L3
Maximum memory	64 GB	64 GB	48 GB
Network ports	4	4	4
Drives supported	Up to 2	Up to 2	Up to 2
Maximum internal storage	292 GB	292 GB	292 GB
I/O Expansion	3 PCIe Mezzanine Expansion Slots	3 PCIe Mezzanine Expansion Slots	3 PCIe Mezzanine Expansion Slots
Form factor	6U or 10U enclosure	6U or 10U enclosure	6U or 10U enclosure
Warranty (parts/labor/onsite)	3-year/3-year/3-year	3-year/3-year/3-year	3-year/3-year/3-year
HP related offerings			
Services*	3-year, 24x7, same-business-day, 4-hour response Proactive BladeSystem Service	3-year, 24x7, same-business-day, 4-hour response Proactive BladeSystem Service	Proactive 24 Service Critical Service
Storage	StorageWorks Ultrium 448c tape blade	StorageWorks SB40c storage blade	StorageWorks SB40c storage blade
Options	NC373m PCI Express Dual-port Multifunction Gigabit Server Adapter Cisco MDS 9124e Fabric Switch	1/10Gb Virtual Connect Ethernet Module Brocade 4 Gb SAN Switch	4 Gb Fibre Channel adapters 4X DDR IB Mezzanine HCA
Software	Insight Control Linux Edition for HP BladeSystem	Insight Control Linux Edition for HP BladeSystem	Insight Control Environment for HP BladeSystem

*All blades within a single HP BladeSystem enclosure must be at the same service level. For a complete list of supported options, please visit www.hp.com/go/productbulletin.

For more information, visit **www.hp.com/go/bladesystem**.

Step 3: choose your storage infrastructure

Connect to external HP SAN, NAS and back-up solutions or put storage solutions inside the same BladeSystem enclosure, side-by-side with your server blades to add storage expansion and data protection quickly, without adding a single cable.

Did you know HP BladeSystem is the most affordable way to connect servers to your Fibre Channel-based SAN? The BladeSystem architecture reduces cables and transceivers and can help you save up to 64 percent[4] compared to traditional rack-mount environments.

For more information on SAN options from HP, visit www.hp.com/go/storage.

HP StorageWorks blades

HP StorageWorks All-in-One SB600c storage blade
Supports the storage needs of all server blades in the enclosure, and blends file serving, shared storage array and data protection functions with simple management.

HP StorageWorks SB40c storage blade
Add up to 876 GB of total storage capacity to one server blade with RAID 0, 1+0, 5, 6 support for outstanding data protection.

HP StorageWorks Ultrium 448c tape blade
Simple, reliable LTO tape backup when you are not connected into a SAN. Ideal for remote locations and small sites, the HP tape blade can backup data on all servers in the enclosure.

Processors supported	Quad-core Intel processor: up to 2.33GHz		**Capacity**	400 GB (2:1 compression)	
RAM	2 GB of PC2-5300 Memory, expandable to 4 GB		**Transfer rate**	Up to 172.8 GB per hour at 2:1 compression	
Hard drives	2 x 146 GB SFF 3G SAS 10K HDDs (in server blade) 6 x 146 GB SFF 3G SAS 10K HDDs (in storage blade)	SFF SAS 36/72/146 GB 10K or SFF SATA 60 GB 5.4K	**Format**	LTO Ultrium 2	
Internal drive support	N/A	Supports up to 6 SAS or SATA universal hot plug hard disk drives	**Media compatibility**	LTO Ultrium 2 (Read and Write) LTO Ultrium 1 (Read and Write)	
Protocol support	SMB/CIFS, NFS, NCP, AppleTalk, HTTP, FTP	3 Gbps SAS, 1.5 Gbps SATA	**Interface**	3 GB/sec SAS interface	
Storage capacity	1.16 TB per storage blade (8 x 146 GB SFF SAS HDDs)	Up to 876 GB per storage blade (using 146 GB 10K disk drives)	**Buffer size**	64 MB	
RAID support	RAID 0, 1+0, 5, 6 with Advanced Data Guarding	RAID 0, 1+0, 5, 6 with Advanced Data Guarding	**Form factor**	Half-height BladeSystem c-Class	
All-in-One storage features included	• File/Print Serving (Windows Storage Server 2003 R2) • Shared Application Storage (Integrated iSCSI Target) • Integrated Data Protection (Snapshots, replication, Data Protector Express Backup software) • All-in-One Storage Management Interface		**Services**	3-year, 24x7, same-business-day, 4-hour response	
Remote management	Dedicated iLO 2 NIC		**Warranty (parts/labor/on-site)**	3-year, next-day, parts exchange, plus 9x5 phone support for the duration of the warranty	
Server blade support	File serving via CIFS and NFS. Block data connectivity via iSCSI. The iSCSI Target is interoperable with standards compliant iSCSI initiators including Microsoft, Linux and VMware.	Supports all BladeSystem c-Class server blades Note: HP PCI Express Mezzanine Pass-Thru Card for HP BladeSystem c-Class is required to support HP BladeSystem c-Class full-height server blades			
Form factor	Half-height server blade, Half-height storage blade Note: All-in-One SB600c storage blade requires two empty adjacent slots for installation	4U BladeSystem c-Class storage blade Fits into a half-height bay on the BladeSystem c7000 enclosure			
Services	Support Plus 24 Service Proactive 24 Service	3-year, 24x7, same-business-day, 4-hour response			
Warranty (parts/labor/onsite)	Hardware – 3-year/3-year/3-year Software – 1-year, 9x5, Next Business Day	3-year/3-year/3-year			

