HP Integrity Superdome X (DragonHawk)

CS900 (HanaHawk)

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Customer challenges on mission-critical computing

Business Processing and Decision Support workloads

“We’re deploying new applications and need more reliability than we have today.”

“I need more scalability and availability for our existing Linux applications.”

“We need to reduce our operational costs for mission-critical applications.”

“I’m not happy with the downtime required for system maintenance.”

“I’m not getting the x86 performance we require for our core database.”
Introducing – HP Integrity Superdome X (DragonHawk)

for mission-critical scale-up and consolidation

designed for the most demanding business processing and decision support workloads

• Highest OLTP performance
• Breakthrough resiliency
• Proven availability
• Intelligent manageability
• Flexible consolidation

Extreme
Scalability

Flexible
Consolidation
Introducing – HP Integrity Superdome X (DragonHawk)
for mission-critical scale-up and consolidation

HP Integrity Superdome X Server

Groundbreaking x86 availability, scalability and performance for Linux workloads

• Ideal platform for mission-critical business processing and decision support workloads
• Superdome X blends x86 efficiencies with proven HP mission-critical innovations for a superior uptime experience and groundbreaking performance
• The HP BladeSystem Superdome Enclosure is the building block for Superdome X
• Supports 1 to 8 Superdome X server blades
• Support for HP hard partitioning, HP nPars
Transform your mission-critical environment

HP Integrity Superdome X, for your critical business processing and decision support workloads

- **16 sockets**
- **12TB memory**
- **20x greater reliability** with unique hardware partitions
- **9x performance** than current HP 8-socket server

Support your largest enterprise applications
Maximize the uptime of your critical Linux apps
Power your most demanding workloads
## Industry-standard efficiency and breakthrough scalability

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scalable blades</td>
<td>1-8 scalable blades</td>
</tr>
<tr>
<td>Sockets</td>
<td>2-16 sockets</td>
</tr>
<tr>
<td>Core count</td>
<td>20-240 core count</td>
</tr>
<tr>
<td>Memory capacity</td>
<td>12TB</td>
</tr>
<tr>
<td>Sockets</td>
<td>16</td>
</tr>
<tr>
<td>Scalability factor</td>
<td>1.9x</td>
</tr>
<tr>
<td>TCO</td>
<td>32% lower TCO than competitive UNIX</td>
</tr>
<tr>
<td>Mission-critical</td>
<td>Redefine the economics of your <strong>mission-critical</strong> environment</td>
</tr>
<tr>
<td>Database needs</td>
<td>Address your largest workloads and <strong>in-memory</strong> database needs</td>
</tr>
<tr>
<td>Performance</td>
<td>Scale confidently without compromising performance</td>
</tr>
</tbody>
</table>

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Linking directly into Operating System software R&D

Unmatched partnership model maximizes mission critical capabilities

Driving innovations with partners and suppliers

Decades of mission-critical experience

Contributing what matters for mission-critical

Intel Processor advancements

Hardware innovation

Data center ecosystem

RESEARCH & DEVELOPMENT

Upstream communities

The Linux Foundation

Distro R&D teams

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Product details
Superdome X at a glance

Front view
- BL920s Gen8 Server Blade (Quantity: 8)
- Insight Display
- Height: 18U

Rear view
- Air exhaust plenum for power supplies
- 4 x Crossbar fabric modules (XFM)
- 2 x Global Partition Service Modules (GPSM)
- 8 x interconnect modules
- 2 x SD2 OA modules
- Air exhaust plenum for power supplies
- AC input module (3-phase or single-phase)
- Active cool fans (15:3 rows of 5)

All components front and rear accessible for easy serviceability
# Integrity Superdome X Platform

