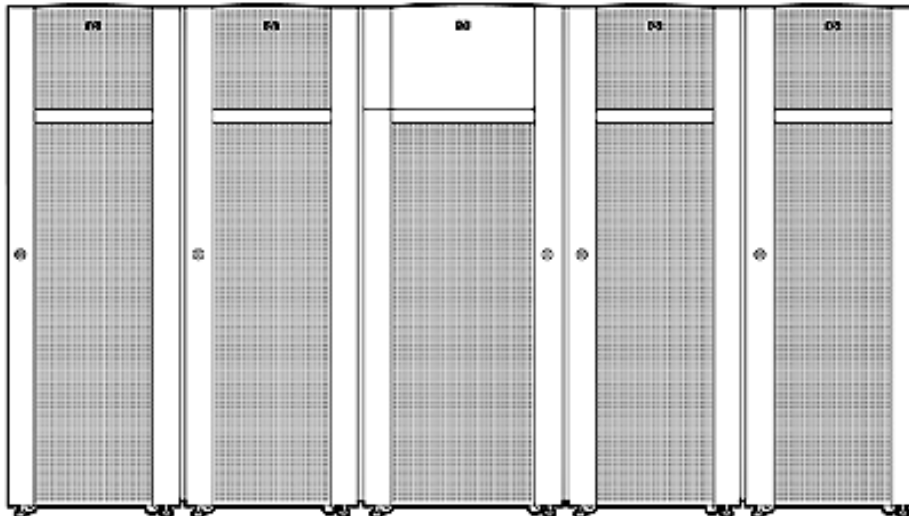


### Overview

The HP XP24000/XP20000 Disk Arrays are large enterprise-class storage systems designed for organizations that simply cannot afford any downtime or tolerate any data loss. The XP mitigates the risk of business downtime by providing a bulletproof platform with complete hardware redundancies, hot-swappable components, and non-disruptive online upgrades. Data replication and tightly integrated clustering solutions, along with disaster recovery support, enable a multi-site disaster tolerant design to achieve complete business continuity. And with enhanced data protection and security features, you can decrease exposure to data loss.

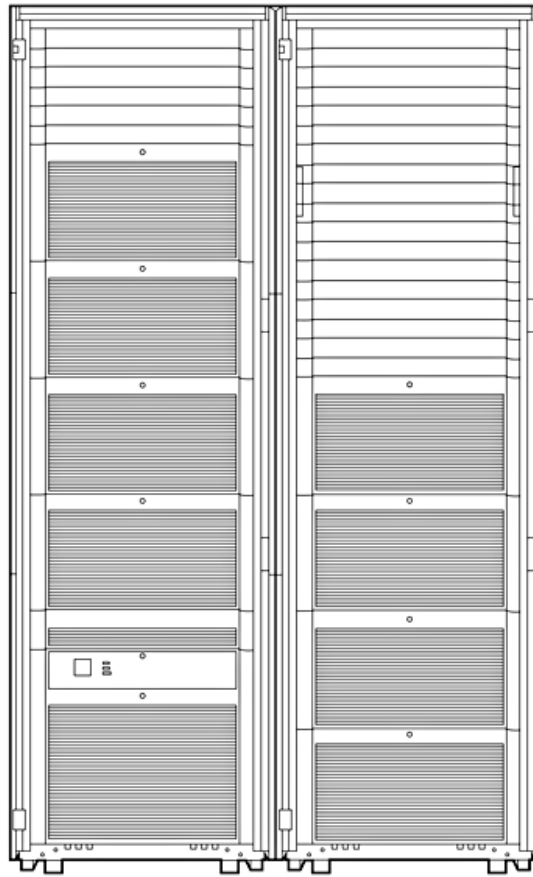
The XP24000 and XP20000 also decrease the costs and complexities of data management with a broad portfolio of software. Through thin provisioning, organizations can reduce power and cooling costs by supplying storage capacity to applications from a virtualized pool and reducing unused storage that consumes power, requires cooling, and takes up space. As a virtualization platform, the XP enables important functions such as heterogeneous data migration, array repurposing, and storage tiers. The XP also eliminates contention for valuable storage resources through array partitioning. Partitioning enhances the success of storage consolidation efforts by assigning array resources to certain applications and administrators. And by consolidating multiple hosts running diverse operating systems to an XP, you can reduce the time it takes to manage diverse environments and simplify the implementation of backups and disaster recovery solutions.

Additionally, with thin provisioning automatically allocating resources when needed and the XP's ability to scale seamlessly, you'll be able to accelerate the growth of your business. With an XP disk array, you can feel confident that the business information your people need is available to them-wherever and whenever they need it.



**HP XP24000 Disk Array**

### Overview



**HP XP20000 Disk Array**

### What's New

Functionality Element	XP24000/XP20000
8 Gbps Channel Adaptors (CHAs)	These new 8 Gbps CHA double the speed of communication between the hosts or servers and the XP.
400 GB Solid State Disk Drives (SSDs)	Introduction of larger capacity Solid State Disk Drive for applications that demand extremely high I/O performance.
2 TB 7.2K rpm Disk Drives	Support for a 2 TB 7.2K rpm disk drive that fits into any existing XP disk drive slot. These lower tier drives offer a higher capacity/lower cost per gigabyte and an energy savings option compared to the 10k/15k disk drives.
600 GB 15K rpm Disk Drives	A 600 GB 15K rpm Disk Drive for larger capacity/higher performance drive option.

### Overview

#### Key Features and Benefits

HP XP24000/XP20000 Disk Arrays are uncompromising storage solutions designed for organizations who demand constant data availability. With the XP's ability to allocate capacity when needed, virtualize a variety of disk arrays, partition storage resources, and connect to many hosts, IT managers can now consolidate their data centers and operate them more efficiently. Combined with HP's disaster proof solutions, the XP disk arrays provide unflinching data protection when needed most.

#### Mitigate business risk with constant data availability

##### **BULLETPROOF DESIGN**    **Boot the XP24000/XP20000 once and never worry about it going down**

When operating a business that demands constant uptime, the risk of data loss or downtime is always at the forefront. That risk is mitigated with the XP24000/XP20000. All components are redundant, hot-swappable, and can be upgraded online, including: disk drives, processors, I/O interfaces, power supplies, batteries, fans, and control processors, to provide extreme reliability and availability. Additionally, the XP24000/XP20000 can upgrade firmware one microprocessor at a time, so no downtime is experienced.

Redundant data paths ensure that there is no single point-of-failure, minimizing the likelihood of unplanned shutdown. If one of the two data paths fails, the other path takes over automatically. You are then alerted to the problem, and can fix it quickly with a minimum of stress because the data is still accessible while the problem is being addressed.

##### **DISASTER PROOF SOLUTIONS**

##### **Configurations that provide continuous access to your data despite disaster**

After the August 2003 Northeastern North America blackouts, 93% of the companies that lost their data center for more than ten days filed for bankruptcy within a year.<sup>1</sup>

If you experience a large-scale disaster, you need to not only have high levels of data protection but also business continuance. Maintaining operations in times of crisis can mean the difference between the continued success of business and its failure. In addition to the protection built-in to the XP24000/XP20000, HP offers various products and solutions around the XP24000/XP20000 for your ultimate protection.

**HP XP Continuous Access Software** provides reliable array-to-array replication for the most demanding requirements. The remote replication capability provided by XP Continuous Access provides assurance that even if access to a site is lost, the business can continue operations by using the storage systems and data located at another site. Replication solutions, such as XP Continuous Access Journal, can save money on telecommunication costs and improve availability. XP Continuous Journal allows the link between sites to be sized for the average I/O rate rather than for the peak I/O rate, resulting in large telecommunication cost savings.

**HP XP Cluster Extension** clustering solutions allow remote replication to be tightly integrated with high availability server clustering to provide true multi-site server/storage disaster recovery. XP Cluster Extension with the XP24000/XP20000 offers disaster tolerance against application downtime from fault, failure, or site disaster by extending clusters between data centers. It resurrects your critical applications at a remote site within minutes after an event. XP Cluster Extension works seamlessly with your open-system clustering software, XP Continuous Access and your XP24000/XP20000 storage system to automate fail-over and fail-back between sites making your business Disaster Proof.

**HP Metroclusters with XP Continuous Access** seamlessly integrates the XP24000/XP20000 disk array remote replication capabilities with HP Serviceguard on HP-UX. It provides automatic and bi-directional failover/failback of business critical data and applications between data centers.

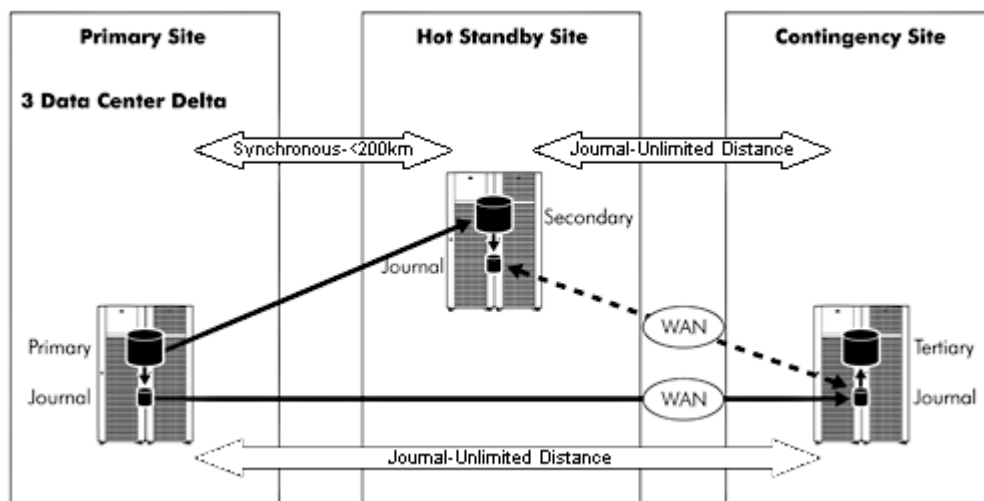
### Overview

**HP Continental Cluster Software** provides the highest levels of disaster tolerance by eliminating the cluster itself as a single point of failure. It uses data replication technologies to provide application recovery across multiple widely-separated HP-UX Serviceguard clusters. The HP Continental Cluster product provides the ability to monitor a Serviceguard cluster and recover mission critical applications to a remote Serviceguard cluster, should the monitored cluster become unavailable or if there is a disaster at the cluster site.

#### The 3 Data Center Solution (3DC)

A 3 Data Center Solution allows you to keep your business online, no matter what happens. XP disk arrays on two sites replicate data synchronously, while the XP on a third site many miles away protects against a regional disaster that hits the first two. Lose any one site and the other two keep going. Implementation of the 3DC solution combines the data consistency of synchronous replication and the long-distance capability of journal replication to protect against local and wide-area disasters. This technology provides other benefits, including:

- Maintaining high performance: Using synchronous replication over a short distance in a campus or metropolitan area cluster provides the highest level of data currency without significant impact to application performance.
- Permitting swift recovery: Campus/metropolitan cluster implementation allows for fast automated failovers after a local area disaster occurred.
- Eliminating transaction loss in the case of localized disasters caused by synchronous replication implementation.
- Permitting recovery even when a disaster exceeds traditional regional boundaries or extended duration: A wide-area disaster could disable both data centers 1 and 2, but with some manual interaction operations can be shifted to data center 3 and continue unaffected by the disaster.
- Staffing the remote data center with people living outside the disaster area: A wide-area disaster affects people located within the disaster area, both professionally and personally. By moving operations out of the region to a remotely located recovery data center, operational responsibilities shift to people not directly affected by the disaster.



#### External Storage Disaster Recovery

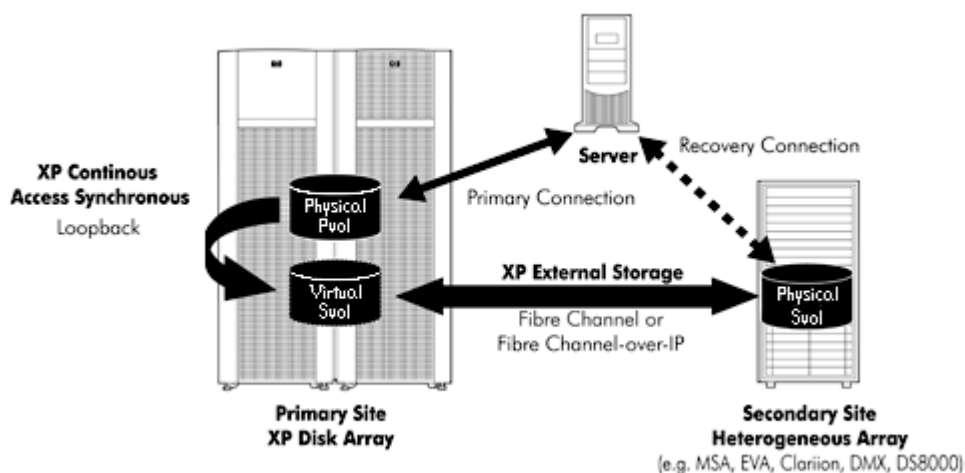
With this feature, you can take the disaster recovery benefits of an XP to any other array from any vendor. An exact, synchronous copy of an XP volume is replicated to a heterogeneous array located at a second site. This second site can be used for manual disaster recovery in the event that the primary site becomes unavailable.

### Overview

By using this 2-site DR solution to synchronously copy data from an XP to an external storage device, you can now implement a lower cost disaster recovery plan by utilizing arrays you already have.

You can use this solution with business critical applications such as email, billing, or data warehouse applications where it is important to have a backup copy of the latest data that can be put back online in a matter of hours by connecting the server to the second array.

Using External Storage Disaster Recovery allows you to 1) implement disaster recovery functionality at a fraction of the cost of other solutions, 2) redeploy existing arrays in a new disaster recovery solution, and 3) enjoy the green effect of using storage resources efficiently.



<sup>1</sup> National Archives and Records Administration in Washington, D.C.

