Overview

HPE Integrity Superdome 2

The Ultimate Mission-Critical Platform

HPE Superdome 2 (SD2) is an HPE 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 HPE 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 HPE 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

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

- Support for 8 socket (8s),16 socket (16s), and 32 socket (32s) Superdome 2 servers
- The Intel® Itanium® Processor 9700 series 8c, with up to 32 sockets, provides up to 256 cores of compute power
- 512 DIMM slots with up to 8 TB of 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: iCAP, GiCAP, and TiCAP
- Built-in shared DVD
- Upgrade paths from SD2-8s to SD2-16s and SD2-16 to SD2-32s socket SMP

HPE Integrity Superdome 2

Overview

HPE Superdome 2 enclosure front

HPE Superdome 2 enclosure back

HPE Superdome 2 IOX

HPE Superdome 2 Server Blade (CB900s i6)

Overview

Superdome 2 product family - Maximum Capabilities

	Superdome 2-8s 16s with 8 socket SMP	Superdome 2-16s 16s with 16 socket SMP	Superdome 2-32s 32s with 32 socket SMP
Max	4 max IOX (4U)	8 max IOX (4U)	8 max IOX (4U)
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

NOTE: *w/16 GB DIMMs

Intel Itanium 9700 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 HPE Crossbar Fabric Modules (XFMs).

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 i6). 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 i6). 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 i6 and/or CB900si4) - 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.

Overview

HP-UX 11iv3 Operating Environments and software

The supported operating environment for HPE 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 QuickSpecs at: **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111649**

Service and Support

Warranty

Hewlett Packard Enterprise branded hardware and options qualified for Superdome 2 servers are covered by a global limited warranty and supported by HPE Services and a worldwide network of Hewlett Packard Enterprise Authorized Channel Partners. The Hewlett Packard Enterprise 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 HPE Pointnext operational services or customized service agreements.

Additional information regarding worldwide limited warranty and technical support is available at: **http://h17007.www1.hpe.com/us/en/enterprise/servers/warranty/**

Support Services

HPE Technology Services for Integrity Servers

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to HPE to help prevent problems and solve issues faster. Our support technology lets you to tap into the knowledge of millions of devices and thousands of experts to stay informed and in control, anywhere, any time.

Protect your business beyond warranty with HPE Pointnext operational services

HPE Pointnext operational services enable you to order the right service level, length of coverage and response time as you purchase your new server, giving you full entitlement for the term you select.

Recommended HPE Pointnext operational services for optimal satisfaction with Superdome 2:

Optimized Care

HPE Proactive Care Advanced – Call to Repair, three year HPE PointNext Service

Achieve a higher return on your product investment with the personal attention from a locally assigned Account Support Manager who delivers recommendations designed to improve availability and performance. Leverage your system's ability to connect to HPE for automated problem detection and rapid critical event management to increase stability and reduce unplanned downtime. This recommendation provides a local customer engineer for onsite hardware repair if required within 6 hours and two-hour callback for supported software. Collaborative call management comes with Proactive Care Advanced or you may choose full support from HPE where we own all cases through to resolution.
https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA5-3259ENW&cc=us&lc=en

Standard Care

HPE Proactive Care Advanced - 24x7 coverage, three year PointNext Service

Achieve a higher return on your product investment with the personal attention from a locally assigned Account Support Manager who delivers recommendations designed to improve availability and performance. Leverage your system's ability to connect to HPE for automated problem detection and rapid critical event management to increase stability and reduce unplanned downtime. This recommendation provides 24x7 coverage with four-hour response for hardware and two-hour callback for supported software. Collaborative call management comes with Proactive Care Advanced or you may choose full support from HPE where we own all cases through to resolution.
https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA5-3259ENW&cc=us&lc=en

Related Services

HPE Datacenter Care service

HPE Datacenter Care helps you improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services "building blocks." You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with

Service and Support

HPE via a single point of accountability for HPE and others' products. For more information, visit **http://www.hpe.com/services/datacentercare**

HPE Server Hardware Installation

Provides for the basic hardware installation of Hewlett Packard Enterprise branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.
http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf

Factory Express for Servers and storage

HPE Factory Express offers configuration, customization, integration and deployment services for Hewlett Packard Enterprise servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed. For more information on Factory Express services for your specific server model please contact your sales representative or go to: **https://www.hpe.com/us/en/services/factory-express.html**.

