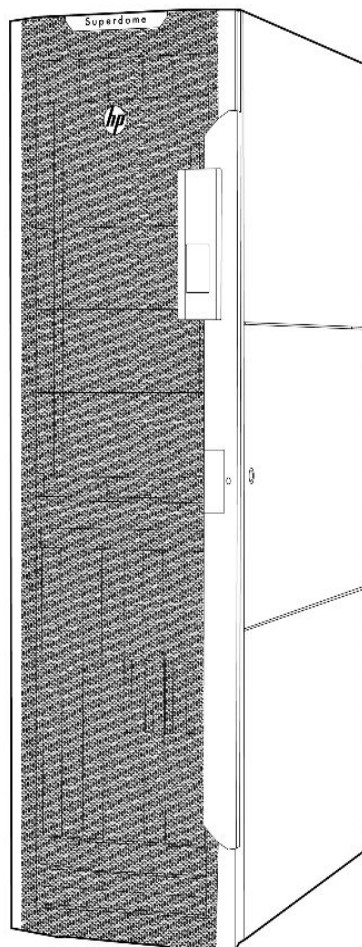
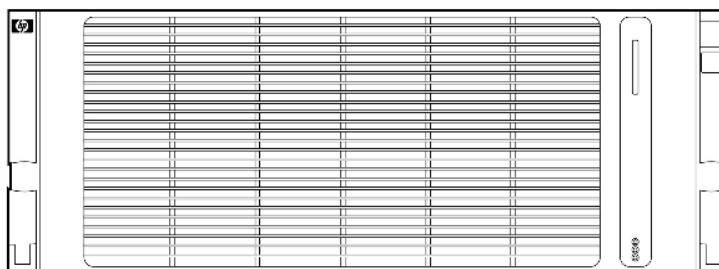


Overview

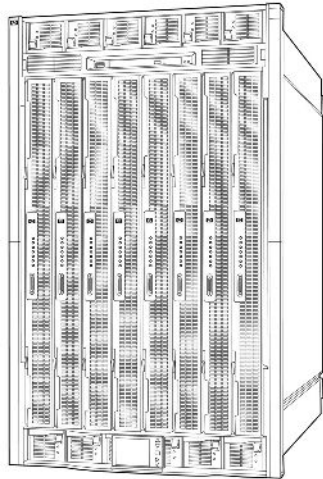


HP Integrity Superdome 2

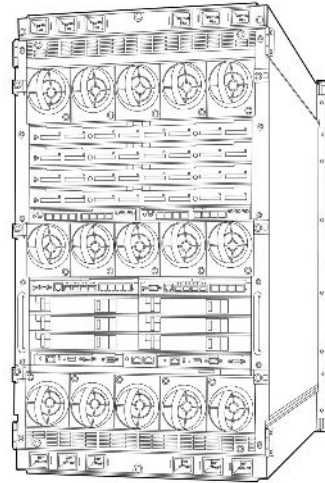


HP Superdome 2 IOX

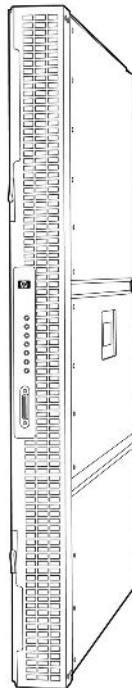
Overview



HP Superdome 2 enclosure front



HP Superdome 2 enclosure back



HP Superdome 2 Server Blade (CB900s i2, CB900s i4)

Overview

HP Superdome 2: The Ultimate Mission-critical Platform

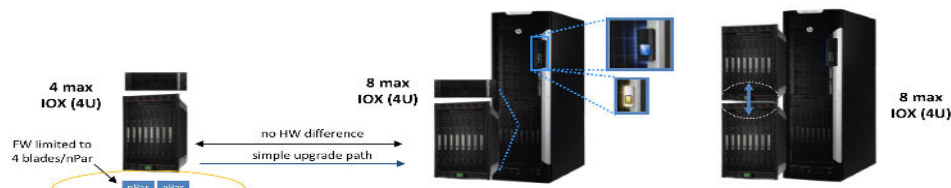
HP Superdome 2 (SD2) is an HP Integrity server that represents a new category of modular, mission-critical systems that scale up, out, and within to consolidate all tiers of critical applications on a common platform. Engineered with trusted Superdome reliability, Superdome 2 includes a modular, bladed design, and common components to other HP c-Class BladeSystems. This also includes a common server management framework, supported from x86 to Superdome. This latest generation Superdome server extends the resiliency of multiple generations of HP high-end servers with 100+ mission critical innovations. With breakthrough innovations such as the Superdome 2 Crossbar Fabric and Superdome 2 Analysis Engine coupled with rich virtualization capabilities, Superdome 2 sets the standard for the next decade of mission-critical computing.

Key features and benefits

HP Superdome 2 offers enhanced features to increase scalability, improve memory, and provide better compute power without compromising performance. Green efficiencies from HP blades are now engineered into Superdome 2. It can scale from 2 to 32 sockets. HP Superdome 2 offers:

- Support for 8 socket (8s), 16 socket (16s), and 32 socket (32s) Superdome 2 servers
- The Intel® Itanium® Processor 9300 series 4c, with up to 32 sockets, provides up to 128 cores of compute power and the Intel® Itanium® Processor 9500 series 8c, with up to 32 sockets, provides up to 256 cores of compute power
- 512 DIMM slots with up to 8 TB of DDR3 memory with double-chip spare, providing a large memory footprint for the most demanding applications
- 64 built in 10 GbE ports
- Full suite of Capacity on Demand capabilities: HP Pay per use (PPU), iCAP, GiCAP, and TiCAP
- Built-in shared DVD
- Upgrade paths from SD2-8s to SD2-16s and SD2-16 to SD2-32s socket SMP

Superdome 2 product family - Maximum capabilities are shown.



	Superdome 2-8s 16s with 8 socket SMP	Superdome 2-16s 16s with 16 socket SMP	Superdome 2-32s 32s with 32 socket SMP
Sockets	16 (8 per nPartition)	16	32
Cores	128	128	256
Memory	4TB*	4TB*	8TB*
10 GbE	32 Internal	32 Internal	64 Internal
PCIe	48 IOX	96 IOX	96 IOX

* w/ 16 GB DIMMs

NOTE: Intel Itanium 9500 series

General

The Superdome 2 compute enclosure is the building block of the 8s, 16s, and 32s systems. Each Superdome 2 compute enclosure supports 15 fans, 12 power supplies, associated power cords, and four HP Crossbar Fabric Modules (XFM).

Overview

The product names for Superdome 2 are:

- Superdome 2 8 socket /SD2-8s/8s
- Superdome 2 16 socket / SD2-16s/16s
- Superdome 2 32 socket / SD2-32s/32s

Superdome 2 - 8s

The SD2-8s system can support up to eight Superdome 2 server blades (CB900s i2 and/or CB900s i4). The SD2-8s compute enclosure is physically the same compute enclosure as the SD2-16s, but the SD2-8s system is limited to up to four blades per nPartition. Although the computer enclosure for both systems is the same, the product number for each system (SD2-8s and SD2-16s) is different. The OS licensing is different between the SD2-8s and SD2-16s. A minimum of one and maximum of four Superdome 2 IOX enclosures per SD2-8s system is supported. The IOX enclosures must be physically located in the same rack as the SD2-8s system it is connected to.

The SD2-8s system is different from the SD2-16s system in that the SD2-8s system has a unique product number, a lower hardware price-point, lower HP-UX pricing with tier-3 pricing, does not include the Superdome 2 active status door display (even if factory integrated into a rack), and has restrictions on its partition size (maximum 4 blades/nPartition).

Superdome 2 - 16s

The SD2-16s system can support up to eight Superdome 2 server blades (CB900s i2 and/or CB900s i4). A minimum of one and up to eight Superdome 2 IOX enclosures per SD2-16s system is supported. The Superdome 2 active status door display is included when the SD2-16s is ordered factory integrated into a rack.

Superdome 2 - 32s

The SD2-32s system is comprised of two compute enclosures. The system supports up to 16 Superdome 2 server blades (CB900s i2 and/or CB900s i4) - eight Superdome 2 server blades per compute enclosure. A minimum of one and up to eight Superdome 2 IOX enclosures per SD2-32s system is supported. The Superdome 2 active status door display is included when the SD2-32s is ordered factory integrated into a rack.

HP-UX 11iv3 Operating Environments and software

The supported operating environment for HP Superdome 2 is HP-UX 11iv3. HP-UX 11i v3 comes with a set of features that can provide more value for your investment. HP-UX 11i v3 is designed to simplify and unify IT, and deliver the always-on resiliency, dynamic optimization of resources, and investment protection and stability demanded in mission-critical computing. It integrates proven UNIX® functionality with advances in high availability, security, partitioning, workload management, and instant-capacity-on-demand. This is delivered within the industry's first mission-critical Converged Infrastructure, to drive up flexibility, while reducing risk, and delivering compelling value.

For more detail, please see the HP-UX QuickSpec at: http://h18000.www1.hp.com/products/quickspecs/12079_na/12079_na.HTML

Service and Support, HP Care Pack, and Warranty Information

Warranty

HP branded hardware and options qualified for Superdome 2 servers are covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. The HP branded hardware and options diagnostic support and repair is available for one year from date of purchase, or the length of the server they are attached to, whichever is greater. Additional support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services or customized service agreements.

Additional information regarding worldwide limited warranty and technical support is available at:
<http://bizsupport2.austin.hp.com/bc/docs/support/SupportManual/c01865770/c01865770.pdf>

Support Services

HP Technology Services—consultants and support experts to solve your most complex infrastructure problems. We help keep your business running, no matter what. Boost availability and avoid downtime, trust our expertise to optimize your HP solution.

HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI

When you buy HP server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HP Care Pack Services.

Protect your business beyond warranty

When it comes to robustness and reliability, standard computing equipment warranties have matured along with technology. Standard Hardware warranty service will be performed during the Principal Period of Maintenance ("PPM"), which is 8:00 a.m. to 5:00 p.m., local time, Monday through Friday, excluding local HP holidays. For Superdome 2 customers, HP recommends that customers consider an upgrade to their warranty to extended hours of coverage and reduced response times for service which will allow the customers to reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively

HP Technology Services offer flexible choices that span the entire technology lifecycle, and help build an infrastructure that is reliable, highly available, responsive and rooted in proven best practices. HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service that offer mission critical support for environments that require high availability. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services depending on your specific requirements from broad menu of service options. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HP Technology Services offers a full spectrum of lifecycle event services—from technology support to complex migrations to complete managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HP Financial solutions extend innovative financing and cost-effective asset management programs—from purchase to equipment retirement. Depending on a customer's individual support needs, customers can choose from three conveniently structured support solutions. The support recommendations listed below generally apply to the server and the complete system. Options should be covered at the same service level as the associated installed system.

Choose the right level of support, deployment and professional integration services for your requirements and expectations.

Learn more: www.hp.com/services/servers and www.hp.com/services/bcs

Service and Support, HP Care Pack, and Warranty Information

NOTE: HP Care Pack Services availability may vary by product and country.

