

# Sun™ Storage J4200 Array Just the Facts



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**Sun Microsystems, Inc.** 4150 Network Circle, Santa Clara, CA 95054 USA **Phone** 1-650-960-1300 or 1-800-555-9SUN **Web** sun.com

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## Positioning: Sun™ Storage J4200 Array



### Introduction

Although "just a bunch of disks," or JBODs as they are commonly called, have been available for some time, and continue to be used in traditional JBOD markets, these controllerless switched arrays are now being used in enterprise applications because of specific market trends that are enabling customers to deploy them as solutions more cost-effectively than ever before. The new enterprise use cases are driven by two fundamental storage trends.

- The first trend is that CPU capabilities have outstripped operating system and application requirements, enabling them to accomplish much more. IT managers are looking into ways to maximize their datacenter budgets, and one way to do so is to leverage surplus CPU cycles to provide all their data protection and data service functionality rather than buying more compute cycles in the form of hardware RAID controllers. In such CPU-based storage solutions, data protection and data services functionality come from application or operating system software rather than from the external storage arrays themselves.
- The second trend driving the use of controllerless switched arrays is this: ISVs are including storage functionality in their applications, or in the deployment of their applications, in the form of data protection and data services to manage storage effectively. Two clear ISV leaders, Oracle and Microsoft, have adopted this strategy in their latest software products. This addition of storage functionality to software is enabling their customers to deploy solutions leveraging industry-standard or "commoditized" storage. This trend permits customers to implement direct-attached storage rather than complex, expensive, and proprietary SAN solutions. The result is a movement away from SANs and toward application-centric storage.<sup>1</sup>

The preceding trends are changing the paradigm for what customers can actually accomplish in a data center and the specific requirements to reach customer data center goals. The Sun Storage J4000 array family is uniquely positioned to meet or exceed these evolving customer application requirements seamlessly, cost-effectively, and with outstanding scalability.

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<sup>1</sup> For more information, see the Forrester white paper on this subject — Reichman, Andrew, "Do You Really Need a SAN Anymore?", Cambridge, MA: Forrester Research Inc., December 4, 2008.

## Sun™ Storage J4200 Array

The Sun™ Storage J4200 array is a general-purpose, high-availability, cost-effective, serial attached SCSI (SAS) device that supports SAS and SATA II disk drives. It has a 2U, 12-disk tray. The main components of this switched array are hot-swappable, including the SAS I/O module (SIM) boards and drives, redundant power supplies, and redundant fan modules — resulting in a fault-tolerant environment with no single point of failure.

Designed to fit into a standard 19-inch cabinet, the J4200 array supports 15K SAS drives and 7.2K SATA II drives. Up to four J4200 array trays can be connected together, resulting in up to 48 drives. This provides a raw storage capacity of 28.8 TB for SAS disks (600 GB per disk) or 48 TB for SATA II disks (1 TB per disk). The J4200 arrays are available in customized factory-configured assemble-to-order (ATO) combinations as well as X-option standalone customer-installable parts that are ordered and shipped for customer assembly of the arrays on-site.

A complete list of supported drives and cabinets into which J4200 arrays can be installed is in the Configuration and Management section of this document.

Available for Solaris, Linux, and Windows operating systems, the J4200 array uses Sun StorageTek™ Common Array Manager (CAM) software as its management console.

Basic Data: J4200 Array	
Drive trays	2U, 12-drive
I/O module	Dual and single SAS I/O modules
Interfaces/link speeds	Three or six 3Gb/sec SAS total ports per tray
Bandwidth	Up to 72 Gb/sec total bandwidth: 4 (x4-wide) SAS host/uplink ports (48 Gb/sec bandwidth) 2 (x4-wide) SAS expansion/host ports (24 Gb/sec bandwidth)
RAID levels HW (with RAID HBA) SW (with Solaris/ZFS)	RAID levels 0, 1, 10, 1E, 5, 6, 50, 5EE, 60 RAID levels 0,1,5,6
Maximum drives per system	Up to 48 3.5" SAS/SATA II drives
Disk types	SAS/SATA II
SAS/SATA intermix	Yes
Management software included	Sun StorageTek Common Array Manager software and Sun StorageTek RAID Manager software
Operating systems	Solaris 10, Linux (Red Hat and SUSE), Windows
Warranty	3 years; parts exchange

### Key Messages: Sun™ Storage J4200 Array

1. Sun's Open Storage approach, using the J4000 array as a storage building block, delivers breakthrough economics while providing enterprise-class quality and reliability to prevent costly downtime.
  - The new ISV application trend is to include key storage functionality, built into the application itself, that provides high-availability (HA) solutions (with clustering and

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data protection, and/or replication) which negate the need for expensive traditional external RAID controllers and/or complicated SAN switches. This provides a significant savings — over 90% compared to the list prices of competitive solutions. For example, for the EMC CLARiiON CX3-20 the replication software alone costs \$86,100.