Data Privacy Services

Protect your data through better media management. HPE Data privacy services help manage and protect sensitive data to reduce the risk of unauthorized access to private information and help meet compliance requirements. Our retention services allow you to keep drives and other devices upon failure, our removal services provide convenient data sanitization and our recovery services allow you to safely retire IT assets and capture any remaining value from the hardware. **https://www.hpe.com/us/en/storage/data-protection-solutions.html**.

Additional HPE Pointnext operational services can be found at: **http://www.hpe.com/info/cpc**

eSupport

Get connected to HPE to improve your support experience

Prevent problems with innovative, automated monitoring tools and proactive services. Combining Proactive Care Services with our remote support technology such as Insight Online provides you with expert advice and personalized, cloud-based automated IT support, helping to prevent unplanned down time and solve problems quickly. For more information, visit: **http://www.hpe.com/info/insightonline**

HPE Support Center

Personalized online support portal with access to information, tools and experts to support Hewlett Packard Enterprise business products. Submit support cases online, chat with Hewlett Packard Enterprise experts, access support resources or collaborate with peers. Learn more **https://support.hpe.com/hpesc/public/home**

The HPE Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.

HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE PointNext or Hewlett Packard Enterprise contractual support agreement.
NOTE: *The Hewlett Packard Enterprise Support Center Mobile App is subject to local availability

Parts and Materials

Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

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Service and Support

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The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

Standard Features

HPE Superdome 2 Server Blade (CB900s i6) (CB900s i4)	**Processors**	The Superdome 2 CB900s i6 server blade is populated with two processors Intel® Itanium® Processor 9760 8c Intel® Itanium® Processor 9740 8c The Superdome 2 CB900s i4 server blade is populated with two processors Intel® Itanium® Processor 9560 8c Intel® Itanium® Processor 9540 8c
	Chipset	HPE sx3000
	Upgradability and scalability	Superdome 2 is scalable from 8 socket configurations to 32 socket configurations
	Cache Memory	For Intel® Itanium® Processor 9760/9560 and 9740/9540 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 (9740, 9540) L3 cache 32 MB per socket shared by 8 cores (9760, 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 i6 blades.
	Memory type Registered	8 GB Single Rank PC3L-12800R DDR3 ECC memory registered DIMMS for CB900s i6 and CB900s i4. 16 GB Dual Rank PC3L-12800R DDR3 ECC memory registered DIMMS for CB900s i6 and CB900s i4.
	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
	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

Standard Features

Capacity on Demand	iCAP, TiCAP, GiCAP	
Form factor	SD2-8s	18U Enclosure 4U IOX Enclosure HPE SD2 G2 42U 600x1200 Enterprise Shock Rack with standard rack door
	SD2-16s	18U Enclosure 4U IOX Enclosure HPE SD2 G2 42U 600x1200 Enterprise Shock Rack with the Superdome 2 door and active status display
	SD2-32s	Two 18U Enclosures in single HPE SD2 G2 42U 600x1200 Enterprise Shock Rack with the Superdome 2 door and active status display 4U IOX Enclosures in a separate HPE 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: HPE Superdome 2 Enclosure and HPE Superdome I/O Expansion Enclosure (IOX).

HPE 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 HPE SD2 G2 42U 600x1200 Enterprise Shock 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

	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

Configuration

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 HPE 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 HPE 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
4. A Superdome 2 blade or filler blade (HPE CAMnet Completer module aka CCM) must be in slot 1 of enclosure 2 (for SD2-32s).
5. A Superdome 2 blade or filler blade (HPE CAMnet Completer module) must be in slot 2 or 3 of enclosures 1and 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

Configuration

HPE 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).

HPE 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 (XFMs)
- 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 HPE SD2 G2 42U 600x1200 Enterprise Shock 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 i4 or CB900s i6) 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 (XFMs)
- 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

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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 HPE SD2 G2 42U 600x1200 Enterprise Shock Rack. The SD2-16s may be 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.

Configuration

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

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

Configuration

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.

Superdome 2 - 32s

32s Configuration Rules

The SD2-32s consists of two 16 socket compute enclosures cabled together. At least one IOX is mandatory. The two compute enclosures must be within the same rack.

Any blade and any IOX/IO bay can be assigned to any nPartition.