Recommended HP Care Pack Services for optimal satisfaction with Superdome 2:

Optimized Care

3-Year HP Critical Service: This is the highest level of recommended service, and suitable for IT environments where high availability is essential and downtime has a serious business impact

HP Critical Service (CS) provides a complete support solution designed for businesses that run essential mission-critical applications, which cannot tolerate downtime without a significant business impact. This 3-year, comprehensive service provides the right combination of proactive and reactive support designed to improve availability and performance across your IT infrastructure. HP Critical Service provides highly-trained professionals with world-class skills and a commitment to understand both your enterprise technology requirements and your business objectives. This service offers an assigned support team, which includes an Account Support Manager (ASM) to address specific support needs, Remove Support Account Advocate who monitors calls to the HP response center, Mission Critical Hardware Specialist for integrated support across the environment, and access to HP's Global Mission Critical Solution Center to resolve complex issues.

- Boost business productivity through increased availability and decrease business losses caused by IT downtime
- Reduce risk and improve efficiency by proactively managing changes across the environment with no interoperability gaps
- Resolve complex problems quickly through direct access to HP Services expertise and support from a team familiar with business and technology infrastructure
- Free IT staff to focus on strategic business issues and increase customer satisfaction

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-1613EEE>

HP Factory Express Package 5 Service - HP Designed Solution

HP Factory Express Service Package 5 provides you with all of the configuration, racking, and installation services of Packages 3 and 4, along with advice and technical assistance. Utilize this service if you want help in designing your solution. HP Factory Express Service Package 5 allows you to leverage HP's factory capabilities along with those of an HP services consultant and field delivery specialist to deliver a solution that helps address your unique needs and requirements.

The service is recommended if you want to benefit from HP's design and configuration skills by having an HP consultant work directly with you to recommend and develop technical specifications for the solution that will help address your performance and availability goals.

Service benefits

- An HP-designed and configured solution based on accurate data that you provide to HP about your requirements
- Dedicated team engagement and collaboration with you from planning through implementation
- Enhanced IT resources and operations
- A solution designed by a team of HP engineering specialists to your specifications in accordance with ISO 9000: 2000 quality standards and then built, tested, shipped, and deployed with skilled onsite deployment assistance
- An HP-designed and configured solution based on accurate data that you provide to HP about your requirements
- Dedicated team engagement and collaboration with you from planning through implementation
- Enhanced IT resources and operations
- A solution designed by a team of HP engineering specialists to your specifications in accordance with ISO 9000: 2000 quality standards and then built, tested, shipped, and deployed with skilled onsite deployment assistance

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-9994EN.pdf>

HP Installation and Startup Services for HP Superdome 2



Service and Support, HP Care Pack, and Warranty Information

HP Installation and Startup Service for HP Superdome 2 provides comprehensive site evaluation, preparation, and verification; installation planning and management; consolidated shipment, de-trashing, moving to final location, and plug-in; power up, testing of basic connectivity, and (if boot disks were enabled in the factory) booting the OS.

- A deployment manager to manage the implementation of the service engagement
- Verification prior to installation that all service prerequisites are met
- Installation and startup by an HP technical specialist
- Availability of an HP service specialist to answer basic questions during the delivery of this service
- Expedited installation, provided all service prerequisites are met prior to commencement of service
- Helps you more effectively utilize HP product by knowledge gained from HP service specialist during onsite delivery of the service

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-7529ENW.pdf>

Standard Care

3-Year HP Proactive 24: This service level is suitable for customers for whom downtime may have some business impact

HP Proactive 24 Service (P24) integrates hardware and software support to help you improve the stability and operational effectiveness of your IT environment. This is an alternative to our recommended support level for customers who want enhanced operational effectiveness and proactive problem identification. An HP Account Manager acts as your primary point of contact to ensure that HP meets your support needs effectively.

P24 provides the maximum value when multiple technologies in the environment (e.g. servers, storage, SAN and the network), are all covered. It provides an environment-wide view and consistent support of all of these components which affect stability of your key applications.

Choose P24 when you want to:

- enhance operational effectiveness with proactive problem identification and recommendations from HP
- partner with technical experts who help coordinate support, provide hands-on assistance, and share knowledge with your staff
- rapidly access support and expertise spanning your environment
- obtain personalized services tailored to your business environment and critical success factors
- anticipate necessary change - and execute it correctly the first time
- efficiently manage infrastructure resources to meet your performance objectives

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-1614ENN.pdf>

HP Factory Express Package 5 Service - HP Designed Solution

HP Factory Express Service Package 5 provides you with all of the configuration, racking, and installation services of Package 3, along with the capability to specify more complex configurations. Utilize this service if you want HP to perform all the configuration and integration activities required for a complex solution that you define, along with project management and onsite implementation services. A deployment project manager and an integration engineer are assigned to manage your solution from start to finish. The project manager serves as the single point of contact in the factory for integration status, and will coordinate delivery and onsite installation of the solution. The integration engineer will work with your technical contact to capture the specific design parameters and prepare a detailed integration package to address your needs. In addition to the integration, configuration, and deployment activities, all solutions receive comprehensive testing and backup/recovery media, as well as a complete documentation package that details the configuration and settings of the delivered solution.

Service benefits



Service and Support, HP Care Pack, and Warranty Information

- Dedicated team engagement and collaboration with you from planning through implementation
- Enhanced IT resources and operations
- A solution built to your specifications in accordance with ISO 9000:2000 quality standards and then tested, shipped, and deployed with skilled onsite deployment assistance

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-9994EN.pdf>

HP Installation and Startup Services for HP Superdome 2

HP Installation and Startup Service for HP Superdome 2 provides comprehensive site evaluation, preparation, and verification; installation planning and management; consolidated shipment, de-trashing, moving to final location, and plug-in; power up, testing of basic connectivity, and (if boot disks were enabled in the factory) booting the OS.

- A deployment manager to manage the implementation of the service engagement
- Verification prior to installation that all service prerequisites are met
- Installation and startup by an HP technical specialist
- Availability of an HP service specialist to answer basic questions during the delivery of this service
- Expedited installation, provided all service prerequisites are met prior to commencement of service
- Helps you more effectively utilize HP product by knowledge gained from HP service specialist during onsite delivery of the service

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-7529ENW.pdf>

Basic Care

3-Year HP Proactive 24 -See Standard Care above for a detailed description. This is the minimum recommended support for Superdome 2 servers.

HP Factory Express Package 4 Service-Customer Designed Solution

HP Factory Express Service Package 4 provides you with all of the configuration, racking, and installation services of Package 3, along with the capability to specify more complex configurations. Utilize this service if the customer will be providing the design. A deployment project manager and an integration engineer are assigned to manage your solution from start to finish. The project manager serves as the single point of contact in the factory for integration status, and will coordinate delivery and onsite installation of the solution. The integration engineer will work with your technical contact to capture the specific design parameters and prepare a detailed integration package to address your needs. In addition to the integration, configuration, and deployment activities, all solutions receive comprehensive testing and backup/recovery media, as well as a complete documentation package that details the configuration and settings of the delivered solution.

Service benefits

- Dedicated team engagement and collaboration with you from planning through implementation
- Enhanced IT resources and operations
- A solution built to your specifications in accordance with ISO 9000:2000 quality standards and then tested, shipped, and deployed with skilled onsite deployment assistance

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-9810EN.pdf>

HP Installation and Startup Services for HP Superdome 2

HP Installation and Startup Service for HP Superdome 2 provides comprehensive site evaluation, preparation, and verification; installation planning and management; consolidated shipment, de-trashing, moving to final location, and plug-in; power up, testing of

Service and Support, HP Care Pack, and Warranty Information

basic connectivity, and (if boot disks were enabled in the factory) booting the OS.

- A deployment manager to manage the implementation of the service engagement
- Verification prior to installation that all service prerequisites are met
- Installation and startup by an HP technical specialist
- Availability of an HP service specialist to answer basic questions during the delivery of this service
- Expedited installation, provided all service prerequisites are met prior to commencement of service
- Helps you more effectively utilize HP product by knowledge gained from HP service specialist during onsite delivery of the service

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-9994EN.pdf>

Related Services

HP Proactive Select Service

For customers that need the flexibility of choosing from a variety of service activities ranging from assessments, performance analysis, firmware management, and infrastructure solution support to technical forums. These service activities cover a broad spectrum of IT technology domains including servers, blades, operating systems, storage, SANs, networks, third party software, virtualization, power and cooling, management software, security and ITSM. The end result is a solution that is designed by you to help you meet your IT and business goals. Customers can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.

Service benefits

HP Proactive Select services help you to

- Access a list of flexible and customizable proactive service activities
- Choose from a variety of service activities addressing both technology and process needs
- Have the ability to change the Plan during the review meeting
- Enhance your in-house IT team with complementary assistance from HP
- Improve the time to solution
- Reduce business risk and project costs by accessing HP specialists
- Simplify IT operational procedures by leveraging HP best practices

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf>

HP BCS Customer Support Team Day Service

For customers who want to purchase technical assistance for same deliverables available within the Proactive Select Service, but would like to purchase the Engineering time in eight-hour (one-day) blocks. HP Support Engineers use proven techniques and processes gained from experience in a multitude of customer engagements worldwide - offering "skills on demand" to reduce risk, complete work in less time, and attain the required business solution.

Service benefits

- Enhance your in-house IT team with complementary assistance from HP
- Flexible Engineering time dedicated to achieving business solutions
- Reduce time to solution
- Simplify IT operational procedure by leveraging HP best practices

<http://h71028.www7.hp.com/ERC/downloads/5982-4197EN.pdf>



Service and Support, HP Care Pack, and Warranty Information

HP Installation and Startup Services Suite for HP-UX Virtualization

For customers who need help setting up a virtualized environment for HP Integrity

HP Installation and Startup Services Suite for HP-UX Virtualization will provide you with the help you need to set up a virtualized environment for HP Integrity servers. These services provide all of the deliverables required to install and configure the software necessary to enable the configuration of physical servers into multiple virtual servers. These services also set up the management tools required to help you manage the Virtualized Environment in HP-UX. The services within this suite are as follows:

1. HP Startup gWLM Service: Installation of HP-UX Global Workload Manager on the central management server
2. HP Startup vPar or Virtual Machine SVC: Creation of up to two virtual partitions or up to two virtual machines.
3. HP Startup Capacity Advisor Service: Installation of Capacity Advisor Tool
4. HP Startup Insight Dynamic Configuration Mgmt SVC - Installation of Insight Dynamics infrastructure orchestration (IO) tool

Service benefits

- Application of HP best practices
- Customized design and installation
- Reduced implementation time and cost
- Help improve system uptime with customized documentation and customer orientation

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA1-4067ENW.pdf>

HP Serviceguard Installation and Startup Service for HP-UX

For customers looking to protect business critical applications from hardware or software failures

HP Serviceguard is an HP product that helps protect mission-critical applications from hardware and software failures. With HP Serviceguard, multiple nodes are organized into an enterprise cluster that is capable of supporting a highly available, virtualized application environment. The HP Serviceguard Installation and Startup Service provides for implementation of the HP Serviceguard application software on HP-UX platforms running on HP Integrity servers.