For more information, visit **www.hp.com/go/storage/blades**.

Step 4: choose your interconnects

Reduce your Ethernet, Fibre Channel or InfiniBand cables, switch ports and other network equipment by up to 94 percent[3] by using fewer cables between your server and the network.

Virtual Connect modules

	HP 1/10Gb Virtual Connect Ethernet Module for BladeSystem c-Class	HP 4Gb Virtual Connect Fibre Channel Module for BladeSystem c-Class
Blade type	Single bay	Single bay
Performance	108 Gb total throughput	4 Gb line speed, full duplex, 1.2 μ sec latency Maximum frame size 2112-byte payload Buffer-to-buffer flow control management Packet prioritization
Port configuration	16 internal 1 Gb downlinks 8 external 10/100/1000BASE-T uplinks 2 external 10 Gb CX-4 uplinks 1 10 Gb internal cross-connect 1 management USB port 1 internal interface to c-Class Onboard Administrator Module	16 internal 4 Gb downlinks presented as F-Ports 4 external 4 Gb uplinks presented as N-Ports
Media types	Copper RJ-45 100 Ohm 2-pair Cat5 UTP or equivalent Twinax CX-4 (IB4x)	Small form factor pluggable (SFP) laser 1/2/4 Gb short wave up to 500 m (1640 ft) and 1/2/4 Gb long wave up to 10 km
Management features	HTTP, HTTPS, SSL Supports PXE, WOL, port VLAN, VLAN tagging, VLAN pass-thru, NIC teaming Integrated with On Board Administrator	Management via Onboard Administrator Telnet, SNMP (FC Management MIB), HP Systems Insight Manager, HP Storage Essentials HTTP, HTTPS, SSL
High-availability features	Link Aggregation Protocol Automatic loop protection Mirrored profile database and multi-path heartbeat between redundant modules	Mirrored profile database and multi-path heartbeat between redundant modules
Protocols supported	802.3, 802.3u, 802.3ab, 802.1s, 802.1w, 802.1p, 802.3ac, 802.3ad (Static), 802.1q	NCITS T11 N_Port ID Virtualization (NPIV)
Maximum per enclosure	8	6
Warranty (parts/labor/onsite)	1-year/1-year/1-year	1-year/1-year/1-year

[3] Comparing all cable requirements of 16 c-Class server blades versus 16 standard 1U servers.

For more information, visit **www.hp.com/go/bladesystem/interconnects**.