### UNFAILING DATA PROTECTION

#### Protect against data loss with built-in safety measures

Relax, knowing that data is protected. If power goes out, the XP batteries can continue operations and then write cache data to disk. RAID 6 adds an extra layer of fault tolerance. Continuous Track checks your XP for unseen issues, and the end-to-end checksum confirms data integrity from port to disk and back.

#### Battery DeStage Mode

The XP gives you two ways to protect your data if you experience a power outage.

- Battery back-up mode: Fast restart with battery backup mode that protects Cache and Shared Memory for at least 36 hours. This mode works for both the XP24000 and XP20000.
- De-stage mode: De-stage mode keeps the entire system running for 1 min and then flushes Cache to final destination disk. This mode works only on the XP24000.

#### RAID 6 Configuration

Protect your data even if two disk drives fail at the same time in a parity group! The XP24000/XP20000 redundancy is further enhanced through a RAID 6 (6D+2P) configuration that allows up to two disk drives out of eight to fail and still maintain data availability. RAID 6 uses block level striping and two independently calculated distributed parity blocks across 8 disk drives. RAID 6 is an excellent combination

### Overview

of performance, extra redundancy, and storage efficiency.

#### Continuous Track

With the rapid increase of e-commerce, data warehousing, and data mining, storage has become a strategic resource within an enterprise. Businesses must access their data instantly and continuously. The criticality of data availability dictates that the storage systems must be up and running all the time. IT departments need the ability to continuously monitor their storage services and resolve their problems proactively and immediately.

Continuous Track utilizes HP's Instant Support Enterprise Edition (ISEE) which continuously and securely monitors an XP Disk Array 24 hours a day by expert systems and engineers at HP Response Centers over either a phone line or the internet. Service events are reported instantly. Hardware failures are detected immediately. Potential problems can be investigated and resolved proactively by HP engineers before your business is affected. The Continuous Track support service substantially eliminates unplanned downtime and increases the availability of storage, applications, and data access. Users of XP disk arrays using Continuous Track gain the following benefits:

- Enhanced total cost of ownership and data availability through an effective and efficient service delivery model.
- Reduced response and investigation times for any on-site support issues.
  - HP support personnel are proactively informed about potential XP issues through incident/event data reports.
  - HP support personnel receive array configuration files and configuration change event notices whenever the XP configuration is changed so they can provide the appropriate support.
  - HP support personnel can connect to the XP SVP to perform remote diagnosis when the Remote Device Access (RDA) is enabled.

XP Disk Arrays currently support two connection methods for Continuous Track remote support; modem and internet. The internet is preferred in comparison to the modem solution for the following reasons:

- Provides more reliable and higher speed connections to the HP support team.
- Enables more frequent transmission of larger files—for example, configuration files and dump files—to enhance remote troubleshooting.
- Supports more rapid remote repair.
- Eliminates telephone line and modem-related issues, including infrastructure setup, repair, and maintenance costs.

Both the internet and modem solutions enable the XP to send the monitored information to HP. However, using the Continuous Track internet option increases the ability of the diagnostic center to get quicker time to resolution through the use of higher bandwidth access to the diagnostic data and other configuration information. This access allows HP support personnel to correctly determine the best course of action and to identify needed parts quickly before the HP support person travels to the XP site, as compared to having to physically go to the site to access the high volume diagnostic data and configuration information before they can correctly diagnose an issue.

XP Disk Arrays using the Continuous Track internet solution also have the option of enabling HP's secure Remote Device Access (RDA). With HP's secure RDA HP support personnel have the enhanced ability, in some cases, to quickly fix a support issue entirely through remotely performed actions. Remote device access can allow the real time ability to access the XP Disk Array remotely, load new drivers or firmware, or alter configuration parameters that may quickly correct a problem, all while the customer's data remains safe and protected.

### Overview

#### End-to-end Checksum

The XP24000/XP20000 end-to-end checksum feature is used when moving data from cache to disk. It protects data against corruption while it is in transit inside the array and confirms data integrity from port to disk and back.

#### Services and Support for comprehensive planning and implementation support

##### HP Proactive 24 Service (P24)

HP Proactive 24 is included standard with your XP24000/XP20000. HP Proactive 24 is an integrated hardware and software support solution designed to help you get more from your IT investment. HP Proactive 24 Service combines industry-leading technical assistance with proactive account services to cover the stability, availability, and operational effectiveness of your XP.

HP Proactive 24 Service provides you with access to the global technical skills of HP. An assigned Account Support Consultant will serve as your primary proactive services contact within the HP support organization and can coordinate additional specialized resources if necessary. Your Account Support Consultant begins by forming a close working relationship with you and by developing an understanding of your IT infrastructure and goals in order to assist you in identifying gaps in supportability.

##### HP Critical Service (CS)

HP Critical Service is a recommended service upgrade for to consider for your XP24000/XP20000. HP Critical Service is a comprehensive support solution designed for businesses that run mission-critical applications and that cannot tolerate downtime without significant business impact. HP Critical Service provides the right combination of proactive and reactive services designed to maximize availability and performance across your IT infrastructure. With fewer interruptions and less downtime, you will lower costs and gain competitive advantages in the marketplace.

HP Critical Service maximizes your infrastructure's availability and performance through an IT Infrastructure Library (ITIL)-based framework of proven, integrated processes and HP best practices. HP's assigns a support team of HP-certified specialists, peaked in complex computing environments. This team begins by conducting an assessment of your infrastructure. The results of the assessment are used to design a strategy to align your IT commitments and business goals. Subsequently your support team will meet with you quarterly to discuss progress and ongoing alignment with your goals. Working closely with your IT staff and management, your HP Account Support Consultant-the leader of your assigned team-will further assist you by identifying and managing the delivery of state-of-the-art technical services for improvements in areas such as high availability, capacity management, change planning, and security.

See the section covering Service and Support, HP Care Pack, and Warranty Information later in this document for more information on HP service and support offerings.

#### ENHANCED SECURITY FEATURES

##### Decrease exposure to data loss through the security features of XP Array Manager Software

HP XP Array Manager Software protects your data by controlling access, preventing unauthorized alteration, and securely deleting data when it is no longer required. Configure security to prevent unauthorized servers from accessing the data. Protect the XP Disk Array from accidental modification by setting up partition administrators who only have access to the partition. Control access to critical data, for purposes such as archiving and data retention. Set read and write access permissions, create read-only volumes, and protect data from being replicated. And when the data is no longer needed, securely delete it with successive overwrites to minimize the likelihood that it can be restored.

### Overview

#### **Protect your data from falling into the wrong hands**

The XP hardware provides encryption capabilities with the optional Enhanced Disk Adapter (DKA) offering. The Enhanced DKA encrypts the data on disk drives so that data cannot be read off a disk drive that is removed from the XP disk array. Only data on the disk drives is encrypted (data in cache is not encrypted).

<http://h71028.www7.hp.com/erc/downloads/4aa2-2629enw.pdf>

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### **Lower costs through efficient data management**

#### **POWER & COOLING SAVINGS AND STORAGE EFFICIENCY**

#### **Reduce environmental impact and accelerate application deployment**

##### ***XP Thin Provisioning Software***

Through XP Thin Provisioning, organizations can reduce storage costs. As an IT manager, you can now configure all the capacity you will need for the future, but only buy what you need today. XP Thin Provisioning will automatically allocate capacity as applications need it.

HP XP Thin Provisioning Software allows you to supply disk storage capacity to your applications from a pool of virtualized storage. By enabling you to allocate your anticipated future storage capacity needs from virtual disk storage, HP XP Thin Provisioning Software reduces the amount of physical disk capacity initially required. As utilization of physical disk space increases over time, you can purchase more disk capacity as it is needed, and install it without affecting your applications. By removing the guessing from capacity planning, HP XP Thin Provisioning reduces the cost of volume management. By using XP Thin Provisioning, you can lower power and cooling costs by supplying storage capacity to applications from a virtualized pool and reducing unused storage that consumes power, requires cooling, and takes up space.

##### ***7.2K Disk Drives***

Disk drives with 7.2K rpm address the need for businesses to cost-effectively store less frequently accessed or lower priority information in a more economical fashion. 7.2K drives on an XP offer you a higher capacity, lower cost per gigabyte, more energy efficient, and slightly lower performance option compared to the 15K/10K disk drives, thereby providing a less expensive tiered storage solution within the array.

##### ***Solid State Disk Drives (SSDs)***

Because a single SSD drive could potentially replace numerous spinning, Fibre Channel (FC) drives to achieve the same performance level, SSD drives will consume less power and generate less heat than compared to implemented Fibre Channel drives.

In addition to power savings, SSDs will generally require less physical space than FC drives since one SSD can likely replace multiple FC drives. A single SSD drive could replace upwards of 30 FC disk drives. This reduction in FC drives then also gives you a smaller physical footprint in the data center.

By using SSD disk drives, 7.2K disk drives, and XP Thin Provisioning Software, you can enjoy the green effect of reduced floor space, reduced power usage, and reduced cooling requirements in your data center.

#### **VIRTUALIZATION**

#### **Reduce costs and simplify management of multi-vendor storage**

Simplify data management in a complex, multi-vendor environment. Virtualization enables important functions such as data migration, array repurposing, and storage tiers. XP External Storage Software

### Overview

virtualizes heterogeneous disk arrays, so that hosts see the capacity, but not the physical attributes of the external storage devices.

The XP24000/XP20000 simplifies the management of heterogeneous SAN environments through its ability to support up to 247 PB/ 96 PB respectively of external storage—all configured 'behind' a single XP. XP External Storage software uses advanced virtualization technology to allow storage administrators to host XP Disk Array LUNs on externally attached disk arrays. Any Fibre Channel port from any CHA pair installed in any slot can be used to connect to external storage.

Instead of seeing a confusing collection of dissimilar arrays, host systems perceive all the data to be stored inside the XP disk array. In effect, the XP becomes the storage controller for a flexible, multi-tiered collection of storage with a range of cost and performance capabilities. By configuring current or legacy storage systems behind a single XP24000/XP20000, data can be moved back and forth dynamically across tiers, all of which is invisible to the applications.

The XP's virtualization feature also reduces the total cost of storage ownership by:

- Exploiting common storage management across multiple vendors' systems
- Easily deploying a dual-vendor policy
- Facilitating simpler and lower cost data migrations
- Increasing storage utilization
- Extending the life of legacy storage

Supported arrays include the HP MSA family of low-cost arrays, the HP EVA disk array family, the HP XP disk array family, and many current and legacy arrays from other storage providers, including EMC, IBM, and HDS.

- For a complete/up-to-date list of supported arrays and accompanying firmware versions, please contact your HP representative.

#### **Virtualization Feature for VMware customers**

HP Insight Control for VMware vCenter Server allows customers who are using vCenter to manage their virtualized environment to access detailed information about HP products which is relevant to this area. Insight Control for vCenter integrates with HP server and blade server management products to provide status, ongoing monitoring, health, and performance information that is needed for optimal management of virtual machines. HP XP Disk Arrays are enabled, allowing vCenter administrators to list LUN/volume connections, determine storage attributes, and monitor the status of the arrays."

### **PARTITIONING**

#### **Deliver predictability and quality of service**

Make certain your critical applications have the resources they demand with partitioning. The dynamic partitioning solution prevents inadvertent administrator errors from affecting the entire array and allows storage consolidation, even when you have applications that can't tolerate performance loss, by allocating XP resources to individual hosts or departments.

As businesses strive to improve operational efficiency, consolidation of servers and storage becomes an attractive option. Partitioning enables storage administrators in large consolidated storage environments to host multiple diverse user groups on one XP while maintaining appropriate isolation between applications. Partitioning allows storage administrators to subdivide a large XP disk array into smaller independently configured and managed storage segments. Applications that would normally compete for resources can share a single disk array without impacting each other. Departments can share a single disk array confident that administrators cannot affect portions of the disk array that belong to someone else.

### Overview

The XP24000 can be divided up into 32 partitions, while the XP20000 can be divided up into 16 partitions. Partitions can be dynamically reconfigured as needs change.

#### **CONSOLIDATION**

##### **Standardize and simplify storage through consolidation**

Simplify your operations and reduce costs by consolidating multiple applications onto a single XP disk array. By having multiple hosts running diverse operating systems connected to an XP, you can reduce the time it takes to manage various environments and simplify the implementation of backups and disaster recovery solutions.

By consolidating multiple SANs into a single XP disk array, four important functions can happen:

1. Backups can be done using a simpler framework and common devices
2. Administration of the total environment can be done with a single set of software
3. Buffer storage for growth can be consolidated and allocated to the hosts as needed. The amount of idle storage awaiting allocation can be reduced. The customer saves money by postponing purchases through minimized waste.
4. With all the enterprise storage consolidated into a single array, the user can implement Disaster Recovery solutions in a much easier and less expensive fashion.

These above four areas are some of the key drivers that make storage consolidation a primary way to reduce costs in the data center.

**Supported Hosts** - A wide variety of servers and operating systems can be connected to an XP24000/XP20000 disk array, including:

- HP-UX
- Microsoft Windows
- IBM AIX
- Sun Solaris
- VMware
- LINUX - IA2, Red Hat
- HP OpenVMS
- HP Tru64 UNIX
- HP NonStop
- Mainframe

For more details on which servers and operating systems are currently supported, please contact your resellers and your HP technical support to review the supported server and operating system information.

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### Overview

#### Accelerate Business Growth with swift adaptability

##### THIN PROVISIONING

##### React quickly to new business demands

Thin provisioning also provides the flexibility you need to respond quickly to new demands. You can now configure all the capacity you will need for the future, but only buy what you need today. XP Thin Provisioning will automatically allocate capacity as applications need it.

HP XP Thin Provisioning Software simplifies and accelerates storage provisioning by allowing you to create volumes without the need for physical installation and formatting time. Because your applications only see the virtual capacity that is allocated to them, there is no need for downtime when you install new physical disk capacity. And with simplified storage provisioning, you will be able to manage your storage with confidence knowing that the risk of human error has been reduced.

Accelerate your return on investment and enhance storage consolidation by using the virtualized storage pool to deploy more applications and servers per storage system. Deploy your applications faster because HP XP Thin Provisioning Software makes it easier to plan and size storage.