- Acquisition cost: By utilizing host-based data protection/services and leveraging server CPU power resources, significant cost savings can be applied without proprietary and hardware-based RAID controllers and expensive SAN infrastructures. When used in open storage environments, J4000 arrays combined with Sun servers and Solaris save more than 90% of the cost of proprietary enterprise storage solutions and more than 80% of the cost of midrange disk systems.
  - For bulk storage applications, where purchase decisions typically follow the lowest \$/GB, the Sun Storage J4000 array family is very competitively priced — starting at below \$1/GB, a price that is as much as 10% less than the cost of competing products.
  - Customers who are looking for an open, economical, and efficient alternative to building out their datacenters can increase performance at double-digit rates with disk-intensive I/O that will significantly decrease application response times.
  - Along with upcoming flash-based disks, the J4000 array family will provide significant application performance enhancements with high reliability.
  - When hardware RAID is required, the Sun J4000 array family and the Sun StorageTek™ SAS RAID HBA provide cost-effective hardware RAID to protect data while delivering industry-leading performance in comparison to competitor RAID HBAs. Alternatively, many customers prefer to use the RAID functionality built into their operating system or application and leverage the SAS RAID HBA card for battery-backed write acceleration.
  - The Sun J4000 array family offers improved functionality, as compared to competitive solutions, in supporting flexible zoning for multihost connectivity and multipath configurations for customer requirements that demand high-availability solutions.
2. Sun Storage J4000 arrays provide industry-leading scalability and groundbreaking storage density
- The Sun Storage J4000 array family provides significantly higher scalability than the competition, behind one or more servers, to meet exponential data growth requirements.
  - The Sun Storage J4000 array family offers over 4 times more capacity scalability than comparable products (for example, Dell's MD1000, HP's MSA 60, or IBM's EXP3000). With the J4500 array, up to 192 SATA II spindles can be supported behind a single PCIe slot in the server. Using 1 TB SATA II drives, that means 192 TB. With the J4400 array, up to 192 spindles (SAS or SATA II drives) can be supported. The J4200 array supports up to 48 spindles (SAS or SATA II drives).
  - The Sun Storage J4000 array family has 3 times the host connectivity of comparable products (Dell's MD1000, HP's MSA 60, or IBM's EXP3000) so it can support multihost connectivity (connection to more than a single server via external DAS). This level of connectivity creates a new way to provide storage consolidation to servers, lower-cost than in traditional approaches that use

expensive SANs with external and proprietary RAID controllers. It has groundbreaking storage density — over 16% more storage density than the Dell MD1000. This enables J4500 array opportunities for meeting customers' requirements where they are short on datacenter space and need extremely dense solutions.

3. Unlike the competition, Sun switched arrays don't just add external capacity to servers; they easily and dynamically scale storage infrastructure to meet the customer's changing business needs.
  - Unlike traditional storage deployments, infrastructure built using Sun Open Storage systems allows customers to freely mix and match the components of their computing infrastructures as business needs change. Customers can match the servers that meet their compute, DRAM, and PCIe slot scalability needs with the right storage building blocks from the J4000 array family to create and extend their storage infrastructures. As business needs change, customers can then re-purpose or re-use storage infrastructure components simply by adding new software.
  - Sun Open Storage supports rapid response. Customers can create and run applications directly on the storage server, with the switched array capabilities of the J4000 array family providing additional capacity and performance.
4. Sun's J4000 arrays offer heterogeneous support across multiple operating systems, HBAs, servers, and ISV environments.
  - The J4000 array family provides switched array support for a wide variety of operating systems (including Solaris, Windows, and Linux environments). In addition the J4000 family supports multiple HBA cards across a wide range of Sun Servers.
  - The J4000 arrays use Sun's Common Array Manager software (CAM), which is a simple, effective, and powerful tool for managing customers' datacenter-wide J4000 array deployments. This enables single-pane-of-glass management for all your J4000 arrays. Furthermore, CAM also works synergistically with the following storage arrays in the Sun portfolio: Sun™ Storage F5100 Flash Array, Sun™ Storage 2500 Arrays, and Sun™ Storage 6000 Arrays.
  - A number of qualified ISV solutions for the J4000 arrays are available. They include but are not limited to the following: MS Exchange, Sugar CRM, Wowza Media Server, and SAM FS; MySQL, Siebel, PeopleSoft, and Oracle database offerings with ASM; Lustre HPC Storage Solution; several video surveillance applications; backup applications such as Zmanda/Amanda, Symantec, and Legato; and open storage solutions such as iSCSI target and NFS server.
  - J4000 array family switched arrays support both SAS and SATA II disk drives as well as advanced hardware RAID via Sun StorageTek RAID Manager Software. The hardware RAID HBA offers mid-tier enterprises exceptional flexibility to deliver advanced data protection and the ability to scale their direct-attached and external storage solutions, all in an extremely cost-effective manner.