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Step 4: choose your interconnects

Ethernet switches

	Cisco Catalyst Blade Switch 3020 for HP c-Class BladeSystem	HP GbE2c Layer 2/3 Ethernet Blade Switch	HP 1:10Gb Ethernet BL-c Switch	HP 10Gb Ethernet BL-c Switch
Performance	48 Gb Switching fabric 128 Mb DDR SDRAM 32 Mb Flash memory	48 Gb Switching fabric 128 Mb SDRAM 16 Mb Flash memory	120 Gb Switching fabric 256 Mb SDRAM 64 Mb Flash memory	400 Gb Switching fabric 256 Mb SDRAM 64 Mb Flash memory
Port configuration	16 Internal 1 Gb Downlinks 8 External 10/100/1000 SFP/BASE-T Uplinks (2 configurable as cross-connects) 1 Management Console Port	16 Internal 1 Gb Downlinks 5 External 10/100/1000BASE-T Uplinks 2 Internal cross-connects 1 Management Console Port	16 Internal 1 Gb Downlinks 4 External 10/100/1000BASE-T Uplinks 1 External 10 Gb CX4 Uplink 2 External 10 Gb XFP ports 1 Internal 10 Gb cross-connect 1 Management Console Port	16 Internal 10 Gb Downlinks 4 External 10 Gb XFP ports 1 Management Console Port
Management features	CiscoWorks SNMP v1, v2,v3 Telnet CLI	Dual mode CLI - AOS and iSCLI SNMP v1, v2, v3 HTTP, HTTPS NTP server support RMON	Dual mode CLI - AOS and iSCLI SNMP v1, v2, v3 HTTP, HTTPS NTP server support RMON	Dual mode CLI - AOS and iSCLI SNMP v1, v2, v3 HTTP, HTTPS NTP server support RMON
High availability features	Per VLAN Spanning Tree Plus Uplink Fast Port Fast Bridge Protocol Data Unit	Link Aggregation Protocol Uplink failure detection Spanning Tree Virtual Router Redundancy Protocol (VRRP)	Link Aggregation Protocol Uplink failure detection Spanning Tree Virtual Router Redundancy Protocol (VRRP)	Link Aggregation Protocol Uplink failure detection Spanning Tree Virtual Router Redundancy Protocol (VRRP)
Protocols supported	SSH v2, 802.1s, 802.1w, 802.1x, 802.3ad , 802.3x, 802.1D, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z	SSH v2, TACACS, TACACS+, RADIUS, 802.3, 802.3u, 802.3ab, 802.1d, 802.1s, 802.1w, 802.1p, 802.3ac, 802.1x, 802.3ad (Static), and 802.1Q, IGMP Snooping, BOOTP	SSH v2, TACACS, TACACS+, RADIUS, 802.3, 802.3u, 802.3ab, 802.1d, 802.1s, 802.1w, 802.1p, 802.3ac, 802.1x, 802.3ad (Static), and 802.1Q, IGMP Snooping, BOOTP	SSH v2, TACACS, TACACS+, RADIUS, 802.3, 802.3u, 802.3ab, 802.1d, 802.1s, 802.1w, 802.1p, 802.3ac, 802.1x, 802.3ad (Static), and 802.1Q, IGMP Snooping, BOOTP
Options available	1000Base SX Fiber SFP Module	Fiber SFP module kit (max 2 per switch)	XFP 850 nm SR module XFP 1310 nm LR module	XFP 850 nm SR module XFP 1310 nm LR module
Warranty (parts/labor/onsite)	1-year/1-year/1-year 3-year software updates	1-year/1-year/1-year	1-year/1-year/1-year	1-year/1-year/1-year

Fibre Channel switches

	Cisco MDS 9124e Fabric Switch for HP c-Class BladeSystem	Brocade 4 GB SAN Switch for HP c-Class BladeSystem
Performance	4 Gbps, non-blocking and auto-sensing 1/2/4 Gb	4 Gbps, non-blocking and auto-sensing 1/2/4 Gb
Port configuration	192 Gbps (end-to-end)	192 Gbps (end-to-end)
Management features	Cisco MDS 9000 Family Command Line Interface (CLI), Cisco Fabric Manager, Cisco Fabric Manager Server (optional), Cisco Enterprise Package (optional)	WebTools; Advanced Zoning; Power Pack (bundled or optional): ISL Trunking, Advanced Performance Monitoring, Fabric Watch, Extended Fabrics; Fabric Manager (optional)
High availability features	Redundant switches; hot pluggable; non-disruptive software upgrades	Redundant switches; hot pluggable; non-disruptive software upgrades
Protocols supported	Fibre Channel	Fibre Channel
Options available	SFPs (short range, medium range, long range); MDS 9000 Port Analyzer Adapter	SFPs (short wave, long wave)
Warranty (parts/labor/onsite)	1-year/1-year/1-year	1-year/1-year/1-year

For more information, visit **www.hp.com/go/bladesystem/interconnects**.