Thin provisioning pools can also be located on external storage devices, adding another virtualization element to the XP disk array.

##### SEAMLESS SCALABILITY

##### Start with the configuration you need today and add additional capacity as your needs change

The CIO dilemma of either overbuying capacity today or planning for a costly "forklift" upgrade tomorrow is now history. The XP24000 can scale from 9 to 1152 disk drives. The XP20000 scales from 0 to 240 disk drives. And all main components like host ports and cache can be added--without shutting down critical operations. Simply buy what you need today and grow as your needs change.

The charts below highlights the XP24000 and XP20000 scalability:

Scalability of the XP24000			
	MIN	INCREMENT	MAX
Data Drives	8	4	1148
Spare Drives	1	1	40
Capacity	1.15 TB raw 576 GB usable	-	2.26 PB* raw 1.98 PB* usable
Disk Adapter (DKA) Sets	1	1	4
Channel Adapter (CHA) Pairs	1	1	14**
Host Ports	8	8/16	128/224**
Cache	4/8/16 GB	4/8/16 GB	512 GB
Cache Bandwidth	17 GB/s	17 GB/s	68 GB/s
Shared Memory	1 GB	1 GB	28 GB
Shared Memory Bandwidth	19.2 GB/sec	19.2 GB/sec	38.4 GB/sec
LDEVs	1	1	64k
Frames	1	1	5

### Overview

\* The capacity of disk drives, and therefore the data capacity of the disk array, is based on 1K = 1000, not 1024. These means that 1 GB = 1,000,000,000 bytes and 1 TB = 1,000,000,000,000 bytes. Configuring an XP24000 entirely with 2 TB disk drives gives an internal storage capacity of 2.26 PB, although this configuration is not recommended in high-performance/high-availability environments.

\*\*\* A fully loaded XP24000 holds up to 8 CHA pairs where all 4 DKA sets are installed

Scalability of the XP20000				
	MIN	INCREMENT	MAX 1 Rack	MAX 2 Rack
<b>Data Drives</b>	0	4	116	236
<b>Spare Drives</b>	0	1	16	
<b>Capacity</b>	0 GB raw 0 GB usable	-	236 TB* raw 206.5 TB* usable	472 TB* raw 413 TB* usable
<b>Disk Adapter (DKA) Pair</b>	1	0	1	
<b>Channel Adapter (CHA) Pairs</b>	1	1	3	
<b>Host Ports</b>	8	8/16	48	
<b>Cache</b>	4/8/16 GB	4/8/16 GB	128 GB	
<b>Cache Bandwidth</b>	4.25 GB/s	4.25 GB/s	8.5 GB/s	
<b>Shared Memory</b>	1 GB	1 GB	14 GB	
<b>Shared Memory Bandwidth</b>	2.4 GB/sec	2.4 GB/sec	4.8 GB/sec	
<b>LDEVs</b>	1	1	64k	

\* The capacity of disk drives, and therefore the data capacity of the disk array, is based on 1K = 1000, not 1024. These means that 1 GB = 1,000,000,000 bytes and 1 TB = 1,000,000,000,000 bytes. Configuring an XP20000 entirely with 2 TB disk drives gives an internal storage capacity of 472 TB, although this configuration is not recommended in high-performance/high-availability environments.

### HIGH-END PERFORMANCE Your round-the-clock environment demands the ultimate in performance to deliver critical data at break-neck speed.

In the fall of 2008, HP announced a new world record SPC-2 result of 8.7GB/s. This result was achieved on a single XP array using 265 Hard Disk Drives (HDDs). HP eclipses the next closest single array result by more than 2x. In fact, this result surpasses the previous overall record that was produced by a system of 16 storage arrays and 1,536 disks by 20 percent.

SPC-2 is a benchmark of the Storage Performance Council (SPC), which measures performance on serial workloads such as streaming media, business intelligence queries, and backups. It is the only standard, audited benchmark for this kind of workload in the storage industry. Coupled with SPC-1 benchmark result of 200,000 Input/output operations Per Second (IOPS) in 2007, the HP SPC-2 result clearly establishes the HP XP24000 as a world leader in storage performance.

The SPC is an industry consortium chartered to provide standard, audited benchmarks to help storage customers evaluate the performance of competing storage products.

To read more about the XP24000's SPC-2 result, please visit the SPC-2 web page at [http://www.storageperformance.org/results/benchmark\\_results\\_spc2](http://www.storageperformance.org/results/benchmark_results_spc2). The full report is found at [http://www.storageperformance.org/results/b00035\\_HP-XP24000\\_SPC2\\_full-disclosure.pdf](http://www.storageperformance.org/results/b00035_HP-XP24000_SPC2_full-disclosure.pdf).

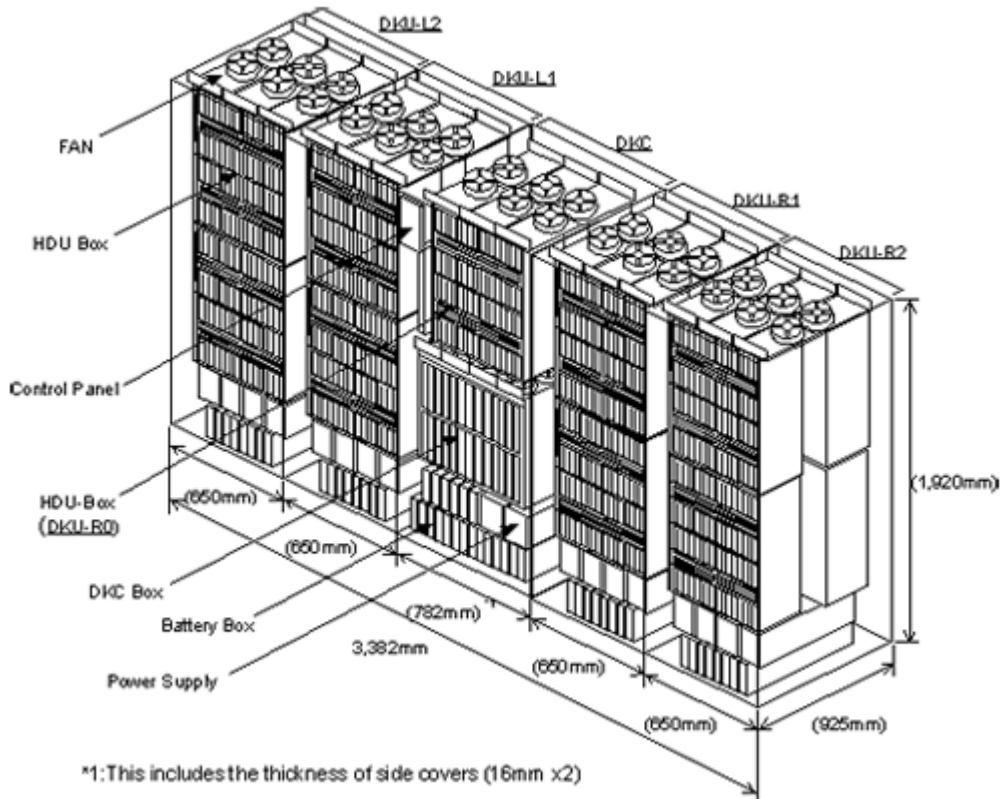
### Overview

To read more about the XP24000's SPC-1 performance results, please visit [http://www.storageperformance.org/results/a00056\\_HP\\_XP24000\\_executive-summary.pdf](http://www.storageperformance.org/results/a00056_HP_XP24000_executive-summary.pdf).

#### **FLEXIBLE CONFIGURATION Have the flexibility you need to meet your performance and availability objectives**

The granular design of the XP24000 gives flexibility to customize for your particular need. The XP24000 can have 224 FC, 112 FICON, or 112 ESCON connections, or a mixture of each, while the XP20000 can have 48 FC, 24 FICON, or 24 ESCON connections, or a mixture of each. RAID types can be mixed to achieve performance or efficiency. And, tiered storage of different disk drive speeds and external storage devices gives you the flexibility to tune capacity and manage system costs.

### Standard Features



#### XP24000 Hardware

The XP24000 hardware consists of a Disk Control Frame (DKC) that holds up to 128 disk drives, and one to four optional Disk Array Frames (DKUs) for the remaining disk drives. An outline of frame components of the XP24000 disk array is shown above.

#### Disk Controller (DKC)

The DKC consists of :

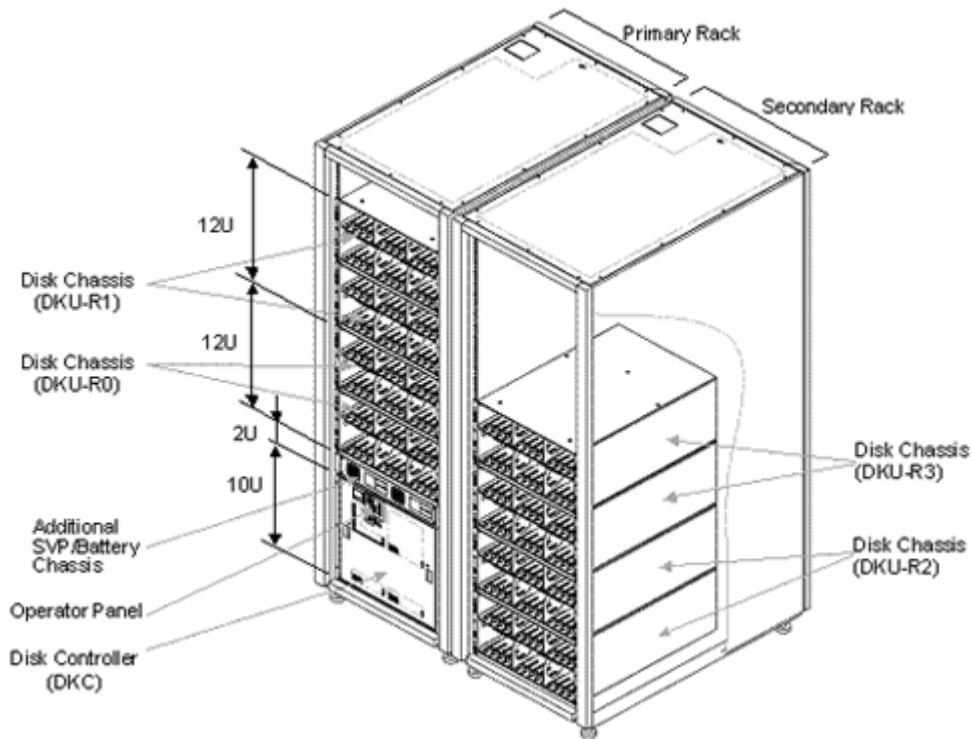
- DKC box in which the channel adapters (CHAs), disk adapters (DKAs), cache memory adapter (CMA), shared memory adapter (SMA), and cache switches;
- The HDU box in which disk drives are installed; and
- The power supplies and battery boxes that supply power to the components above.

The control unit in the DKC is equipped with a Service Processor (SVP), which is used to service the subsystem, monitor its running condition, and analyze faults. Connecting the SVP with HP Continuous Track enables remote maintenance of the subsystem.

#### Disk Unit (DKU)

The DKU consists of the four HDU boxes in each of which 64 disk drives can be installed. Each DKU can hold up to 256 disk drives and have redundant power supply systems and cooling fans included. Battery boxes that supply power to the disk drives are also held in the DKUs.

### Standard Features



#### XP20000 Hardware

The XP20000 hardware consists of a primary rack that will hold up to 120 disk drives. This primary rack also contains the control panel, service processor (SVP), Cache Memory, Shared Memory, Crossbar Switch, Batteries, Channel Adapters (CHAs) and the Disk Adapters (DKAs). A second rack can be added that can hold up to 120 more disk drives.

#### XP24000/XP20000 Software

A full complement of software tools is available for managing the XP24000/XP20000, and to enable a wide range of high availability solutions. The XP24000/XP20000 also provides local and remote replication capabilities for the IBM eServer zSeries and for IBM z/OS, z/VM and VSE environments.

Please see the "HP XP Disk Array Software Products" QuickSpecs for further information:

[http://h18000.www1.hp.com/products/quickspecs/12066\\_div/12066\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12066_div/12066_div.html)

#### Server connectivity

The XP24000/XP20000 connects to a variety of servers and operating systems. For details on which servers and operating systems are currently supported, please contact your resellers and your HP technical support to review the supported server and operating system information.

### Standard Features

#### Disk Drive Support

The number and type of disk drives installed in an XP24000/XP20000 array is flexible. Disk drives must be added in groups of four. Additional capacity can be installed over time as capacity needs grow. All disk drives use the industry standard dual ported Fibre Channel Arbitrated Loop (FC-AL) interface. Each disk drive is connected to both blades pairs of the redundant DKA set by separate FC-AL loops. Spare disk drives are automatically used in the event of a disk drive failure.

#### 15K/10K Disk Drives

The XP24000, XP20000, XP12000, and XP10000 disk arrays support the following 15K/10K disk drives:

- 146 GB 15K rpm 4 Gb/s Fibre Channel Arbitrated Loop (FC-AL)
- 300 GB 15K rpm 4 Gb/s Fibre Channel Arbitrated Loop (FC-AL)
- 400 GB 10K rpm 4 Gb/s Fibre Channel Arbitrated Loop (FC-AL)
- 450 GB 15K rpm 4 Gb/s Fibre Channel Arbitrated Loop (FC-AL)
- 600 GB 15K rpm 4 Gb/s Fibre Channel Arbitrated Loop (FC-AL)

These drives should be used in mission-critical, high input/output workload environments typically running 24 hours a day. They offer a medium capacity/high performance storage option within the array. 15K/10K drives are designed for high priority/Tier 1 applications such as:

- OLTP
- Oracle
- SAP
- Exchange workloads

#### 7.2K Disk Drives

The XP24000 and XP20000 disk arrays also supports the following 7.2K rpm disk drives:

- 1 TB 7.2K rpm dual ported
- 2 TB 7.2K rpm dual ported

The 7.2K disk drives offer a higher capacity/lower cost per gigabyte option compared to the 15K/10K disk drives. These disk drives provide a less expensive tiered storage solution within the array.