- Blades can be ordered in single or multiple quantities. A minimum of one Superdome 2 blade must be ordered with a SD2-32s system and populated in enclosure 1, slot 1. If only 1 Superdome 2 blade is ordered, a CCM must be populated in slot 2 of the first enclosure for CAMnet topology redundancy and CCMs must be populated in slots 1 and 2 in the second enclosure. The CCMs are automatically included in the enclosure when there are less than two compute blades.
- Each blade must have both processor modules populated.
- A SD2-32s system contains four XFMs populated in slots X1, X2, X3 & X4 in each compute enclosure for a total of eight XFMs.
- A SD2-32s must have two OAs in each compute enclosure for a total of four OAs per complex.
- Two GPSMs per compute enclosure are included for a total of four per SD2-32s complex.
- There are 1-phase and 3-phase power distribution options. Only the 2N option is available for the SD2-32s.
- Up to eight IOXs may be ordered independently to provide additional IO capability for the SD2-32s.

The OAs in enclosure #1 are the master and failover OAs for the system.

- The configuration guidelines direct partitions to be loaded such that the blades are fairly "balanced" across the two enclosures. IOXs are ordered with the partitions of each enclosure as I/O Bays. IOXs are assigned at a partition level such that latency between the nPartition compute resources and I/O resources is minimized. A rule was created to maximize performance but can be "overridden".

32s Racking Choices

Each compute enclosure is 18U high and can be racked in a HPE SD2 G2 42U 600x1200 Enterprise Shock Rack. The two compute enclosures must be in the same rack. Hewlett Packard Enterprise will not support field racking SD2-32s systems. The assumption is that enclosure loading starts at the bottom of the rack. It is recommended that 2U is left at the bottom of the 42U rack to provide PDU and cabling exit space.

Complexes that consist of multiple racks must be fully adjacent to each other, i.e. no space between the two racks. Cabling from the compute enclosure to the IOXs goes through the side (not down through the floor). Going through the floor would require longer cables, which are not supported. Racks for systems in multiple racks must be the same height, width, and depth.
NOTE: The TFT7600 rack mountable display is not supported on SD2.

32s Partitioning Choices

A SD2-32s complex may be partitioned into many different mixes of nPartitions. The configurations recommended herein allow the customer to partition their SD2-32s system 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).

These are the configurations as they will be shipped from CTO. The partition table should be used as a guideline when creating new partitions. After the creation of two partitions using the table, it is possible that remaining partitions would not appear in the table. Other configurations are legal and supported, but will not have had as extensive testing done on them, may not have the best performance, or may not allow as much flexibility for future upgrades. As an example, it is legal for a two blade partition to be populated in slots 1 & 2 vs. 1 & 3. Extra care should be taken to design partitions such that spanning of enclosures is kept to a minimum.

Configuration

SD2-32s partition loading

Size	ENCLOSURE 1								ENCLOSURE 2							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	1	3	5	7	9	11	13	15	2	4	6	8	10	12	14	16
2P	1	3	1	3	5	7	5	7	2	4	2	4	6	8	6	8
2A	11	11	15	15	13	13	9	9	12	12	16	16	14	14	10	10
2A				17				17				18				18
3P	1	3	1	3	1	3			2	4	2	4	2	4		
3A	5	5	5		7	7	7		6	6	6		8	8	8	
3A				9		9		9				10		10		10
4P	1	3	1	3	1	3	1	3	2	4	2	4	2	4	2	4
4A	5	5	5	5	7	7	7	7	6	6	6	6	8	8	8	8
5P	1	1	1		1		1		2	2	2		2		2	
5A	3	3	3	3	3				4	4	4	4	4			
6P	1	1	1	1	1		1		2	2	2	2	2		2	
6A	3	3	3	3	3	3			4	4	4	4	4	4		
7	1	1	1	1	1	1	1		2	2	2	2	2	2	2	
8	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
9	1	1	1	1	1	1	1	1	1							
10P	1	1	1	1	1	1	1	1	1		1					
10A	2	2	2	2	2	2	2	2	2	2						
11P	1	1	1	1	1	1	1	1	1		1		1			
11A	2	2	2	2	2	2	2	2	2	2	2					
12P	1	1	1	1	1	1	1	1	1		1		1		1	
12A	2	2	2	2	2	2	2	2	2	2	2	2				
13P	1	1	1	1	1	1	1	1	1	1	1		1		1	
13A	2	2	2	2	2	2	2	2	2	2	2	2	2			
14P	1	1	1	1	1	1	1	1	1	1	1	1	1		1	
14A	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

IOX bays are assigned at a nPartition level. For multi-enclosure systems, the assignment of IOXs is done such that latency between the nPartition compute resources and IO resources is minimized. Therefore, IOX configurations cannot be limited to require that the IOX are always loaded in the same order: IOX5, IOX6, IOX7, IOX8, IOX9, IOX10, IOX11, and IOX12. It is very dependent on the number and size of nPartitions ordered.

