Today’s world demands an IT environment that will adapt and scale as your business grows. Scale out architecture helps by allowing you to add additional building blocks whenever your business requires more capacity. However, these industry standard building blocks must have the best price performance and the best energy performance while being flexible, easy to manage, and quick to deploy.

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Welcome to the HP Technology Guide for Scalable Business Solutions. This guide features HP’s latest industry leading technologies – products designed to help you build and maintain an infrastructure that delivers the performance you need to drive your best business outcomes. As the world changes, many business initiatives require technology that is easy to manage and makes every dollar count.

Performance per Dollar
With increasing IT demands, a stressful economic climate, limited data center space and shrinking budgets, performance counts.

But where do you need maximum performance in your IT infrastructure?

• Perhaps performance per watt, getting you the most performance vs the electricity invested?

• What about the performance of computing power in your data center, to tackle issues around density, space constraints and real-estate costs?

• How about maximizing the performance of your people’s time?

• Or the performance of storage capacity?

• Or the performance of each CPU?

At HP, we know that when you’re asking for any, or all, of the above, you asking for maximum return on your investment.

And that’s where HP’s Scalable Business Solutions fit the bill.

HP’s Scalable Business Solutions are technologies specifically designed to maximize the performance of every dollar, whether it be data center space, energy efficiency or automation and control of common tasks. From HP BladeSystem products that can double compute power without breaking the bank, to extreme data storage systems that allow you to scale to the multi-petabyte level, from simple management with HP Insight Software, to HP Services that give you immediate expertise and a quick turnaround, HP Scalable Business Solutions can help you get the most out every IT investment.

Maximizing your performance per dollar – www.hp.com/go/performanceperdollar
The ProLiant SL6000 Scalable System has been designed to meet the unique requirements of extreme scale out for a Data Center.

The HP ProLiant SL6000 Scalable System uses a new highly efficient and modular power and cooling infrastructure that enables an array of server trays to be easily integrated into a Data Center. This new system delivers higher density that uses less data center floor space and lower energy consumption.

The ProLiant SL6000 has been designed specifically for organizations who need a highly scalable environment starting from a single rack all the way up to hundreds of racks. Through the use of industry standard components ensures it is cost effective while meeting the demands of High Performance Computing, Web 2.0, Cloud and Enterprise computing applications.

The SL6000 is a multi-node system that features pluggable server nodes utilizing shared power and cooling in a 2U rack form factor - HP ProLiant z6000 G6 Chassis which can mount in a standard 19” rack. This provides greater flexibility to mix and match server node configuration based on the application workload while improving serviceability and manageability. Key modules for SL6000 Scalable System solution are:

- HP ProLiant z6000 G6 Chassis (2U)
  - Provides power and cooling for Two Server trays.
  - Fits standard 19” Rack using either 10U bulk or 2U rail kits.
- HP ProLiant SL170z G6 (1U) - Single Server node.
- HP ProLiant SL2x170z G6 (1U) - Two Server nodes with 1 LFF Drive each.
- HP ProLiant SL160z G6 (1U) - Single Server node with up to 2 LFF Drives each.

The SL6000 Scalable System provides all of the features expected in an enterprise server, including essential management features (LO100i) and Easy Setup CD for rapid deployment.
HP ProLiant SL6000 Scalable System – Closer Look

<table>
<thead>
<tr>
<th>HP ProLiant SL160z</th>
<th>HP ProLiant SL170z</th>
<th>HP ProLiant SL2x170z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum memory expansion, 18 DIMM Slots and full height PCI-Express Slot. Maximum drive expansion, up to six drives per server node. Maximum processor density, up to eight processors.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Memory 6GB per Server Node (3x2GB)</td>
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</tr>
</tbody>
</table>

Ideal Application

- HPC database tier
- Web memory-cache
- Web Search
- Web database
- HPC compute intensive
- Web front end

Server Nodes

<table>
<thead>
<tr>
<th>Processor</th>
<th>Memory</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>18 DDR3 DIMM Sockets</td>
<td>HP Embedded SATA w/RAID</td>
</tr>
<tr>
<td></td>
<td>16 DDR3 DIMM Sockets</td>
<td>Up to 2 non-hot plug large form factor drives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 non-hot plug large form factor drives per Node</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HP Embedded SATA w/RAID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HP Embedded SATA w/RAID</td>
</tr>
</tbody>
</table>

Expansion Slot per Server Node

- Low Profile PCI-Express Slot
- Low Profile PCI-Express Slot
- Low Profile PCI-Express Slot

Network

- Embedded Dual Port 1GbE NICs

For more detailed information please go to: www.hp.com/go/productbulletin

HP Scalable Computing and Infrastructure Services

HP Services for Scalable Computing and Infrastructure are designed for massive scale-out data center requirements.

If you are delivering services to your customers that have vastly increasing volumes of usage, it becomes critical for your business to be able to scale data centers very fast to match. To address these requirements, HP offers highly responsive and flexible support services to help you keep your data center up and running all the time.

Lower costs, manage growth, and receive the service you need to match your own process requirements. This is where you can benefit from the technological advances brought about by HP Scalable Computing and Infrastructure Services.

