Eight steps to building an HPE BladeSystem

Hewlett Packard Enterprise

HPE BladeSystem overview

HPE BladeSystem with HPE OneView delivers a whole new experience for IT with the power of one—one infrastructure and one management platform to speed the delivery of services. Only the power of one delivers leading infrastructure convergence, availability with federation, and agility through data center automation.

HPE BladeSystem delivers real business results

Building Blocks for a Modular Infrastructure

HPE BladeSystem is a modular infrastructure platform that converges servers, storage, and network fabric. It accelerates operations and speeds delivery of applications as well as services that run in physical, virtual, and cloud-computing environments.

Shared infrastructure—reduced costs

Because the core infrastructure is shared, capital costs can be significantly lower. Blades share power, cooling, network, and storage infrastructure at the BladeSystem enclosure level.

Since equipment is not needed for reach server there is a dramatic reduction in power distribution units, power cables, LAN and SAN switches, connectors, adapters, and cables.

Easier upgrades

You can bring in the newest-generation technologies by simply changing the components that need to be updated.

Simplify routine maintenance

HPE BladeSystem infrastructure changes takes less time with the wire-once connectivity only available with HPE Virtual Connect. Virtual Connect simplifies and converges server-edge connections, making them transparent to storage and networks. You can reduce server-edge infrastructure such as network interface cards, cables, and switches.

HPE Virtual Connect FlexFabric modules can be directly connected to HPE 3PAR Storage solutions via direct-attach flat SAN technology, which reduces complexity, cost, and latency.

Simplified management

HPE OneView delivers unprecedented ease to use, so you can deploy and manage HPE BladeSystem faster, at lower cost, and at greater scale. HPE OneView is the first software platform that creates a modern and integrated workspace for lifecycle management of HPE BladeSystem. HPE OneView reduces the needs for multiple management tools and non-management tools, streamlining processes, and helps eliminate common sources of errors.

Resources:
hpe.com/info/bladesystem **hpe.com/info/virtualconnect** **HPE Product Bulletin**

Modular, future-proof design

The HPE global community of business technology experts and partners is here to help you build a solution and support plan that is just right for your needs. And we do a lot of the hard work for you by integrating the infrastructure essentials inside the BladeSystem. It arrives at your door, ready to deliver outstanding business results.

Building your ideal BladeSystem infrastructure solution begins with these eight simple steps:

- **Step 1: Choose your operating environment**
- **Step 2: Choose your BladeSystem enclosure**
- **Step 3: Choose your server blades**
- **Step 4: Choose your interconnects**
- **Step 5: Choose your storage infrastructure**
- **Step 6: Choose your infrastructure management**
- **Step 7: Choose your power and cooling configurations**
- **Step 8: Choose your services**

Step 1: Choose your operating environment

HPE Integrity and HPE ProLiant server blades run in almost the same operating environment as other HPE servers, but with the advantages of a BladeSystem infrastructure. You can mix and match different Integrity and ProLiant server blades and run multiple operating environments in the same enclosure.

Supported OS and virtualization software

- Microsoft® Windows®: **hp.com/go/wincert**
- Red Hat® Enterprise Linux® (RHEL): **hp.com/go/rhelcert**
- SUSE Linux Enterprise Server (SLES): **hp.com/go/slescert**
- Oracle Linux Unbreakable Enterprise Kernel: **hp.com/go/oelcert**
- Oracle Solaris: **hp.com/go/solariscert**
- Canonical Ubuntu: **hp.com/go/ubuntucert**
- VMware®: **hp.com/go/vmwarecert**
- Citrix®: **hp.com/go/citrixcert**

Purchase your entire operating environment from Hewlett Packard Enterprise

Hewlett Packard Enterprise resells and provides full service and support for Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, Ubuntu Server, Citrix, and VMware.

Learn more at **hp.com/go/ossupport**.

Step 2: Choose your BladeSystem enclosure

HPE BladeSystem c3000 Platinum Enclosure

HPE BladeSystem c7000 Platinum Enclosure

Features	6U, up to 8 HH/4 FH blades, 4 I/O Fabric interconnects, 6 Power Supplies, 6 Fans, 2 Onboard Administrators (OA)	10U, up to 16 HH/8 FH blades, 8 I/O Fabric interconnects, 6 Power Supplies, 10 Fans, 2 Onboard Administrators (OA)

For more info go to: **BladeSystem Enclosures**.