Service benefits

- A project manager to direct the implementation of the service engagement, including the coordination of technical pre-planning meetings to ensure readiness for the service deployment
- Application of HP best practices
- Customized design and installation
- Reduced implementation time and cost
- Help improve system uptime with customized documentation and customer orientation

http://www.hp.sk/carepack/data/Installation%20and%20Deployment/Business%20Critical%20Servers/HP_Serviceguard_Storage_Management_Suite5982-7440ENN.pdf

eSupport

Insight Remote Support

Delivers secure remote monitoring and support for HP servers and storage, 24x7 at no additional cost. Available as part of HP Warranty, Care Pack and Service Contract offers.

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.



Service and Support, HP Care Pack, and Warranty Information

Support Portal

The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit <http://www.hp.com/support>

HP Insight Remote Support software delivers secure remote monitoring and support for your HP Servers and Storage, 24 X 7, so you can spend less time solving problems and more time focused on your business. You can have your systems remotely monitored for hardware failure using secure technology that's been proven at thousands of companies around the world. In many cases, you can avoid problems before they occur.

Customer Technical Training

HP Education Services

In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, HP offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.

<http://www.education.hp.com>

HP Services Awards

HP Technology Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction.

Standard Features

HP Superdome 2 Server Blade (CB900c i2 and CB900ci4)

Processors

The Superdome 2 CB900s i2 server blade is populated with two processors:

Intel® Itanium® Processor 9340 4c

Intel® Itanium® Processor 9350 4c

The Superdome 2 CB900s i4 server blade is populated with two processors

Intel® Itanium® Processor 9560 8c

Intel® Itanium® Processor 9540 8c

Chipset

HP sx3000

Upgradability and scalability

Superdome 2 is scalable from 8 socket configurations to 32 socket configurations

Cache Memory

For Intel® Itanium® Processor 9350 and 9340 4c:

L1 cache 16 KB per core (instr)

L1 cache 16 KB per core (data)

L2 cache 512 KB per core (instr)

L2 cache 256 KB per core (data)

L3 cache (9340 series) 20 MB per socket - split 5 MB/core

L3 cache (9350 series) 24 MB per socket - split 6 MB/core

L4 cache 64 MB per socket

For Intel® Itanium® Processor 9560 and 9540 8c:

L1 cache 16 KB per core (instr)

L1 cache 16 KB per core (data)

L2 cache 512 KB per core (instr)

L2 cache 256 KB per core (data)

L3 cache 24 MB per socket shared by 8 cores (9540)

L3 cache 32 MB per socket shared by 8 cores (9560)

L4 cache 64 MB per socket

SD2-8s: minimum: 32 GB (4 x 8 GB) / maximum: 4TB (256 x 16 GB)

SD2-16s: minimum: 32 GB (4 x 8 GB) / maximum: 4 TB (256 x 16 GB)

SD2-32s: minimum: 64 GB (4 x 8 GB per enclosure) / maximum : 8 TB (512 x 16 GB)

NOTE: 8GB and 16GB LV DIMMs are supported in CB900s i4 blades.

Memory type Registered

16 GB PC3L-10600R DDR3 ECC memory registered DIMMS for CB900s i4

8 GB PC3L-10600R DDR3 ECC memory registered DIMMSfor CB900s i4

4 GB PC3-10600R DDR3 ECC memory registered DIMMS for CB900s i2

8 GB PC3-10600R DDR3 ECC memory registered DIMMS for CB900s i2

Memory protection

Error checking and correcting (ECC) on memory and caches; double-chip spare

Operating system

HP-UX 11i v3

NOTE: licensing is on a per-socket basis

I/O slots - External

SD2-8s: 48 external PCIe 8x Gen2

SD2-16s: 96 external PCIe 8x Gen2

SD2-32s: 96 external PCIe 8x Gen2

Standard Features

Built in Networking	SD2-8s: 32 10GbE NIC ports max (4 per blade) SD2-16s: 32 10GbE NIC ports max (4 per blade) SD2-32s: 64 10GbE NIC ports max (4 per blade) NOTE: Ethernet Pass-through, Ethernet Switch interconnect or Cisco Fabric Extender module (stand-alone only)
Partitioning	SD2-8s 8 socket electrically isolated nPars SD2-16s 16 socket electrically isolated nPars SD2-32s 32 socket electrically isolated nPars
Capacity on Demand PPU	PPU, iCAP, TiCAP, GiCAP
Form factor	SD2-8s 18U Enclosure 4U IOX Enclosure HP 600 mm wide 42U Intelligent Series rack with standard rack door SD2-16s 18U Enclosure 4U IOX Enclosure HP 600 mm wide 42U Intelligent Series rack with the Superdome 2 door and active status display SD2-32s Two 18U Enclosures in single HP 600 mm wide 42U Intelligent Series rack with the Superdome 2 door and active status display 4U IOX Enclosures in a separate HP Intelligent Series rack
High availability-standard server features	2N (N+N) redundant power supplies N+1 fans (or greater depending on the load) Online, replaceable, and redundant OA, utilities, clock, and service processor subsystems Fault Tolerant Crossbar Fabric built on dynamic multi-pathing and end-to-end retry technology Enhanced MCA recovery (Automated Processor Recovery) w/Intel Cache Fail-Safe Technology® ECC on caches, Memory ECC, and double-chip spare ECC, re-tries, and Link Width Reduction on data paths Automatic de-configuration of memory and processors I/O Advanced Error Recovery, and I/O isolation off Crossbar Fabric Redundant network paths Redundant Fibre Channel paths
I/O	Interfaces VGA and 2 USB ports for local human interface; 1 RS-232 serial port and 10/100Base-T LAN for Integrity Integrated Lights-Out (iLO 3) management Removable media built-in DVD-ROM, accessible from all partitions
Standard Warranty	One year, onsite hardware support

Configuration

Superdome 2 products are comprised of two main components: HP Superdome 2 Enclosure and HP Superdome I/O Expansion Enclosure (IOX).

HP Superdome 2 Enclosure

The SD2-8s (AH352A) is an entry level offering of the SD-16s (AH337A) system. The SD2-8s system is limited to up to four blades per nPartition and thus has different OS licensing than larger systems. It supports a maximum of four IOXs which must be in the same rack as the compute enclosure. From a hardware perspective, the SD2-8s enclosure is exactly the same as the SD2-16s.

The SD2-8s and SD2-16s systems and IOXs can be field racked. However, it is recommended that customers order the systems racked from the factory. This provides the customer the benefit of extensive system testing and avoids possible premium service charges for field racking service. An important restriction to note about field racked units: field racked units are limited to single blade configurations due to weight limitations. Additional blades must be ordered as separate items and will be shipped along with the enclosure. Field racked units will not have the Superdome 2 active status door display. Field racking the SD2 requires the use of an appropriate material lift capable of lifting 400 lbs. The RONI lift is no longer available for purchase. Suggested replacement is the Genie Material Lift GL8 (<http://www.genielift.com/>).

Model No.	Description	Overall L x W	Base Dimensions	Maximum Lifting Height	Width – stowed	Capacity	Weight
GL-8	Standard Base GL-8	5'-7.5" x 35"	2' 10.75"L Operating / 2' 0.75"W Outside	10 ft. 5 in	2 ft. 0.75 in	400 lbs	132 lbs.

The SD2-32s system consists of two 16 socket compute enclosures in a single rack with one to eight IOXs in an adjacent rack. These two racks must be immediately adjacent to each in order for the side panels to be removed to connect the cables between the compute enclosure and IOX's (i.e. cabling does not go out the bottom of the rack and through the floor). Field racking is not an option for SD2-32s systems due to the extensive effort required.

Superdome 2 systems are supported in the HP 600 mm wide 42U Intelligent Series rack.

Non-Superdome 2 product may be placed in the same rack as Superdome 2 product. Placement of these other products must not result in moving Superdome 2 product.

All racks in the same order must be the same height and width.

Superdome 2 Hardware Configuration

Configuration

	SD2-8s (AH352A)	SD2-16s (AH337A)	SD2-32s (AH353A)	IOX (AH338A)
Number of Compute enclosures	1	1	2	NA
Number of Superdome 2 Blades (min/max) per compute enclosure	1 to 8	1 to 8	1 to 16	NA
Number of CAMnet Completer modules (CCMs)	0 to 1	0 or 1	0 to 3	NA
Number of processor modules per compute enclosure (min/max)	2 to 16	2 to 16	2 to 32	NA
Number of DIMMs (increments of 8 DIMMs per blade - min/max)	8 to 256	8 to 256	8 to 512	NA
Number of XFMs	4	4	8	NA
Number of Ethernet NIC ports	4 to 32	4 to 32	4 to 64	NA
Number of I/O slots	NA	NA	NA	12 per IOX (6 per I/O bay)
Number of IOX enclosures	1 to 4	1 to 8	1 to 8	NA
Number of supported external I/O slots	48 max	96 max	96 max	NA
Number of OAs	2	2	4	NA
Number of GPSMs (Global Partition Services module)	2	2	4	NA
DVD module	1	1	2	NA
Fans	15	15	30	4
Power Supplies	<=4 blades, N: 6, 2N: 12	2N: 12	2N: 24	2N: 2
SUV Dongle cable	1	1	2	0

NOTE: The SUV dongle cable is HP part number 409496. It connects to the SUV port on the front of each blade and brings out USB (2 port) serial (DB9) and VGA (DB15). This is how a crash cart or a direct-attached USB DVD is connected for debugging the system.

Superdome 2 is supported in the HP 600mm 42U wide Intelligent Series rack. A SD2-8s system integrated into one of these racks will come with a standard rack door. The door included with the SD2-16 and SD2-32s systems has unique industrial design features: an active LCD status display on the compute enclosure rack and a Superdome 2 splash plate. Although the door with the racked SD2-8s systems does not have the Superdome 2 door with the active LCD status display, the racks will be pre-cabled to easily add the active LCD status display to the standard rack door when upgrading from a SD2-8s to a SD2-16s.

Each Superdome 2 blade is populated with two Agents, two processor modules, and eight Intel Scalable Memory Buffer chips.

Detailed partitioning rules are included in the configuration rules for each system. However, general rules are as follows:

1. Load the largest partitions first
2. Odd/even slot loading for Superdome 2 blades in the same partition is recommended for improved performance. This benefit decreases as the size of the partition increases and is most important for 2 & 3 blade partitions. For instance, a four blade partition should have blades loaded in slots 1/3/5/7 or 2/4/6/8 (not slots 1/2/3/4 as in legacy Superdome).
3. A Superdome 2 blade must be in slot 1 of enclosure 1

Configuration

4. A Superdome 2 blade or filler blade (HP CAMnet Completer module aka CCM) must be in slot 1 of enclosure 2 (for SD2-32s).
5. A Superdome 2 blade or filler blade (HP CAMnet Completer module) must be in slot 2 or 3 of enclosures 1 and 2 (SD2-32s). A CCM is needed if there is only a single blade to provide redundant manageability fabric from the GPSMs to the OAs. The CCMs are automatically included in the enclosure when there are less than two compute blades.
6. P= indicates preferred partition arrangements (from a performance perspective).
7. A = indicates alternative partition arrangements (provided to accommodate c-Class blades)

The following configurations are currently supported:

- SD2-8s with up to four IOXs
- SD2-16s with up to eight IOXs
- SD2-32s with up to eight IOXs

HP Superdome 2 IOX enclosure

The Superdome 2 I/O Expansion enclosure (IOX) is used across the entire Superdome 2 product family. The IOX consists of a single board with two IO Hubs (IOHs). Each IOH supports up to six 8x PCI-Express cards.