Ideal for Mission Critical scale-up and consolidation

<table>
<thead>
<tr>
<th>Form Factor</th>
<th>2s Blade Full extended height</th>
<th>Enclosure 18U in standard HP 19” rack standard power, airflow, cooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compute Blades &amp; CPUs</td>
<td>• 2 CPU sockets for IVY-B EX • Low and High core count CPU SKUs</td>
<td>• Up to eight 2s cell blades • 2-16 sockets • Xeon CPUs in one or many nPARs, 3 processor generations.</td>
</tr>
<tr>
<td>Memory</td>
<td>• 48 DIMM slots, 1.5TB per blade w/ 32GB DIMMs</td>
<td>• 12TB memory capacity w/ 32GB DIMMS</td>
</tr>
<tr>
<td>I/O*</td>
<td>• 2 LOM Cards: Fully configurable / customizable 10Gbe Flex LOMs • 3 mezzanine slots</td>
<td>• 16 10Gbe Flex LOMs • 24 mezzanine slots</td>
</tr>
<tr>
<td>Management</td>
<td>• iLO 4 management processor</td>
<td>• SD2 based mission-critical Onboard Administrator</td>
</tr>
<tr>
<td>Partitioning and Virtualization</td>
<td>• Electrically isolated blades, can be grouped into nPARs through the flexible crossbar fabric</td>
<td>• Electrically isolated nPARs</td>
</tr>
</tbody>
</table>

* IO Bandwidth is **7.5x** any current x86 scale-up system.
The unique value of HP nPars

**Hard partitions** add resource and cost efficiencies

**Lower your TCO**
Optimize software costs by using **HP nPars**

**Maximize resource utilization**
Create different **development, test, and production environments** within a single enclosure

**Minimize downtime**
Take one partition **offline**, while the others continue to run undisturbed

20x greater reliability than soft partitions

**Protect your data**
Electronic isolation provides a **high degree of security** between partitions

*HP BladeSystem Superdome Enclosure*
Superdome X - Target mission-critical environments

Business Processing (OLTP), Decision Support (OLAP: BI & DW)

Mission Critical:
Superior Scaling, Breakthrough Resiliency, Intelligent Management, Ultimate Flexibility, Economic Efficiencies

<table>
<thead>
<tr>
<th>Scale-up</th>
<th>Multi-instance</th>
<th>Multi-workload consolidation</th>
<th>Virtualization</th>
</tr>
</thead>
</table>
| • Large OLTP  
• Scale-up DW – real-time DW  
• Large DB Back-end  
• SAP HANA in-memory | • Consolidation of mixed DB Server workloads | • BI in a box  
• Cluster in a box  
• Consolidation of mixed DB Server workloads | • Consolidation of mixed DB Server workloads |

DB Server instance 1  
DB Server instance 2  
DB Server instance 3  
...  
DB Server instance “n”  
DB or App Server/ OS  
DB or App Server/ OS  
Large guest w/ multiple DB Instances  
Guest w/ DB  
Guest w/ DB
Breakthrough Performance
Scale confidently without compromising performance

Superdome X: 15-cores/socket scaling with SPECjbb2013-MultiJVM

- 16s / 240c / 4TB SLES 11sp3: 259.778 / 1.010.123
- 8s / 120c / 2TB SLES 11sp3: 139.471 / 526.229
- 4s / 60c / 1TB SLES 11sp3: 71.766 / 269.987
- 2s / 30c / .5TB SLES 11sp3: 37.553 / 142.514
- 1s / 15c / .25TB SLES 11sp3: 18.980 / 74.631

Unparalleled 1s to 16s scalability

Configuration key: “s”: Socket count, “c”: Core count, “TB”: memory in TB

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Quantum leap over current HP 8-socket x86 server

Superdome X configurations vs. DL980 G7 SPECjbb2013-Multi.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>max-jOPS</th>
<th>critical-jOPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superdome X 16s / 240c / 4TB</td>
<td>1.010.123</td>
<td>259.778</td>
</tr>
<tr>
<td>Superdome X 16s / 160c / 4TB</td>
<td>735.477</td>
<td>200.970</td>
</tr>
<tr>
<td>Superdome X 8s / 120c / 2TB</td>
<td>526.229</td>
<td>139.471</td>
</tr>
<tr>
<td>Superdome X 8s / 80c / 2TB</td>
<td>389.675</td>
<td>102.193</td>
</tr>
<tr>
<td>HP DL980 8s / 80c / 1TB</td>
<td>106.141</td>
<td>23.268</td>
</tr>
</tbody>
</table>