With the attractive low cost and high capacity points of 7.2K disk drives, understanding the appropriate applications where 7.2K disk drives should be used is important. Proper usage will lessen the probability of drive failure impacting a customer application.

7.2K disk drives are designed for non-mission critical applications which lower random or sequential access performance is acceptable, such as:

- data replication for back-up
- email archives
- medical records
- imaging archives
- financial compliance archives
- test environments

These drives, with their 4Gb/s FC interface, address the need for businesses to cost-effectively store infrequently accessed information in a more economical fashion but with performance that can be less than that of 15 /10K disk drives.

**NOTE:** 15K/10K and 7.2K disk drives should not be used together when doing Business Copy, Continuous

### Standard Features

Access, or Thin Provisioning. For example, in the case of Thin Provisioning, you should only use 7.2K disk drives in virtualized pools where the entire virtualized volume is made up of 7.2K disk drives.

#### Software ideally suited with 7.2K disk drives

- HP XP Tiered Storage Manager Software  
XP Tiered Storage Manager allows you to non-disruptively migrate data between tiers of storage while your applications remain on line. Using this software will simplify the creation of new storage tiers when the 7.2K drives are implemented. XP Tiered Storage Manager Software is a plug-in application for XP Command View Advanced Edition Software.
- HP XP Auto LUN Software  
XP Auto LUN Software provides automatic monitoring and load balancing for your XP Disk Arrays. AutoLUN allows you to move high-priority tasks to underutilized volumes and view the health of your arrays. It also proposes a migration plan and even estimates how much your storage performance will improve when it's done. Using this software in combination with the 7.2K drives will allow you to make migration decisions based on disk array performance criteria.
- HP XP Business Copy Software  
XP Business Copy Software is a local replication solution that provides data copies within a single XP Disk Array. Using Business Copy, you can do disk-to-disk backups to the 7.2K drives and use those backups for testing, archiving, etc. Backing up to 7.2K disks provides a less expensive alternative per gigabyte than traditional backup to 15K/10K disks.

### Solid State Disk Drives

The XP24000/XP20000 disk arrays also support Solid State Disk Drives (SSDs). These disk drives are designed for applications that require the ultimate performance and speed. SSDs can be utilized as a high-performance storage tier for applications that need very low latency/high IOPs. Examples of applications that might require this extremely high performance are:

#### SSD Use Cases

SSD drives are best utilized with low write-intensive applications and latency sensitive environments. You'll see the best performance in environments with many random read cache misses (the XP cache already reduces the response time for writes and sequential reads/writes accesses).

Some instances where SSDs may improve performance are:

- Database and file system metadata (journals, indexes, directories, etc)
- Online Transaction Processing (OLTP)
- Cluster metadata (locks, logs, etc)
- Content caching for near Static data file/web servers
- Real time data processing
- Hypervisor running a large number of virtual machines
- Virtual Desktop Infrastructure solutions
- CAD/CAM
- 3D animation / rendering
- Contextual web advertising
- Data Modeling
- Seismic data processing
- Business Intelligence and Data mining

The SSD drives supported on the XP disk arrays are:

### Standard Features

- 73 GB 4 Gb/s SDD
- 200 GB 4 Gb/s SSD
- 400 GB 4 Gb/s SSD

Solid State Disk drives can be implemented on your XP24000/XP20000 using any RAID type that is supported on any other drives today. In addition, any XP software can also be used on the SSD drives, including the popular XP Thin Provisioning Software.

The XP24000 can support up to 128 SSD drives with a max of 8 SSDs on a FC-AL loop. .

The XP20000 can support a total of 32 SSD drives.

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### Channel Adapter (CHA) Pairs

Channel Adapters (CHAs) provide connections to host or servers that use the XP24000/XP20000 for data storage (either directly connected to the servers or through SAN switches). The primary function of a CHA is to process host commands and signal the DKAs to read or write Cache to or from the disk drives. In addition, CHAs access and update the cache track directory, monitor data access patterns, and emulate host device types. The CHAs are configured in pairs for redundancy.

The XP24000 can have up to 14 pairs of CHAs.\*

The XP20000 can have up to 3 pairs of CHAs.

CHA pairs available for use in the XP24000/XP20000 include:

- 8 and 16 port 4 Gbps auto sensing Fibre Channel\*\*
- 8 port 8 Gbps auto sensing Fibre Channel\*\*
- 8 port ExSA Channel (ESCON compatible)
- 8 port 4 Gbps auto-sensing FICON in both short-and long-wave versions

For the FICON interface, HP offers a High Performance FICON Connectivity Software that delivers higher performance without changing the hardware. HP XP for Compatible High Performance FICON Connectivity Software reduces command overhead and improves FICON throughput on existing FICON hardware when used with IBM System z10.

\* Up to 8 CHA pairs if 4 DKA sets are installed.

\*\* The standard optical transceiver (small form-factor pluggable [SFP]) on the Fibre Channel CHAs is short-wave. Long-wave SFP transceivers can be ordered individually. A single Fibre Channel port can be quickly converted from short-wave to long-wave by swapping a short-wave SFP transceiver for a long-wave SFP transceiver. 4Gbps and 8 Gbps long-wave transceivers are available.

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### Standard Features

#### Disk Adapter (DKA) Sets

The Disk Adapters (DKAs) perform all data movement between the disk drives and Cache Memory. The DKA also provides data protection through the use of RAID 1, RAID 5, and RAID 6. Each DKA set has eight 4 Gbps FC-AL loops or 16 loops total per set, and supports up to 48 disk drives per loop. The DKA is configured in sets (2 DKA pairs) for redundancy. The XP24000 can have one, two, three, or four sets of DKAs. The XP20000 can have one DKA pair providing four 4 Gbps FC-AL loops or 8 loops total per set, and supports up to 60 disk drives per loop.

#### Enhanced DKA

The XP hardware provides encryption capabilities with the optional Enhanced Disk Adapter (DKA) offering. The Enhanced DKA encrypts the data on disk drives so that data cannot be read off a disk drive that is removed from the XP disk array. Encryption can be enabled on a Parity Group basis. Only data on the disk drives is encrypted (data in cache is not encrypted).

An XP disk array can house both an encrypted and non-encrypted DKA at the same time; however, only the data that sits behind the Enhanced DKA set is protected. XP Auto LUN software can be used to move data between encrypted and non-encrypted Parity Groups.

Only one encryption key is needed for the entire XP array. The encryption key is randomly generated by the XP when encryption is enabled for the first time. The encryption key can be backed up to the Remote Web Console computer using a KEK (Key Encryption Key).

It is important to note that utilizing this encryption feature does not change the performance of XP, as data is encrypted at the hardware (DKA) level and not at the cache.

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#### Cache Memory

The XP24000 supports up to 512 GB of Cache while the XP20000 supports up to 128 GB of Cache. Cache Memory is used to temporarily store data from the host until it is written to disk, or to stage data requested by the host from the disk. The XP24000/XP20000 Cache Memory modules are installed on Cache Memory Adapters (CMA):

- The basic CMA pair supports up to 16 sets of Cache modules (up to 128 GB).
- The optional additional CMA pair supports up to 16 additional sets of Cache modules (up to an additional 128 GB).

The Cache is configured as two sets of memories, onto which data that is to be written on the disk is mirrored, so the data will not be lost even if a Cache failure occurs.

#### Cache Partitions

XP Cache can also be allocated to particular host/port combinations to ensure that those hosts/ports enjoy optimized performance of Cache-oriented I/O. These cache partitions are assigned to specified disk array groups. Up to 32 partitions of at least 4GB can be created in an XP24000 or XP20000\*. Assigning cache in this way provides another method for tuning performance for data access for performance critical applications. Cache can be partitioned separate from storage partitions.

\*The XP20000 can have up to 16 partitions when using 64 GB of cache, or up to 32 partitions when using 128 GB of cache.

### Standard Features

#### Shared Memory

The XP240000 can have up to 28 GB of Shared Memory, while the XP20000 can have up to 14 GB. Shared Memory is independent of the Cache Memory and is used to store tables, side files, and other information, thus freeing up the Cache Memory for user data. Shared Memory is also used to store system configuration information. The configuration information includes system components mapping, LUN maps, Cache pointers, and RAID levels.

All Shared Memory is backed up by a fully redundant 36 hour battery.

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#### Switch support details

The XP24000 and XP20000 connect to the leading Fibre Channel switches in the industry today. For detailed information on supported switch configurations, please contact your sales representative.

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#### Service Processor

The Service Processor (SVP) manages and configures the disk array. It also monitors the operational status of the array and reports failures. The SVP utilizes Microsoft's Vista O/S, thereby making the XP IPv6 compliant. Internet Protocol version 6 (IPv6) is a network layer protocol for general use on the Internet and is intended to replace IPv4 for the Internet. IPv6 has a much larger address space that allows greater flexibility in assigning addresses.

Vista on the SVP also adds improvements to IPsec such as simplified policies to speed up connection times, a new User Interface that is integrated with the firewall, user and application-based policies, more troubleshooting and diagnostic tools, and support for Advanced Encryption Standard (AES).

The XP24000/20000 also offers a 2nd SVP High Reliability Support Kit that increases the management availability of the XP.

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#### Batteries & Power Supplies

##### Batteries

The XP24000 has two different kinds of batteries 56V & 12V

- 12V batteries backup Cache and Shared Memory
- 56V batteries supply power to disk drives
- 12V batteries backup data in Cache and Shared Memory for at least 36 hours
- 56V batteries are only required for De-Stage Mode\*
  - De-Stage Moe will continue array operations for 1 minute uninterrupted operation, then will move all data to disk

[\\*The De-Stage mode is only available on the XP24000.](#)

The XP20000 only has the 12V battery

- 12V batteries backup Cache and Shared Memory
- 12V batteries backup data in Cache and Shared Memory for at least 36 hours

##### Power Supplies

The XP24000 and XP20000 contain redundant AC power connections so that it continues operation when a problem occurs in one of the power systems.

### Standard Features

### Software Components

#### Software Features

HP offers numerous software titles along with the XP24000/XP20000. These software titles can be broken down into five categories:

1. Device configuration and management
2. Performance management
3. High availability and replication
4. Business continuity solutions
5. Mainframe tools.

Please see the "HP XP Disk Array Software Products" QuickSpecs for further information:  
[http://h18000.www1.hp.com/products/quickspecs/12066\\_div/12066\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12066_div/12066_div.html)

### Service and Support, HP Care Pack, and Warranty Information

#### **Warranty and Services Included with the XP24000/XP20000**

Services included with the XP24000/XP20000 are:

- Hardware site preparation.
- Array installation and start up.
- Warranty level of hardware reactive support is 2 years, 24×7, 4 hour response time
- 1 year of Proactive 24 proactive services
- Software support-1 year of 24×7 support services, which includes LTU, right to new versions, documentation, phone in assistance and access to the IT Resource Center
- Software enablement is bundled in with each individual software title

#### **For bundled Software Support (24x7):**

Your HP storage product includes software updates and comprehensive round-the-clock support to enhance the performance and availability of your software. Experienced Response Center engineers provide trustworthy advice on issues such as software features and use, problem diagnosis and resolution, and software defect identification.

24x7 Software support benefits include:

- Improved productivity of system managers and operators
- Improved system performance and reduced downtime due to software defects
- Expedited problem resolution through expert-level technical resources
- Software and documentation updates
- Electronic access to essential product and support information

#### **For bundled Proactive 24:**

Your HP storage product includes Proactive 24 Service to help you improve the stability and operational effectiveness of your IT environment. An HP Account Manager acts as your primary point of contact to ensure that HP meets your support needs effectively.

Proactive 24 Service benefits include:

- Enhanced operational effectiveness with proactive problem identification and recommendations from HP
- Technical experts who help coordinate support, provide hands-on assistance, and share knowledge with your staff
- Rapid access to support and expertise spanning your environment
- Personalized services tailored to your business environment and critical success factors
- Help anticipating change - and executing correctly the first time
- Efficient management of infrastructure resources to meet your performance objectives

#### **For bundled deployment (I&S) service:**

Your HP storage product includes deployment which helps you improve the productivity of your technical staff and allows your IT resources to stay focused on their core tasks and business priorities. HP deployment helps ensure that your product is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.

You'll benefit from:

- Specialized expertise for a complex, one-time task
- Reduced implementation time, impact and risk to your storage environment
- Shortened time-to-ROI
- Product knowledge gained during orientation session

### Service and Support, HP Care Pack, and Warranty Information

HP warrants only that the Software media will be free of physical defects for a period of ninety (90) days from delivery.

For more information about HP's Global Limited Warranty and Technical Support, visit <http://www.hp.com/products/storageworks/warranty>

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### For increased uptime, productivity and ROI -HP Care Pack packaged services for Storage

These days, you need to get the most out of your storage investment-you can't afford not to. When you buy HP storage products and solutions, it's also a good time to think about what levels of service and support you may need. To help take the worry out of deploying, designing, maintaining, and managing your environment, we've designed a portfolio of service options that are as flexible, reliable and scalable as your storage. Unlike storage-only vendors, we take a holistic approach to your entire environment, bridging storage, servers, blades, software and network infrastructures with our HP Care Pack packaged services for Storage.

Protect your business beyond the warranty

When it comes to robustness and reliability, standard warranties on today's computing equipment have matured just as the technologies have matured. Good news on some fronts-but also a source of potential problems and subsequent consequences that come from depending on standard warranties alone. Standard warranty protects against product defects and some causes of downtime- but not the business. By using a standard approach to warranty uplifts, such as HP Care Pack Services, you can reduce downtime risks and be more certain of operational consistency for both mission-critical and standard business computing. Simply put, HP Care Pack Services normalize the warranty of combined products - helping you proactively guard against unplanned downtime.

### Extending warranties with HP Care Pack Services

For cost-effective upgrading or extending your standard warranty, HP Care Pack Services offer a suite of standard reactive hardware and software support services that are sold separately, or combined as with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition, with HP Proactive Select we offer an innovative approach to service delivery that gives you the flexibility to acquire the specific proactive services you need today, then add services as your needs evolve. HP Proactive Select offers a broad set of technical or per-event type service options - including server, storage, and network, SAN device, and software, environment, installation and education services. Services that you can mix and match depending on your specific requirements, from preliminary planning and equipment delivery to installation, configuration, integration, and testing, through every level of ongoing support. Our HP Care Pack packaged services for Storage assures help when you need it most. And for many products, post-warranty HP Care Pack Services are available when your original warranty has expired.

