
BAI Yun Fei
HP ISS APJ /SP&HPC/Business Development Manager
CUSTOMER OBJECTIVES

Deeper insight
Smarter decisions
Create profit

OBSTACLES

– Increasing scale and complexity of deployments and applications
– Exploding volumes of data
– Pressure to provide instantaneous results
– Affordability
– Power and space constraints
– Technology and market risks and uncertainty
– Adapting to new business models and technologies
HP = HPC LEADERSHIP FOR A CHANGING WORLD

Accelerating innovation through a converged infrastructure for the HPC data center

HPC solutions, purpose-built for scale

Holistic datacenter portfolio

Adaptive and scalable software for HPC

Worldwide HPC expertise and engagement

Performance
Efficiency
Agility
Confidence
Purpose-built
HPC Servers
The Most Successful Architecture Ever to Enter the TOP500 – the BL-Series (c-Class)
<table>
<thead>
<tr>
<th>Component</th>
<th>BL280c G6</th>
<th>BL460c G6</th>
<th>BL490c G6</th>
<th>BL465c G7 (June)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Up to 2P, up to 6c Intel Xeon 5500/5600 series</td>
<td>Up to 2P, up to 6c Intel Xeon 5500/5600 series</td>
<td>Up to 2P, up to 6c Intel Xeon 5500/5600 series</td>
<td>Up to 2, up to 12-Core AMD Opteron 6100 Series</td>
</tr>
<tr>
<td>Max Memory</td>
<td>12 DDR3 slots Max memory: 192GB</td>
<td>18 DDR3 slots Max memory: 192GB</td>
<td>16 DDR3 Sockets Max memory: 256GB</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>2 non-hot plug SFF SATA/SAS/SSD drives</td>
<td>Up to 2 Hot Plug SFF SAS/SATA</td>
<td>Up to 2 non-hot plug SSD</td>
<td>Up to 2 Hot Plug SFF SATA/SAS/SSD</td>
</tr>
<tr>
<td>Networking</td>
<td>2 integrated Multifunction GbE ports</td>
<td>2 integrated Multifunction GbE ports</td>
<td>2 integrated Multifunction 10GbE ports with Flex-10 support</td>
<td></td>
</tr>
<tr>
<td>Form factor</td>
<td>16 per 10u enclosure 8 per 6u enclosure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usage</td>
<td>General Compute</td>
<td>General Compute, with hot-plug drives &amp; 10GbE</td>
<td>Large Memory, with 10GbE</td>
<td>General Compute, with hot-plug drives &amp; 10GbE</td>
</tr>
</tbody>
</table>

**Usage:**
- **General Compute**
- **General Compute, with hot-plug drives & 10GbE**
- **Large Memory, with 10GbE**
- **General Compute, with hot-plug drives & 10GbE**
New Performance/Density for HPC: HP ProLiant BL2x220c G6

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Two 80W or 60W dual- or quad-core Intel Xeon 5500 Series processors per server node*</td>
</tr>
<tr>
<td>Memory</td>
<td>Registered or Unbuffered DDR3</td>
</tr>
<tr>
<td></td>
<td>6 DIMM Sockets per server</td>
</tr>
<tr>
<td></td>
<td>96GB max per server</td>
</tr>
<tr>
<td>Internal Storage</td>
<td>1 Non-Hot Plug SFF SATA HDD per server</td>
</tr>
<tr>
<td>Networking</td>
<td>2 integrated 1GbE Ethernet ports per server</td>
</tr>
<tr>
<td>Mezzanine Slots</td>
<td>1 PCIe Gen2 x8 mezzanine expansion slot per server</td>
</tr>
<tr>
<td>Additional Features</td>
<td>Internal USB 2.0 connector</td>
</tr>
<tr>
<td></td>
<td>Optional internal SD Card slot (consumes the USB slot)</td>
</tr>
<tr>
<td>Management</td>
<td>ProLiant Onboard Administrator powered by iLO2</td>
</tr>
<tr>
<td>Density</td>
<td>32 server nodes in 10U enclosure</td>
</tr>
</tbody>
</table>

*95W processors available through the SCI Private-plus process
### PURPOSE DRIVEN SCALE-OUT PRODUCT LINES

<table>
<thead>
<tr>
<th>Design center</th>
<th>Rack</th>
<th>Blade enclosure in rack</th>
<th>Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design focus</strong></td>
<td>Versatility &amp; value</td>
<td>Integrated &amp; optimized, maximum redundancy</td>
<td>Cost &amp; features optimized for extreme scale out</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>General purpose</td>
<td>General purpose / private cloud / scale out</td>
<td>Web 2.0 / cloud / scale out</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Essential and advanced management HP Insight Dynamics</td>
<td>Advanced management-accelerated service delivery &amp; change in minutes</td>
<td>Home grown management</td>
</tr>
</tbody>
</table>

- **Density optimized for the data center**
- **Shared infrastructure for accelerated service delivery**
- **Extreme scale out datacenters with lean management**
Purpose-built
HPC Nodes
Highly Flexible SL Chassis

Benefits: Low cost, high efficiency chassis
- 4U Chassis for deployment flexibility
- Standard 19” racks, with front I/O cabling
- Unrestricted airflow (no mid-plane or I/O connectors)
- Reduced weight
- Individually Serviceable Nodes
- Variety of optimized Node Modules
- Ability to mix and match nodes

Multi-node, Shared Power & Cooling Architecture
- Shared Power & Fans
- Optional Hot-Plug Redundant PSU
- Energy efficient Hot Plug fans
- 3 Phase Load Balancing
- 94% Platinum Common Slot Power Supplies
- N +1 Capable Power Supplies (up to 4)