More information on Sun's J4000 array messaging is available in the *J4000 Messaging Source Document*: Sun Win #535196.



Key Features, Functions, and Benefits: J4200 Array		
Feature	Function	Benefit
SAS zoning	Multihost connectivity	Security for multiple domains in a single J4000 array
Drive choice flexibility	Sun's support for different-capacity SAS drives and different-capacity SATA drives in the same tray	>Customizable application provisioning >Ability to meet customer performance/capacity requirements in single-host or multihost environments >Reduction of cost by storing performance data on high-performance drives, using capacity drives for second-tier data
Mix and match of trays (J4200 and J4400 arrays only)	Ability to mix J4200 arrays and J4400 arrays in a single cascade	Capability for customers to deploy solutions to meet their space and/or capacity requirements
Advanced RAID feature of the Sun StorageTek SAS RAID HBA	Provides complete data protection for the customer data stored on the Sun Storage J4200, J4400, and J4500 arrays; supports RAID levels 0, 1, 10, 1E, 5, 6, 50, 5EE, 60	Optimized performance, robustness, and reliability; the Sun StorageTek SAS RAID HBA can deliver benefits typically reserved for the larger enterprise storage environments
J4200 and J4400 arrays support both SAS and SATA II disk drives	Flexibility to meet customer needs and system requirements	A more cost-effective storage pool for different kinds of data, providing better management for information lifecycle management (ILM) applications
Dynamic scalability	Ability to add capacity without system interruption	Powerful scalability to meet growing business requirements
High-availability characteristics of the J4000 array family	No single point of failure due to online storage management, redundant hot-swappable components, and automated path failover	24x7 availability and confidence that business-critical data will be online and accessible at all times
Breakthrough price/performance	> Slashes the cost of add-on storage to less than \$1 per gigabyte > Up to 6 * 12 Gb/sec SAS ports (x4-wide) for 72 Gb total bandwidth	Provides the best value for inexpensive, reliable storage
Support for high-performance SAS and high-capacity SATA II disk drives	J4200 and J4400 arrays with SAS drives can be utilized to maximize performance and increase capacity; for secondary storage requirements, trays with SATA II drives can be integrated to create a cost-effective solution in a single cascade of arrays	Enables a single cascade of Sun Storage J4200 or J4400 arrays to satisfy primary and secondary storage requirements
Dual I/O module cards, redundant host connectivity, and redundant power/cooling on J4200/J4400 arrays	Redundant everything on one single 2RU (J4200 array) or 4RU (J4400 array) chassis	Robust, high-availability design

Key Features, Functions, and Benefits: J4200 Array		
Feature	Function	Benefit
Designed with "pay-as-you-grow" scalability	Online capacity expansion	Lowers acquisition and expansion costs by enabling customers to purchase what they need when they need it, match the storage to the application, add storage without impacting data availability, and create an affordable entry point without sacrificing future scalability
SAS connectivity	The J4000 array family leverages SAS drive and interface technology	Better interoperability, better performance, reduced costs
Common configuration/quoting/ordering system	The J4000 array family is in the same configuration/quoting/ordering system, easing solution ordering with Sun's servers	Helps ensure quick, accurate delivery of Sun server/storage solutions and simplifies opportunities to take advantage of cross-sell promotions
Sun StorageTek™ Common Array Manager software (CAM)	<ul style="list-style-type: none"> <li>&gt; Application-aware storage pools: fast, easy application deployment</li> <li>&gt; Proactive monitoring: dramatically reduced service complexity</li> <li>&gt; Centralized support for a range of Sun Storage offerings, including the Sun Storage F5100 Flash Array, the Sun Storage 2500 Arrays, and the Sun Storage 6000 Arrays</li> </ul>	<ul style="list-style-type: none"> <li>&gt;Less training, reduced operations costs</li> <li>&gt;Quicker deployment time</li> <li>&gt;Quick service for maximum uptime</li> <li>&gt;No need to go from one management interface to another when managing multiple Sun modular arrays; no need to re-train staff from one array model to the other or when upgrading</li> <li>&gt;Supports maximum utilization of storage capacity and complete control over a rapidly growing storage environment</li> </ul>
SAS drive technology	Point-to-point architecture and dual-porting	<ul style="list-style-type: none"> <li>&gt;Provides direct contact with each drive</li> <li>&gt;Drive isolation locates and remedies drive problems more quickly; in contrast to loop topology, where communication must travel through each node</li> <li>&gt;Redundant data paths to each drive maintain connectivity should one link fail</li> </ul>
High spindle density per rack unit	Maximizes floor tile density in full- rack configurations	Reduces floor tile real estate costs for fully populated storage racks and cabinets
Full configuration and support for major operating systems	Support for Sun Solaris, Red Hat Linux, SUSE Linux, Microsoft Windows operating environments	Allows for consolidation on major operating systems, reducing management and maintenance costs