For partitions larger than 8 blades, IOXs would be loaded in the following order:
9 blade nPartition: IOX5, IOX6, IOX7, IOX9, IOX8, IOX10, IOX11, IOX12
10 blade nPartition: IOX5, IOX6, IOX7, IOX9, IOX8, IOX10, IOX11, IOX12
11 blade nPartition: IOX5, IOX6, IOX9, IOX7, IOX8, IOX10, IOX11, IOX12
12 blade nPartition: IOX5, IOX6, IOX9, IOX7, IOX8, IOX10, IOX11, IOX12
13 blade nPartition: IOX5, IOX9, IOX6, IOX7, IOX10, IOX8, IOX11, IOX12
14 blade nPartition: IOX5, IOX9, IOX6, IOX10, IOX7, IOX8, IOX11, IOX12
15 blade nPartition: IOX5, IOX9, IOX6, IOX10, IOX7, IOX11, IOX8, IOX12
16 blade nPartition: IOX5, IOX9, IOX6, IOX10, IOX7, IOX11, IOX8, IOX12

NOTE: The rules are above were constructed to meet "most" conditions and provide future flexibility. They can be overridden if desired.

Configuration

Power Distribution Options

The Superdome 2 compute enclosure power supply is an 80 PLUS Platinum Rated 2400W supply.
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. 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
  - 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
  - In the HPE Superdome 2 enclosure back photo you see 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)
  - A total of 4 cords are necessary to power the 12 power supplies in the Superdome 2 compute enclosure.
  - In the HPE Superdome 2 enclosure back photo you see 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

Configuration

connections on the IOX are IEC 60320 C14.

HPE Power Advisor

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

Available at: **https://www.hpe.com/in/en/integrated-systems/rack-power-cooling.html**

HPE Superdome2 Server Blades

HPE Superdome 2 CB900s i6 Itanium 9760 (2.67GHz/16-core/32MB/170W) Cell Blade	AT121B
HPE Superdome 2 CB900s i6 Itanium 9740 (2.13GHz/16-core/24MB/170W) Cell Blade	AT122B
HPE Superdome 2 CB900s i4 Itanium 9560 16-core Cell Blade	AT121A
HPE Superdome 2 CB900s i4 Itanium 9540 16-core Cell Blade	AT122A

HPE Superdome 2 CPU / CPU module Support

Superdome 2 CB900s i6 blades include the Intel Itanium Processor 9700 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:

Processor

Superdome 2 supported CPU Matrix

		Intel® Itanium® Processor 9500 and 9700 Series					
Processor	**# of cores per processor**	**Frequency**	**L1 CPU cache**	**L2 CPU cache**	**L3 CPU cache**	**L4 chipset cache**	**Power**
Intel Itanium Processor 9740	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 9760	8c	2.66 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

Intel® Itanium® Processor 9500 Series

Processor	**# of cores per processor**	**Frequency**	**L1 CPU cache**	**L2 CPU cache**	**L3 CPU cache**	**L4 chipset cache**	**Power**
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

Configuration

- Mixing of processors with different frequencies and/or cache sizes will be NOT allowed within a nPartition
- Mixing of CB900s i2, CB900s i4 and CB900s i6 blades within a complex is allowed; however, mixing of blade types within a nPartition is not supported.

HPE 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 Memory modules are supported on CB900s i6 and CB900s i4 blades:

HPE CB900s 32GB (4x8GB) Single Rank PC3L-12800 (DDR3-1600) Registered CAS-11 Memory Module	AT127B
HPE CB900s 64GB (4x16GB) Dual Rank PC3L-12800 (DDR3-1600) Registered CAS-11 Memory Module	AT128A

Only DIMMs that Hewlett Packard Enterprise 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.