### HP Storage Services: Offering reliability, flexibility and value-just like your storage

HP Storage Services offers a full spectrum of customer care, from technology support to complex migrations to complete completely managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education offers flexible, comprehensive training on storage networking, disk storage systems, and storage software to help your IT staff get the most out of your investments. And HP Financial solutions extend innovative financing and asset management programs to cost-effective buy, manage and eventually retire your older equipment.

HP Storage Services, the trusted business technology experts who manage your technology in action, because when technology works, business works. <http://www.hp.com/services/storage>

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

### HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at [http://h30125.www3.hp.com/csn/salesmktg/elfpack/elf\\_nonlkup\\_ctrylang.asp?code=ELNL](http://h30125.www3.hp.com/csn/salesmktg/elfpack/elf_nonlkup_ctrylang.asp?code=ELNL)

#### Recommended HP Care Pack Services for optimal satisfaction with your HP product

**Recommended Services**    3-Year HP Critical Service    When downtime is not an option, 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. With fewer interruptions and less downtime, you will lower costs and gain competitive advantages in the marketplace. 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. In today's new era of business technology, technology must produce thousands of business outcomes. Today's HP Technology Services portfolio helps customers manage their technology in action—because when technology works, business works.

- Boost business productivity through increased storage 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 single-source 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/5982-0079EN.pdf>

#### Recommended Deployment

HP Data Replication Solution Services

To help you safeguard your critical business information, HP Data Replication Solution Services, provides efficient deployment and configuration of real-time data mirroring between local and remote arrays. These services provide scalable deployment and configuration of the HP Business Copy real-time data mirroring or Snapshot features and of the HP Continuous Access real-time data mirroring between a local and a remote disk array. In today's new era of business technology, technology must produce thousands of business outcomes. Today's HP Technology Services portfolio helps customers manage their technology in action—because when technology works, business works.

- Confidence that in the event of an outage or disaster, the business will be able to access critical data
- Increased control and efficiency by integrating data replication software with IT management applications
- By engaging HP to implement data replication, customers' IT staff can stay focused on their core tasks and priorities, resulting in less impact to the business
- Professional replication planning that aligns with customer's business needs and implementation that reduces project execution time, risk to the storage environment and helps ensure issues are avoided

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-7875EN.pdf>

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Service and Support, HP Care Pack, and Warranty Information

### Related HP Care Pack Services that will enhance your HP product experience

#### Related Services

**HP Data Migration Service** For customers who need to safely transport mission critical data with minimal impact to their operations:

You need to move your critical enterprise data to your new HP SAN platform. And you need to accomplish that without losing data. And without interrupting your ongoing business operations.

HP Data Migration Service helps you lessen the risk of data loss, minimize threats to data integrity, and avoid productivity-sapping performance slowdowns during data transport. A highly experienced HP Services storage specialist works with you to rapidly and securely migrate mission-critical business information across your data center or around the globe - regardless of the complexity of your environment.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/5982-4107EN.pdf>

**HP Performance Analysis for the XP/EVA Disk Arrays** For customers who need to increase performance, stability, and availability of their XP/EVA arrays:

Enhancing the return on your HP Disk Array investment requires informed configuration and management decision-making. That, in turn, calls for an in-depth understanding of the performance level your array is delivering. HP's experienced storage specialists can help.

Capitalize on HP Services XP/EVA knowledge and know-how.

HP Performance Analysis for the XP/EVA Disk Arrays provides automated data collection, detailed I/O analysis, and expert recommendations for throughput enhancement. It offers a quick, convenient way to:

- Increase XP/EVA performance, stability, and availability by identifying potential bottlenecks and effective solutions for avoiding them
- Establish a baseline for future performance analysis and change management
- Make sound proactive decisions on XP/EVA system capacity planning
- Minimize the need for costly reactive upgrades
- Transfer HP knowledge and skills to your storage management staff

<http://h20195.www2.hp.com/v2/GetPDF.aspx/5982-6668EN.pdf>

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#### eSupport

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

##### 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

### Service and Support, HP Care Pack, and Warranty Information

- 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>

#### Remote Support Technology (RST)-HP Remote Support Pack

Taking a more proactive approach to IT support, the HP Remote Support pack plug-in module easily integrates with HP Systems Insight Manager to provide a powerful, unified "single pane of glass" solution for onsite and remote management.

HP Remote Support Pack enhances HP Systems Insight Manager with intelligent event diagnosis plus the automatic submission of hardware event notifications securely to HP support, including acknowledgment and status returns. It adds remote configuration collections to allow the delivery of assessment and proactive services for your SAN storage and HP-UX environments.

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#### Customer Technical Training

Consider education as an integral part of your strategy to get the best return on investment for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to on-site training customized to your needs or online. [www.hp.com/learn/storage](http://www.hp.com/learn/storage)

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#### HP Services Awards

HP 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. For a list of all our awards, please visit: <http://h20129.www2.hp.com/services/cache/77318-0-0-225-121.html>.

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#### Additional Services Information

For more information about HP Care Pack Services for Storage, please visit: <http://www.hp.com/services/storage>

If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" <http://www.hp.com>

### Family Information

Functionality Element	XP24000	XP20000
Max Raw Capacity	2.26 PB* + 247 PB External Storage	472 TB* + 96 PB External Storage
Max Cache	512 GB	128 GB
Host System Interface	4 Gbps FC 8 Gbps ESCON 4 Gbps FICON	4 Gbps FC 8 Gbps ESCON 4 Gbps FICON
RAID levels supported	RAID 1 (2D + 2D) RAID 1 (4D + 4D) RAID 5 (3D + 1P) RAID 5 (7D + 1P) RAID 5 (14D + 2P) RAID 5 (28 D + 4P) RAID 6 (6D + 2P)	RAID 1 (2D + 2D) RAID 1 (4D + 4D) RAID 5 (3D + 1P) RAID 5 (7D + 1P) RAID 5 (14D + 2P) RAID 5 (28 D + 4P) RAID 6 (6D + 2P)
Drive Interface	4 Gbps FC-AL Dual Active Ports	4 Gbps FC-AL Dual Active Ports
Drive Capacity	146 GB 15K rpm 300 GB 15K rpm 400 GB 10K rpm 450 GB 15K rpm 600 GB 15K rpm 1 TB 7.2K rpm 2TB 7.2K rpm 73 GB SSD 200 GB SSD 400 GB SSD	146 GB 15K rpm 300 GB 15K rpm 400 GB 10K rpm 450 GB 15K rpm 600 GB 15K rpm 1 TB 7.2K rpm 2TB 7.2K rpm 73 GB SSD 200 GB SSD 400 GB SSD
Disk Drives	1152	240
External storage capability	XP12000, XP10000 XP1024, XP128, XP512, XP48, XP256, EVA81000, EVA8000, EVA6100, EVA6000, EVA4400, EVA 4100, EVA4000, EVA5000, EVA3000, MSA1500, MSA1000, EMC, IBM, and HDS arrays**	XP12000, XP10000 XP1024, XP128, XP512, XP48, XP256, EVA81000, EVA8000, EVA6100, EVA6000, EVA4400, EVA 4100, EVA4000, EVA5000, EVA3000, MSA1500, MSA1000, EMC, IBM, and HDS arrays**
Online firmware update	One CHA processor at a time keeps all ports operating with no host port interruption	One CHA processor at a time keeps all ports operating with no host port interruption
<p>* The capacity of disk drives, and therefore the data capacity of the disk array, is based on 1K = 1000, not 1024. These means that 1 GB = 1,000,000,000 bytes and 1 TB = 1,000,000,000,000 bytes.</p> <p>** For a complete/up-to-date list of supported arrays and accompanying firmware versions, please ask your HP representative.</p>		

### Configuration Information

An extensive list of accessories is available for this product. For more information, please contact your reseller or authorized HP representative to work with the requirements to configure the product correctly.

#### Base Configurations - HP XP24000 Disk Array SSP

AE130A

**NOTE:** The XP24000 is a Structured Solution Product (SSP). This product number (AE130A) is a zero-price ordering mechanism that is used as an "umbrella" product to indicate to the ordering system that this is a new XP24000 order.

#### HP XP24000 DKC

XP24000 Disk Control Frame - DKC

AE131A

(Supports up to 128 disk drives. Contains Basic Redundant Power Supplies, base batteries for up to 64GB Cache and up to 64 disk drives, HP microcode, HP Continuous Track Modem and pcAnywhere. Does not include DKA - 1 required per XP system). Must select one power option.

<b>3P/30A/60Hz 3760PDG/115J-AP8508 2 Cords</b>	Power Cable Kit 3-Phase/30A/60Hz DKC-DKU AC Box Kit, 3-Phase/30A, DKC-DKU	AE131A#001
<b>3P/30A/50Hz No Plugs 2 Cords</b>	Power Cable Kit 3-Phase/30A/50Hz DKC-DKU AC Box Kit, 3-Phase/30A, DKC-DKU	AE131A#002
<b>1P/50A/60Hz 9P53U2 2 Cords</b>	Power Cable Kit 1-Phase/50A/60Hz DKC-DKU AC Box Kit, 1-Phase/50A, DKC-DKU	AE131A#003
<b>1P/50A/50Hz No Plugs 2 Cords</b>	Power Cable Kit 1 Phase/50A/50 Hz DKC-DKU AC Box Kit, 1-Phase/50A, DKC-DKU	AE131A#004
<b>1P/30A/60Hz Std Config 3750DP 4 Cords</b>	Power Cable Kit 1-Phase/30A/60Hz DKC-DKU AC Box Kit, 1-Phase/30A, DKC-DKU	AE131A#005
<b>1P/30A/50Hz Std Config No Plugs 4 Cords</b>	Power Cable Kit 1-Phase/30A/50Hz DKC-DKU AC Box Kit, 1-Phase/30A, DKC-DKU	AE131A#006
<b>NonStop Server Connectivity</b>	XP24000 option to connect to NonStop Server	AE131A#010
<b>SVP High Reliability Support Kit (min 0, max 1)</b>	HP XP24000/20000 SVP Reliability Kit	AE132A
<b>Power Control Interface Kit for Mainframe Kit (min 0, max 1)</b>	HP XP24000 Power Control I/F MF Kit	AE133A

### Configuration Information

**Channel Adapter (CHA) pairs** (Min 1 pr, Max 14)

[Less 2 CHA prs per 2nd, 3rd or 4th DKA set (AE164A) installed]

HP XP24000/20000 8 Port 4 Gb FC CHA	AE135A
HP XP24000/20000 16 Port 4 Gb FC CHA	AE136A
HP XP24000/20000 8 Port 4 Gb FICON SW CHA	AE137A
HP XP24000/20000 8 Port 4 Gb FICON LW CHA	AE138A
HP XP High Performance FICON Connectivity Software	T5217A
HP XP24000/20000 8 Port EXSA CHA	AE139A
HP XP24000/20000 8 Port 8 Gb FC CHA	AE141A
<b>NOTE:</b> FC CHA Long Wave Transceiver - Converts 1 SW FC port to 1 LW FC port. Must order in quantities of 2 for failover capability.	
HP XP24000/XP20000 4 Gb LW Transceiver	AE146A
HP XP24000/XP20000 8 Gb LW Transceiver	AE147A

**Additional 12V DKC Power Supply** HP XP24000 12V DKC Power Supply AE150A

**Supply**  
(Min 0, Max 2)

**NOTE:**

1st required with any of the following:

- Install 5 or more CHA pr + DKA pr (note AE164A consists of 2 DKA prs).
- Install 2 or more of Cache Adapter AE151A
- Install 2 Shared Memory Adapter AE155A

2nd required with any of the following:

- Install 11 or more CHA prs + DKA prs.
- Install 3 or more Cache Adapter AE151A.

**Cache Memory Adapter** HP XP24000/XP20000 Cache Memory Adapter AE151A  
(Min 1, Max 4) **NOTE:** Max 8 cache modules (64 GB) per Cache adapter.