Services tuned for your specific needs

HP Hardware Support Services for the Scalable Computing Infrastructure (SCI) environment are services designed for massive scale-out data center environments. Providing the services of highly trained professionals with the world-class skills you already expect from HP, these services can be selected from a set of available service packages, or customized to match the unique needs of your data center.

So whether you prefer that your own IT department handles diagnostics and repairs, or you require HP to provide all these services for you, or you want something in-between, we have the service to meet your needs.

What you gain

Services for HP Scalable Computing and Infrastructure provide the following benefits to your business:

- Hardware support tuned for massive scale-out data centers.
- On-site repair options that offer scheduled and predictable repair days defined by you, or a repair coverage window that meets more demanding response needs, such as next business day or same day response times.
- Proactive Account Support planning and escalation management.
- Preferred call handling and expedited problem resolution through trained HP technical resources.
- Access to electronic support information and services.
- Electronic remote monitoring and support (for eligible products) enabling HP engineers to quickly identify the parts necessary to repair your hardware.
- On-site inventory (for SCI approved certified self-maintainers only).
- Installation services.
BLADESYSTEM:
HP BladeSystem Matrix

A cloud infrastructure in a box that helps you realize your vision for your data center today.

The BladeSystem Matrix is a cloud infrastructure in a box that brings the economics, scalability and response times of the cloud to diverse applications across your data center. Uniquely, it combines disaster recovery, capacity planning, and automated provisioning with a self-service portal into one command center to unite your physical and virtual worlds. With Matrix, you get a wire-once infrastructure that converges network, storage and compute to help you accelerate complex IT projects, simplify daily tasks and the continuously lower costs across your data center.

Key Scenarios for BladeSystem Matrix:
- Design application infrastructure, provision and operate it.
- Consolidate from the start and continuously in the future.
- Everyday high-availability and be disaster recovery ready.
- Dynamic power capping.
- Real-time capacity planning.
- Business planning = scheduling or reserving capacity

BladeSystem Matrix delivers an integrated infrastructure built on well-established HP technologies and functionality including:
- HP BladeSystem c-Class c7000 enclosure, server blades, and Virtual Connect Flex-10 and Virtual Connect Fibre Channel.
- HP Insight software.
- Factory Express and Technology Services for end to end implementation.
- StorageWorks EVA4400 (optional).

What BladeSystem Matrix can deliver for your business?
- Only truly integrated package and delivery, end to end.
- Industry standard components with better integration so no surprises.
- Cost effective from acquisition point forward (CapEx and OpEx)
- Range of HP Financial Services to suit the business financial needs.
- Compatibility – existing environment, open – works with all key partners you use today.
- More cost effective than piecing it together.
HP BladeSystem Matrix – Under the hood

Management

Manage your data center
HP BladeSystem Matrix combines automated provisioning, capacity planning, disaster recovery and a self-service portal into one command center via a private management network.

Compute

HP BladeSystem c7000

Network

LAN
Virtual Connect Flex10 (Redundant 10Gb Ethernet)

SAN
Virtual Connect (Redundant 8Gb Fibre channel)

Storage

Recommended SAN: HP StorageWorks EVA4400
Matrix is compatible with any c-Class certified SAN including EMC, Hitachi, and IBM

Manage your data center
HP BladeSystem Matrix combines automated provisioning, capacity planning, disaster recovery and a self-service portal into one command center via a private management network.

HP BladeSystem Matrix Services to help you drive better business outcomes:

Matrix Implementation Service - included as part of the core Matrix solution to help ensure smooth, worry-free deployment. This included service combines factory integration and onsite support to get your Matrix solution off to a speedy, successful start, eliminate the need for time-consuming training and minimize disruption to your users. An assigned project manager oversees all implementation activities. Service deliverables include core component hardware installation, management software configuration and testing, and orientation training. Also included with your Matrix solution: one-year 24x7 Software Technical Support providing direct access to HP expertise and cost-saving software updates for management software.

Matrix Support Plus 24 — a value-added option for consistent whole-environment optimization. This service option delivers one consistent level of integrated support for your Matrix enclosure hardware and management software. It uplifts your core Matrix hardware component warranty coverage to three-year, same-business-day 24x7 four-hour response. And it extends the Matrix one-year, 24x7 software support and update service to three years. Matrix Support Plus 24 brings you:

- Priority access to Matrix solution experts
- A systemic approach to diagnosing complex problems involving multiple solution components
- Faster solution-wide issue identification and resolution

The HP BladeSystem Matrix creates one pool of infrastructure capacity that can be easily carved up to support applications across up to 1000 physical or virtual servers; all managed as one environment in the same way. Think of it like a cloud in a box to simplify how you deliver applications and cost-saving software updates for management software.

Ideal for consolidation projects, providing disaster recovery and rapid deployment to production environments, the HP BladeSystem Matrix unites the tools, processes, and architecture of your physical and virtual worlds. The goal is to help you speed time to service delivery without chaos, take costs out today and keep them out tomorrow.

Matrix consolidates all resources into a single environment. It helps you automatically align infrastructure capacity for your applications on the fly, then adapts resources to deliver better costs, availability, and quality of service.

This is not a vision of tomorrow. HP BladeSystem Matrix is here now to help you realize your vision for your data center, today. The most fully integrated, adaptive infrastructure environment that HP has ever created, Matrix brings together the best of HP and our partner data center know-how into one environment.