It is important to note that the I/O subsystem in Superdome 2 products is different than that in legacy products. Superdome 2 has I/O directly on the blade and supports the external IOX. The I/O bays in IOXs are connected directly to the crossbar fabric (and not directly to blades). Therefore, assignment of I/O bays to nPartitions is independent of the assignment of blades. Also, a blade can be removed from the partition without losing access to IOXs.

IOX bays are assigned at a partition level. For multi-enclosure systems, IOX bays are assigned with the minimal number of "hops" to obtain connectivity.

Each IOX consists of two I/O bays. Each I/O bay has a single IOH chip and six I/O slots. Each I/O bay in the IOX can be assigned to an nPartition independently of the other I/O bay. There are several ways to partition the I/O subsystem depending on a customer's priorities:

- One nPartition per IOX
- Distribute redundant I/O cards across IOXs for higher availability
- Combine partitions within a IOX for lowered cost
- Distribute I/O cards across both IOHs and across the root complexes for best bandwidth within the IOX. For example, with a single nPartition in the IOX, rather than populating all 6 I/O cards off IOH 0 (slots 1-6), place three of the cards off IOH 0 and the other three cards off IOH1. Furthermore, distribute the cards across all three root complexes within a single IOH (i.e. use slots 1, 3 and 5 rather than 1, 2 and 3).

Configuration

HP Superdome 2 - 8s

8s Configuration Rules SD2-8s uses the same compute enclosure as the SD2-16s

Any blade and any IOH bay can be used to create an nPartition.

- Blades can be ordered in single or multiple quantities. A minimum of one blade must be ordered and populated in slot 1. If a second blade is not ordered, a CAMnet Completer Module (CCM) must be populated in slot 2. The CCM provides a redundant manageability path from the Global Partition Services module (GPSM) to the OA. The CCMs are automatically included in the enclosure when there are less than two blades.
- All blades are populated with two processor modules
- SD2-8s contains four Crossbar Fabric Modules (XFM)s
- SD2-8s can have up to eight Superdome 2 blades. However, no single partition can be larger than four blades.
- SD2-8s can support up to four IOXs.
- SD2-8s can be upgraded to a SD2-16s. This would be required if partitions larger than four blades are desired and/or more than four IOXs are needed. For more details, please see the upgrade section.
- Each SD2-8s has two OA boards
- Two GPSMs are included with the SD2-8s.
- There are single phase and three phase power distribution options.
- AH389A (Power Boost Option) must be ordered if the SD2-8s system will have more than four Superdome 2 blades.

8s Racking Choices

The SD2-8s enclosure is 18U high and can be racked in a 42U HP 600mm wide Intelligent Series rack. A SD2-8s system can be connected with up to four IOX's. The enclosure is located 2U from the bottom of a 42U rack to allow for PDUs and cables to exit.

NOTE: Mixing of SD2-8s and SD2-16s systems in the same rack - either from the factory or as a field installation - is not supported.

NOTE: The TFT7600 rack mountable display is not supported on SD2.

Configuration

8s Partitioning Choices A SD2-8s may be partitioned into several partitions. The configurations recommended herein allow the customer to partition their SD2-8s into the maximum number of recommended, useful, and allowed partitions.

The compute enclosure's midplane has been routed such that there is more bandwidth across odd slots and even slots vs. mixed. Therefore, a four blade partition will have better performance when all four of the blades are in odd (1, 3, 5, 7) or even (2, 4, 6, 8) slots vs. mixed (1, 2, 3, 4) slots.

NOTE: Superdome 2 enforces the maximum of four blades per partition in the SD2-8s system.

Below are the configurations when shipped from the factory.

SD2-8s blade loading

nPartition Size	ENCLOSURE 1 Slot Number							
	1	2	3	4	5	6	7	8
1	1	2	3	4	5	6	7	8
2P	1	2	1	2	3	4	3	4
2A	6	6	8	8	7	7	5	5
2A				9				9
3P	1	2	1	2	1	2		
3A	3	3	3		4	4	4	
4P	1	2	1	2	1	2	1	2
4A	3	3	3	3	4	4	4	4

NOTE: The alternative 2-blade partition with blades in slots 7 & 8 is provided to allow two 3-blade partition and one 2-blade partition to co-exist in the same enclosure. The alternative 2-blade partition in slots 4 & 8 is provided to support a 2-blade partition if two alternative 3-blade partitions are used.

Superdome 2 - 16s

16s Configuration Rules The SD2-16s enclosure is the basic building block for Superdome 2.

Any blade and any IOH can be assigned to any nPartition.

- Blades can be ordered in single or multiple quantities. A minimum of one Superdome 2 server blade (CB900s i2 or CB900s i4) must be ordered with a SD2-16s enclosure and populated in slot 1. If only one blade is ordered, a CCM must be populated in slot 2 for CAMnet topology redundancy. The CCMs are automatically included in the enclosure when there are less than two blades.
- All blades are populated with two processor modules
- SD2-16s can have up to eight Superdome 2 server blades
- A SD2-16s system contains four Crossbar Fabric Modules (XFM)
- A SD2-16s has two OA boards populated
- Two GPSMs are included
- There are single phase and three phase power distribution options.
- Up to eight IOXs may be ordered independently to provide additional I/O capability for the SD2-16s

16s Racking Choices

The SD2-16s has some basic racking rules as the SD2-8s, and is very configurable. The SD2-16s enclosure is 18U high and can be racked in the 42U high HP 600mm wide Intelligent Series rack. The SD2-16s may be

Configuration

ordered field racked, but some disassembly is required.

The default assumption is that enclosures are loaded in the rack starting at the bottom. It is recommended that 2U is left at the bottom of the 42U rack to provide PDU and cabling exit space.

The default configuration is a single rack for a SD2-16s with up to four IOXs in the same rack and any additional IOX's in an adjacent rack.

IOXs can be configured in an adjacent rack. A customer may want to consider this configuration if they want to: 1) order a SD2-16s and upgrade to a SD2-32s in the future or 2) order four or fewer IOXs now but want to add IOXs in the future and ensure they have rack space reserved. This configuration may be ordered by selecting the "adjacent rack" option. The "adjacent rack" option can be used regardless of the number of IOXs are ordered.

Two SD2-16s systems may be ordered in the same rack. A customer may want to consider this configuration if they want to have the compute resources in one rack with more directed cooling and all the IOXs in the adjacent rack that has lower cooling demands. The HDD bay should either go above the topmost IOX or in an adjacent rack. The HDD cannot be "nested" within the IOXs due to cable length restrictions.

Systems that consist of multiple racks (i.e. SD2-16s with IOX in adjacent rack) must be fully adjacent to each other, i.e. no space between the racks. Cabling from the compute enclosure to the IOXs is from the side (not down through the floor). Racks for systems in multiple racks must be the same height, width, and depth.

NOTE: Mixing of SD2-8s and SD2-16s systems in the same rack - either from the factory or as a field installation is not supported.

NOTE: The TFT7600 rack mountable display is not supported on SD2.

16s Partitioning Choices A SD2-16s system may be partitioned into many different mixes of partitions. The configurations recommended herein allow the customer to partition their SD2-16s into the maximum number of recommended, useful, and allowed nPartitions.

The enclosure's midplane has been routed such there is more bandwidth across odd slots and even slots vs. mixed. Therefore, a four blade partition will have better performance when all four of the blades are in odd (1, 3, 5, 7) or even (2, 4, 6, 8) slots vs. mixed (1, 2, 3, 4) slots.

Below are the configurations when shipped from the factory

SD2-16s partition loading

Configuration

nPartition Size	ENCLOSURE 1 Slot Number							
	1	2	3	4	5	6	7	8
1	1	2	3	4	5	6	7	8
2P	1	2	1	2	3	4	3	4
2A	6	6	8	8	7	7	5	5
2A				9				9
3P	1	2	1	2	1	2		
3A	3	3	3		4	4	4	
3A				5		5		5
4P	1	2	1	2	1	2	1	2
4A	3	3	3	3	4	4	4	4
5P	1	1	1		1		1	
5A	2	2	2	2	2			
6P	1	1	1	1	1		1	
6A	2	2	2	2	2	2		
7	1	1	1	1	1	1	1	
8	1	1	1	1	1	1	1	1

NOTE: The alternative 2-blade partition with blades in slots 7 & 8 is provided to allow two 3-blade partitions and one 2-blade partition to co-exist in the same enclosure. The alternative 2-blade partition in slots 4 & 8 is provided to support a 2-blade partition if two alternative 3-blade partitions are used. The alternative 3-blade partition in slots 4, 6 and 8 allows both a 5-blade and 3-blade partition to co-exist in the same enclosure.

Power Distribution Options

There are two types of power supplies supported in the Superdome 2 compute enclosure, an 80 PLUS Gold rated 2400w supply (default) or an 80 PLUS Platinum rated 2400W supply (option #009).

NOTE: Mixed power supplies within the same compute enclosure is not supported.

The IOX power supply is an 80 PLUS Platinum Rated 750w supply.

NOTE: Mixed power supplies within the IOX is not supported.

Superdome 2 is designed to support N+N redundancy of the power supplies. In conjunction with Power Saver mode which enables only the supplies necessary for the current load, power supplies are enabled in quads, two of the bottom power supplies and two of the top power supplies. Quads are configured such that there are two power supplies on the right hand side of the chassis (one top and one bottom) and two on the left hand side of the chassis (one top and one bottom). To retain dual source redundancy in conjunction with the power supply redundancy of Superdome 2, it is necessary to connect all six power supplies located left of center (three top and three bottom) to one source and all six power supplies located right of center (three top and three bottom) to the other source.

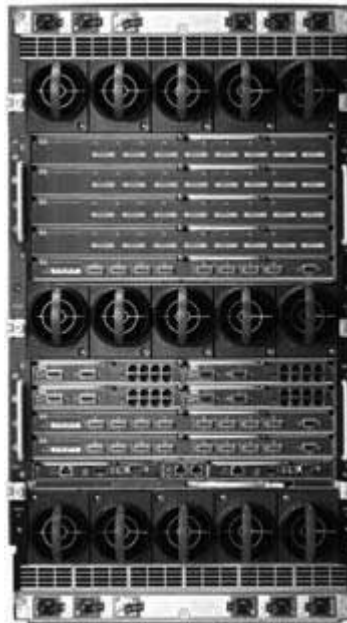
There are nine AC power connection options offered in Superdome 2 enclosures. These can be divided into three main configurations

- Single Phase only (16A/20A, single phase cords that plug directly into wall sockets)
 - Connectors on back of the compute enclosure are IEC60320-C19:

Configuration



- A total of 12 single phase power cords are necessary to power the 12 power supplies in the Superdome 2 compute enclosure. (power option #001)
- To limit the number of power cords exiting the rack (decrease from 12 cords to 4 cords) it is possible to use a single phase IEC309 63A Power Distribution Units (PDUs) for power cord aggregation. (power option #006)
- Power option #010 is only available in Japan. There are 6 NEMA L6-30P single phase PDU's at the bottom of the rack. Note: power option #010 is not available with the 36u rack. A manual override is required if ordered with the 32s starter package or the SD2-32s SMP
- Below is a photo of the rear of a Superdome 2 compute enclosure with the single phase power interface modules installed, they are visible at the extreme top and bottom of the unit:



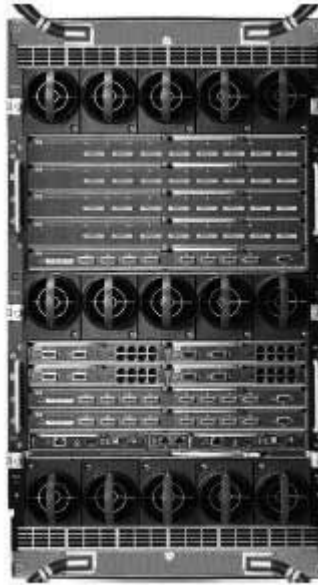
- Single and Three Phase mix (single phase cables within the rack connected to the PDU, three phase cables to customer supplied receptacles)
 - The power interface modules used are the single phase units shown above.
 - PDUs used have:
 - 4 wire, IEC 309 60A connector, qty. 2 needed. (power option #004)
 - 5 wire, IEC309 32A connector, qty. 2 needed. (power option #005)
- Three Phase only (three phase cords that connect directly to customer provided receptacles)
 - 4 wire version utilizes NEMA L15-30R connectors: (power option #002)



- 5 wire version utilizes IEC309 16A 5 pin connectors: (power option #003)

Configuration

- A total of 4 cords are necessary to power the 12 power supplies in the Superdome 2 compute enclosure.
- Below is a photo of the rear of a Superdome 2 compute enclosure with the three phase power interface modules installed:

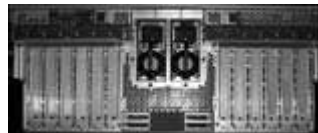


All these options are offered for all Superdome 2 products.