Key Features, Functions, and Benefits: J4200 Array		
Feature	Function	Benefit
Phone home capability	Sun's Auto Service Request uses fault telemetry 24x7 to automatically initiate a service request and begin the problem resolution process as soon as a problem occurs; Automatic Service Request requires a one-way connection via the Internet and a valid warranty or support contract	<ul style="list-style-type: none"> <li>&gt;No cost to enable or install for Sun storage devices under warranty or support contract</li> <li>&gt;Reduction in time-to-repair: 50% reduction in total time from service alert to completed repair with connection</li> <li>&gt;Less phone time and fewer calls: lowers operational costs because diagnostics are sent electronically</li> <li>&gt;Improved device availability</li> <li>&gt;More peace of mind due to reliability of electronic system alerts, 24x7</li> <li>&gt;Quick and easy deployment</li> </ul>
Sun System Pack Rate Card	Provides a concise matrix of service elements, hardware configurations, service terms and prices that make up the J4000 array family Sun System Performance Pack.	Predictable and transparent pricing of hardware and support combinations, to demonstrate the value offered through Sun System Packs and help customers select the appropriate System Pack configuration to meet their service and budget needs
Sun System Pack Allowance	An additional customer discount applicable to the price of hardware when purchased jointly with support	Further reduces the price point of hardware and enables customers to lock in service contracts at lower rates, or to acquire higher levels of support within the same budget.
Simplified data protection with Solaris/ZFS	ZFS makes it easy to grow and shrink file system capacity without administrative intervention, reducing provisioning time by 50% — also significantly reducing cost and complexity by streamlining storage administration and allowing resources to be shared	Reduction in the time required to perform certain functions, from hours to just seconds

## Product Family Placement and Positioning

### Key take-away

The Sun Storage J4000 array family offers scalable and reliable storage while delivering breakthrough economics and low cost with heterogeneous operating system support (Linux and Windows) across a variety of operating systems and environments. When combined with Solaris, the J4000 array is the perfect building block for open storage solutions for customers seeking to reduce reliance on proprietary, higher-priced storage hardware and software from IBM, EMC, HP, etc.

### Sun StorageTek™ J4000 array family key competitive attributes

- Breakthrough pricing (starting well below \$1/GB for the J4200 array, half the price/GB of either HP or Dell)
- Simple, effective, and free management through Sun StorageTek Common Array Manager software (CAM)
- Small footprint (double the storage density of comparable systems from HP and IBM)

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- Additional connectivity (at least 3 times the host connectivity of Dell, HP, and IBM)
- Extreme scalability (up to 4 times more spindles than Dell, HP, and IBM)

### **Positioning of J4000 array family**

In a highly competitive storage market where low-cost storage is considered to be an integral component of any data protection strategy, Sun J4000 array family switched array products are in the forefront. Sun's goal has been to use switched arrays as the basis for feature-rich, inexpensive storage that has the power to truly solve key data growth and protection issues. The Sun Storage J4000 array family answers the need for cost-effective storage by providing offerings that are above and beyond "low cost" and beyond traditional JBOD offerings.

Where the Sun Storage J4000 array family differs from the competition is in its versatility. Its switched arrays provide multihost capability and expandability with flexible drive security (SAS zoning) while they support a wide range of heterogeneous operating system environments. In addition, the J4000 arrays are not only ideal solutions for the traditional JBOD market, but they also take advantage of enterprise application functionality trends to deliver highly reliable and cost-effective storage solutions in a much broader market. J4000 array versatility offers peace of mind for customers, who know that they will not be boxed in by proprietary dead-ends that require forklift replacements for future application upgrades.