For more information please see www.hp.com/go/matrix or ask your local HP Representative today.
The BL280c G6 server blade was designed specifically for high performance computing and scale-out data centers.

HP BladeSystem c-Class is designed for performance density, power & cooling efficiency, and manageability, making it the ideal platform for scale-out, from small workgroup and remote site solutions to some of the most massive scale-out environments in the world. With the broadest product set in the industry, an HP BladeSystem solution can be tailored to virtually every customer workload.

It delivers the excellent dual-processor performance per watt and price per watt to reduce overall data center spending in power constrained scale-out environments. The primary differences between the ProLiant BL280c G6 and other HP BladeSystem servers are the feature set and price point. The BL280c G6 offers a basic feature set that meets the requirements of scale-out customers focused on power savings and often utilizing it to support a single application in large compute clusters.

- Low price per watt.
- Reduces overall data center maintenance costs based on power savings.
- Large memory footprint with 12 DIMM slots per server.
- Significant memory expansion gives flexibility to customers on how to deploy their memory configurations.
- Flexible and robust management software to simplify and standardize cluster environments

Key Features At A Glance

<table>
<thead>
<tr>
<th>Processor</th>
<th>Up to two Intel® Xeon 5500 Series processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>• Registered or Unbuffered DDR3</td>
</tr>
<tr>
<td></td>
<td>• 12 DIMM Sockets</td>
</tr>
<tr>
<td></td>
<td>• 96 GB max</td>
</tr>
<tr>
<td>Internal Storage</td>
<td>• 2 non-hot plug SFF SATA/SAS*/SSD drives</td>
</tr>
<tr>
<td></td>
<td>• HP Embedded SATA RAID</td>
</tr>
<tr>
<td></td>
<td>• SAS Hardware RAID capability via mezzanine card</td>
</tr>
<tr>
<td>Networking</td>
<td>2 Embedded Multifunction 1GbE ports</td>
</tr>
<tr>
<td>Mezzanine Slots</td>
<td>2 PCIe x8 Gen 2 mezzanine expansion slots</td>
</tr>
<tr>
<td>Additional Features</td>
<td>• Internal USB 2.0 connector</td>
</tr>
<tr>
<td></td>
<td>• Internal SD Card slot</td>
</tr>
<tr>
<td></td>
<td>• TPM 1.2 module support</td>
</tr>
<tr>
<td>Management</td>
<td>• ProLiant Onboard Administrator</td>
</tr>
<tr>
<td></td>
<td>• Power Meter, Power Regulator, Power Capping</td>
</tr>
<tr>
<td>Density</td>
<td>• 16 server blades in 10U enclosure</td>
</tr>
<tr>
<td></td>
<td>• 8 server blades in 6U enclosure</td>
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</tbody>
</table>

For detailed technical information on the BL280c G6 please refer to: www.hp.com/go/productbulletin or www.hp.com/go/bladesystem
The HP ProLiant BL280c G6 leverages the flexibility of the industry leading BladeSystem architecture which enables you to mix and match your architecture to your business needs.

**What Are The Current Enclosure Options For BL280C G6?**

The HP ProLiant BL280c G6 Server is in a half-height form factor which means you have a maximum of 16 x BL280c G6 in BladeSystem c7000 Enclosure & 8 x BL280c G6 in a BladeSystem c3000 Rack or Tower Enclosure. The BL280c G6 Server can be mixed with other BladeSystem Servers as required.

- **c7000 Enclosure**
- **c3000 Rack Enclosure**
- **c3000 Tower Enclosure**

For detailed technical information on the BL280c G6 please refer to: www.hp.com/go/productbulletin or www.hp.com/go/bladesystem
The BL2x220c G5 server was designed specifically for high performance computing, grid, and massive scale-out applications, the BL2x220c G5 provides industry-leading compute density.

HP BladeSystem c-Class is designed for performance density, power & cooling efficiency, and manageability, making it the ideal platform for scale-out, from small workgroup and remote site solutions to some of the most massive scale-out environments in the world. With the broadest product set in the industry, an HP BladeSystem solution can be tailored to virtually every customer workload.

With up to 32 server nodes per enclosure each capable of supporting 2 Quad-Core CPUs and up to 32GB of RAM, the BL2x220c scales to provide up to 1024 cores and 4TB of RAM per 42U rack. Two Gigabit Ethernet ports are provided per server node as standard with options available to upgrade to 10Gbit Ethernet or Infiniband for high performance, low latency interconnects.

### Key Features At A Glance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>ProLiant BL2x220c server blade includes 2 server nodes per half-height blade</td>
</tr>
<tr>
<td>Processor</td>
<td>Up to two Intel® Xeon 5400 Series processors per server node</td>
</tr>
</tbody>
</table>
| Memory                | • Registered DDR2-667  
                        | • 4 DIMM Sockets  
                        | • 32 GB max |
| Internal Storage      | 1 Non-hot plug SFF SATA/SSD drive per Server Node |
| Networking            | 2 integrated Multifunction 1GbE ports per Server Node |
| Mezzanine Slots       | 1 mezzanine expansion slot |
| Additional Features   | Internal USB 2.0 connector |
| Management            | • Integrated Lights Out 2 Standard Blade Edition  
                        | • Power Meter, Power Regulator, Power Capping |
| Density               | • 32 server nodes in 10U enclosure  
                        | • 16 server nodes in 6U enclosure |
**Server Node A**

**Internal Storage / Slot per Node**
- Up to One Non-Hot plug SATA or Solid State Drives internally.
- SAS is supported using an M700 Mezzanine Smart Array Controller.
- OR use embedded USB for embedded Hypervisor for Virtualization.