Step 3: Choose your server blades

HPE ProLiant BL460c Gen9

HPE ProLiant BL660c Gen9

Server Blade Features:	HH Blade, 1 or 2 Processors, Intel® Xeon® E5-2600 v4 or v3, 2 TB max memory, 2 SFF Drive bays, M.2 support, Persistent Memory support PCIe 3.0 Mezzanine slots, NVMe support, UEFI support	FH Blade, 2 or 4 Processors, Intel Xeon E5-4600 v4 or v3, 4 TB max memory, 4 SFF Drive bays, M.2 support, 3 PCIe 3.0 Mezz slots, NVMe support, UEFI support

HPE ProLiant WS460c Gen9 Graphics Server Blade

HPE ProLiant WS460c Gen9 Graphics Server Blade with Expansion Slot

Server Blade Features:	HH Blade, 1 or 2 Processors, Intel Xeon E5-2600 v4 or v3, 1 TB max memory, 2 SFF Drive bays, M.2 support, 2 PCIe 3.0 Mezz slots, NVMe support, UEFI support, NVIDIA® Quadro M6 or K3100M and AMD S7100X in MXM Mezz adapter	HH/DW Blade, 1 or 2 Processors, Intel Xeon E5-2600 v4 or v3, 1 TB max memory, 2 SFF Drive bays, M.2 support, 2 PCIe 3.0 Mezz slots, UEFI support, NVIDIA GRID K2, K1, Quadro K6000, K5000, K4000, up to 2 HPE Multi-GPU with 2 NVIDIA M6 or 3 NVIDIA Quadro K3100M on each expansion card

For more info go here: **ProLiant BL Blade ProLiant Servers**, **Gen9 Technologies White Paper**, **HPE BladeSystem Firmware Compatibility List**

Step 4: Choose your interconnects

HPE BladeSystem Virtual Connect and Interconnect modules

Proven wire-once simplicity with HPE Virtual Connect

HPE Virtual Connect is an essential building block for any virtualized or cloud-ready environment. This innovative, wire-once HPE connection management simplifies server connectivity, making it possible to add, move, and change servers in minutes vs. hours or days. Virtual Connect is the simplest way to connect servers to any network and reduces network sprawl at the edge by up to 95 percent. With more than 10 million ports shipped, Virtual Connect continues to deliver proven simplified operations for LAN, SAN, and converged infrastructures.

HPE Virtual Connect FlexFabric and Ethernet

The HPE VC FlexFabric and Ethernet Modules for HPE BladeSystem c-Class are the simplest, most flexible connection to your Ethernet and Converged fabrics. Virtual Connect modules provide high-performance and end-to-end optical or copper connections with HPE Networking and other brands of aggregation or core switches. HPE Virtual Connect modules are edge-safe. The HPE Virtual Connect FlexFabric family supports Flat SAN solutions by directly attaching to Fibre Channel (FC) storage with HPE 3PAR StoreServ Storage Systems. Doing so removes the need for a SAN fabric between servers and HPE 3PAR StoreServ Storage Arrays.

HPE Virtual Connect Fibre Channel

The HPE VC Fibre Channel Modules for HPE BladeSystem c-Class are the simplest, most flexible connection to your SAN fabrics. The modules simplify server connections by cleanly separating the server enclosure from SAN, and simplify SAN fabrics by reducing cables without adding switches to the domain. This allows you to change servers in minutes, not days.

Find a complete list of products in the Virtual Connect portfolio at **hpe.com/info/virtualconnect**.

Ethernet blade switches

HPE BladeSystem c-Class switches provide a rich set of networking features that can lower maintenance and operating costs. You can count on HPE Ethernet switches to provide the solution by choosing from simple-to-configure 1 Gb switches, 1 Gb/10 Gb hybrid switches designed especially for data centers in transition, or a powerful 10/20/40 Gb switch designed for handling data from today's multiprocessor virtualized servers.

Find a complete list of products in the Interconnects portfolio at **hpe.com/servers/blades/interconnects**.