3.6x to 9.5x greater performance than the HP DL980 G7

HP internal measurements only
Configuration key: “s”: Socket count, “c”: Core count, “TB”: memory in TB
SPEC and the benchmark name SPECjbb are registered trademarks of the Standard Performance Evaluation Corporation (SPEC), see spec.org
# Integrity Superdome X I/O Bandwidth and Slot Compares

<table>
<thead>
<tr>
<th>System</th>
<th>PCIe Root Complexes</th>
<th>I/O slots¹</th>
<th>Aggregate PCIe lanes for slots</th>
<th>Aggregate I/O BW for slots¹</th>
<th>LOM ports, speeds, &amp; aggregate BW²</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH-16S</td>
<td>16</td>
<td>24</td>
<td>320 @Gen3 (8GT/s)</td>
<td>Total slot BW: 640 GB/s</td>
<td>32 ports @20Gb/port Total FlexLOM BW: 160 GB/s</td>
</tr>
<tr>
<td>DH-8S</td>
<td>8</td>
<td>12</td>
<td>160 @Gen3 (8GT/s)</td>
<td>Total slot BW: 320 GB/s</td>
<td>16 ports @20Gb/port Total FlexLOM BW: 80 GB/s</td>
</tr>
<tr>
<td>DH-4S</td>
<td>4</td>
<td>6</td>
<td>80 @Gen3 (8GT/s)</td>
<td>Total slot BW: 160 GB/s</td>
<td>8 ports @20Gb/port Total FlexLOM BW: 40 GB/s</td>
</tr>
<tr>
<td>DL980-G7 (8 socket)</td>
<td>3</td>
<td>16</td>
<td>100 @Gen2 (4GT/s) &lt;br&gt;4 @Gen1 (2GT/s)</td>
<td>Total slot BW: 102 GB/s</td>
<td>2 ports @10Gb/port 2 ports @1Gb/port Total LOM BW: &lt;5.5 GB/s</td>
</tr>
</tbody>
</table>

DH-8S delivers >3x the I/O slot BW and >14x the LOM BW of the DL980

1 Slot count & BW don’t include BLOM/FLexLOM slots since they are accounted for under LOM ports.

2 DH FlexLOM aggregate BW assumes that FlexLOM traffic isn’t constrained by uplink oversubscription.
RAS Features
Advanced System RAS engineered at all levels
From components to complete solutions

Solution reliability

- Mission-critical services
- Serviceguard Linux
- Insight Remote Support
- Operating System
- Superdome 2 Analysis Engine
- Passive backplane
- Online optimization and repair
- Fault-tolerant Fabric
- "Firmware First" Architecture
- System Components

Up to 100% application availability

Automation and orchestration
Reduce human error

Tool-free hot pluggable components

Boost Infrastructure reliability
Uninterrupted performance - Serviceguard for Linux

Industry’s only Automated Unattended Failover for SAP HANA

- Increase Availability
- Reduce errors caused by human intervention
- Easy to deploy
- Prevents data corruption
Superdome X roadmap

Current
- Intel Xeon processor E7 v2 with 20-240 cores per system
- Operating Environment support with
  - RHEL 6.5, 6.6, 7.0
  - SLES 11 SP3
- Memory: DDR3 16GB and 32GB DIMMs
- 10GigE and 16Gb FC

Future
- Next Gen Xeon processor support
- Memory: DDR4 16GB and 32GB DIMMs
- Windows, SQL Server, VMware support
- Infiniband and FCoE support

This is a rolling (up to 3 year) roadmap and is subject to change without notice
Target workloads

Highest Mission Criticality

**Business processing**
- Enterprise Resource Planning (ERP)
- Customer Relationship Management (CRM)
- Online transaction processing (OLTP)
- Batch

**Decision support**
- Data warehousing/data mart
- Data analysis/data mining

Traditional and in memory large OLTP databases

UNIX migration

Large scale workload consolidation
ScaleUp/ScaleOut SAP HANA w/ CS900

Base Building Blocks:
- Common
- Designed for Upgradability

Single Node 8s/6TB

- 2x HP 5900AF-4BS-4XG-2QFP+ Switch
- 3Par 7400-4node FC Storage 96x 900GB HDD
- ProLiant DL380p Gen8
- C9000 BladeSystem 8x Enterprise Blade BL920s Gen9