**Standard Network Ports**
- TWO integrated Multifunction 1GbE ports
- Integrated Lights Out 2 Management Port

**One Mezzanine Expansion Slot for each Server Node**
- Can be used for Ethernet, Fibre Channel, and Infiniband.

**Server Node B**

**Intel® Xeon 5400 Series Processors**
- Supports up to two Intel® Xeon 5400 Series processors

**Additional Memory**
- Up to 32GB Memory using all 8GB DIMMS.
- 4 DIMM Slots in total.

**iLO2 Management**
- Essential part of managing any HP Server enables full remote management of Server.
- Ask about Insight Control Environment (ICE) which delivers comprehensive system health monitoring, remote control, vulnerability scanning and patch management as well as flexible deployment, virtual machine management, and power management in one easy to install package.

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**What Are The Current Enclosure Options For BL2x220C G5?**

The HP ProLiant BL2x220c G5 Server is in a half-height form factor which means you have a maximum of 16 x BL2x220c in BladeSystem c7000 Enclosure & 8 x BL2x220c in a BladeSystem c3000 Rack or Tower Enclosure. The BL2x220c G5 Server can be mixed with other BladeSystem Servers as required.

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For detailed technical information on the BL2x220 G5 please refer to: [www.hp.com/go/productbulletin](http://www.hp.com/go/productbulletin) or [www.hp.com/go/bladesystem](http://www.hp.com/go/bladesystem)
The HP ProLiant DL1000 Multi Node Series is HP’s first rack solution providing multi node flexibility with 4-in-1 efficiency.

The HP ProLiant DL1000 Multi Node Series has been designed to help customers meet the unique requirements of scale-out environments while minimizing cost through the use of industry standard components. In comparison to other rack mount servers, the new series utilizes higher density and a shared power/cooling infrastructure to use less rack space and lower server energy consumption.

The flexibility of the DL1000 starts with the ProLiant h1000 G6 Chassis (2U rack ready) which provides the option of two, three and four node configurations. Two pre-configured models are available:

- HP ProLiant DL4x170h G6 Server with four DL170h G6 nodes.
- HP ProLiant DL2x170h G6 Server with two DL170h G6 nodes and additional PCI expansion slots.

Each server chassis shares power supplies and fans, providing greater power and cooling efficiencies. The HP ProLiant DL1000 Multi Node Series provides all of the features expected in an enterprise server, including essential management features (LO100i) and Easy Setup CD for rapid deployment.

### Key Features At A Glance

<table>
<thead>
<tr>
<th>Processor</th>
<th>Up to two Intel® Xeon® 5500 Series Processors per Node.</th>
</tr>
</thead>
</table>
| Memory             | • Up to 128 GB, using PC3-10600R DDR3 RDIMMs, operating at 800MHz when fully populated in 16 slots per node.  
                    • Up to 24 GB, using PC3-10600E DDR3 UDIMMs, operating at 1066MHz when fully populated at 2 DIMMs per Channel in 12 slots per node. |
| Internal Storage   | • Up to EIGHT Large Form Factor SAS or SATA Drives or SIXTEEN Small Form Factor SAS Drives.  
                    • NOTE: SAS and/or hot-plug functionality requires the addition of a Smart Array controller. |
| Networking         | HP NC362i Integrated Dual Port Gigabit Server Adapter per Node. |
| PCI Express Slots  | • HP ProLiant DL4x170h G6 Server has one low profile PCI-Express 16x Slot per Node.  
                    • HP ProLiant DL2x170h G6 Server has two PCI-Express Slots per Node. Two additional 3 slot full height riser options are available for configure to order systems. |
| Management         | HP ProLiant Onboard Administrator (powered by the HP Integrated Lights-Out 100i Baseboard Management Controller) with optional LO100i Advanced Licenses for Virtual KVM and Virtual Media. |
HP ProLiant DL1000 Multi Node Series – Closer Look

HP ProLiant DL4x170h G6 Server
(4 server nodes each with one PCI Express expansion slot)

HP ProLiant DL2x170h G6 Server
(2 server nodes each with up to two PCI-Express expansion slots) Two additional 3 slot full height riser options are available for configure to order systems.

Latest Intel Xeon 5500 Series Processors
• Supports up to two Intel Xeon 5500 Series processors per Server Node.

Drive Shelf
• Standard models provide capacity for up to eight hot plug large form factor drives.

Memory DIMM Slots
• Up to 128GB RDIMM or 24GB UDIMM Memory
• 16 DIMM Slots per Server Node

Shared Power Supplies
• Utilizes the latest G6 power efficient technology.

Front View of the HP ProLiant DL1000 Multi Node Series shown with 8LFF HDD cage and up front power button/health LED/UID bezel option. A 16SFF HDD cage is also available for configure to order models.