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Step 4: choose your interconnects

Interconnects *(continued)*

Fibre Channel HBA mezzanine cards

	Emulex LPe1105-HP 4Gb FC HBA for HP c-Class BladeSystem	HP QLogic QMH2462 4Gb FC HBA for HP c-Class BladeSystem
Performance	115,000 IOPS per port	150,000 IOPS per port
Port configuration	Dual 4 Gb Fibre Channel Ports	Dual 4 Gb Fibre Channel Ports
Management features	Emulex installation and management tools automate installation and provide local and remote HBA configuration and management	QLogic SANsurfer FC HBA Manager for centralized management and remote control of distributed HBAs
High availability features	Multi-path support for redundant HBAs and paths	Multi-path support for redundant HBAs and paths
Protocols supported	Full support for both FC service Class 2 and 3	Full support for both FC service Class 2 and 3
Warranty (parts/labor/onsite)	1-year/1-year/1-year	1-year/1-year/1-year

Ethernet network adapter mezzanines

	NC325m Quad-Port Gigabit Ethernet Adapter	NC326m Dual-Port Gigabit Ethernet Adapter	NC373m Dual-port Multifunction Gigabit Ethernet Adapter	NC512m Dual-port Multifunction 10 Gigabit Ethernet Adapter
Hardware features				
IEEE compliance	802.1p, 802.1Q, 802.3, 802.3ad, 802.3x	802.1p, 802.1Q, 802.3, 802.3ad, 802.3x	802.1p, 802.1Q, 802.3, 802.3ad, 802.3x	802.1p, 802.3, 802.3ad, 802.3x, 802.3ap 10GBase-KX4
Ports and transfer rate	4 @ 1000 Mbps	2 @ 1000 Mbps	2 @ 1000 Mbps	2 @ 10,000 Mbps
Form factor	x4 PCIe, type I card	x4 PCIe, type I card	x4 PCIe, type I card	x8 PCIe, type II card
Network controller	Dual Broadcom 5715S	Broadcom 5715S	Dual Broadcom 5708S	NetXen Intelligent NIC NX2031
Software features				
PXE	•	•	•	Planned future
TCP/IP offload engine			Windows	Windows and Linux
Adapter teaming	•	•	•	Planned future
Warranty* (parts/labor/onsite)	1-year/0/0*	1-year/0/0*	1-year/0/0*	1-year/0/0*

InfiniBand mezzanine HCA and switch module

	HP 4X DDR IB Mezz HCAs	HP 4X DDR IB Switch Module
Performance	4X Double Data Rate (20 Gbps)	4X DDR non-blocking switch
Port configuration	Choice of dual-port or single-port card	16 internal 4X DDR downlinks, 8 external 4X DDR uplinks, 1 Management Console Port
Management features	Choice of Cisco IB drivers or Voltaire GridStack IB stack	Externally managed with a choice of Cisco High-Performance Subnet Manager or Voltaire GridVision Fabric Manager
Protocols supported	HP-MPI, IPoIB, and other ULPs	IBTA
Warranty (parts/labor/onsite)	1-year/1-year/1-year	1-year/1-year/1-year

*Or the warranty of the server that holds the adapter, whichever is greater

For more information, visit **www.hp.com/go/bladesystem/interconnects**.

Step 5: choose your BladeSystem enclosure

HP BladeSystem enclosures come in two sizes and share the same server, storage and networking components.

BladeSystem enclosure

BladeSystem c3000 enclosure

A smaller, versatile design, ideal for small sites like business offices or branch locations that only need four to eight server or storage components at a time. Ideal because it plugs right into the wall, uses standard power and doesn't need special air conditioning. It also includes many useful features to help a small staff be more productive with less effort.

BladeSystem c7000 enclosure

A larger, modular block of infrastructure that is ideal for bigger data centers. It holds up to 16 different types of server and storage blades with twice as many interconnect expansion slots available to run nearly any application in a dynamic, high-performance IT environment.