All PDUs supported in Superdome 2 are half depth such that two can fit in 1U (one in the front and one in the back). Many of the PDUs are offered in both 1U (horizontally mounted) and 0U (side-mounted) options. The three phase PDU's for the SD2 compute enclosure are AF511A or AF518A. The IOX single phase PDU's are either 252663-D74 or 252663-B33.

Specifying power option #007 in conjunction with any of the others (#001 - #006) routes the power cords to exit the top of the rack rather than the bottom.

The IOX also supports N+N power supply redundancy with 2 power supplies. Dual source capability may be utilized by connecting one power cord to one source and the other to a different source. Power cord connections on the IOX are IEC 60320 C14 as shown below:



Configuration

Superdome 2 Power Option Matrix

Power Option	Country	Power cord and input module (+phase type)	# of power cords per enclosure	# of PDU's (+phase type) & location	Type of wire plug	Other notes
#001	Localized power cords	Single phase (1Φ)	12	no PDU	Localized	20A/ 16A power cords
#002		Three phase(3Φ)	4 (2 per Power Input module)	no PDU	4 wire	NEMA L1 5-30P
#003	International	Three phase (3Φ)	4 (2 per Power Input module)	no PDU	5 wire	IEC309-16A
#004		Single phase (1Φ)	12 (same qty and length cords)	2 PDU's (3 Φ Three phase) Bottom of rack	4 wire	Rack mountable AF511A (PDU p/ n) IEC309 60A
#005	International	Single phase (1Φ)	12 (Same qty and length cords)	2 PDU's (3 Φ Three phase) Bottom of rack	5 wire	Rack Mountable AF516A (PDU p/ n) IEC309 32A
#006	NA/ Japan/ International	Single phase (1Φ)	12 (Same qty and length cords)	4 PDU's (single phase) Bottom of rack	3 wire (single phase)	252663-B04 (single phase 40A PDU p/ n)
#007	NA/ Japan/ International	Based on options #001, #004 -#006, #010	Based on options #001, #004 -#006, #010	Based on options #001, #004 -#006, #010; places location of PDU top of rack	3 wire (single phase) 4 or 5 wire (three phase)	Trigger to route power top of rack and to replace with longer patch cords/ jumper cords;
#008						HP2400 W Platinum Power Supply
#010	Japan	Single phase (1Φ)	12 (Same qty and length cords)	6 PDU's (single phase) Bottom of rack default	3 wire (single phase)	252663-D74 (2 4A PDU with NEMA L6-30P Plug) Option not available with 36U rack, Manual Override Required for 32s starter pkg #006, or 32s SMP (AH353A)

* Connections to the enclosure



HP Power Advisor

The HP power Advisor is a tool provided by Hewlett-Packard to assist in the estimation of power consumption at a system, rack, and multi-rack level.

Available at: www.hp.com/go/hppoweradvisor

HP Superdome 2 CPU / CPU module Support

Superdome 2 CB900s i2 blades include the Intel® Itanium® Processor 9300 series 4c and the Superdome 2 CB900s i4 blades include the Intel Itanium Processor 9500 series 8c. See below for supported CPU frequency/cache bins, number of cores and I/O frequencies.

Support for the various speed bins is as follows:

Configuration

Processor

Superdome 2 supported CPU Matrix

Intel® Itanium® Processor 9300 and 9500 Series							
Processor	# of cores per processor	Frequency	L1 CPU cache	L2 CPU cache	L3 CPU cache	L4 chipset cache	Power
Intel Itanium Processor 9340	4c	1.60 Ghz	16 KB /core (instr) 16 KB /core (data)	512 KB /core (instr) 256 KB /core (data)	20MB per socket - split 5 MB /core	64 MB per socket	185W
Intel Itanium Processor 9350	4c	1.73 Ghz	16 KB /core (instr) 16 KB /core (data)	512 KB /core (instr) 256 KB /core (data)	24MB per socket - split 6 MB /core	64 MB per socket	185W
Intel Itanium Processor 9540	8c	2.13 Ghz	16 KB /core (instr) 16 KB /core (data)	512 KB /core (instr) 256 KB /core (data)	24MB per socket - shared by 8 cores	64 MB per socket	170W
Intel Itanium Processor 9560	8c	2.53 Ghz	16 KB /core (instr) 16 KB /core (data)	512 KB /core (instr) 256 KB /core (data)	32MB per socket - shared by 8 cores	64 MB per socket	170W

CPU Mixing Support

Superdome 2 governing rules for mixing processors are as follows:

- No mixing of processor families or blade types within a nPartition
- No support for processors running at different frequencies or different cache sizes within the same nPartition enabled
- Processor modules on a blade must be the same revision, frequency, & cache size
- Mixing of processors with different frequencies and/or cache sizes will be NOT allowed within a nPartition
- Mixing of CB900s i2 and CB900s i4 blades within a complex is allowed; however, mixing of blade types within a nPartition is not supported.

Configuration

HP Superdome 2 Memory Support

Superdome 2 systems will use the Intel® Scalable Memory Buffer chip to translate between the Scalable Memory Interconnect (SMI) technology on the memory controller and the DDR3 R-DIMMs.

The following R-DIMMs are supported on CB900s i2 blades:

- 4 GB PC3-10600R DDR3 ECC memory registered DIMMS for CB900s i2
- 8 GB PC3-10600R DDR3 ECC memory registered DIMMS for CB900s i2

The following R-DIMM is supported on CB900s i4 blades:

- 8 GB PC3L-10600R DDR3 ECC memory registered DIMMSfor CB900s i4
- 16 GB PC3L-10600R DDR3 ECC memory registered DIMMS for CB900s i4

Only DIMMs that HP has qualified on Superdome 2 are supported in Superdome 2 products.

The Superdome 2 blade supports 32 RDIMMs and eight Intel® Scalable Memory Buffer chips. This breaks downs to eight R-DIMMs and two Scalable Memory Buffer chips per memory controller.

General memory configuration rules:

- For best performance, the amount of memory on each blade within the partition should be the same.
- Use the most number of DIMMs to get the best bandwidth. For instance, using 16 4GB DIMMs per blade rather than 8 8GB DIMMs will load both busses off the memory controller resulting in better bandwidth.
- Use the same amount of memory on each processor module within a partition.

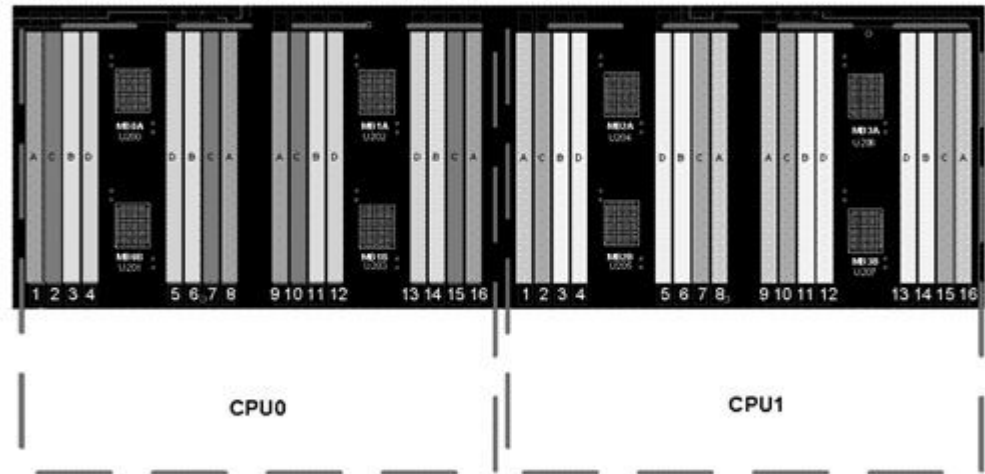
Superdome 2 DDR3 DIMM loading rules and numbering (top-down view of blade)

The DIMM groups must be loaded in the following order:

A -> B -> C -> D

Configuration

CPU0: 1A, 8A, 9A, 16A → 3B, 6B, 11B, 14B → 2C, 7C, 10C, 15C → 4D, 5D, 12D, 13D
 CPU1: 1A, 8A, 9A, 16A → 3B, 6B, 11B, 14B → 2C, 7C, 10C, 15C → 4D, 5D, 12D, 13D



Superdome 2 blade DIMM Arrangement

NOTE: Per the commonality guidelines, the first DIMMs to be loaded will have white DIMM connectors loaded on the blade. Therefore, "A" and "B" connectors will be white. Connectors in slot positions "C" and "D" will be black.

Configuration

The following table shows the supported configurations as shipped from the factory.

NOTE: Mixing DIMM sizes within the same blade is not supported at this time.

NOTE: 8GB and 16GB LV DIMMs are supported on CB900s i4 blades.

Recommended Configurations per Superdome 2 i2 server blade

Total Memory per Blade (Gbytes)	Number of DIMMS		Echelon A	Echelon B	Echelon C	Echelon D
	4GB	8GB				
32	8		4G			
64	16		4G	4G		
64		8	8G			
96	24		4G	4G	4G	
128	32		4G	4G	4G	4G
128		16	8G	8G		
192		24	8G	8G	8G	
256		32	8G	8G	8G	8G

Superdome 2 i2 DIMM configurations shipped from the factory

Recommended Configurations per Superdome 2 i4 server blade

Total Memory per Blade (Gbytes)	Number of DIMMS		Echelon A	Echelon B	Echelon C	Echelon D
	8GB	16GB				
64	8		8G			
128	16		8G	8G		
128		8	16G			
192	24		8G	8G	8G	
256	32		8G	8G	8G	8G
256		16	16G	16G		
384		24	16G	16G	16G	
512		32	16G	16G	16G	16G

Superdome 2 i4 DIMM configurations shipped from the factory

HP Superdome 2 Storage Support

For HP Storage solutions, please see:

<http://www.hp.com/storage/spock>

For third party storage solutions please see:

http://www.hp.com/products1/serverconnectivity/mass_storage_devices.html

Configuration

HP Superdome 2 Interconnect Module Support

Superdome 2 will support some of the same interconnect modules as the c-7000 and c-3000 enclosures.
A supported Ethernet interconnect module must be ordered for bay 1 of all enclosures.