Single Node 16s/12TB

- 2x HP 5900AF-4BS-4XG-2QFP+ Switch
- 3Par 7400-4node FC Storage 96x 900GB HDD
- ProLiant DL380p Gen8
- C9000 BladeSystem 8x Enterprise Blade BL920s Gen9

2N ScaleOut 8s/2TB

- Plus: 2x NFS Servers for ScaleOut, node shared log files (not HANA LOG)
- May be physical or virtualized 3PAR service Processors

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Unmatched scalability across ConvergedSystem portfolio
ConvergedSystem 900 for SAP HANA

2x capacity

Industry standard servers comparison

Max scale-up node for business applications

Bigger apps
Single in-memory pool
12TB and 16 socket

More data
For maximum DW scale,
2TB nodes*

More choice
Deploy on-premise, hosted, Cloud

*Available later in 2014 as part of the scale out offering
Achieve breakthrough performance
HP and SUSE Break 1-Million max-jOPS!!

HP ConvergedSystem 900 for SAP HANA
powered by SLES 11sp3
#1 16-socket SPECjbb2013 max-jOPS record

- HP ConvergedSystem 900 for SAP HANA (16s/12TB) 16-socket
  Intel Xeon E7-2890 v2: 244,162
- HP ConvergedSystem 900 for SAP HANA (8s/6TB) 8-socket
  Intel Xeon E7-2890 v2: 129,876
- HP ConvergedSystem 900 for SAP HANA (16s/12TB) 16-socket
  Intel Xeon E7-2890 v2: 524,790

Published: Nov 2014

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Unprecedented x86 performance across workloads

Upcoming Superdome X SPEC CPU2006 benchmarks

- 8-socket Superdome X performance exceeds all x86 competition
  - #1 8S x86 SPECfp_rate_base_2006 / #1 8S x86 SPECfp_rate2006
  - #1 8S x86 SPECint_rate_base_2006 / #1 8S x86 SPECint_rate2006 (tie)
- 16-socket Superdome X system performance even beats out “big iron”
  - #1 16S SPECint_rate_base_2006 / #1 16S SPECint_rate2006
  - #1 16S SPECfp_rate_base_2006 / #2 16S SPECfp_rate2006

Oracle OLTP

- Customers running Oracle workloads are meeting expectations
- Preliminary internal benchmarking results at 2S and 4S are consistent with a 4-socket DL580 Gen8, and scale-up work to 8S and 16S is underway

HPTC workloads

- Preliminary Graph 500 results already put 16S Superdome X as the #2 single-node solution in performance terms, as well as, the #4 most power efficient – and still tuning left to do
- Early HPLinpack results at 5 TFlops out of a theoretical peak possible 5.376 TFlops (93% eff.)

Note: Will be published on spec.org on Dec 1, 2014

Overshadows the best from:
- Fujitsu PRIMEQUEST
- IBM x3950 X6
- Hitachi BladeSymphony

Superdome X 240-core system wins over the best from:
- Fujitsu M10-4S (256-cores)
- IBM Power 780 (256-cores)
Uninterrupted performance
Industry’s only Automated Unattended Failover for SAP HANA

Automated High availability/Disaster Recovery system replication
- Uniform, cross-application HA/DR technology
- Unattended secondary takeover
- Automated role reversal
- Client access handling

Simplified High availability/Disaster Recovery configuration and administration
- Integrated with SAP startup framework
- Non-intrusive design
- Regular configuration verification
- Context-driven instance restarts
Why HP for SAP HANA?

- 25+ Year partnership
- 46% SAP licenses on HP
- 77K+ SAP Installations
- 800+ HANA Deployments

Co Innovation: 100+ engineers working together
SAP runs on HP
HP IT runs on SAP

170 countries
9,500 trained SAP professionals
1,700,000+ SAP users
50+ countries

Only 12TB SAP certified system
Only automated unattended HA and DT

Global SAP Pinnacle Awards 2014
Winner: 2014 Rapid Deployment Partner of the Year
Winner: 2014 Platform Co-Innovation Partner of the Year
Finalist: 2014 HANA Adoption Partner of the Year
Thank you