Device bays	4 to 8 server and storage blades, mixed configurations supported	8 to 16 server and storage blades, mixed configurations supported
Interconnect bays	4	8 (up to 4 redundant I/O fabrics)
Power supplies	Up to 6 x 1200W	Up to 6 x 2250W
Fans	Up to 6 hot plug Active Cool fans	Up to 10 hot plug Active Cool fans
Onboard administrator	Up to 2	Up to 2
Height	6U	10U
Warranty (parts/labor/on-site)	3-year/3-year/3-year	3-year/3-year/3-year
HP related offerings		
Services*	3-year, 24x7, same-business day, 4-hour response 3-year, Support Plus 24 Proactive BladeSystem Service	3-year, 24x7, same-business day, 4-hour response 3-year, Support Plus 24 Proactive BladeSystem Service
Storage	StorageWorks SB40c storage blade StorageWorks Ultrium 448c tape blade	StorageWorks SB40c storage blade StorageWorks Ultrium 448c tape blade
Options	10000 G2 Series Rack, Active Cool Fans	10000 G2 Series Rack, Active Cool Fans
Software	Insight Control Environment for HP BladeSystem	Insight Control Environment for HP BladeSystem

For a complete list of supported options, please visit www.hp.com/go/productbulletin.

Now that you have a good idea of the number of server and storage blades and interconnect modules you may need, it's time to choose the right enclosure for the size of your solution and your environment.

HP BladeSystem enclosures come in two sizes and share the same server, storage and networking components.

Each BladeSystem enclosure includes the Onboard Administrator to set up and maintain, plus the NonStop midplane to keep everything inside up and running at top performance. Both share the same useful innovations like Thermal Logic technology to save on power and cooling, Insight Control to manage it all, and Virtual Connect architecture to add, replace and recover servers on the fly with less cables and hassles.

Best of all, you can mix and match servers, storage and network modules between both enclosures to fit your needs and upgrade easily as you grow.

For more information, visit **www.hp.com/go/bladesystem/enclosure**.

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Step 6: choose your management

Manage all components of the infrastructure as one system and through one console.

HP Insight Control software

Function	HP Insight Control Environment for BladeSystem	HP Insight Control Linux Edition for BladeSystem	HP iLO Power Management Pack for BladeSystem
Health monitoring	•	•	•
Remote control	•	•[1]	•
Performance monitoring	•		
Vulnerability scanning	•		
Rapid server deployment	•	•	
Power measurement and control[2]	•		•
Virtual machine management	•		
Virtual server migration	•[3]		
Operating system focus[4]	**Windows, Linux**	**Linux, Windows**	**Windows, Linux**
1-year, 24x7 Software technical support (3-year extension available)	•	•	•

[1] Based on embedded iLO 2 Standard Blade Edition processor within c-Class server blades.

[2] Power management component works with required Power Regulator and Power Meter technology now embedded in HP ProLiant ML, DL, 300 and 500 series and BL series servers.

[3] Integrated upgrade possible with optional purchase of ProLiant Essentials Server Migration Pack offering P2P, V2P and V2V migrations.

[4] HP-UX and OpenVMS are available with the Integrity BL860c server blade. Integrity iLO 2 Advanced Pack is included with the Integrity BL860c.

HP Insight Control software combines everything you need for infrastructure management in one tool—giving you choices for different environments. This software has tools that are built specifically for the unique abilities of blades. And it is designed to manage the rest of your IT infrastructure and other servers and storage with a single installer that simplifies the installation and integration of content.

Each enclosure also comes with the HP Onboard Administrator module and the handy LCD screen to help you set up, troubleshoot and maintain your hardware infrastructure with less effort. With it, you can set up, in 15 minutes or less, up to 64 server blades. The intelligence built in keeps track of where resources are in the enclosure, keeps detailed tabs on power and cooling and monitors the performance of your server, storage and network. Plus, it provides one link to remotely access all servers in the enclosure via the Integrated Lights-Out 2 controllers built in to each server blade. (If you choose Integrity servers, you may need to purchase additional management software.)