HPE Virtual Connect FlexFabric-20/40 F8 Module

HPE Virtual Connect FlexFabric 10 Gb/24-Port Module

HPE Virtual Connect Flex-10/10D Module

HPE Interconnect module features:	Single Bay Blade, 10/20/40 Gbps line speed, full duplex, 16 x 10/20 Gb downlinks, 4 x 40 Gb QSFP uplinks, 8 x 10 Gb external uplinks (SFP+, Ethernet/FC), 2 x 20 Gb cross connects, HPE OneView, VCEM support and CLI, Flat SAN capable, sFlow®	Single Bay Blade, 10 Gbps line speed, full duplex, 16 x 10 Gb downlinks, 2 x 10 Gb cross connects, 8 x 10 Gb external uplinks (SFP+, Ethernet/FC), HPE OneView, VCEM support and CLI, Flat SAN capable	Single Bay Blade, 10 Gbps line speed, full duplex, 16 x 10 Gb downlinks, 4 x 10 Gb cross connects, 10 x 10 Gb external uplinks (SFP+), HPE OneView, VCEM support and CLI

HPE Virtual Connect 16 Gb 24-Port Fibre Channel Module

HPE Virtual Connect 8 Gb 20-Port Fibre Channel Module

HPE Virtual Connect 8 Gb 24-Port Fibre Channel Module

HPE Interconnect module features:	Single Bay Blade, 16 Gbps line speed, full duplex, 16 internal 16/8 Gb downlinks, 8 external 16/8/4 Gb uplinks, N-port trunking, VCEM support and CLI	Single Bay Blade, 8 Gbps line speed, full duplex, 16 internal 8/4/2/1 Gb downlinks, 4 external 8/4/2 Gb uplinks, HPE OneView, VCEM support and CLI	Single Bay Blade, 8 Gbps line speed, full duplex, 16 internal 8/4/2/1 Gb downlinks, 8 external 8/4/2 Gb uplinks, HPE OneView, N-port trunking, VCEM support and CLI

HPE Networking 6127XLG Ethernet Switch

HPE Networking 6125XLG Ethernet Switch

HPE Networking 6125G/XG Ethernet Switch

HPE Interconnect module features:	Single Bay Blade, 10/20/40 Gbps line speed, full duplex, 16 x 10/20 Gb downlinks, 4 x 40 Gb QSFP uplinks, 8 x 10 Gb external uplinks (SFP+), 4 x 10 Gb cross connects, Comware v7, HPE IMC, CLI support, SDN & OpenFlow support, IRF	Single Bay Blade, 10/40 Gbps line speed, full duplex, 16 x 10 Gb downlinks, 4 x 40 Gb QSFP uplinks, 8 x 10 Gb external uplinks (SFP+), 4 x 10 Gb cross connects, Comware v7, HPE IMC, CLI support, SDN & OpenFlow support, IRF	Single Bay Blade, 1/10 Gbps line speed, full duplex, 16 x 1 Gb downlinks, 4 x 1 Gb external uplinks (RJ-45), 4 x 1/10 Gb external uplinks (SFP+), 1 x 10 Gb cross connects, Comware v5, HPE IMC, CLI support, IRF

HPE Networking 6125G Ethernet Switch

Mellanox SX1018HP Ethernet Blade Switch

Cisco B22HP Fabric Extender

HPE Interconnect module features:	Single Bay Blade, 1/10 Gbps line speed, full duplex, 16 x 1 Gb downlinks, 4 x 1 Gb external uplinks (RJ-45), 4 x 1 Gb external uplinks (SFP+), 1 x 1 Gb cross connect, Comware v5, HPE IMC, CLI support, IRF	Double Bay Blade, 10/40 Gbps line speed, full duplex, 16 x 10/40 Gb downlinks, 18 x 40 Gb external QSFP uplinks, GUI and CLI support, OpenFlow support	Single Bay Blade, 1/10 Gbps line speed, full duplex, 16 x 1/10 Gb downlinks, 8 x 10 Gb external uplinks (SFP+), Cisco management and CLI support

HPE BladeSystem Virtual Connect and Interconnect modules (Continued)