**Cache Memory** HP XP24000/XP20000 8 GB Cache Memory AE152A  
(Min 1 module, Max 32 HP XP24000/XP20000 4 GB Cache Memory AE153A  
modules) HP XP24000/XP20000 16 GB Cache Memory AE154A

**NOTE:** Must configure 1 Cache Adapter per 8 cache modules (per 64 GB cache).

**(Configurations greater than 256 GB Cache)** HP XP24000 Cache Backup Expansion Kit AE187A  
HP XP24000 Cache Backup DKC/DKU Cable AE188A

**Shared Memory Adapter** HP XP24000 Shared Memory Adapter AE155A  
(Min 1, Max 2) **NOTE:** Max 4 SM modules per SM Adapter

### Configuration Information

<b>Shared Memory</b> (Min 1, Max 8)	HP XP24000/XP20000 2 GB Shared Memory	AE156A
	HP XP24000/XP20000 4 GB Shared Memory	AE157A
	<b>NOTE:</b> Max 4 SM modules per SM Adapter	
<b>Additional DKC 12V Battery</b> (Min 0, Max 3)	HP XP24000 DKC 12V Battery	AE160A
	<b>NOTE:</b> 1st set required if any: <ul style="list-style-type: none"><li>• Cache Memory Capacity is 56 GB or more.</li><li>• Shared Memory Capacity is 14 GB or more.</li><li>• When the 1st set of DKC 12V Power Supply AE150A is installed.</li></ul> 2nd set required if either: <ul style="list-style-type: none"><li>• CM Capacity is 72 GB or more.</li><li>• When the 2nd set of the DKC 12V Power Supply AE150A is installed</li></ul> 3rd set required if: <ul style="list-style-type: none"><li>• CM Capacity is 104 GB or more.</li></ul>	
<b>Additional DKC-DKU 56V Battery</b> (Min 0, Max 1 per DKC and each DKU)	HP XP24000 DKC/DKU 56V Battery	AE161A
	<b>NOTE:</b> 1 set for DKC required if either condition: <ul style="list-style-type: none"><li>• When De-stage mode is selected</li><li>• When memory backup mode is selected and when CM is 136 GB or more.</li></ul> Additional 56V Battery for DKU: <ul style="list-style-type: none"><li>• When the De-stage mode is selected then:<ul style="list-style-type: none"><li>○ 1 set required for each DKU without DKU Expansion Kit AE174A installed</li><li>○ 2 sets required for each with DKU Expansion Kit AE174A installed</li></ul></li></ul>	
<b>HP XP24000 Cache Switch</b>	DKC Data Path Expansion kit (Min 0, Max 3)	AE162A
	<b>NOTE:</b> 1 set required if either: <ul style="list-style-type: none"><li>• When installing 3rd or 4th CHA pr</li><li>• When installing 2nd AE64A/AU DKA Set</li></ul> 2nd set required if either: <ul style="list-style-type: none"><li>• When installing 5th or 6th CHA pr</li><li>• When installing 3rd AE164A/AU DKA Set</li></ul> 3rd set required if either: <ul style="list-style-type: none"><li>• When installing 7th or 8th CHA pr</li><li>• When installing 4th AE164A/AU DKA Set</li></ul>	

### Configuration Information

<b>HP XP24000 DKA Disk Adapter Set</b>	Disk Adapter Set (DKA) (Min 1, Max 4)	AE164A
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<b>HP XP24000 Enhanced DKA Disk Adapter Set</b>	Enhanced Disk Adapter Set (EDKA) (Min 0, Max 4)	AE165A
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#### DKC-DKU and DKU-DKU Frame Interconnect Cables

HP XP24000 DKU R1 Base Cable Set	AE168A
HP XP24000 DKU R1 Expansion Cable Set	AE169A
HP XP24000 DKU L1 Base Cable Set	AE170A
HP XP24000 DKU L1 Expansion Cable Set	AE171A
HP XP24000 DKU R2 or L2 Cable Set	AE172A

<b>HP XP24000 DKU Disk Unit Frame</b>	AE173A
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Disk Unit (DKU) Frame (Min 0, Max 4)

Must select one option and must match Power option of DKC (no intermixing of power options). Base DKU does not include batteries

<b>3P/30A/60Hz 3760PDG/115J-AP8508 2 Cords</b>	Power Cable Kit 3-Phase/30A/60Hz DKC-DKU AC Box Kit 3-Phase/30A DKC-DKU	AE173A#001
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<b>3P/30A/50Hz No Plugs 2 Cords</b>	Power Cable Kit 3-Phase/30A/50Hz DKC-DKU AC Box Kit 3-Phase/30A DKC-DKU	AE173A#002
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<b>1P/50A/60Hz 9P53U2 2 Cords</b>	Power Cable Kit 1-Phase/50A/60Hz DKC-DKU AC Box Kit 1-Phase/50A DKC-DKU	AE173A#003
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<b>1P/50A/50Hz No Plugs 2 Cords</b>	Power Cable Kit 1 Phase/50A/50 Hz DKC-DKU AC Box Kit 1-Phase/50A DKC-DKU	AE173A#004
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<b>1P/30A/60Hz 3750DP 4 Cords</b>	Power Cable Kit 1-Phase/30A/60Hz DKC-DKU AC Box Kit 1-Phase/30A DKC-DKU	AE173A#005
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<b>1P/30A/50Hz No Plugs 4 Cords</b>	Power Cable Kit 1-Phase/30A/50Hz DKC-DKU AC Box Kit 1-Phase/30A DKC-DKU	AE173A#006
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### Configuration Information

**HP XP24000 DKU Disk Expansion Kit** AE174A

**NOTE:** DKU Expansion Kit (Min 0, Max 1 per DKU frame)

Required for connecting upper HDU boxes to 2nd and 4th DKA set AE164A/AU

**XP Array Groups** (min 1 max 287) 4 disk drives per group

HP XP24000 146 GB 15K Array Group	AE177A
HP XP24000 300 GB 15K Array Group	AE179A
HP XP24000 400 GB FC 10k Array Group	AE181A
HP XP24000 450 GB 15K HDD Array Group	AE183A
HP XP20000 600 GB 15K HDD Array Group	AE227A
HP XP24000 1 TB 7.2K Array Group	AE182A
HP XP24000 2 TB 7.2K Array Group	AE228A
HP XP24000 73 GB SSD Array Group	AE184A
HP XP24000 200 GB Solid State Disk Array Group	AE225A
HP XP24000 400 GB Solid State Disk Array Group	AE226A

**Spare Disk Drives** (Min 1 max 40): Recommend 1 spare per 32 disk drives

HP XP24000 146 GB 15K Spare Disk	AE177AS
HP XP24000 300 GB 15K Spare Disk	AE179AS
HP XP24000 400 GB 10K Spare Disk	AE181AS
HP XP24000 450 GB 15K Spare Disk	AE183AS
HP XP24000 600 GB 15K Spare Disk	AE227AS
HP XP24000 1 TB 7.2K SATA Spare Disk	AE182AS
HP XP24000 2 TB 7.2K Spare Disk	AE228AS
HP XP24000 73 GB SSD Spare Disk	AE184AS
HP XP24000 200 GB Solid State Spare Disk	AE225AS
HP XP24000 400 GB Solid State Spare Disk	AE226AS

### Upgrades

Upgrade Configurations - HP XP24000/XP20000 Upgrade Disk Array AE130AU

**NOTE:** This product number (AE130AU) is a zero-price ordering mechanism that is used as an "umbrella" product to indicate to the ordering system that this is an upgrade XP order.

### Configuration Information

#### HP XP24000 DKC upgrade components

NonStop Server Connectivity	AE130AU#010
HP XP24000/XP20000 Upgrade SVP High Reliability Kit SVP High Reliability Sup. Kit / XP24000 Modem Card	AE132AU
HP XP24000/20000 Upgrade 2nd Vista SVP Kit	AE132BU
HP XP24000/20000 Upgrade SVP to Vista Kit	AE132CU
HP XP24000 Upgrade Power Control I/F MF Kit	AE133AU
HP XP24000/XP20000 Upgrade 8 Port 4 Gb FC CHA	AE135AU
HP XP24000/XP20000 Upgrade 16 Port 4 Gb FC CHA	AE136AU
HP XP24000/XP20000 Upg 8 Port 8 Gb FC CHA	AE141AU
HP XP24000/XP20000 Upgrade 8 Port 4 Gb FICON SW CHA	AE137AU
HP XP24000/XP20000 Upgrade 8 Port 4 Gb FICON LW CHA	AE138AU
HP XP24000/XP20000 Upgrade 8 Port EXSA CHA	AE139AU
HP XP24000/XP20000 Upgrade 4 Gb LW Transceiver	AE146AU
HP XP24000/XP20000 Upgrade 8 Gb LW Transceiver	AE147AU
HP XP24000 Upgrade 12V DKC Power Supply	AE150AU
HP XP24000 Upgrade Cache Memory Adapter	AE151AU
HP XP24000/XP20000 Upgrade 8 GB Cache Memory	AE152AU
HP XP24000/XP20000 Upgrade 4 GB Cache Memory	AE153AU
HP XP24000/20000 Upgrade 16 GB Cache Memory	AE154AU
HP XP24000 Upgrade Cache Backup Kit	AE187AU
HP XP24000 Upgrade Cache Backup Cable	AE188AU
HP XP24000 Upgrade Shared Memory Adapter	AE155AU
HP XP24000/XP20000 Upgrade 2 GB Shared Memory	AE156AU
HP XP24000/XP20000 Upgrade 4 GB Shared Memory	AE157AU
HP XP24000 Upgrade DKC 12V Battery	AE160AU
HP XP24000 Upgrade DKC/DKU 56V Battery	AE161AU
HP XP24000 Upgrade Cache Switch	AE162AU
HP XP24000 Upgrade DKA Disk Adapter Set	AE164AU
HP XP24000 Upgrade Enhanced DKA Set	AE165AU
HP XP24000 Upgrade DKU R1 Base Cable Set	AE168AU
HP XP24000 Upgrade DKU R1 Exp Cable Set	AE169AU
HP XP24000 Upgrade DKU L1 Base Cable Set	AE170AU
HP XP24000 Upgrade DKU L1 Exp Cable Set	AE171AU
HP XP24000 Upgrade DKU R2 or L2 Cable Set	AE172AU

### Configuration Information

#### HP XP24000 DKU upgrade components

HP XP24000 Upgrade DKU Disk Unit Frame		AE173AU
3P/30A/60Hz 3760PDG/115J-AP8508 2 Cords	Power Cable Kit 3-Phase/30A/60Hz DKC-DKU AC Box Kit 3-Phase/30A DKC-DKU	AE173AU#001
3P/30A/50Hz No Plugs 2 Cords	Power Cable Kit 3-Phase/30A/50Hz DKC-DKU AC Box Kit 3-Phase/30A DKC-DKU	AE173AU#002
1P/50A/60Hz 9P53U2 2 Cords	Power Cable Kit 1-Phase/50A/60Hz DKC-DKU AC Box Kit 1-Phase/50A DKC-DKU	AE173AU#003
1P/50A/50Hz No Plugs 2 Cords	Power Cable Kit 1 Phase/50A/50 Hz DKC-DKU AC Box Kit 1-Phase/50A DKC-DKU	AE173AU#004
1P/30A/60Hz 3750DP 4 Cords	Power Cable Kit 1-Phase/30A/60Hz DKC-DKU AC Box Kit 1-Phase/30A DKC-DKU	AE173AU#005
1P/30A/50Hz Std Config No Plugs 4 Cords	Power Cable Kit 1-Phase/30A/50Hz DKC-DKU AC Box Kit 1-Phase/30A DKC-DKU	AE173AU#006
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HP XP24000 Upgrade DKU Disk Expansion Kit		AE174AU
HP XP24000 Upgrade 146 GB 15K Array Group		AE177AU
HP XP24000 Upgrade 300 GB 15K Array Group		AE179AU
HP XP24000 Upgrade 400 GB 10K Array Group		AE181AU
HP XP24000 Upgrade 450 GB 15K Array Group		AE183AU
HP XP24000 Upgrade 600 GB 15K Array Group		AE227AU
HP XP24000 Upgrade 1 TB 7.2K Array Group		AE182AU
HP XP24000 Upgrade 2 TB 7.2K Array Group		AE228AU
HP XP24000 Upgrade 73 GB SSD Array Group		AE184AU
HP XP24000 Upgrade 200 GB Solid State Disk Array Group		AE225AU
HP XP24000 Upgrade 400 GB Solid State Disk Array Group		AE226AU
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HP XP24000 Upgrade 146 GB 15K Spare Disk		AE177AK
HP XP24000 Upgrade 300 GB 15K Spare Disk		AE179AK
HP XP24000 Upgrade 400 GB 10K Spare Disk		AE181AK
HP XP24000 Upgrade 450 GB 15K Spare Disk		AE183AK
HP XP24000 Upgrade 600 GB 15K Spare Disk		AE227AK
HP XP24000 Upgrade 1 TB 7.2K Spare Disk		AE182AK
HP XP24000 Upgrade 2 TB 7.2K Spare Disk		AE228AK
HP XP24000 Upgrade 73 GB SSD Spare Disk		AE184AK

### Configuration Information

HP XP24000 Upgrade 200 GB Solid State Spare Disk	AE225AK
HP XP24000 Upgrade 400 GB Solid State Spare Disk	AE226AK

#### Base Configurations - HP XP20000 Disk Array SSP

AE189A

**NOTE:** The XP20000 is a Structured Solution Product (SSP). This product number (AE189A) is a zero-price ordering mechanism that is used as an "umbrella" product to indicate to the ordering system that this is a new XP20000 order.

#### HP XP20000 DKC

HP XP20000 Rack Assembly (min 1, max 2)	AE190A
4.5M power cord w/Nema L6-20P plug	#001
4.5M power cord with stripped ends	#002
4.5M power cord w/ IEC309 plug	#003
4.5M power cord w/ CEE7/7 plug	#004
4.5M power cord w/Nema L6-30P plug	#005

#### HP XP20000 DKC Disk Control Unit

DKC is the XP20000 System level product. It contains SVP, Power Supplies, base 12V batteries for up to 24 GB cache and 14 GB Shared Memory, HP microcode, HP Continuous Track XP and Modem. (min 1 per XP20000 system, must select 1 internal power cord option (60Hz or 50Hz))	AE191A
60Hz Power Option	#001
50Hz Power Option	#002
NonStop Server Connectivity	#010
P-24 Services Adjustment	#111

<b>SVP High Reliability Support Kit</b> (min 0, max 1)	HP XP24000/20000 SVP Reliability Kit	AE132A
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#### Channel Adapter (CHA) pairs (Min1 pr, Max 3)

HP XP24000/XP20000 8 Port 4 Gb FC CHA	AE135A
HP XP24000/XP20000 16 Port 4 Gb FC CHA	AE136A
HP XP24000/XP20000 8 Port 8 Gb FC CHA	AE141A
HP XP24000/XP20000 8 Port 4Gb FICON SW CHA	AE137A
HP XP24000/XP20000 8 Port 4Gb FICON LW CHA	AE138A
HP XP High Performance FICON Connectivity Software	T5217A
HP XP24000/XP20000 8 Port EXSA CHA	AE139A

**NOTE:** FC CHA Long Wave Transceiver - Converts 1 SW FC port to 1 LW FC port.  
Must order in quantities of 2 for failover capability.

HP XP24000/XP20000 4 Gb LW Transceiver	AE146A
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### Configuration Information

HP XP24000/XP20000 8 Gb LW Transceiver AE147A

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**Cache Memory Adapter** (Min 1, Max 1) HP XP24000/XP20000 Cache Memory Adapter AE151A  
**NOTE:** Max 8 cache modules (64 GB) per Cache adapter.