Your Insight Control software can be expanded on your terms with other HP management software. HP Essentials Software for ProLiant, Integrity or StorageWorks adds more specific capabilities to help you get things done. For a broader view of your total environment, Insight Control also integrates with HP OpenView and other enterprise-wide tools.

Step 7: choose your power and cooling configurations

Save power every second with power configurations and redundancy levels to suit your needs.

HP Thermal Logic capabilities

Active Cool Fans	Delivers both high airflow and high pressure in a small size that can scale to meet future cooling needs. This technology provides the ability to optimize airflow, reduce power draw, and improve acoustic performance for any server blade configuration.
Parallel Redundant Scalable Enclosure Cooling design (PARSEC)	A hybrid model for cooling that combines the best of local and centralized cooling in a single system to offer more effective airflow and cooling for all servers. Server blades get more cooling airflow where it is needed most and use less power than traditional rack servers.
Instant Thermal Monitoring	Provides a real-time view of heat, power and cooling data. If the enclosure's thermal load increases, the Onboard Administrator's thermal logic feature instructs the fan controllers to increase fan speeds to accommodate the additional demand. Even better, it works in reverse, using all the features of Thermal Logic to keep fan and system power at the lowest level possible. Onboard Administrator monitors the thermal conditions on the hardware in real-time, without a delay for a polling cycle.
Power pooled for true N+N power redundancy	All the power in the enclosure is provided as a single pool that any blade can access, providing increased flexibility when configuring the power in the system so that customers can choose what level of redundancy with which to operate. Because this power design has no zones, it facilitates both N+N and N+1 power modes, which future-proofs the enclosure for higher power requirements, if needed.
Dynamic Power Saver Mode	Provides power load shifting for improved efficiency and reliability, it improves power supply efficiency to provide real customer power savings and, therefore, money savings. When enabled through Onboard Administrator, the total enclosure power consumption is monitored in real-time and automatically adjusted with changes in demand.
Power Regulator	Provides Integrated Lights-Out-controlled speed stepping for Intel x86 processors. The Power Regulator feature improves server energy efficiency by giving CPUs full power for applications when they need it and reducing power when they do not.
Power workload balancing	Power workload balancing improves performance per watt used and uses the HP Power Regulator technology to manage power at the enclosure level, so that power usage stays within defined power caps. Using power caps, system administrators can constrain the most BTUs per enclosure and rack to enable the enclosure to fit in an existing rack power envelope. A simple power cap will allow devices to power on until power usage reaches the specified power cap and then will prevent any more devices from powering on.

Blades use less energy than traditional rack servers. A lot less. HP believes you shouldn't compromise anything to save energy. From dynamic data center cooling solutions to thermal service expertise, HP delivers a total solution to power and cooling.

With built-in instrumentation, accurate monitoring and control, and the ability to pool, share and allocate the right amount of power and cooling to match your demand, HP Thermal Logic keeps your blade solution from wasting a watt of power or a gram of air.

To help determine how much power your BladeSystem c-Class enclosure will draw, HP provides an easy to use power sizing tool at **www.hp.com/go/bladesystem/powercalculator**.

For more detailed information on how to plan and configure power for a BladeSystem c-Class installation, see the site planning guide at **www.hp.com/go/bladesiteplanning.**

Step 8: choose services

Keep your environment up and running.

HP Thermal Quick Assessment for HP BladeSystem Environments	Leverages sophisticated modeling tools and techniques to determine the unique thermal conditions within your data center to help optimize your BladeSystem environment.
VMware Capacity Planning Assessment service	Support migration planning by providing an assessment of your current IT infrastructure.
HP Factory Express Services	Speed implementation with plug-and-play blade solutions that are pre-integrated and pre-configured to your specifications. You choose how your blade solution is built, tested, integrated, shipped and deployed.
Installation and Startup for HP BladeSystem c-Class Infrastructure	Provides speedy hardware deployment including enclosure for all types of interconnects, direct attach storage blades plus software deployment of Insight Control management software and either Microsoft or Linux operating system.
Enhanced Network Installation and Startup service for HP BladeSystem	Provides advanced network software configuration including configuration of HP Virtual Connect options.
3-year, 24x7, same–business-day hardware support	Coverage options available for HP BladeSystem enclosures, HP ProLiant server blades, HP BladeSystem SAN switches and HP StorageWorks tape blades.
HP Support Plus 24	Provides integrated 24x7 4-hour response hardware support with 2-hour response software technical support and software update service.
Proactive BladeSystem Service	Consultative support to help deliver HP BladeSystem environmental operational efficiency and performance optimization.
Proactive 24 Service	Integrated hardware and software support including proactive and reactive services to improve stability and availability across your environment.
Critical Service	Comprehensive support solution designed to help reduce the business impact of downtime for mission-critical applications.