For more detailed technical information please go to: www.hp.com/servers/proliantdl1000
HP StorageWorks MDS600

HP extends and redefines direct-attached storage for BladeSystem servers, combining the simplicity and cost effectiveness of direct-attached storage without sacrificing flexibility or performance. The MDS600 provide high density, high capacity storage for unstructured data, high performance computing, web farms, and Microsoft Exchange.

Use the HP StorageWorks 600 Modular Disk System (MDS600) as part of a straightforward in-rack 3Gb/s SAS implementation that delivers high-density, low-cost external zoned direct attach storage for HP BladeSystem servers. Use the Virtual SAS Manager (VSM) 3Gb/s SAS BL switch to dynamically assign drives to each BladeSystem server, on the fly, without complex configuration or re-cabling. The drives that are zoned to each server appear as local storage to that server. This allows complete flexibility to reconfigure quickly and easily without moving cables.

Key Features At A Glance

- 70 LFF Universal SAS or SATA drives (Up to 70TB of capacity using 1TB Drives) in 5U rack form factor.
- Two pull-out drive drawers support hot plug large form factor dual-ported SAS or archival-class SATA drives in just 5U of rack space.
- Each pull-out drive drawer accesses a redundant set of hot plug power supplies and redundant hot plug fans.
- Straight-forward SAS architecture provides zoned direct attach storage for BladeSystem servers; just a P700m in the blade server, a redundant pair of 3Gb/s SAS BL switches in the chassis connected to an MDS600.
- MDS600 drives are assigned or ‘zoned’ to individual blade servers using SAS 2.0 zoning capabilities. Use the Virtual SAS Manager (VSM) ing the 3Gb/s BL SAS switch to group MDS600 drives, assigning up to 100 drives to specific blade servers. These drives now appear as local storage to that server.
- Server administrators can build local storage on the fly according to their configuration requirements.
- Quickly deploy and expand capacity by configuring additional drives to a servers drive zone without moving a single cable.
- End-to-end 3 Gb/s SAS connectivity ensures a high performance storage solution.
- HP offers a complete end-to-end storage solution including the MDS600 storage enclosure, HP 3G SAS BL Switch, Smart Array P700m and HP ProLiant and Integrity Blade Servers and c-Class Enclosures.
- P700m Smart Array controller installed in the blade server provides 512MB battery-backed write cache (BBWC) for high performance.
- Familiar Smart Array technology of the P700m Smart Array Controller/512 MB enables support for RAID levels 0, 1, 1+0, 5 and RAID 6 with ADG. Optional battery-backed write cache.
Up to LFF SAS/SATA drives

Drive Zoning
MD5600 drives are assigned or ‘zoned’ to individual blade servers using SAS 2.0 zoning capabilities. Use the Virtual SAS Manager (VSM) using the 3Gb/s BL SAS switch to group MD5600 drives, assigning up to 100 drives to specific blade servers. These drives now appear as local storage to that server.

Drive Drawer
- Two drive drawers supporting SAS or SATA Drives.
- Each drive drawer supports 35 Hot pluggable Large Form Factor (LFF) SAS or SATA Drives.

Power / Cooling & I/O
- Four redundant hot plug 1200W power supplies.
- Includes four redundant hot plug fans.
- Each pull-out drive drawer accesses a redundant set of fans and power supplies.

Currently Drive Options:
- 146GB LFF SAS DP
- 450GB LFF SAS DP
- 500GB LFF SATA
- 750GB LFF SATA
- 1TBGB LFF SATA

HP 3Gb SAS Switch
- Hot Pluggable SAS Switch
- Configured in interconnect bay
- Dual Domain architecture support
- Configured in pairs with path failover
- 3 Gb/s SAS interface
- Eight x4 3 Gb/s SAS ports
- Supports multiple MD5600

HP P700m Smart Array Controller
- Mezzanine card for c-Class Blade servers
- Dual Domain architecture support
- Two x4 3 Gb/s SAS ports
- 256MB and 512MB w/ BBWC

Supported on these Blade Servers
- BL2x220 G5
- BL260G5
- BL280c G6
- BL460c G1/G5/G6
- BL465c G5
- BL490c G5
- BL680c G1/G5
- BL685c G5/G6
- BL860c
- BL870c

HP BladeSystem c7000 Enclosure
STORAGEWORKS:

HP StorageWorks 9100 Extreme Data Storage System (ExDS9100)

Single system designed to tackle the storage-density, pricing, management and performance challenges you are facing today.

The HP StorageWorks 9100 Extreme Data Storage System serves and stores hundreds of terabytes or petabytes of file-based data for your expanding applications. Designed to be extremely scalable, affordable and easy to manage, ExDS9100 delivers excellent performance and availability for service providers and enterprise customers alike. Its ability to independently scale beyond traditional storage systems in both capacity and performance enables scalability up to a maximum configuration of 16 blades with up to 12.8 CPU cores per unit for an astounding 3.2 GB/second of raw performance with up to 820 TB of storage. A single management interface allows the administrator to manage not just terabytes but multiple petabyte systems. And it is highly affordable—with both low overall acquisition costs and low operational costs.