SL Advanced Power Manager Support
- Power Monitoring
- Node Level Power Off/On
HP ProLiant SL Scalable System
Next generation breakthrough server family optimized for scale

- Affordable scale
  - Lower acquisition cost than traditional rack servers
  - Right-sized dense server solutions
  - Based on Industry Standards

- Leading performance and efficiency
  - Concentrated compute power
  - Shared high efficiency power and cooling components
  - Lower your operating costs

- Flexible and serviceable solutions
  - Modular design allows tailoring
  - Serviceability and storage capable designs
  - Works in existing data center infrastructure
Purpose-built
HPC Storage
Complementary Scalable Storage Solutions for High Performance Computing

**X9000 Network Storage System**
- Scalable performance and capacity
  - Scalable aggregate bandwidth
  - Scalable metadata, ideal for small files
- Shared datacenter multipurpose storage
  - Linux and Windows clients
  - NFS & CIFS support
- Ideal for applications in media, FSI, bioinformatics, web/cloud

**DDN Storage with Lustre**
- Scalable performance and capacity
  - Scalable single-file bandwidth, with multiple writers
  - Demanding bandwidth requirements
- Tightly coupled to HPC Linux clusters
- Ideal for parallel applications in traditional HPC
Purpose-built
HPC Fabrics
HP + 3Com – Leadership from Edge to Data Center Core

<table>
<thead>
<tr>
<th>Data Center</th>
<th>Virtual Connect</th>
<th>Edge</th>
<th>End of Row</th>
<th>DC Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>Core Routing</td>
<td>Aggregation</td>
<td>Campus Core</td>
<td>Enterprise Core</td>
</tr>
<tr>
<td>Edge</td>
<td>SMB</td>
<td>Wireless</td>
<td>Campus</td>
<td>Edge Routing</td>
</tr>
<tr>
<td>Security</td>
<td>Edge Firewall</td>
<td>Data Center</td>
<td>Threat Management</td>
<td>Intrusion Prevention</td>
</tr>
<tr>
<td>Management</td>
<td>Network Node Manager</td>
<td>Ops. Automation &amp; Orchestration</td>
<td>Operations Center</td>
<td>Integrated Management Center</td>
</tr>
</tbody>
</table>
HPC Software Infrastructure
Unified Cluster Portfolio

HPC Technical and Enterprise
HPC application, development and cloud software portfolio

Advanced and specialty options
(Accelerators, Visualization, other)

Scalable data management
(HP x9000 NSS, Lustre Cluster FS)

Cluster management layer
- HP CMU
- Partner and Open Source choice
- Microsoft Windows HPC Server 2008

Operating environment and OS extensions
- Linux
- Windows

HP cluster platforms
HP ProLiant servers, HP BladeSystem, multiple interconnects

HP Datacenter Products & Services
A la Carte cluster options for HP Clusters

- Operating systems: RHEL, SLES, or customer-supported community distributions; Microsoft Windows HPC Server 2008
- Cluster Management: HP CMU, or third party, via SLMS or customer installed (e.g., ROCKS, Platform Cluster Manager)
- MPI: HP-MPI, or third party/open source; Windows MPI
- Workload manager: Platform LSF (via SLMS now), Altair PBS Pro (HP SKU), Adaptive Computing Moab (via SLMS)
Datacenters – PODs
Trend?
Are Next Generation Data Centers Ugly?
HP POD products and concepts

- 22 50U racks 40ft
- 600kW power capacity
- Designed for high density deployments – max 34kW per rack
- Flexible for redundant or non-redundant deployments

- 10 50U racks 20ft
- Modular design for better supply chain efficiency
- Flexibility to customize

- Rugged exterior
- EMI shielding
- Designed for portability
Peta-scale
Implementation Example:
TITECH Tsubame 2.0
TSUBAME 2.0 Overview

– Compute nodes: 2.4PFlops (CPU+GPU)
  • New SL-node >>1408 thin nodes, each with 2 Westmere-EP and 3 NVIDIA M2050
    – 1347 with 54GB and SSD 60GB, 41 with 96GB and SSD 120GB
    – Suse Linux Enterprise Server or Windows HPC Server
  • DL580 G7 Medium (24) and Fat (10) nodes, with 2 NVIDIA S1070
    – Medium: 128GB plus SSD 120GB x4
    – Fat: 256BG plus SSD 120GB x4

– QDR InfiniBand, full bisection, non-blocking
  • Spine: Voltaire Grid Director 4700 12 x 324port
  • Edge: Voltaire Grid Director 4036 179 x 36 port and 4036E 6 x 34port/10GbE 2 port

– Storage: 5.93PB
  • Lustre file system 5.93PB: DDN SFA 10000 (10/rack, 5 racks) and DL360 G6 (30)
  • Home file system: 1.2PB: DDN SFA 10000 (10/rack, 1 racks), BlueArc Mercury 100 (2) and DL360 G6 (30)

– Press release (Japanese):
FOR MORE INFORMATION

– Our web sites
  • HPC: www.hp.com/go/hpc
  • HP BladeSystem: www.hp.com/go/bladesystem
  • x9000 NSS: www.hp.com/go/x9000
  • POD: www.hp.com/go/pod
  • MOAB ACS: www.hp.com/go/max

– Our booth at SC09
  • Purpose-built solutions for scale: new SL series, BL2x220c, x9000, 10GbE/IB networking
  • Holistic datacenter portfolio: POD
  • Adaptive and scalable software: new Moab ACS, CMU, HP-MPI
Thank You