Need a hand? HP and our network of partners offer the right mix of services.

- Budgeting
- Planning
- Design
- Integration
- Installation
- Configuration
- Support

HP Care Pack services for HP BladeSystem and storage options are easy-to-buy, easy-to-use packaged services. HP certified professionals offer a breadth of expertise across BladeSystem technologies to help you ward off downtime, protect your IT investment and stay competitive—with expert support that's affordable, personal and scaled to your needs. Our service capabilities and those of HP authorized channel partners are available worldwide, offering a single point of accountability and local support, helping you bring people, processes and technology together.

Benefits of HP BladeSystem services include:

- Efficient project implementation
- Fast problem resolution
- System performance optimization

Whether you are managing a small SMB business or are in charge of IT for a large global enterprise, HP Services and our service channel partners can meet your service needs. Services are available at every stage of your BladeSystem solution lifecycle, from assessment to legacy system migration to deployment and implementation. We also offer a range of support services including integrated hardware and software and mission-critical support to help optimize your BladeSystem environment. With our comprehensive service portfolio, we can help you realize the full potential of your technology and keep your environment up and running.

HP puts it all together

In addition to server blades, HP also offers a full infrastructure portfolio of servers, storage and management software. Whether it's a simple departmental server, an enterprise data protection solution or anything in between, HP is committed to meeting your exact needs. This commitment has resulted in more customers choosing HP servers over any other vendor's servers[5].

To gain the full value from your investments, you need expert services across the IT lifecycle, intelligent software, advanced storage devices and system-enhancing options.

- **Services**—How important is it that your service partner provides a single point of ownership and accountability? Are your service needs met across your enterprise? Have you reached the mission critical reliability you require to meet your business needs? From training and basic product support to selective outsourcing, our services help you realize the full potential of your technology and keep your environment up and running.

- **Management software**—Do you need a single interface to monitor and control your complex IT environment? Our management software allows you to align IT with business needs and automate error-prone processes that simplify and enhance your infrastructure.

- **Storage devices**—Do you need help optimizing your storage resources, managing multi-vendor environments and evolving to open architectures? Our network and direct-attached storage devices help you keep large amounts of information protected and readily accessible to people when needed.

- **Server options**—Do you have everything you need to meet your infrastructure needs? Our server options—including memory, drives, processors, racks, operating system software, power and cooling—help fine-tune your solution by enhancing system performance and functionality.

To learn more about other HP server, workstation and storage products, contact your local HP representative, your authorized HP reseller or visit:
www.hp.com/go/proliant
www.hp.com/go/integrity
www.hp.com/go/nonstop
www.hp.com/go/arrays
www.hp.com/go/san

HP Financial Services

Not every technology acquisition has to be a traditional cash-and-carry transaction. HP Financial Services offers a variety of customized leasing and financing options to facilitate your HP BladeSystem purchase and keep your technology expenditures in line with your overall budget.

For more information, visit
www.hp.com/go/hpfinancialservices.

Evaluate

The BladeSystem Evaluation Center contains interactive demos, videos, webinars, TCO calculators, detailed technical data and more.

For more information, visit **www.hp.com/go/bladesystem/evaluate**.

Unlimited possibilities for your business

A BladeSystem is simply a smarter way to build an infrastructure that supports the vital applications your business requires, with fewer wires, lower electric bills and none of the headaches you might find with the other choices you have today.

All of this adds up to big savings for your IT budget that can be re-invested back into your business. With your streamlined foundation in place, you can also deliver top line business results to grow, get to market faster and empower your employees, partners and customers more effectively.

Wherever you plan to take your business in the future, the HP BladeSystem will be ready when you get there.

To learn more, visit www.hp.com/go/bladesystem