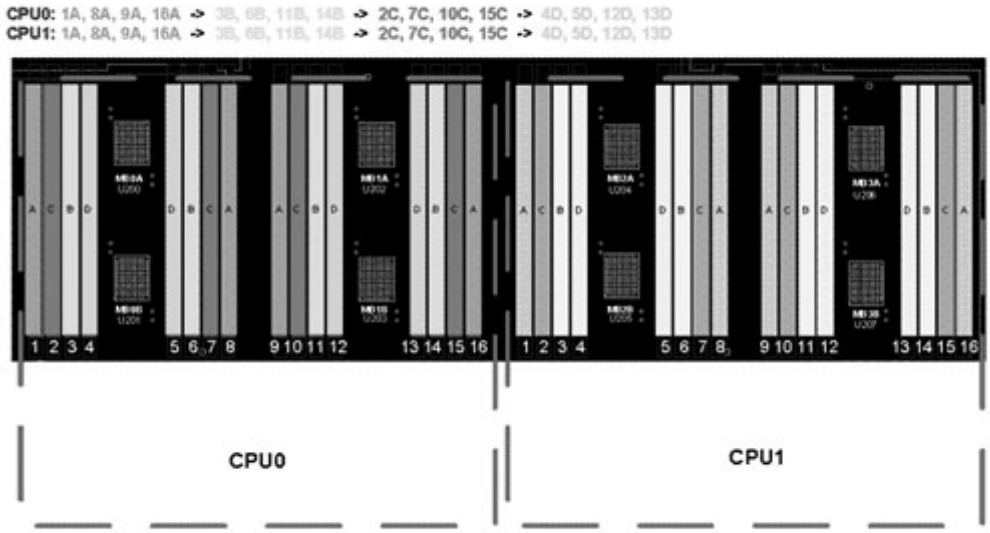
General memory configuration rules:

- For best performance it is recommended to use the 16GB DIMMs
- 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



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 different DIMM sizes (eg. AT127B and AT128A) or densities (eg. AT127A and AT127B) within the same blade is not supported at this time.
NOTE: However individual Blades may have DIMMs of different sizes or densities (eg. one Blade can have all 8GB DIMMs while another Blade can have all 16GB DIMMs)
NOTE: 8GB and 16GB LV DIMMs are supported on CB900s i6 blades.

Recommended Configurations per Superdome 2 i4 or i6 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 and i6 DIMM configurations shipped from the factory

HPE Superdome 2 Storage Support

For HPE Storage solutions, please see:
http://www.hpe.com/storage/spock

HPE 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:

HPE 6125XLG Ethernet Blade Switch	711307-B21
HPE Cisco B22HP Fabric Extender for BladeSystem c-Class	641146-B21
HPE Cisco B22HP Fabric Extender with 16 FET for BladeSystem c-Class	657787-B21
HPE 10GbE Pass-Thru Module II	854194-B21
HPE BLc 10GbE Pass Thru Mod Opt Kit	538113-B21

NOTE: The HPE Integrity Cisco B22HP Fabric Extender with 16 FET - (PN 657787-B21) is packaged with 16 Cisco Fabric Extender Transceivers.

HPE Networking Options

The following cards are currently supported:

Converged Networking

HPE Integrity CN1100E Dual Port Converged Network Adapter	AT111A

Networking

HPE PCIe 2-port 1000Base-T LAN Adapter	AD337A
HPE PCIe 2-port 1000Base-SX LAN Adapter	AD338A
HPE Integrity PCIe 2-port 10GbE-SR Fabric Adapter	AM225A

Configuration

HPE Integrity PCIe 2-port 10GbE-LR Fabric Adapter	AM232A
HPE Integrity PCIe 2-port 10GbE-CR Copper Adapter	AM233A
HPE Ethernet 10Gb 2-port 561T Adapter for Integrity Servers	B9F25A

Storage

HPE Integrity SN1000Q 1-port 16Gb Fibre Channel Host Bus Adapter	B9F23A
HPE Integrity SN1000Q 2-port 16Gb Fibre Channel Host Bus Adapter	B9F24A
HPE Integrity Smart Array P411/256 2-port External PCIe 6Gb SAS Controller	AM311A
HPE Integrity Smart Array P812/1GB PCIe SAS Controller	AM312A

Infiniband (Quad Data Rate)

HPE Integrity PCIe 2-port 4X QDR Infiniband Host Channel Adapter	AT083A

PCIe Workload Accelerator

HPE 750GB PCIe x4 Lanes Write Intensive HHHL 3yr Wty Digitally Signed Firmware Card	878038-B21

NOTE: 878038-B21 is supported only SD2 i6 servers.
NOTE: Maximum of eight (8) cards are supported

HPE Superdome 2 Boot Support

Boot From "Local" SAN

NOTE: Information pertains to boot requirement only.