Key Features At A Glance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Storage Capacity (Raw)</td>
<td>820 TB</td>
</tr>
<tr>
<td>Maximum Capacity (Useable)</td>
<td>600 TB</td>
</tr>
<tr>
<td>Maximum Number of Storage Blocks</td>
<td>10</td>
</tr>
<tr>
<td>Maximum Number of Performance Blocks</td>
<td>16 fully symmetric, shared storage</td>
</tr>
<tr>
<td>High Availability</td>
<td>Self healing, fully symmetrical active/active; hot plug drives; redundant power supplies; redundant fans; dual controllers</td>
</tr>
<tr>
<td>Disk Drive Types (Capacity, Port Type, Speed, Form Factor, Technology)</td>
<td>1 TB 7.2K rpm 3.5-inch Hot Plug Dual-Port SAS Midline Hard Drive</td>
</tr>
<tr>
<td>File Serving Support</td>
<td>NFS, CIFS, HTTP, WebDAV, FTP</td>
</tr>
<tr>
<td>Supported Operating Systems</td>
<td>Linux</td>
</tr>
<tr>
<td>Maximum Data Bandwidth</td>
<td>3.2 GB/sec</td>
</tr>
<tr>
<td>RAID Support</td>
<td>RAID 6 (8D +2P)</td>
</tr>
<tr>
<td>Form Factor</td>
<td>(2) 42U Racks (maximum configuration)</td>
</tr>
</tbody>
</table>
Extreme Scalability
• Ability to scale performance and capacity independently.
• Starts at 82 TB and non-disruptively scales to 820 TB.

Unified Manageability
• Lower costs with system configuration and control from single management interface.
• Instead of TB/administrator, simplified management enables PB/administrator.

Extreme Affordability
• Archived materials can now be moved to more affordable content on demand system.
• Lowest acquisition cost.

HP StorageWorks ExDS9100 – Architecture
The ExDS9100 comes fully configured, complete with all hardware and software to be up and running quickly.

Software Architecture
Extreme Manager
• Single User Interface
• Manage all hardware and software
• Monitoring and alerts based on agents
• Built-in logging and diagnostics

PolyServe Clustered File System
• Scalable FS
• Performance
• Self-Healing/HA
• PolyServe Linux v3.5.1

Capacity Blocks
• 82 drives in 7U
• Dual-Redundant Active-Active Controllers
• Redundant 3Gbit SAS Connect
• Eight 8+2 RAID6 groups, 2 hot spares,
• 73% storage efficiency

Disk Drives
• 1TB 7200 RPM Dual-Port Midline SAS
• Hot Swappable.

Performance Blocks
Utilizes HP BladeSystem Servers and c7000 Enclosure.

Including:
• Redundant Virtual Connect Ethernet Modules, 16-1Gbit and 4-10Gbit
• Redundant SAS Switches, 3Gbit SAS, 16 4x ports total (64 SAS lanes).
Alternative thinking about Data Centers – Build an IT strategy where you can deploy capacity within weeks – where you want it, when you want it, anywhere in the world.

HP is delivering the HP POD as part of a complete answer to these constraints, allowing you to define your data center strategy, not be defined by it. The HP Performance-Optimized Data center (POD) is more than a data center container; it is a part of a complete data center portfolio from HP, from data center strategy and planning, to innovative products and comprehensive global support. This means best-in-class technology to provide flexible, dense and energy-efficient data centers that can be deployed in weeks rather than months or years.

- **Six weeks to build:** Whether you need 4,000 square feet of data center capacity shipped inside of six weeks, or want to blend traditional brick-and-mortar and container data centers into a flexible strategy, or both, turn to HP for your fully integrated customized solution, with the expertise of HP Mission Critical Facilities and the IT and data center skills of HP Technology & Services.

- **Industry-Standard Flexibility:** Don’t sacrifice your data center flexibility; the HP POD is designed to support almost all of the technology found in the typical data center environment. Using standard 19” racks, front-to-back cooling and design flexibility, you can deploy your HP and/or competitive technology with minimal constraints. Your HP POD will arrive fully integrated for your heterogeneous IT environment.

- **Lower data center operation and power costs:** Put more of your power into your IT, not your infrastructure – the HP POD is 50% more efficient than typical data center build-outs, reducing energy cost and carbon emissions. Designed for multiple workloads, future technology density, thermal and power needs, the HP POD provides the critical infrastructure components required to run a wide range of compute, storage and application functions.

### Key Features At A Glance

- Capacity for 3,520 compute nodes or 12,000 hard drives, or any combination, in a 40-foot container.
- Delivers the equivalent of 4,000 square feet of traditional data center space, providing customers with support for HP and 3rd party technologies, providing ultimate container flexibility.
- Power capacity up to 27kW per rack (1,800+ watts / sq. ft.).
- Conventional access to all IT equipment, including front and rear rack access, and overhead, serviceable, pod components.
- Fully integrated POD management capability, either remotely or locally, throughout the technology lifecycle.
Ideal customer deployment scenarios:

**A temporary expansion site while you build out your new data center**

Or you have your new data center strategy and plans all laid out ready to go. Except that your new state-of-the-art data center will take over two years to build, and in the meantime you can’t expand your IT footprint. You could co-locate, but your strategy is based on your own resources. So you load additional air handlers into your existing data center, aggressively start managing their system power and hope for the best.

**Or, you can add HP POD to your strategy:**

By working with Mission Critical Facilities, you know exactly how much capacity is needed now, and in the next two years. In your HP POD, your IT equipment is configured ready for the new data center space, in full-depth, industry-standard 50U racks.