The LOMs on the blade are supported running at 10GbE. The interconnect modules supported in the Superdome 2 enclosure are:

HP ProCurve 6120XG Module	AT064A
HP Integrity 10Gb Pass-Thru Module	AT084A
HP Cisco B22HP Fabric Extender for Integrity (supported as stand-alone only)	AT135A
HP Cisco B22HP Fabric Extender with 16 FET for Integrity (supported as stand-alone only)	AT136A

NOTE: The HP Integrity Cisco B22HP Fabric Extender with 16 FET - (PN AT136A) is packaged with 16 Cisco Fabric Extender Transceivers.

The following cards are currently supported:

Converged Networking

HP Integrity CN1100E PCIe 2P Converged Network Adapter	AT111A
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Networking

HP PCIe 2-port 1000Base-T Card	AD337A
HP PCIe 2-port 1000Base-SX Card	AD338A
HP PCIe 4-port 1000Base-T Gigabit Adapter	AD339A
HP Integrity NC552SFP 2P 10GbE Adapter	AT118A
HP Integrity 10GbE-SR 2p PCIe Adapter	AM225A
HP Integrity 10GbE-LR 2p PCIe Adapter	AM232A
HP Integrity 10GbE-Cu 2p PCIe Adapter	AM233A

Storage

HP PCIe 1-port 8Gb FC SR (Qlogic) HBA	AH400A
HP PCIe 2-port 8Gb FC SR (Qlogic) HBA	AH401A
HP PCIe 1-port 8Gb FC SR (Emulex) HBA	AH402A
HP PCIe 2-port 8Gb FC SR (Emulex) HBA	AH403A
HP PCIe 1p 4Gb FC and 1p 1000BT Adapter	AD221A
HP PCIe 2p 4Gb FC and 2p 1000BT Adapter	AD222A
HP PCIe 2p 4Gb FC and 2p 1000BSX Adapter	AD393A
HP PCIe 2P 8Gb FC & 2P 1/10GbE Adapter	AT094A
HP Integrity PCIe 2p P411/256MB SAS Ctlr	AM311A
HP Integrity PCIe 2p P812/256MB SAS Ctlr	AM312A

Infiniband (Quad Data Rate)

HP Integrity PCIe 4X QDR IB HCA	AT083A
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Configuration

HP Superdome 2 Boot Support

- The HP Storage P2000fc array is the recommended boot solution.
- Up to 12 LFF or 24 SFF SAS HDDs per array (SATA is available but not supported)
- P2000 G3 FC expansion options allow configurations up to 149 HDDs
- P2000 FC G3 product options, HDD and RAID details in P2000 Fc G3 QuickSpec http://h18004.www1.hp.com/products/quickspecs/13551_na/13551_na.HTML

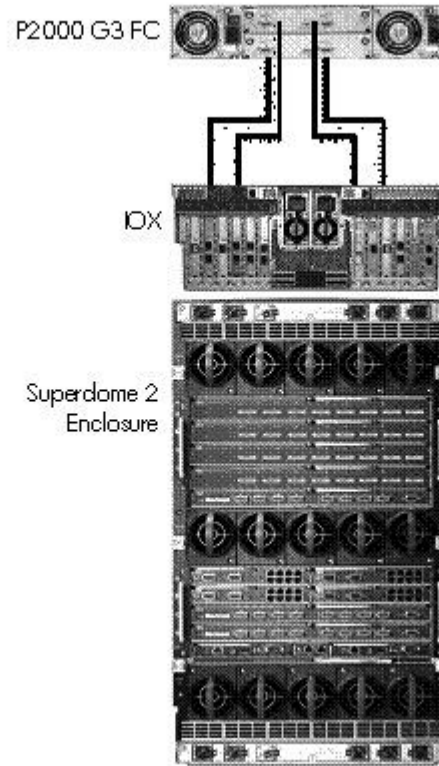
Each partition (nPartition or vPar) requires dedicated boot path(s)

- Minimum of one FC HBA card is required per partition with one channel used for boot. Dual port FC HBA cards may have one port for boot, and second port for data access.
- One dedicated FC HBA port per partition - two dedicated FC HBA ports for Serviceguard
NOTE: The remaining ports on the FC HBA can be used for any other purpose. It is not necessary to reserve an entire FC HBA for just boot.
- Local boot from external SAS storage

Configuration

Local Boot direct attach FC

INFORMATION PERTAINS TO BOOT REQUIREMENTS ONLY

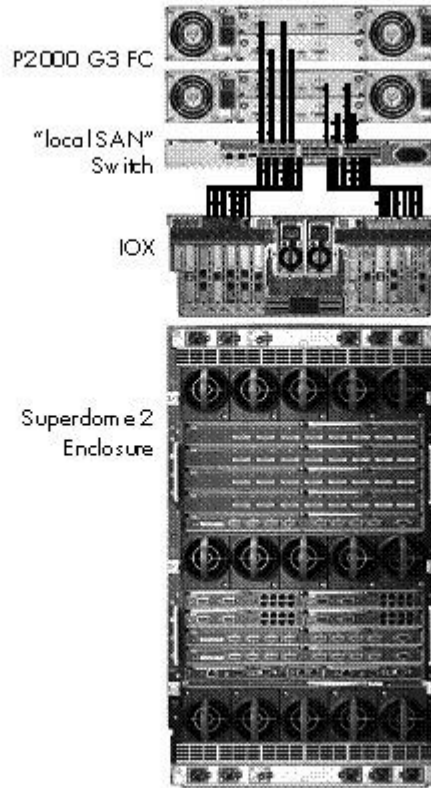


- One P2000 G3 FC can support up to four partitions (nPar or vPar)
 - One P2000 G3 FC array can support up to two (2) dual port array controllers
 - Each controller supports up to two (2) 8GB FC links
- Considerations for local boot
 - Minimum configuration: one P2000 G3 FC
 - One P2000 G3 FC could support up to four partitions
 - Supplies only a single dedicated boot path for each partition
 - Multiple single points of failure
 - P2000 G3 FC firmware upgrades require taking down the partition
- Optimal configuration: one or multiple P2000 G3 FC arrays
 - Configure redundant boot paths to separate controllers
 - P2000 G3 FC firmware upgrades do NOT require taking down SD2
 - One P2000 G3 FC array, with two, dual channel controllers, would support up to two partitions
 - Multiple arrays increases availability
 - Minimize single points of failure

Configuration

Boot From "Local" SAN

INFORMATION PERTAINS TO BOOT REQUIREMENT ONLY



HP Fibre Channel Switch(s)

- HP Storage 8/24 Base SAN Switch (AM868A) is Watson default switch
- 8Gb switches recommended

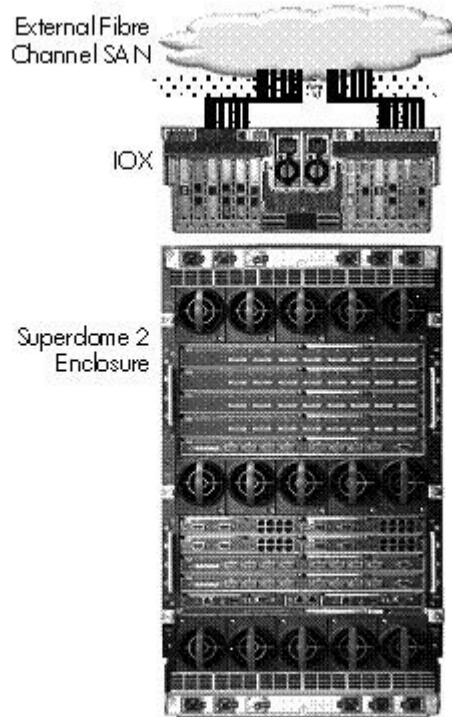
Considerations for "Local" SAN

- Minimum configuration: one P2000 G3 FC and one SAN switch
 - One P2000 G3 FC would support up to sixteen partitions
 - Supplies only a single dedicated bootpath for each partition
 - P2000 G3 FC firmware upgrades require taking down the partition
- Optimal configuration: one or multiple P2000 G3 FC and two SAN switches
 - Configure redundant bootpaths to separate controllers with each boot path routed by different switch
 - P2000 G3 FC and SAN switch firmware updates do NOT require taking down the SD2
 - One P2000 G3 FC array/ two SAN switches would support up to 16 partitions
 - Two P2000 G3 FC arrays/ two SAN switches would support up to 32 partitions

Configuration

Boot From External SAN

INFORMATION PERTAINS TO BOOT REQUIREMENTS ONLY



- SAN Provides essentially unlimited LUNs

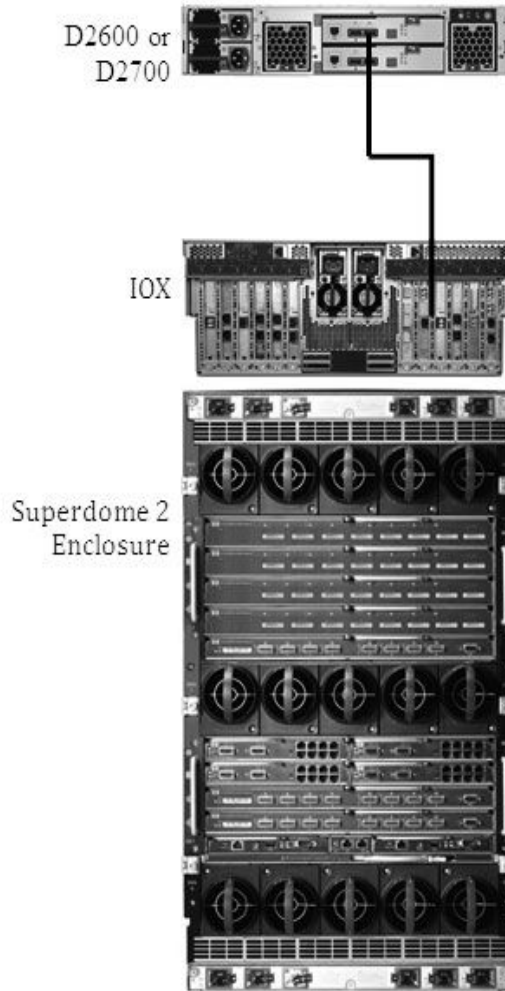
Considerations for SAN boot

- Two hops or less strongly recommended
- Dedicated "local SAN" switch(s) not required
- Redundant paths to SAN/storage recommended for all partitions
 - Allows online updates of switch and array firmware
- No factory installation of operating environment
 - nPar and vPar definition is available and independent of installation of operating system