HPE Fibre Channel Switch(s)

- HPE 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 boot-path 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 boot-paths 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

Boot From External SAN

NOTE: Information pertains to boot requirement 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

Local Boot From SAS storage - D2x00

NOTE: Information pertains to boot requirement only.

- One D2x00 can support one partition (nPar or vPar)
  - D2x00 can be cascaded to expand storage

Configuration

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

Local Boot From SAS storage - MDS600

NOTE: Information pertains to boot requirement 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

Local Boot From SAS storage - P2000

NOTE: Information pertains to boot requirement 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 8TB 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.

Hewlett Packard Enterprise 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.

HPE 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:
https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04123435

HPE Superdome2 iCAP Blades (RTA / RTU)	HPE Superdome 2 CB900s i6 Itanium 9760 (2.67GHz/16-core/32MB/170W) iCAP RTA Cell Blade	AT123B
	HPE Superdome 2 CB900s i6 Itanium 9740 (2.13GHz/16-core/24MB/170W) iCAP RTA Cell Blade	AT124B
	HPE Superdome 2 CB900s i4 Itanium 9560 16-core iCAP Cell Blade	AT123A
	HPE Superdome 2 CB900s i4 Itanium 9540 16-core iCAP Cell Blade	AT124A
	HPE Superdome 2 CB900s i6 Itanium 9740 2.13GHz 24MB iCAP RTU Cell Blade	AT125B
	HPE Superdome 2 CB900s i6 Itanium 9760 2.67GHz 32MB iCAP RTU Cell Blade	AT126B
	HPE Superdome 2 CB900s i4 Itanium 9540 Cell Blade CPU Activation RTU	AT125A
	HPE Superdome 2 CB900s i4 Itanium 9560 Cell Blade CPU Activation RTU	AT126A

Configuring HPE Superdome 2 blades (Cores)

Blades will be classified as "Active" or "iCAP". The Superdome 2 CB9000s i6 and 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" (RTA's) 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 HPE 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

Configuration

	the blade with iCAP to activate all of the iCAP memory. Consult the ICAP ordering and configuration guide for more details.
iCAP functionality on HPE 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 HPE 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, Hewlett Packard Enterprise 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 HPE Systems Insight Manager (HPE 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.
- HPE-SIM for data-center level management support. HPE-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.

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 HPE 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 do not 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:

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

See: **https://www.hpe.com/info/hpuxvirtualization** ("nPartitions" tab)

HPE Startup VSE gWLM w/VM SVC

For customers who need help setting up a virtualized environment for HPE Integrity and HPE 9000 servers.
HPE 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 HPE Integrity and HPE 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. Hewlett Packard Enterprise will conduct a pre-delivery planning session with you to review your specific requirements

Configuration

and make recommendations on the best mix of HP-UX Virtualization and infrastructure management services (within this suite) to address your particular goals. Hewlett Packard Enterprise 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:

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

HPE Startup Insight Dynamic Configuration Mgmt SVC - Installation of Insight Dynamics infrastructure orchestration (IO) tool
https://www.hpe.com/h20195/v2/getpdf.aspx/4aa1-4067enw.pdf

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 PointNext 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 PointNext for the SD2-32 and will receive credit for their existing SD2-16 PointNext. PointNext 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	**Superdome 2**	**IOX**
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	**Superdome 2**	**IOX**
Acoustics	<= 8.3 bels LwA^d (Sound Power)	< 7.4 bels LwA^d (Sound Power)
Temperature - Recommended Operating Range1,2	+18°C to +27°C	+18°C to +27°C
Temperature - Allowable Operating Range1,2	+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)
Maximum Non operating altitude	4500m (15,000 ft)	4500m (15,000 ft)
Voltage tolerance range	200-240 VAC	200-240 VAC

Physical & Environmental Information

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 AH352A (CB900s i2, i4, and i6), 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.