- The HP POD rolls into your facility, and is switched on and operating in a matter of days. And when the new data center opens, the racks will roll right into the new space.
- Alternatively, you can save several million dollars and base your strategy on containers.

**Affordable disaster-recovery sites**

Your company knows it needs disaster recovery sites, but there’s no budget for backup locations. Plus some of your data center locations have limited infrastructure anyway, so a backup location is even more expensive than usual. And your energy costs are skyrocketing, and now you have to plan for more energy consumption.

This isn’t a problem. With the HP POD your disaster recovery strategy will be cheaper, less complex, flexible and available.

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One of the key advantages of a customer-designed approach using HP’s POD is to move away from business constraints based on data center strategy. Define your data center strategy, don’t be defined by it.

**New and alternative data center growth strategies**

Your company has a large data center footprint, a strong connection between business and IT, and is rapidly growing its IT ecosystem. You want a way to build the optimal, complete data center environment.

We work with you to plan approaches combining brick-and-mortar and containers, or even focused solely on containers. With this alternate strategy, you instantly realize several advantages:

- **Postponement of large capital expenses:** You now buy data center space as you need it. For large data centers, this can mean tens of millions of dollars in deferred expenses.
- **Less risk and reliance on accurate forecasting:** Related to the point above, in a brick-and-mortar environment you must accurately forecast the economy and your market, resulting business growth and your data center growth curve. With the HP POD, capacity is added as required.
- **Flexibility in resource placement:** Consolidating data centers in a few existing locations may or may not be optimal for you customer support or energy costs.

The HP POD delivers:

- the equivalent of 4,000 square feet of typical data center space
- capacity for over 3,500 compute nodes, or 12,000 hot plug hard drives, or a combination thereof
- A backup site that doesn’t have to cost multiple millions of dollars, where your hardware that’s standard in your data center can be supported and which has the capacity to support future generations of IT
HP Insight Dynamics

Advanced management software that is an integrated command center that can continuously analyze and optimize hundreds of servers so ideal for large scale environments.

HP Insight Dynamics – VSE can help you cut operational costs and adapt your infrastructure as your business grows. For example, you can accelerate top IT project schedules by weeks or months, easily repurpose resources to match business priorities, extend the life of data centers with energy-aware capacity planning, and free untapped resources for use where they are needed most. Specifically, HP Insight Dynamics – helps:

- **Reduce costs:** HP estimates that the software can reduce the cost of common data center tasks by as much as 40 percent, lowering costs associated with capacity planning, provisioning, upgrades and changes, and energy. Complex spreadsheets or services engagements for capacity planning can be replaced by instantly available data, helping you accelerate cost-saving consolidation project by weeks or months.

- **Increase the speed of change:** By collapsing steps for key tasks, you can accelerate key IT projects. For instance, moving a workload from one server to another with a simple drag and drop takes minutes while traditional approaches can take days and often require extensive coordination between server, storage, networking, and facilities groups. With the Insight Orchestration option, you can provision the infrastructure for an entire IT service with the push of a button, resulting in faster time-to-production.

- **Improve quality:** Insight Dynamics software enables you to provide high availability more cost effectively than traditional clustering. By redeploying logical servers easily in the event of hardware failure, you can enjoy fast and affordable protection where it was previously unaffordable.

- **Manage energy:** Insight Dynamics helps you easily compare the energy consumption of different data center configurations. While consolidation projects often see considerable power savings, they can vary significantly based on the configuration choices you make. HP Insight Dynamics gives you the hard data you need to fine-tune your energy consumption.

HP Insight Dynamics is ideal for enterprise customers looking to consolidate their server infrastructure. Using data-driven capacity planning and integrated migration tools, you can accelerate consolidation projects by weeks or months. To get started quickly on large-scale consolidations, consider the HP Insight Capacity Advisor Consolidation software, a limited time license of just the capacity planning capability.

If you are looking beyond consolidation to full-scale transformation to a next-generation data center environment, HP Insight Dynamics is for you.

The flexibility of logical servers, the automated service provisioning, and the ability to manage the physical and virtual in the same way, bring the efficiency and agility that is the hallmark of a next generation data center.
HP Insight Dynamics
– What can it do?

**Plan capacity and power continuously**
- State-of-the-art capacity planning uses deep insight into resource utilization with integrated monitoring and forecasting capabilities to plan for infrastructure optimization in real time, including for power.
- Eliminate guesswork and months of tedious capacity planning by using thousands of data points per server per day, for all of your HP servers and select non-HP Windows-based x86 platforms including IBM and DELL, to make informed capacity management decisions in real time.
- Quickly generate consolidation solutions for reducing the number of physical servers and optimizing for energy efficiency using Smart Solver technology.
- Use the 5-Star rating system to easily identify best-fit candidates for individual workload placement enabling fast relocation of servers for better resource utilization.
- Enable on-going tuning of the environment using the integrated tools for rebalancing of virtual machines across existing resources.

**Balance physical and virtual resources**
- Based on precise historical and real-time utilization data combined with the flexibility of logical servers, which are server profiles that detach the logical identity from the physical resource, balance resources on the fly to provide better performance and service levels to the business.
- Easily move logical servers across physical and virtual resources to ensure the environment’s utilization is optimally balanced with drag and drop ease.
- Migrate workloads from physical to virtual infrastructure, from virtual to physical, from non-HP x86 servers to HP Blades or ProLiant, or from one hypervisor type to another.
- Visualize and manage all physical and virtual resources from single tool, with the ability to drill down as far as needed without logging into another tool.