**Cache Memory** (Min 1 module, Max 32 modules) HP XP24000/XP20000 8 GB Cache Memory AE152A  
 HP XP24000/XP20000 4 GB Cache Memory AE153A  
 HP XP24000/XP20000 16 GB Cache Memory AE154A  
**NOTE:** Must configure 1 Cache Adapter per 8 cache modules (per 64 GB cache).

**Shared Memory Adapter** (Min 1, Max 2) HP XP20000 Shared Memory Adapter AE192A  
**NOTE:** Max 4 SM modules per SM Adapter

**Shared Memory** (Min 1, Max 8) HP XP24000/XP20000 2 GB Shared Memory AE156A  
 HP XP24000/XP20000 4 GB Shared Memory AE157A  
**NOTE:** Max 4 SM modules per SM Adapter

**Additional DKC 12V Battery** (Min 0, Max 1) HP XP20000 DKC 12V Battery AE193A  
 1 set required if either condition is met:  

- Cache Memory Capacity is 24 GB or more.
- Shared Memory Capacity is 8 GB or more.

**Additional SVP/Battery Chassis** (min 0, max 1) HP XP20000 SVP/Battery Chassis AE194A  
**NOTE:** required for SVP High Reliability Support Kit AE132A or for Additional Battery AE194A.

**Disk Adapter Pair** (DKA) (min1, max 1) HP XP20000 DKA Disk Adapter Pair AE195A

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**Disk Chassis** HP XP20000 Disk Chassis AE196A  
 60Hz Power Option #001  
 50Hz Power Option #002

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**Device Interface Cables** HP XP20000 DKU R0 Base Cable Set AE197A  
 HP XP20000 DKU R1 or R3 Cable Set AE198A  
 HP XP20000 DKU R2 Cable Set AE199A

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### Configuration Information

#### XP20000 Array Groups

(Min 0 with Diskless XP20000) (Max 14 with 1 Disk Chassis) (Max 29 with 2 Disk Chassis in Rack 1) (Max 44 with 2nd Rack and 3 Disk Chassis) (Max 59 with 2nd rack and 4 Disk Chassis) Max AG allowed decreases by 1 for each increment of 4 spares

HP XP20000 146 GB 15K Array Group	AE201A
HP XP20000 300 GB 15K Array Group	AE203A
HP XP20000 400 GB 10K Array Group	AE205A
HP XP20000 450 GB 15K Array Group	AE207A
HP XP20000 600 GB 15K Array Group	AE212A
HP XP20000 1 TB 7.2K Array Group	AE206A
HP XP20000 2 TB 7.2K Array Group	AE213A
HP XP20000 73 GB SSD Array Group	AE208A
HP XP20000 200 GB Solid State Disk Array Group	AE210A
HP XP20000 400 GB Solid State Disk Array Group	AE211A

#### Spare Disk Drives (min 1 per array group capacity, 4 spares allowed per Disk Chassis)

HP XP20000 146 GB 15K Spare Disk	AE201AS
HP XP20000 300 GB 15K Spare Disk	AE203AS
HP XP20000 400 GB 10K Spare Disk	AE205AS
HP XP20000 450 GB 15K Spare Disk	AE207AS
HP XP20000 600 GB 15K Spare Disk	AE212AS
HP XP20000 1 TB 7.2K Spare Disk	AE206AS
HP XP20000 2 TB 7.2K Spare Disk	AE213AS
HP XP20000 73 GB SSD Spare Disk	AE208AS
HP XP20000 200 GB Solid State Spare Disk	AE210AS
HP XP20000 400 GB Solid State Spare Disk	AE211AS

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<b>Enhanced Disk Adapter Pair (EDKA)</b>	HP XP20000 Enhanced DKA Pair	AE215A
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### Configuration Information

#### Upgrades

Upgrade Configurations - HP XP24000/XP20000 Upgrade Disk Array

AE130AU

**NOTE:** This product number (AE130AU) is a zero-price ordering mechanism that is used as an "umbrella" product to indicate to the ordering system that this is an upgrade XP order.

#### HP XP20000 DKC upgrade components

NonStop Server Connectivity	AE130AU#010
HP XP20000 Upgrade Rack Assembly	AE190AU
4.5M power cord w/Nema L6-20P plug	#001
4.5M power cord with stripped ends	#002
4.5M power cord w/ IEC309 plug	#003
4.5M power cord w/ CEE7/7 plug	#004
4.5M power cord w/Nema L6-30P plug	#005
HP XP24000/XP20000 Upgrade SVP High Reliability Kit SVP High Reliability Sup. Kit / XP24000 Modem Card	AE132AU
HP XP24000/XP20000 Upgrade 2nd Vista SVP Kit	AE132BU
HP XP24000/XP20000 Upgrade SVP to Vista Kit	AE132CU
HP XP24000/XP20000 Upgrade 8 Port 4 Gb FC CHA	AE135AU
HP XP24000/XP20000 Upgrade 16 Port 4 Gb FC CHA	AE136AU
HP XP24000/XP20000 Upgrade 8 Port 8 Gb FC CHA	AE141AU
HP XP24000/XP20000 Upgrade 8 Port 4 Gb FICON SW CHA	AE137AU
HP XP24000/XP20000 Upgrade 8 Port 4 Gb FICON LW CHA	AE138AU
HP XP24000/XP20000 Upgrade 8 Port EXSA CHA	AE139AU
HP XP24000/XP20000 Upgrade 4 Gb LW Transceiver	AE146AU
HP XP24000/XP20000 Upgrade 8 Gb LW Transceiver	AE147AU
HP XP24000/XP20000 Upgrade 8 GB Cache Memory	AE152AU
HP XP24000/XP20000 Upgrade 4 GB Cache Memory	AE153AU
HP XP24000/XP20000 Upgrade 16GB Cache Memory	AE154AU
HP XP24000/XP20000 Upgrade 2 GB Shared Memory	AE156AU
HP XP24000/XP20000 Upgrade 4 GB Shared Memory	AE157AU
HP XP20000 Upgrade DKC Battery	AE193AU
HP XP20000 Upgrade SVP/Battery Chassis	AE194AU

### Configuration Information

#### HP XP20000 DKU upgrade components

HP XP20000 Upgrade Disk Chassis	AE196AU
60Hz Power Option	#001
50Hz Power Option	#002
HP XP20000 Upgrade DKU R0 Base Cable Set	AE197AU
HP XP20000 Upgrade DKU R1 or R3 Cable Set	AE198AU
HP XP20000 Upgrade DKU R2 Cable Set	AE199AU

HP XP20000 Upgrade 146 GB 15K Array Group	AE201AU
HP XP20000 Upgrade 300 GB 15K Array Group	AE203AU
HP XP20000 Upgrade 400 GB 10K Array Group	AE205AU
HP XP20000 Upgrade 450 GB 15K Array Group	AE207AU
HP XP20000 Upgrade 600 GB 15K Array Group	AE212AU
HP XP20000 Upgrade 1 TB Array Group	AE206AU
HP XP20000 Upgrade 2 TB Array Group	AE213AU
HP XP20000 Upgrade 73 GB SSD Array Group	AE208AU
HP XP20000 Upgrade 200 GB SSD Array Group	AE210AU
HP XP20000 Upgrade 400 GB SSD Array Group	AE211AU

HP XP20000 Upgrade 146 GB 15K Spare Disk	AE201AK
HP XP20000 Upgrade 300 GB 15K Spare Disk	AE203AK
HP XP20000 Upgrade 400 GB 10K Spare Disk	AE205AK
HP XP20000 Upgrade 450 GB 15K Spare Disk	AE207AK
HP XP20000 Upgrade 600 GB 15K Spare Disk	AE212AK
HP XP20000 Upgrade 1 TB Spare Disk	AE206AK
HP XP20000 Upgrade 2 TB Spare Disk	AE213AK
HP XP20000 Upgrade 73 GB SSD Spare Disk	AE208AK
HP XP20000 Upgrade 200 GB SSD Spare Disk	AE210AK
HP XP20000 Upgrade 400 GB SSD Spare Disk	AE211AK

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<b>Upgrade Enhanced DKA</b> HP XP20000 Upgrade Enhanced DKA Pair	AE215AU
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### Technical Specifications

<b>Model</b>	<b>HP XP24000 Disk Array</b>							
<b>Number of Disk Drives</b>	9 -1152 in 1 to 5 cabinets (Disk Control Frame holds 128 disk drives and the Disk Array Frames hold 256 disk drives each)							
<b>Disk Drives, Interface</b>	<b>Disk drive specifications</b>	<b>146 GB 15K</b>	<b>300 GB 15K</b>	<b>400 GB 10k</b>	<b>450 GB 15K</b>	<b>600 GB 15K</b>	<b>1 TB 7.2K</b>	<b>2 TB 7.2K</b>
	<b>Raw capacity (User area)</b>	143.76 GB	288.20 GB	393.85 GB	440.57 GB	576.39 GB	984.62 GB	1.97 TB
	<b>Rotation speed</b>	15,000 rpm	15,000 rpm	10,000 rpm	15,000 rpm	15,000 rpm	7,200 rpm	7,200 rpm
	<b>Mean latency time</b>	2.01 ms	2.01 ms	2.99 ms	2.01 ms	2.01 ms	4.17 ms	4.17 ms
	<b>Mean seek time (Read/Write)</b>	3.5 / 4.0 ms	3.5 / 4.0 ms	3.9 / 4.2 ms	3.5 / 4.0 ms	3.4 / 3.9 ms	8.2/9.2 ms	8.2/9.2 ms
	<b>Internal data transfer rate</b>	Up to 202 MB/sec	Up to 243 MB/sec	Up to 151 MB/sec	Up to 243 MB/sec	Up to 296 MB/sec	Up to 136.38 MB/sec	Up to 202 MB/sec
	<b>Interface type</b>	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL
<b>SSD Disk Drives, Interface</b>	<b>Disk drive specifications</b>	<b>73 GB SSD</b>		<b>200 GB SSD</b>		<b>400 GB SSD</b>		
	<b>Raw capacity (User area)</b>	<b>71.5 GB</b>		<b>196.92 GB</b>		<b>393.85GB</b>		
	<b>Mean access time</b>	<b>120 microsecond</b>		<b>120 microsecond</b>		<b>120 microsecond</b>		
	<b>Interface type</b>	<b>Dual ported 4 Gbps FC AL</b>		<b>Dual ported 4 Gbps FC AL</b>		<b>Dual ported 4 Gbps FC AL</b>		
<b>Capacity</b>	1.15 TB - 2.26 PB raw 576 GB - 1.98 PB usable							
<b>RAID Level</b>	RAID 1 (2D + 2D) RAID 1 (4D + 4D) RAID 5 (3D + 1P) RAID 5 (7D + 1P) RAID 5 (14D + 2P) RAID 5 (28 D + 4P) RAID 6 (6D + 2P)							
<b>Maximum number of Logical Devices (LDEVs)</b>	64K							
<b>Cache Memory</b>	4 GB - 512 GB							
<b>Shared Memory</b>	2 GB to 28 GB							
<b>Battery backup time</b>	Fast restart with battery backup mode protects Cache and Shared Memory for at least 36 hours. De-stage mode keeps the entire system running for 1 min and then flushes Cache to final destination.							
<b>Operating Systems</b>	HP-UX, Tru64, Open VMS, NonStop, Solaris, VMware, AIX, Windows, NetWare, IRIX, Linux, Mainframe							
<b>Host Interface</b>	Fibre Channel, ESCON, FICON							
<b>Host Ports</b>	8 to 224 by increments of 8/16							
<b>Regulatory Approvals</b>	This product meets all applicable safety and regulatory specifications							

### Technical Specifications

<b>Physical Dimensions - Disk control frame (DKC)</b>	<b>Width x Depth x Height</b>	30.8 x 36.4 x 75.6 in (78.2 x 92.5 x 192.0 cm)
	<b>Max Weight</b>	1745 lb (791 kg)
<b>Physical Dimensions - Disk array frame (DKU)</b>	<b>Width x Depth x Height</b>	25.6 x 36.4 x 75.6 in (65.0 x 92.5 x 192.0 cm)
	<b>Max Weight</b>	1579 lb (716 kg)
<b>Shipping Dimensions - Disk control frame (DKC)</b>	<b>Width x Depth x Height</b>	37.4 x 43.7 x 82.3 in (95.0 x 111.0 x 209.0 cm)
	<b>Max Weight</b>	1955 lb (887 kg)
<b>Shipping Dimensions - Disk array frame (DKU)</b>	<b>Width x Depth x Height</b>	37.4 x 43.7 x 82.3 in (95.0 x 111.0 x 209.0 cm)
	<b>Max Weight</b>	1779 lb (807 kg)

### Heat Dissipation and Power Consumption Specifications

Parameter	DKC	Each DKU	Full Array (4 DKUs and 1 DKC)
Max Power consumption (kVA)	6.71	6.56	33
Max Heat dissipation (kW)	6.46	6.27	31.5
Max BTUs per hour	22052	21400	107646
Max Kcal per hour	5557	5390	27100

### DKC AC line voltage requirements

50 amp, 50 or 60 Hz, Single phase DKC operation

Parameter	Nominal Rated Voltage (VAC)				
	200 VAC	208* VAC	220** VAC	230 VAC	240** VAC
Minimum operating voltage (VAC)	184	191	202	212	221
Maximum operating voltage (VAC)	212	220	233	244	254
Rated line current per power cord (Arms)***	18.2	17.5	16.6	15.8	15.2
Number of power cords	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2
Recommended circuit breakers	50	50	50	50	50
* 60 Hz only					
** 50 Hz only					
*** Maximum configured DKC at minimum operating voltage					

30 amp, 50 or 60 Hz, Single phase DKC operation

Parameter	Nominal Rated Voltage (VAC)				
	200 VAC	208* VAC	220** VAC	230 VAC	240** VAC
Minimum operating voltage (VAC)	184	191	202	212	221
Maximum operating voltage (VAC)	212	220	233	244	254
Rated line current per power cord (Arms)***	9.10	8.77	8.29	7.90	7.58
Number of power cords	4	4	4	4	4
Number of circuit breakers	4	4	4	4	4
Recommended circuit breakers	30	30	30	30	30
* 60 Hz only					
** 50 Hz only					
*** Maximum configured DKC at minimum operating voltage					