Feature	VC FF-20/40 F8	VC 16 Gb 24-port FC	VC Flex-10/10D	HPN 6127XLG	HPN 6125XLG	Mellanox SX1018HP
20G/Flex-20	✓	-	-	✓(20G)	-	-
10G/Flex-10	✓	-	✓	✓(10G)	✓(10G)	✓(10G)
Ethernet	1/10/20/40 Gb	-	1/10 Gb	1/10/20/40 Gb	1/10/40 Gb	1/10/40 Gb
Fibre Channel	8 Gb	8/16 Gb	-	-	-	-
FCoE	✓	-	✓	✓	✓	-
RoCE	-	-	-	✓	✓	✓
Tunnel Offload	✓	-	✓	✓	✓	✓
Gen8/Gen9	✓	✓	✓	✓	✓	✓

For more info go here: **Virtual Connect**, **Server Interconnects**, **Server Adapters**.

HPE BladeSystem adapter options

A workload-optimized portfolio of networking adapters for better business outcomes.
HPE Server Networking Adapter solutions deliver application-centric connectivity including core business applications, mission-critical environment, virtualized and cloud workloads as well as Big Data, HPC, and Web Scalability.

HPE server adapters for HPE BladeSystem benefits include:

- **Intelligence** to increase productivity
- **Availability** for continuous business
- **Density and efficiency** to scale rapidly
- **Convergence** to accelerate IT service delivery

Technologies:
HPE Ethernet adapters deliver performance and value solutions for fast data center and Enterprise operations with up to 10GbE and 4 port-densities per adapter. This family includes the HPE Ethernet 300 and 500 Series adapters.

HPE Fibre Channel Host Bus Adapters enable high performance, low latency, and reliable I/O operations for SAN-based infrastructures. This family includes 4, 8, and 16 Gb Fibre Channel adapters from Hewlett Packard Enterprise and HPE's partners.

HPE FlexFabric: Deliver converged operations with a variety of capabilities and standards including FCoE, iSCSI, and RoCE with LAN traffic on a single Ethernet wire. FlexFabric dynamically enables up to 4 channels per port to improve and maximize utilization, all manageable with HPE OneView.

HPE Flex-20: HPE Flex-20 (FlexFabric 600 Series) adapters for HPE BladeSystem deliver the best of all worlds, performance, convergence, and innovation. Boost workloads with increased server to adapter performance from 10 Gb (Flex-10) to 20 Gb.

Feature	HPE Fibre Channel adapters	HPE Ethernet adapters (3xx, 5xx Series)	HPE FlexFabric adapters (5xx Series)	HPE FlexFabric 630, 650 Series adapters
20G/Flex-20	-	-	-	✓
10G/Flex-10	-	-	BL only	✓
Ethernet	-	1/10 Gb	1/10 Gb	1/10/20 Gb
Fibre Channel	4/8/16 Gb	-	-	-
FCoE	-	-	Selected	✓
RoCE	-	-	-	✓(650)
Tunnel Offload	-	-	Selected	✓
NPAR/FlexFabric	-	NPAR (select adapters)	FlexFabric	FlexFabric
Gen8/Gen9	✓	Consult your sales representative	Consult your sales representative	✓

Step 5: Choose your storage infrastructure

HPE BladeSystem Storage options (internal)

HPE D2220sb Storage Blade

HPE StoreEasy 3850 Gateway Blade Storage

HPE StoreVirtual VSA

HPE StoreEver LTO-5 Ultrium SB3000c Tape Blade

	HPE D2220sb Storage Blade	HPE StoreEasy 3850 Gateway Blade Storage	HPE StoreVirtual VSA	HPE StoreEver LTO-5 Ultrium SB3000c Tape Blade
Storage Blade Features:	HH Blade, DAS storage or iSCSI with VSA, 12 SFF Drive bays, up to 24 TB raw storage	HH Blade, SAN connect: iSCSI, FC, and SAS, 2 SFF Drive bays, Server Blade gateway to unlimited external storage	This affordable, software-defined storage solution provides you with flexible deployment choices to reduce complexity and cost by co-locating virtualized applications and shared storage.	HH Blade, 6 Gb/s SAS, 1.6 TB to 3 TB (2:1 compressed) capacity

HPE BladeSystem Storage options (external)

HPE 3PAR StoreServ Storage

HPE MSA Storage

HPE StoreOnce System

	HPE 3PAR StoreServ Storage	HPE MSA Storage	HPE StoreOnce System
External Storage Family Features:	Flash-optimized storage arrays with massive scalability for mission-critical workloads in midrange to large enterprise and service provider environments.	Storage consolidation for small to midsize companies and remote locations.	Disk-based data protection suitable for small local and remote virtualized sites as well as large, central data centers.