**Ensure cost-effective availability**
- With the combination of the advanced visualization, real-time planning and the speed and ease of moving resources with logical servers, higher levels of availability and quality of service can be achieved more economically than with traditional clustering solutions.
- Quickly move servers to spare capacity to maintain availability.
- Reactivate stored templates to rapidly restart applications.
- Shorten maintenance windows by creating and moving workloads as logical servers, and allowing for more proactive maintenance.
- Insight Dynamics - VSE can also be extended with the Insight Recovery option for cost-effective disaster recovery from one location to another.

**Provision infrastructure consistently**
- HP Insight Dynamics enables IT organizations to consistently and efficiently manage the infrastructure lifecycle from planning to retirement. With the HP Insight Orchestration option you can accelerate the design and delivery of infrastructure resources through a self-service portal.
- Create logical server templates based on HP reference architectures that can be started, stopped and stored off line for re-use.
- Rapidly provision infrastructure from pools of shared server and storage resources using automation and streamlined approval processes.
- Integrates with existing IT management tools and processes using an embedded workflow automation tool.
- Benefits all key IT roles and functions, such as architects/planners, server admins, networks admins, storage admins, and operations teams to make the infrastructure delivery process fast, efficient, and reliable.

For more information: www.hp.com/go/insightdynamics
SERVICES:

HP Insight Remote Support

Delivers secure remote support for your HP Servers and storage 24 x 7 so you can spend your time focused on the business.

With the HP Insight Remote Support, many issues that previously required the active involvement of your staff and/or onsite support calls can be resolved automatically.

The RSP plug-in module fully integrates and co-installs with HP Systems Insight Manager (version 5.2 or higher). The result: a powerful, unified solution for onsite and remote management — and a more proactive approach to IT support.

Reduce downtime. Cut support costs. Improve resource utilization.

Available at no extra charge with your warranty, support contract or HP Care Pack service, HP Remote Support Pack can help you:

• Automate 24x7 fault detection and management processes
• Avert potential disruptions caused by unplanned downtime
• Recover more quickly from unpredictable failures
• Improve your diagnostic accuracy and first-time fix rate
• Free your IT personnel to focus on core business activities

Key benefits

The overall benefits are real and substantial. HP Insight Remote Support not only improves the efficiency of your IT staff, it reduces the time it takes to resolve problems by as much as 20 percent. One reason is the increased accuracy of problem diagnoses. With such accuracy, system availability can be improved dramatically. Just as important, Remote Support can address problems before they turn into reactive service requests or system outages. In the end, productivity improves for both end users and for IT.

Reduce costs

• Speed and simplify support: With HP Insight Remote Support, you can automate your entire support process for fault detection and automatically generate support requests.
• Improve diagnostic accuracy: Thanks to the detailed diagnostic information that is provided, cases detected and diagnosed through remote monitoring have a very high first-time fix rate.
• Recover quickly: Equipment with remote monitoring is restored, on average, 20 percent faster.¹ This is due to several factors: faster problem detection, better diagnosis, and a quicker start on repairs.

Mitigate Risk

• Be proactive: You can avert potential disruptions caused by unplanned downtime.
• Plan interventions: You can be more aware of potential problems and plan interventions better – perhaps the installation of new software – on a schedule that meets your convenience instead of simply reacting to foreseeable problems.
• Installation of new software – on a schedule that meets your convenience instead of simply reacting to problems.

¹ Based on an HP-internal data analysis from EMEA in August 2006 on equipment monitored by Remote Support compared to equipment without Remote Support monitoring.
HP Proactive Select
Select the service level that’s right for your business.

Do more with your current systems and staff — while you spend less.

Now there’s an innovative approach to service delivery that gives you the flexibility to acquire the specific proactive services you need today, then add services as your needs evolve.

HP Proactive Select offers a broad set of service options — including server, storage, network, SAN device, software, environment, installation and education services — that you can mix and match depending on your specific requirements.

Select the service level that’s right for you.

Proactive Select gives you a choice of precisely targeted services to assess your existing infrastructure and optimize its performance and manageability. They can be purchased when and how you need them, at affordable price points to meet your business goals.

Plus, if you have unique business or IT requirements, HP can custom-tailor Proactive Select services to address them.

Here’s a sample of the service activities available through Proactive Select:

- Blade Technology Assessment
- Blade Toolset Assessment
- Virtualization Performance Audit
- Firmware and Patch Analysis
- SAN Supportability Assessment
- Storage and SAN Firmware and Software Analysis and Management
- Power and Cooling Assessment
- IT Service Management Quick Assessment
- System Health Check
- Security Quick Assessment
- Performance Analysis for SAP Systems
- Support Planning and Review Meetings
- Education Credit

Key Benefits of what HP Proactive Select can do for you?

- Accelerate your time-to-solution deployment.
- Provide specialized skills in emerging technologies.
- Obtain cost-effective access to experienced HP technical service specialists to augment your IT staff.
- Benefit from outstanding practices based on experience with thousands of customers across a broad range of technologies.