### **Sun Storage J4000 array summary of key points**

- Market-leading scalability — up to 192 TB per array
- Breakthrough economy — 90% less than traditional disk arrays, starting at less than \$1/GB
- Performance — equivalent to traditional arrays, high-throughput SAS host ports, 12 Gb/sec
- Market-leading connectivity — up to 6 host ports per J4000 array
- Simplicity — no SAN, attaches directly to server
- Flexibility — customer can add SAS disk for performance or SATA II disk for capacity
- Availability — hot-swap and redundant components

### **Sun Storage J4200 array positioning**

- Best for low entry cost: \$3140
- Smallest size: 2U, 12-drive enclosure
- High connectivity: 6 ports x 12 Gb/sec
- Scales to 48 TB

### **Sun Storage J4400 array positioning**

- Best for high performance or bulk capacity
- Scalability: scales to 192 TB
- High performance: 15 Krpm SAS
- High capacity: 1 TB SATA II

### **Sun Storage J4500 array positioning**

- Best for dense bulk storage
- Highest capacity in its class: 48 TB per tray

- Highest scalability in its class: 192 TB
- Highest density in the market: 12 TB per RU
- Optimized for low-cost SATA II drives

For those customers who require low cost and high-quality storage using simple add-on disk to extend their server storage capacities, the Sun Storage J4200 array is an ideal fit. For those customers seeking high-performance bulk storage with lowest \$/GB, the J4400 array is an ideal fit. For extremely dense requirements where density is key, the J4500 array is an ideal fit.

## Value Proposition

### J4000 arrays with Solaris

When combined with Solaris, J4000 arrays reduce customer reliance on proprietary, higher-priced storage hardware and software offered by such competitors as EMC, HP, and IBM. Unlike the competition, the J4000 arrays allow for easy integration and flexibility with any general-purpose server, and when combined with the Solaris/ZFS file system, they further reduce overall cost by decreasing the time and complexity of administrative tasks while increasing RAS, simplifying administration, and offering unparalleled data protection. Lastly, the J4000 arrays easily manage storage with host-based data services by leveraging a server's virtualization framework capabilities (XVM).

### J4000 arrays with non-Solaris (Linux and Windows)

The J4000 arrays provide heterogeneous support across a wide variety of operating environments (non-Solaris channel opportunities) that include both Linux and Windows operating systems. For customers who need to manage these heterogeneous operating system environments, J4000 arrays combined with the low-cost Sun StorageTek SAS RAID HBA (included with Sun StorageTek RAID Manager software) provide a high level of performance and mission-critical reliability. Unlike the competition, J4000 arrays allow for easy integration and flexibility with any general-purpose server. They offer 10 times more scalability than comparable HP and Dell products and over 3 times more connectivity than comparable HP and IBM products.

### Open, innovative, with breakthrough economics

The J4000 array family belongs to the Sun Systems portfolio, whose core family values are to be open, to be innovative, and to provide breakthrough economics.

#### Open

Sun Open Storage combines industry-standard hardware and open source software to completely change the economics of high-performance, enterprise-class storage. Sun's technology frees your customers from purchasing expensive proprietary systems that lock them into a single architecture or vendor. Sun is committed to being completely open. Customers can deploy the J4000 array family in a wide variety of qualified operating environments such as Solaris, Red Hat Linux, SuSE Linux, or Windows.

#### Innovative

Taking the next step in open storage, Sun has introduced the Sun Storage J4000 array family. These arrays will increase your customers' ability to manage exponential data growth and rising datacenter costs. When you combine them with Sun's industry-leading servers, the Sun J4000 arrays provide highly scalable, cost-effective building blocks that help create a flexible open storage infrastructure. And with Sun's plans to incorporate flash technologies, customers will be able to take advantage of a truly balanced solution.

## Breakthrough economics

When the J4000 array is used in an open storage deployment, your customers can reduce their storage costs by up to 90 percent. And unlike traditional storage environments, Sun's Open Storage allows them to freely mix and match components, including the J4000 array, in their computing infrastructures as their business needs change. Customers can repurpose and reuse hardware simply by adding new software to the server component. They will recognize this dramatic change in enterprise-class cost performance; it will enable them to deploy entirely new applications and compete much more effectively in their core markets. These arrays offer the most scalability, connectivity, and reliability in comparison to competing solutions. And when they are combined with Solaris, the J4000 arrays are ideal storage building blocks for those who want to reduce reliance on proprietary, high-priced storage hardware and software.