Summary of Changes

Date	Version History	Action	Description of Change
01-Oct-2018	Version 27	Changed	Configuration section was updated.
		Added	SKUs added in Configuration section: 854194-B21, 538113-B21.
02-July-2018	Version 26	Added	SKU added in Configuration section: 878038-B21.
05-Mar-2018	Version 25	Changed	Changed the note for DIMM size/density compatibility on same Blade.
		Removed	PCIe Workload Accelerator: 803197-B21 and 803195-B21. were removed.
04-Dec-2017	Version 24	Changed	Overview, Standard Features, and Configuration sections were updated.
23-Oct-2017	Version 23	Changed	Care Pack naming and Service and Support- Parts and Materials updated.
25-Sep-2017	Version 22	Changed	Configuration section was updated.
		Added	SKUs added in Configuration section: 641146-B21, 657787-B21.
		Removed	SKUs deleted in Configuration section: AT135A, AT136A.
14-Aug-2017	Version 21	Added	SKUs added in Configuration section: 803197-B21, 803195-B21, AT123B, AT124B, AT123A, AT124A, AT125B, AT126B, AT125A, AT126A, AT127B, AT128A.
07-Aug-2017	Version 20	Added	SKUs added in Configuration section: 803197-B21, 803195-B21, AT123B, AT124B, AT123A, AT124A, AT125B, AT126B, AT125A, AT126A, AT127B, AT128A.
11-Jul-2017	Version 19	Changed	Configuration section was updated.
		Added	SKUs added in Configuration section: AD337A, AD338A, AD339A.
05-Jun-2017	Version 18	Changed	Overview, Standard Features, Configuration, and Physical & Environment Information sections were updated.
		Removed	Obsolete SKUs were deleted: AD337A, AD338A, AD339A, AT118A, AH400A, AH401A, AH402A, AH403A, AD221A, AD222A, AD393A.
27-Mar-2017	Version 17	Added	Overview, Standard Features, and Configuration sections were updated.
26-Oct-2016	Version 16	Changed	Rebranding edition. Revisions were made throughout the QuickSpecs.
10-Jul-2015	Version 15	Added	SKU added in Ordering and Configuration section: B9F25A
		Changed	Information in Standard Features section was updated.
05-Dec-2014	Version 14	Changed	Standard Features, Support Services, Configuration Information - Factory Integrated Models, Core Options and Memory sections were updated
		Added	SKU Added on HP Superdome 2 Interconnect Module Support: 711307-B21
13-Mar-2014	Version 13	Changed	Power Distribution Options and HP Superdome 2 Interconnect Module Support were revised.
30-Sep-2013	Version 12	Added	HP Integrity SN1000Q 1p 16GB FC HBA was added to Configuration.
19-Aug-2013	Version 11	Changed	Updated the Superdome 2 product family image Changes made to the Cache Memory section in the HP Superdome 2 Server Blade section of Standard Features. Changes made to the HP Superdome 2 Memory Support section of Configuration. Changes made to the OS & Default Configuration Settings section.
03-Jul-2013	Version 10	Changed	Physical and environmental information: Update made in the Physical Information section.
13-May-2013	Version 9	Changed	Standard Features: Update Form factor section-SD2-8s, SD2-16s and SD2-32s.

Summary of Changes

			Configuration Information: Updated HP Superdome 2 Enclosure, Superdome 2 Hardware Configuration, 8s Racking Choices, 16s Racking Choices, and 32s Racking Choices sections. Physical and environmental information: Updated temperature information in the Physical Information section.
04-Dec-2012	Version 8	Changed	Revisions were made throughout Standard Features, Configuration and Upgrades.
28-Mar-2012	Version 7	Changed	Revisions were made throughout Standard Features, Configuration and Upgrades.
18-Nov-2011	Version 6	Changed	Revisions were made throughout Standard Features, Configuration and Upgrades.
18-Aug-2011	Version 5	Changed	Changes made throughout the QuickSpecs.
06-Apr-2011	Version 4	Changed	Superdome 2 Storage Support was revised and AM311A HP Integrity PCIe 2p P411/256 MB SAS Ctlr was added to Superdome 2 IOX Card Support.
09-Feb-2011	Version 3	Changed	Changes made throughout the QuickSpecs.
20-Dec-2010	Version 2	Changed	Changes made throughout the QuickSpecs.
01-Sep-2010	Version 1	New	Initial version..

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