For more info go here: **Storage Blades**, **Tape Blades**, **Converged Storage**.

Step 6: Choose your infrastructure management

Management for HPE BladeSystem

	On system	On premise	On cloud
	Integrated Lights-Out (iLO)	**HPE OneView**	**HPE Insight Online**
Automated support case management/Contracts, warranty, and service credit management			Yes
Direct connect registration with no host server			Yes
Channel partner dashboard			Yes
Network management with HPE Virtual Connect		Yes	
Storage and SAN provisioning		Yes	
Software-defined flexibility using server profiles, templates, groups, and sets		Yes	
Advanced power, thermal, and location management		Yes	
Enterprise partner integrations: VMware vCenter, Microsoft System Center, RHEV		Yes	
Open development platform using REST APIs (PowerShell and scripting)	Yes	Yes	
Firmware maintenance	Yes	Yes	
Server provisioning configuration replication	Yes	Yes	
Integrated Remote Console (virtual media, folders, record/replay, virtual power management)	Yes	Yes	
Pre-boot health summary and iLO reboot switch (used when server is down)	Yes		
iLO Federation	Yes		
Mobile app	Yes		Yes
Security: Encryption and role-based	Yes	Yes	Yes
Dashboards and downloadable reports	Yes	Yes	Yes
24x7 health, alerts, and notifications	Yes	Yes	Yes
Standardized and secure BIOS configuration via UEFI	Yes	Yes	

Refer to the **HPE Server Management Family Guide for specifics**.

For more info go here: **HPE Server Management**.

Step 7: Choose your power and cooling configurations

HPE 8.6 kVA 24 A Three-Phase Core Intelligent Modular Power Distribution Unit

Note: Hewlett Packard Enterprise offers larger capacity Intelligent PDUs. For more information: **hp.com/go/ipdu**.

Hewlett Packard Enterprise created the HPE Power Advisor utility to provide more accurate and meaningful estimates of power needs for HPE ProLiant server blades. This utility can even show you how HPE Intelligent Infrastructure can help you save money by enhancing power and cooling. Learn more or download the HPE Power Advisor at **hp.com/go/hppoweradvisor**.

c7000
- Up to six power supplies and up to ten fans
- Single- or three-phase power options and N+N and N+1 for power supply redundancy

c3000
- Up to six power supplies and up to six fans
- Single-phase 110/220 V power

Choose your HPE PDU and UPS
- Choice of Modular or Monitored PDU
- 4.9 kVA to 17.3 kVA single- or three-phase
- Single- or three-phase UPS systems ranging from 5000 VA to 60 kW (N+1)

Choose your HPE 10000 G2 Rack or Modular Cooling System
- Capabilities up to 35 kW per rack

For more info go here: **HPE Enterprise Information Library**, **HPE Rack and Power Infrastructure**.

Step 8: Choose your services

HPE Care Pack services:
- HPE Installation and Startup Service for c-Class BladeSystem Service
- HPE BladeSystem Enhanced Network Installation and Startup Service for c-Class Service
- HPE Installation and Startup Service for HPE Insight Dynamics for ProLiant
- HPE Installation and Startup Service for HPE Virtual Connect Enterprise Manager software
- HPE Installation and Startup Service for HPE Insight Control
- HPE Support Plus 24 Service
- HPE Proactive BladeSystem Service
- HPE Data Center services

HPE Factory Express: factory-based CTO solutions
HPE Education Services
HPE Financial Services

Unleash the Full Power of Your HPE BladeSystem

HPE offers a full range of services to help keep your blade environment running strong.

Converged Infrastructure Services
Let Hewlett Packard Enterprise design an integrated data center architecture to match your business needs.

Support Services
Shift IT focus from infrastructure maintenance to creating business value.

Flexible Capacity Services
Hewlett Packard Enterprise delivers a public cloud experience with all the benefits of on-premise IT.

Hewlett Packard Enterprise offers a full range of services to help keep your blade environment running strong.

Learn more at
hpe.com/info/bladesystem

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