## Solaris/ZFS

With Solaris your customers get the ZFS file system at no extra cost. Together, Solaris and ZFS provide high availability and reliable data protection capabilities that prevent corruption. ZFS also lets customers diagnose and fix problems in minutes or hours, instead of days or weeks. Advanced services for replication, snapshot, compression, and restore are built-in features, instead of being extra-cost options.

## Sun Storage J4200 array value propositions

- Best for low entry cost: \$3140
- Smallest size: 2U, 12-drive enclosure
- High connectivity: 6 ports x 12 Gb/sec
- Scales to 48 TB

## Target Customers

The primary customers for the Sun Storage J4200 array are Sun network storage direct accounts, storage-only resellers, solution resellers, server resellers, OEMs, distributors, and system integrators. The J4200 array meets the needs of a variety of end users, as shown in the following table.

Target Customers	
Individual User	Buying Needs
Corporate Buyer	Self-administrable storage system from a name they can trust to support departmental storage
Remote Office Manager	Cost-effective and self-administrable storage system with the flexibility to grow
System Administrator	Familiar GUI with a choice of interface technologies and flexibility to add premium software features
Office Manager	Cost-effective and simple interface to consolidate internal or external DAS for highly available and performance-optimized shared storage
MIS Manager	Flexible, configurable, and scalable storage

Sun Storage J4200 arrays support a range of customers' unique data requirements, from the needs of enterprise organizations to the requirements of entry/workgroup environments. For the enterprise buyer with departmental and remote offices, the J4200 array is a reliable and self-administrable array from a name they can trust. For the entry-level user, the J4200 array

replaces overburdened and inefficient internal storage or external DAS with a highly available shared storage solution.

## Target Markets

Below is an example of the end-user scenarios for which Sun Storage J4000 arrays are suitable, as well as a listing of the key features that apply to each scenario.

Target Market Scenarios	
End-User Scenario	Key Features
<b>Rising datacenter costs</b>	The Sun Storage J4000 array family offers breakthrough pricing as low as \$1/GB for bulk storage applications, and provides a very cost-effective starting point at around \$3K/system. Additionally, with its industry-leading density and small footprint (up to 6 drives/U for the J4400 array and 12 drives/U for the J4500 array), the J4000 array family increases the bottom line by saving scarce rack space.
<b>Massive data growth</b>	The Sun Storage J4000 array family provides extreme scalability and density. This allows for easy capacity growth projections and circumvents the need for costly forklift upgrades if and when data growth thresholds are exceeded.
<b>Overloaded IT staff and resources</b>	The Sun Storage J4000 array family leverages Common Array Manager features — available at no charge — to simplify IT resources by providing single-pane-of-glass management for all the J4000 arrays in the datacenter.
<b>Reliability</b>	The Sun Storage J4200/J4400 arrays are designed for high reliability, providing redundant, hot-swappable components for 1+1 redundancy across the system. The Sun Storage J4500 array is designed for high reliability through redundant power supplies/fans and redundant data paths.

## Target Applications

With a choice of SATA or SAS interfaces, the Sun Storage J4200 array satisfies a wide range of application data requirements. Key applications include:

- Low-cost SAS/SATA storage
- Incremental server storage
- Cost-effective data protection
- Multihost connectivity

# Enabling Technology for Sun™ Storage J4200 Array

## Technology Overview

The Sun™ Storage J4200 array is a high-availability, cost-effective, modular, rack-mountable and scalable 2U SAS-to-SAS switched array, which provides 12 x 3.5" hard disk drive (HDD) carriers per tray to support various types of drives. The HDDs supported include 3 Gb/sec SAS drives (300 GB and 450 GB 15 Krpm drives) and 3 Gb/sec SATA II drives (250 GB, 500 GB, 750 GB, and 1 TB 7.2 Krpm drives) with an interposer card. In addition, the J4200 array includes two 500W fully redundant power supplies, two fan modules, and two SIM modules, all hot-swappable. Each SIM module provides two x4-wide SAS ports for host connectivity and J4200 array cascading configurations.

The J4200 arrays come with Sun StorageTek™ Common Array Manager software, which is common across the Sun Storage J4000 array family as well as the Sun StorageTek 6xxx and 25xx lines of storage arrays. StorageTek Common Array Manager software is a powerful yet easy-to-use management interface that helps reduce the complexity and lower storage administration costs with centralized management, run-anywhere flexibility, and a single interface across the J4000 arrays.