Configuration

Local Boot From SAS storage - D2x00

INFORMATION PERTAINS TO BOOT REQUIREMENTS ONLY



- One D2x00 can support one partition (nPar or vPar)
 - D2x00 can be cascaded to expand storage
 - Smart Array P411 supports a maximum of 100 drives (25 may be solid state drives in a RAID set separate from mechanical disks)
 - Smart Array P411 can be used as a RAID controller or can be put into "HBA mode" for use with HP-UX disk mirroring used (utility SAUPDATE)
- Considerations for local boot
 - Minimum configuration: one D2x00
 - One D2x00 can support one partition
 - Supplies only a single dedicated boot path for each partition
 - Multiple single points of failure
 - D2x00 firmware upgrades require taking down the partition
 - Dual-domain not supported with Smart Array P411 controller

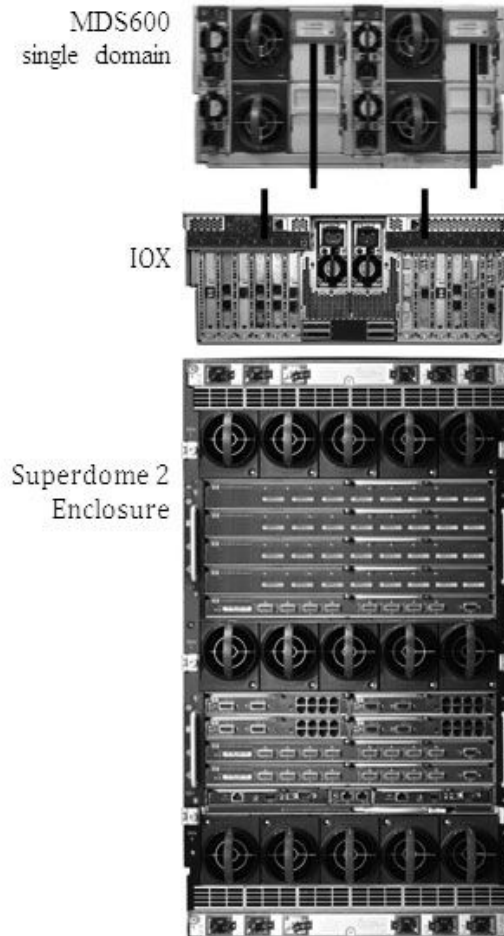
Configuration

- Smart Array P812 not supported in this release
- Serviceguard multi-initiator not supported in this release

Configuration

Local Boot From SAS storage - MDS600

INFORMATION PERTAINS TO BOOT REQUIREMENTS ONLY

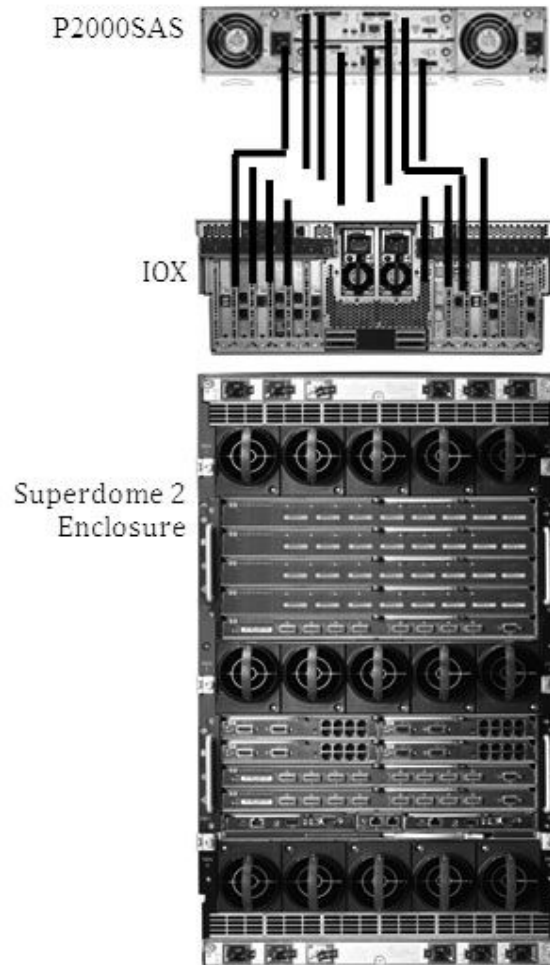


- One MDS600 can support up to two partitions (nPar or vPar)
 - MDS600 is a high density storage array
 - Smart Array P411 can be used as a RAID controller or can be put into "HBA mode" for use with HP-UX disk mirroring used (utility SAUPDATE)
- Considerations for local boot
 - Minimum configuration: one MDS600
 - Dual-domain not supported with Smart Array P411 controller
 - Zoning not supported with MDS600 direct attach to a Smart Array controller in IOX expansion
 - Smart Array P812 not supported with SD2
 - Serviceguard multi-initiator not supported in this release

Configuration

Local Boot From SAS storage - P2000

INFORMATION PERTAINS TO BOOT REQUIREMENTS ONLY



- One P2000 SAS can support up to eight partitions (nPar or vPar), or four partitions with redundant data paths
 - P2000 Arrays are expandable storage systems
 - Smart Array P411 is used in "HBA mode" for use with P2000 arrays
 - Smart Array P411 supports multi-initiator and Serviceguard with P2000 SAS
 - **NOTE:** Supported FW version for P411 is 5.78 and higher. Supported FW version for P2000 TS204 and higher
- Considerations for local boot
 - Minimum configuration: one P2000
 - Dual-domain not supported with Smart Array P411 controller
 - Smart Array P812 not supported with SD2
 - Serviceguard multi-initiator supported mid 2011 for P411, P2000 SAS, and Superdome 2

Configuration

OS & Default Configuration Settings

This section describes OS limitations and default configuration settings

HP-UX Settings

HP-UX 11iv3 will be supported on Superdome 2. HP-UX 11iv2 or early versions will NOT be supported on Superdome 2. Licensing is on a per-socket basis.

HP-UX will support up to 32 sockets, 256 cores and 512 threads up to 4TB of memory per Operation Environment image.

Default HP-UX memory configuration: 87.5% socket local memory, 12.5% interleaved memory.

Default is hyperthreading is turned on.

Hyperthreading with HPVM is not supported. Error messages will be sent if one attempts to set up HPVMs with hyperthreading turned on.

HP recommends that the same percentage of SLM vs. ILM be configured for every blade within an nPartition. Configurations with different percentages of SLM vs. ILM on blades within an nPartition could experience performance anomalies.

HP Instant Capacity (iCAP)

Some customers require the ability to configure their server environment with instant capacity resources (cores/memory). For a complete description of how to configure Instant Capacity, please refer to the following URL:

http://h18000.www1.hp.com/products/quickspecs/11723_na/11723_na.html

Configuring HP Superdome 2 blades (Cores)

Blades will be classified as "Active" or "iCAP". The Superdome 2 CB9000s i2 blades have 8 cores on a single blade (two sockets with four cores per socket). Ordering an active blade will result in 8 cores being activated and licensed. Ordering an iCAP blade provides customers the "right to access" for 8 cores. Customers then have the option to purchase "right to use" (RTU's) which provide the capability to use four cores. The Superdome 2 CB9000s i4 blades have 16 cores on a single blade (two sockets with eight cores per socket). Ordering an active blade will result in 16 cores being activated and licensed. Ordering an iCAP blade provides customers the "right to access" for 16 cores. Customers have the option to purchase "right to use" (RTU's) which provide the capability to use eight cores.

There is an ordering requirement for each nPartition to have either at least one active blade or, if all iCAP blades, one RTU. During deployment, usage rights can be redistributed among the nPartitions, but at least one core must be active in each nPartition. To determine the number HP-UX License to Use (LTU's) required, multiply the number of active blades by 2 and add the number of iCAP enablements (RTU's). Unique product numbers are used to differentiate the speed and activation level for Superdome 2 blades.

Configuring HP Superdome 2 blades (Memory)

Blades can be configured with different memory sizes and memory type (iCAP Memory). iCAP memory is only available on an iCAP blade. Memory on an iCAP blade must be all active or all iCAP. A blade with iCAP memory will not be available for a customer to use and is considered "off" until enablements are purchased. A blade can be configured with up to 8 memory product units (active/iCAP). It is possible to mix both active/iCAP memory within an nPartition. All active memory on an iCAP blade is accessible even if none of the cores on the blade are in use. The customer will need to purchase multiple 4GB enablement SKUs to activate each memory product on the blade with iCAP to activate all of the iCAP memory. Consult the iCAP ordering and configuration guide for more details.

Configuration

iCAP functionality on HP Superdome 2 servers

Usage of iCAP components will be enforced through codewords. Inventory management will be automatic and this iCAP version will be integrated with gWLM for automated workload management. A separate GiCAP Group Manager will also be made available to manage Superdome 2 groups. iCAP components would be turned "off" at the factory at the time of shipping with the factory release of the new iCAP version.

Platform and Partition Management

Superdome 2 delivers partition administration and control and platform management both in easy-to-use graphical management tools and also in a comprehensive and concise command-line interface.

The Superdome 2 Onboard Administrator is a unique OA option specific to the SD2 systems. It is based on HP BladeSystem OA, but adds more memory, more firmware control, and tools uniquely designed for the SD2 platform. The benefit of using the SD2 OA is lowered administration costs along with improved platform and partition management, all within a familiar graphical or command line interface (CLI).

In a major advancement over prior Superdome systems, Superdome 2 has a built-in and always available platform and partition management system. By integrating the management into the server platform, HP ensures that every Superdome 2 comes with the full set of management features, and simplifies the task of integrating Superdome 2 into the data center. At the same time, the rich set of capabilities available through the Onboard Administrator's secure network interface enables data-center-level management tools such as HP Systems Insight Manager (HP SIM) and others to add value at the data-center level.

The purpose of the Superdome 2 management system is to:

- Provide built-in tools to manage hardware and provide mission-critical system availability (inventory, monitor, diagnose, configure, maintain, and self-healing)
- Make it easier for users and applications to manage partitions (create, modify, inventory, start, stop, connect console, and so on)

The new SD2 manageability system provides the most user-friendly Superdome experience yet. The Superdome 2 OA makes managing a Superdome much easier than before by centralizing the control and building the management into the hardware and firmware of the system. It provides the following features:

- Intuitive GUI interface makes it easier for system administrators to navigate the intricacies of Superdome management. GUI status displays update automatically when system status changes (dynamic Web technology).
- CLI for easy scripting and power user convenience
- Console for each nPartition and vPar, simultaneously available from OA GUI or CLI. The Control-A to switch between vPar consoles has been replaced with direct access. vPars behave much more like fine-grained nPars than on previous Superdome platforms.
- Sharable enclosure DVD or remotely connected iLO virtual media can be used to attach a DVD-ROM to nPartitions or vPars.
- HP-SIM for data-center level management support. HP-SIM subscribes to alerts from the SD2 OA.
- Insight software plug-in tools for power management can display power consumption for the entire server or for individual nPartitions.

Onboard Firmware Manager

This is all-new functionality which can scan a partition and report components with incompatible firmware versions. A firmware mismatch can arise through changes in the field that is parts replacements, or partitions which were not upgraded at the same time and then later reconfigured, moving resources around. Partitions with consistent firmware levels in all components run more reliably. Whole partitions, or the entire Superdome 2 system, can have firmware updated to a consistent level with just a click of a button.

Configuration

Onboard Partition Manager

The Onboard Partition Manager is a set of commands built into the SD2 OA GUI and command line to manage partitions. With these new tools, partitions can be fully configured BEFORE they have to be booted (major improvement over older Superdome systems.)