### Technical Specifications

30 amp, 50 or 60 Hz, Three phase DKC operation

Parameter	Nominal Rated Voltage (VAC)							
	200 VAC	208* VAC	220** VAC	230 VAC	240** VAC	380** VAC	400** VAC	415** VAC
Minimum operating voltage (VAC)	184	191	202	212	221	350	368	382
Maximum operating voltage (VAC)	212	220	233	244	254	403	424	440
Rated line current per power cord (Arms)***	10.5	10.1	9.59	9.13	8.76	5.53	5.26	5.07
Number of power cords	2	2	2	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2	2	2	2
Recommended circuit breakers	30A	30A	30A	30A	30A	30A	30A	30A
Dropout carry-through time at minimum line voltage (ms)	30	30	30	30	30	30	30	30
* 60 Hz only								
** 50 Hz only								
*** Maximum configured DKC at minimum operating voltage								

### DKU AC line voltage requirements

50 amp, 50 or 60 Hz, Single phase DKU operation

Parameter	Nominal Rated Voltage (VAC)				
	200 VAC	208* VAC	220** VAC	230 VAC	240** VAC
Minimum operating voltage (VAC)	184	191	202	212	221
Maximum operating voltage (VAC)	212	220	233	244	254
Rated line current per power cord (Arms)***	17.8	17.2	16.2	15.5	14.8
Number of power cords	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2
Recommended circuit breakers	50	50	50	50	50
* 60 Hz only					
** 50 Hz only					
*** Maximum configured DKU at minimum operating voltage					

30 amp, 50 or 60 Hz, Single phase DKU operation

### Technical Specifications

Parameter	Nominal Rated Voltage (VAC)				
	200 VAC	208* VAC	220** VAC	230 VAC	240** VAC
Minimum operating voltage (VAC)	184	191	202	212	221
Maximum operating voltage (VAC)	212	220	233	244	254
Rated line current per power cord (Arms)***	8.91	8.59	8.12	7.74	7.42
Number of power cords	4	4	4	4	4
Number of circuit breakers	4	4	4	4	4
Recommended circuit breakers	30	30	30	30	30
* 60 Hz only					
** 50 Hz only					
*** Maximum configured DKU at minimum operating voltage					

30 amp, 50 or 60 Hz, Three phase DKU operation

Parameter	Nominal Rated Voltage (VAC)							
	200 VAC	208* VAC	220** VAC	230 VAC	240** VAC	380** VAC	400** VAC	415** VAC
Minimum operating voltage (VAC)	184	191	202	212	221	350	368	382
Maximum operating voltage (VAC)	212	220	233	244	254	403	424	440
Rated line current per power cord (Arms)***	10.3	14.4	13.6	13.0	12.5	8.8	8.4	8.1
Number of power cords	2	2	2	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2	2	2	2
Recommended circuit breakers	30	30	30	30	30	30	30	30
* 60 Hz only								
** 50 Hz only								
*** Maximum configured DKU at minimum operating voltage								

### Environmental Specifications

Item	Condition		
	Operating <sup>1</sup>	Non-operation <sup>2</sup>	Shipping & Storage <sup>3</sup>
Temperature (°C)	16 to 32	-10 to 43	-25 to 60
Relative Humidity (%) <sup>4</sup>	20 to 80	8 to 90	5 to 95
Max. Wet Bulb (°C)	26	27	29
Temperature Deviation (°C/hour)	10	10	20
Vibration <sup>5</sup>	5 to 10Hz: 0.25mm	5 to 10Hz: 2.5mm	Sine Vibration: 4.9m/s <sup>2</sup> , 5min.
	10 to 300Hz: 0.49m/s <sup>2</sup>	10 to 70Hz: 4.9m/s <sup>2</sup> 70 to 99Hz: 0.05mm	At the resonant frequency with the highest displacement found between 3 to 100Hz

### Technical Specifications

		99 to 300Hz: 9.8m/s <sup>2</sup>	Random Vibration: 0.147m <sup>2</sup> /s <sup>3</sup> , 30min, 5 to 100Hz
Shock	—	78.4m/s <sup>2</sup> , 15ms	Horizontal: Incline Impact 1.22m/s Vertical: Rotational Edge 0.15m
Altitude	-60 to 3,000m		—

<sup>1</sup> Environmental specification for operating condition should be satisfied before the disk subsystem is powered on. Maximum temperature of 32°C should be strictly satisfied at air inlet portion. Recommended temperature range is 21 to 24°C.

<sup>2</sup> Non-operating conditions include both packing and unpacking conditions unless otherwise specified.

<sup>3</sup> On shipping/storage condition, the product should be packed with factory packing.

<sup>4</sup> No condensation in and around the disk drive should be observed under any conditions.

<sup>5</sup> The above specifications of vibration are applied to all three axes.

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**Accessories** An extensive list of accessories is available for this product; for more information, please contact your HP sales representative

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**Safety** This product meets all applicable safety and regulatory specifications

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**Software**

- HP XP Thin Provisioning Software
- HP XP Array Manager Software
- HP XP External Storage Software
- HP XP Performance Advisor Software
- HP XP Continuous Access Software
- HP XP Business Copy Software
- HP XP Command View Advanced Edition Software
- HP XP Provisioning Manager Software
- HP XP Replication Monitor Software
- HP XP Tiered Storage Manager Software
- HP XP Auto LUN Software

**Mainframe titles for the XP24000**

The HP XP24000 Disk Array also provides unique capabilities for the IBM eServer zSeries and for IBM z/OS, z/VM and VSE environments. XP24000 mainframe capabilities include local and remote replication (hardware and host based) of mainframe volumes, DB2 cloning, mainframe array based partitioning, advanced cache, security and archive functions and multiple concurrent I/O handling.

- HP XP for Business Continuity Manager Software
- HP XP for Compatible Parallel Access Volumes Software
- HP XP for Compatible Extended Remote Copy (XRC) Software
- HP XP for FlashCopy Mirroring Software
- HP XP for Data Exchange Software

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**Model** **HP XP20000 Disk Array**

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### Technical Specifications

**Number of Disk Drives** 0 -240 in 1 to 2 racks (primary rack holds 120 disk drives and the second rack holds up to 120 more disk drives)

Disk drive specifications	146 GB 15K	300 GB 15K	400 GB 10K	450 GB 15K	600 GB 15K	1 TB 7.2K	2 TB 7.2K
<b>Raw capacity (User area)</b>	143.76 GB	288.20 GB	393.85 GB	440.57 GB	576.39 GB	984.62 GB	1.97 TB
<b>Rotation speed</b>	15,000 rpm	15,000 rpm	10,000 rpm	15,000 rpm	15,000 rpm	7,200 rpm	7,200 rpm
<b>Mean latency time</b>	2.01 ms	2.01 ms	2.99 ms	2.01 ms	2.01 ms	4.17 ms	4.17 ms
<b>Mean seek time (Read/Write)</b>	3.5 / 4.0 ms	3.5 / 4.0 ms	3.9 / 4.2 ms	3.5 / 4.0 ms	3.4 / 3.9 ms	8.2/9.2 ms	8.2/9.2 ms
<b>Internal data transfer rate</b>	Up to 202 MB/sec	Up to 243 MB/sec	Up to 151 MB/sec	Up to 243 MB/sec	Up to 296 MB/sec	Up to 136.38 MB/sec	Up to 202 MB/sec
<b>Interface type</b>	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL

Disk drive specifications	73 GB SSD	200 GB SSD	400 GB SSD
<b>Raw capacity (User area)</b>	71.5 GB	196.92 GB	393.85 GB
<b>Mean access time</b>	120 microsecond	120 microsecond	120 microsecond
<b>Interface type</b>	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL	Dual ported 4 Gbps FC AL

**Capacity** 0 GB - 472 TB raw  
0 GB - 413 TB usable

**RAID Level** RAID 1 (2D + 2D)  
RAID 1 (4D + 4D)  
RAID 5 (3D + 1P)  
RAID 5 (7D + 1P)  
RAID 5 (14D + 2P)  
RAID 5 (28 D + 4P)  
RAID 6 (6D + 2P)

**Maximum number of Logical Devices (LDEVs)** 64K

**Cache Memory** 4 GB - 128 GB

**Shared Memory** 2 GB to 14 GB

**Battery backup time** Fast restart with battery backup mode protects Cache and Shared Memory for at least 36 hours.

**Operating Systems** HP-UX, Tru64, Open VMS, NonStop, Solaris, VMware, AIX, Windows, NetWare, IRIX, Linux, Mainframe

**Host Interface** Fibre Channel, ESCON, FICON

**Host Ports** 8 to 48 by increments of 8/16

**Regulatory Approvals** This product meets all applicable safety and regulatory specifications

**Primary Rack Physical Dimensions** **Width x Depth x Height** 24 x 40 x 77 in (60.4 x 102 x 200 cm)

**Max Weight** 1297 lb (588 kg)

### Technical Specifications

<b>Second Rack Physical Dimensions</b>	<b>Width x Depth x Height</b>	24 x 40 x 77 in (60.4 x 102 x 200 cm)
	<b>Max Weight</b>	997 lb (452 kg)
<b>Primary Rack Shipping Dimensions</b>	<b>Width x Depth x Height</b>	36 x 48 x 86 in (91 x 122 x 218 cm)
	<b>Max Weight</b>	1422 lb (645 kg)
<b>Second Rack Shipping Dimensions</b>	<b>Width x Depth x Height</b>	36 x 48 x 86 in (91 x 122 x 218 cm)
	<b>Max Weight</b>	1122 lb (509 kg)

### Heat Dissipation and Power Consumption Specifications

Parameter	Primary Rack	Secondary Rack	Full Array (Primary and Secondary)
Max Power consumption (kVA)	4.20	3.00	7.20
Max Heat dissipation (kW)	4.03	2.87	6.9
Max BTUs per hour	13760	9788	23548
Max Kcal per hour	3467	2466	5933

### Primary Rack AC line voltage requirements

20- amp, 50 or 60 Hz, Single phase operation

Parameter	Nominal Rated Voltage (VAC)				
	200	208*	220**	230	240**
Minimum operating voltage (VAC)	184	191	202	212	221
Maximum operating voltage (VAC)	212	220	233	244	254
Number of power cords	4	4	4	4	4
Number of circuit breakers	4	4	4	4	4
Recommended circuit breakers (amps)	20A	20A	20A	20A	20A
* 60 Hz only					
** 50 Hz only					

### Secondary Rack AC line voltage requirements

20- amp, 50 or 60 Hz, Single phase operation

Parameter	Nominal Rated Voltage (VAC)				
	200 VAC	208* VAC	220** VAC	230 VAC	240** VAC
Minimum operating voltage (VAC)	184	191	202	212	221
Maximum operating voltage (VAC)	212	220	233	244	254
Number of power cords	2/4***	2/4***	2/4***	2/4***	2/4***
Number of circuit breakers	2/4***	2/4***	2/4***	2/4***	2/4***
Recommended circuit breakers	20A	20A	20A	20A	20A
* 60 Hz only					
** 50 Hz only					
*** 4 power cords provided with AE190A/AU XP20000 Rack Assembly. Only 2 power cords and 2 circuit breakers required when only 1 AE196A/AU Disk Chassis is installed. 4 power cords and 4 circuit breakers required when 2 AE196A/AU Disk Chassis are installed.					

### Technical Specifications

#### Environmental Specifications

Item	Condition		
	Operating <sup>1</sup>	Non-operation <sup>2</sup>	Shipping & Storage <sup>3</sup>
Temperature (°C)	16 to 32	-10 to 43	-25 to 60
Relative Humidity (%) <sup>4</sup>	20 to 80	8 to 90	5 to 95
Max. Wet Bulb (°C)	26	27	29
Temperature Deviation	10	10	20
Vibration <sup>5</sup>	5 to 10Hz: 0.25mm	5 to 10Hz: 2.5mm	Sine Vibration: 4.9m/s <sup>2</sup> , 5min.
		10 to 300Hz: 0.49m/s <sup>2</sup>	At the resonant frequency with the highest displacement found between 3 to 100Hz
	10 to 300Hz: 0.49m/s <sup>2</sup>	70 to 99Hz: 0.05mm	Random Vibration: 0.147m <sup>2</sup> /s <sup>3</sup> 30min, 5 to 100Hz
		99 to 300Hz: 9.8m/s <sup>2</sup>	
Shock	—	8G, 15ms	Horizontal: Incline Impact 1.22m/s
			Vertical: Rotational Edge 0.15m
Altitude	-60 to 3,000m		—

<sup>1</sup> Environmental specification for operating condition should be satisfied before the disk subsystem is powered on. Maximum temperature of 32°C should be strictly satisfied at air inlet portion.

Recommended temperature range is 21 to 24°C.

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<sup>5</sup> The above specifications of vibration are applied to all three axes.

#### Accessories

An extensive list of accessories is available for this product; for more information, please contact your HP sales representative

#### Safety

This product meets all applicable safety and regulatory specifications

#### Software

HP XP Thin Provisioning Software  
 HP XP Array Manager Software  
 HP XP External Storage Software  
 HP XP Performance Advisor Software  
 HP XP Continuous Access Software  
 HP XP Business Copy Software  
 HP XP Command View Advanced Edition Software  
 HP XP Provisioning Manager Software  
 HP XP Replication Monitor Software  
 HP XP Tiered Storage Manager Software  
 HP XP Auto LUN Software

### Technical Specifications

#### **Mainframe titles for the XP20000**

The HP XP20000 Disk Array also provides unique capabilities for the IBM eServer zSeries and for IBM z/OS, z/VM and VSE environments. XP20000 mainframe capabilities include local and remote replication (hardware and host based) of mainframe volumes, DB2 cloning, mainframe array based partitioning, advanced cache, security and archive functions and multiple concurrent I/O handling.

HP XP for Business Continuity Manager Software  
HP XP for Compatible Parallel Access Volumes Software  
HP XP for Compatible Extended Remote Copy (XRC) Software  
HP XP for FlashCopy Mirroring Software  
HP XP for Data Exchange Software

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For disk drives, 1 GB = 1 billion bytes. Actual formatted capacity is less