## Interface Technologies Overview

### SAS interface technology and the Sun Storage J4200 array

SAS offers customers more choice, with the ability to deploy a diverse range of system capabilities through a common storage connection interface. Due to the full duplexing capabilities of SAS, data can be received and transmitted at the same time, providing increased bandwidth. SAS also breaks free of the 15-drive-per-channel barrier that parallel SCSI technology established. With its high addressability and connectivity, the SAS interface dynamically increases connectivity to attached nodes.

Additional SAS features include:

- Port and bandwidth aggregation will connect storage devices via x4-wide ports
  - 3 Gb/sec wide ports combine x4 links providing a cumulative bandwidth of 12 Gb/sec using all lanes to ship frames comprising I/O and data
  - When connecting a server to a J4200 array, wide ports offer higher bandwidth than parallel SCSI
- 2 meters maximum cabling length between devices
- SAS preserves SCSI middleware, the software that uses interface commands such as applications, custom utilities, or scripts; it has not changed from parallel SCSI

### SAS and SATA drive overview

#### SAS drives

As the next chapter of SCSI technology, SAS benefits from more than 20 years of SCSI technology, incorporating SCSI command sets while taking full advantage of serial architecture. Comparably priced to SCSI drives, SAS drives enable users to scale and add drives for critical and transaction-based applications without extending budgets.

SAS has several key benefits:

- Universal connection – interoperability with SATA II drives supporting SAS and SATA on



the same controller

- 3 Gb/sec throughput
- Improved RPM with 10,000 and 15,000 RPM options
- Dual-porting – redundancy that increases availability, with each drive having an alternate link and maintaining that connectivity in case one link fails
- Point-to-point architecture that provides direct contact with each drive, enabling users to locate problem drives more quickly than with parallel loop topology where communication travels through each node

### SATA II drives

Serial ATA is the latest generation of the ATA (Advanced Technology Attachment) disk interface. SATA is based on serial signaling technology, unlike IDE drives that use parallel signaling. SATA uses a less-expensive protocol and is less expensive to implement. With emerging markets promising unique applications that demand low-cost storage as a priority (such as nearline storage, virtual tape, tape replacement, fixed content, and Web caching) SATA technology fills the bill.

The J4200 array is ideally suited for the specific workload, capacity, and cost requirements of entry-level and secondary storage. With SATA technology, organizations can allow data that would otherwise be archived on tape to be cost-effectively brought online, thereby improving reliability, access rates, and service levels. In addition, with SATA's larger drive capacity, fewer drives are needed to reach a desired system capacity — resulting in bigger savings for secondary storage applications.

SAS and SATA II Drive Technology Differentiators			
Feature	SATA		SAS
Data Types	Secondary : Online access necessary with periodic access	Entry-level: Sporadic access with cost presiding over performance	Business-critical and transaction-based: <ul style="list-style-type: none"> <li>• Online, high availability</li> <li>• Random reads</li> </ul>
Business Applications	Fixed content, reference data, D2D	First external RAID, file and print server	ERP, OLTP, Oracle, Exchange
Performance	Good IOPS and MB/sec		Highest IOPS and MB/sec
Specifications			
Protocol	ATA commands		SCSI commands
Dual-Porting	No*		Yes
Duplex	Half		Full

\* **Note:** Redundancy is made available via the drive interposer card

## Sun StorageTek™ Common Array Manager Software

Sun StorageTek™ Common Array Manager software (CAM), included with every J4000 array family product, is the J4000 array family's browser-based, application-oriented management console. This intuitive, centralized management interface needs only a secure Internet connection and a browser window to be at the user's fingertips. The interface provides powerful granular controls for expert users, as well as indispensable ease of use for those less familiar with storage management. Whether the task is replicating between sites, running snapshots, or

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configuring for specific application workloads, quick wizards and menus get users there fast.

An array management tool with powerful functionality, CAM is used as the standard management software for Sun Storage J4000 arrays as well as the Sun Storage F5100 Flash Array and Sun™ Storage 2510, 2530, 2540, 6180, 6580, and 6780 Arrays. CAM has an easy-to-use, Java-based GUI which provides centralized administration for multiple arrays, including the J4000 arrays and any other Sun storage arrays that the customer may deploy. CAM enables online administration, a consistent interface across all operating systems, and the ability to monitor and manage one or all arrays from any location on the network, regardless of host platform. CAM version 6.4.1 or later includes zoning software that enables and provides security for multihost connectivity environments.

CAM helps reduce complexity and lower storage administration costs with centralized management, run-anywhere flexibility, and a single interface across the J4000 arrays. CAM improves storage utilization by providing data services tailored for the J4000 array family.