There are three main aspects of partition management:

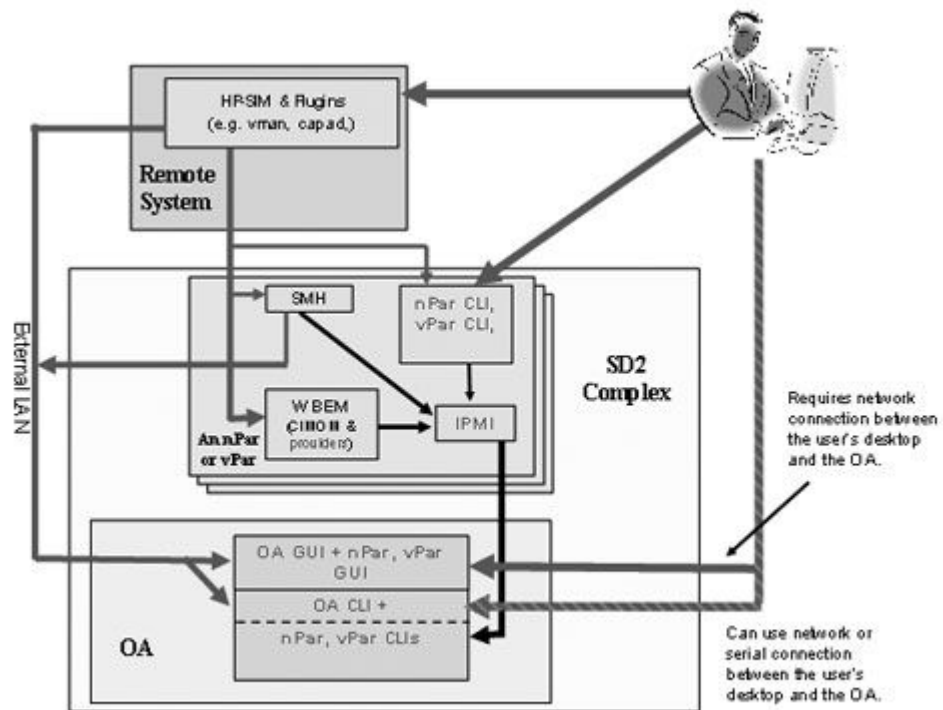
1. Partition configuration and re-configuration
2. Partition start/stop
3. Management of the OS running on the partition

The Onboard Partition Manager focuses on the first two aspects, partition configuration and partition start/stop. The partition management architecture has changed on SD2 systems to adapt to the new hardware and firmware architecture. The core of partition management functionality now resides on the built-in Superdome 2 Onboard Administrator (SD2 OA).

The new OA-based partition management architecture supports a unified nPar and vPar management model based on the fact that partitioning (both nPars and vPars) is now entirely firmware functionality. There are no longer any dependencies on software tools, no need for an external management station or a special partition to run tools. The result is faster, easier, partition configuration and partition start/stop. Both graphical user interface (GUI) and command line interface (CLI) are supported on the OA to manage partitions.

NOTE: On servers prior to Superdome 2, partition configuration management software primarily ran on the system processors on the partition side. Hence, in order to ease the transition to the new management model, legacy partition management command interfaces with minor modifications are still supported from the partition side.

Figure 1: Interacting with SD2 Partition Management



Configuration

Figure 1 depicts the different ways a user can interact with the system to manage partitions. There are primarily three ways users can do partition management on SD2 servers.

1. From the Superdome 2 Onboard Administrator
 - OA GUI for all nPar and many vPar uses
 - OA CLI for all nPar and all vPar commands
2. From the partitions
 - Legacy (SD1 and earlier) partition management command interfaces are still supported from the partition side.
3. From a datacenter management environment such as HP SIM
 - Get health information for the entire SD2 complex and each partition
 - Click down into the SD2 OA to access the SD2 partition management tools

New with SD2 are "ParSpecs" which are away to save, create, and build partitions from resource definitions. ParSpec definitions allow you to have overlapping resources as long as the partitions booted don't all claim the same resources at the same time. One way to use ParSpecs is to create one set for "end of month" jobs, and another set for "daily work". ParSpec commands are built into the OA CLI at first release.

Technical Whitepapers are available for additional information on the new platform and partition management features of Superdome 2:

- HP Superdome 2 Platform Management
- New Features in Superdome 2 Partition Management
- Getting Started with Partitions

See: www.hp.com/go/hpuxvirtualization ("nPartitions" tab)

For customers who need help setting up a virtualized environment for HP Integrity and HP 9000 servers.

HP Installation and Startup Services Suite for HP-UX Virtualization and infrastructure management will provide you with the help you need to set up a virtualized environment for HP Integrity and HP 9000 servers. These services provide all of the deliverables required to install the HP-UX Virtualization and infrastructure management software, and configure physical servers into multiple virtual servers as well as set up the infrastructure management tools that can help you manage this type of virtual environment. HP will conduct a pre-delivery planning session with you to review your specific requirements and make recommendations on the best mix of HP-UX Virtualization and infrastructure management services (within this suite) to address your particular goals. HP will then install and configure the software, perform verification tests, and conduct a knowledge-transfer session with you.

The services within this suite are as follows:

1. HP Startup gWLM Service: Installation of HP-UX Global Workload Manager on the central management server
2. HP Startup vPar or Virtual Machine SVC: Creation of up to two virtual partitions or up to two virtual machines
3. HP Startup Capacity Advisor Service: Installation of Capacity Advisor Tool

HP Startup Insight Dynamic Configuration Mgmt SVC - Installation of Insight Dynamics infrastructure orchestration (IO) tool

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA1-4067ENW.pdf>

HP Startup VSE gWLM w/VM SVC

Upgrades

Scalability is a core part of the Superdome 2 value. Customers can start small and grow their Superdome 2 systems as needed to support changing business needs.

The following basic system configurations are orderable as upgrades:

- SD2-8s to SD2-16s
- SD2-16s to SD2-32s

SD2-8s to SD2-16s Upgrade

- The SD2-8s to SD2-16s upgrade package includes a firmware update, new labels, and the door display kit. The server ID and labels on the SD2-8s system must be updated to AM222A. Installation of the door display and door trim are performed at the customer site. Customers must order Tier 4 OE licenses. A credit is given for Tier 3 OE licenses already purchased. Tier 2 HA/DC-OE + SMS licenses covers SD2-8s and SD2-16s servers. Therefore, no additional licenses are required. Ordering this upgrade triggers a new Care Pack for SD2-16s. Installation services are required for this upgrade (HA113A1#5MG).

SD2-16s to SD2-32s Upgrade

- The SD2-16s to SD2-32s upgrade package includes a firmware update, an additional 16s enclosure, and new labels. The server ID and labels must be updated to AM223A. Installation of the door display and door trim are performed at the customer site. Customers must order Tier 5 OE licenses for their SD2-32 server and will receive credit for their existing Tier 4 OE licenses. If a customer has licenses for the OE Storage Mgmt Suite bundles, then they need to purchase Tier 3 of these bundles for their SD2-32 server and will receive credit for their existing Tier 2 OE Storage Mgmt Suite bundles. Customers must purchase the appropriate Care Pack for the SD2-32 and will receive credit for their existing SD2-16 Care Pack. Care Pack Installation services are required for this upgrade (HA114A1#5RE).

Physical & Environmental Information

This section describes the physical and environmental information.

Physical Information

	Superdome 2	IOX
Site planning and installation included	Yes	Yes
Maximum Heat dissipation (fully populated system)	30,076 BTU/hr / 8820W	1,790 BTU/hr / 525 W
Depth	828 mm / 32.6"	572mm / 22.5"
Width	447 mm / 17.6"	437mm / 17.2"
Height	798 mm / 31.4" (18U)	173mm / 6.8" (4U)
Weight - Minimum (empty chassis with midplane assembly and rear chassis cage)	108 kg / 237 lb (empty chassis with midplane assembly and rear chassis cage)	22.1 kg / 48.7 lb
Weight - Typical (half populated)	254 kg / 559 lb	23.6kg / 51.9 lbs
Weight - Maximum (fully populated)	314 kg / 692 lb	29.5 kg / 65.0 lb
Electrical Characteristics:		
AC input power: 3-phase	2N Dual Power input modules with two 5-wire cords each: IEC309 16A or two 4-wire cords each: NEMA L15-30P 30A. 5 wire: 12.26A per cord. 4wire: 23.3A per cord	N/A
AC input power: Single-Phase	2N Dual Power input modules with 6 Input Receptacles each: IEC-C19, 16/20A.	2N Dual power receptacles, IEC-C14, 10A (1 per power supply)
Maximum Input Current: Single Phase (200V)	13.45A per C19 cord	3.00A per C14 cord
Maximum Input Power total	9,000 VA at PF .98 or greater	535 VA at PF .98 or greater
Cooling airflow	800 CFM min; 1100 CFM@32 deg. C; 1900 CFM max	180 CFM min. 230 CFM max
Environmental Characteristics:		
Acoustics	<= 8.3 bels LwA ^d (Sound Power)	< 7.4 bels LwA ^d (Sound Power)
Temperature - Recommended Operating Range ^{1,2}	+18°C to +27°C	+18°C to +27°C
Temperature - Allowable Operating Range ^{1,2}	+5°C to +40°C	+5°C to +40°C
Maximum rate of temperature change	20°C/hr	20°C/hr
Non operating temperature	-40°C to +80°C	-40°C to +80°C
Air quality	Gaseous contaminants must be at the G1 level or less as defined by ISA Standard ISA-71.04-1985	Gaseous contaminants must be at the G1 level or less as defined by ISA Standard ISA-71.04-1985
Humidity - Recommended Operating Range (non-condensing) ¹	+5.5 °C dew point minimum, 60%RH and +15°C dew point maximum	+5.5 °C dew point minimum, 60% RH and +15°C dew point maximum
Humidity - Allowable Operating Range (non-condensing) ¹	8%RH and -12°C dew point minimum, 85%RH and +24°C dew point maximum	8%RH and -12°C dew point minimum, 85%RH and +24°C dew point maximum
Operating relative humidity	20% to 80% @ 30°C	20% to 80% @ 30°C
Maximum Operating altitude	3050m (10,000 ft)	3050m (10,000 ft)

Physical & Environmental Information

Maximum Non operating altitude	4500m (15,000 ft)	4500m (15,000 ft)
Voltage tolerance range	200-240 VAC	200-240 VAC

The Recommended Operating Range is recommended for continuous operation. Operating within the Allowable Operating Range is supported but may result in a decrease in system performance.

2 All temperature ratings shown are for sea level. An altitude de-rating of 1°C per 300 m above 900 m is applicable. No direct sunlight allowed. Upper operating limit is 3,048 m (10,000 ft).

Environmental Info

Regulatory model numbers:

AH337A (Superdome 2 Enclosure), RMN: FCLSB-1001

AH338A (Superdome 2 IOX), RMN: FCLSB-1002

AH342A (CB900s i2 and i4, aka Superdome 2 server blade), RMN: FCLSB-BB31

Additional Power Data

The maximum power figures given were developed with the maximum configuration running applications designed to draw the maximum power possible. It is highly unlikely that any real-world application will result in this amount of power use for any significant time period.

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