Administrative tasks are supported by CAM features such as proactive health checking, intelligent diagnosis, fault isolation, event notification, guided service procedures, and fault management reporting for the J4000 arrays from a single management console — including the ability to automatically open Sun Service Tickets through Sun's Auto Service Request (ASR) service (<http://www.sun.com/service/remotectstorage/>). This software helps improve the time to recover and increases infrastructure uptime, thus contributing to the overall improvement of application service levels.

CAM provides both a browser interface and a command-line interface (CLI) for configuring and managing arrays on an external management host or a host directly attached to storage. In addition, CAM provides a small relay agent (also known as a proxy) which provides single-pane-of-glass management for all J4000 arrays in the datacenter. This includes the ability to upgrade array firmware from the centralized location.

CAM support for the J4000 arrays is available with the Sun StorageTek™ PCIe SAS HBA (SG-(X)PCIE8SAS-E-Z), or the Sun StorageTek™ Express Module SAS HBA (SG-XPCIE8SAS-EB-Z), and the Sun StorageTek™ SAS RAID HBA (SG(X)PCIESAS-R-EXT-Z).

## Sun StorageTek™ RAID Manager software

Sun StorageTek™ RAID Manager software provides RAID configuration and management capabilities. It includes a full-featured GUI software application and provides a single-view tool that supports simple, secure, centralized configuration and monitoring of all RAID HBAs and disk drives in the storage environment. RAID Manager software enables storage administrators to group disk drives into logical arrays and build in redundancy, to safeguard business-critical data and improve system performance.

StorageTek RAID Manager software is intended to be used in conjunction with the installation of Sun StorageTek Common Array Manager software (CAM) and the Sun StorageTek™ SAS RAID HBA. (See preceding Common Array Manager subsection.) It is important that customers install CAM to take full advantage of the features and functionality of RAID Manager software. CAM will provide firmware upgrade capability and remote serviceability, through Auto Service Request (ASR), to the J4000 arrays.

A command line utility is available in addition to StorageTek RAID Manager software to assist in the configuration and management of the Sun StorageTek SAS RAID HBA.

## Sun Solaris™ ZFS

The Solaris™ Zettabyte File System (ZFS) is available to use at no added cost when J4000 arrays are deployed with Sun Servers running Solaris 10. ZFS is designed from the ground up to offer customers robust data protection and increasing RAS to meet their demanding data requirements. Solaris/ZFS contains many powerful features, including self-healing data and end-to-end data check sums that dramatically improve data integrity. Together these can reduce downtime by 32 percent to 52 percent.

Sun Solaris™ and Solaris/ZFS (Zettabyte File System) software automate common administrative tasks for arrays, protecting data from corruption and providing virtually unlimited scalability. ZFS uses virtual storage pools to make it easy to expand or contract the J4000 arrays simply by adding or deleting drives. Solaris/ZFS will significantly reduce costs by streamlining storage administration and allowing resources to be shared among file systems. The time required to perform some functions will be reduced by orders of magnitude — from hours to just seconds.

Solaris/ZFS offers the capability to manage more data with less; with ZFS, there is no need to configure (or worse, reconfigure) the underlying storage device when storage requirements change, as this is handled automatically when disks are added to a ZFS pool. Any J4000 array — whether fitted with hard disk drives or solid state drives (SSDs) — can simply be added to the storage pool and its full capacity will be automatically and immediately available.

### Further management software information

For more information about the software that is used to manage the J4000 arrays, please refer to the following URLs:

Sun StorageTek Common Array Manager software:

[http://www.sun.com/storagetek/management\\_software/resource\\_management/cam/](http://www.sun.com/storagetek/management_software/resource_management/cam/)

Solaris/ZFS: [http://www.sun.com/software/solaris/zfs\\_learning\\_center.jsp](http://www.sun.com/software/solaris/zfs_learning_center.jsp)

Sun StorageTek RAID Manager software: <http://docs.sun.com/app/docs/prod/storedge.raid#hic>

# System Architecture: Sun™ Storage J4200 Array

## Overview

The Sun Storage J4200 array is a high-availability, cost-effective 2U storage array. It supports up to 12 3.5-inch SATA II or SAS hard drives. In addition, the J4200 array supports two 500W fully redundant power supplies, two fan modules, and two SIM modules. Each SIM module in the J4200 array provides two x4-wide SAS ports for host connectivity and an additional x4-wide SAS expansion/host port for a total of 36 Gb per second of throughput.

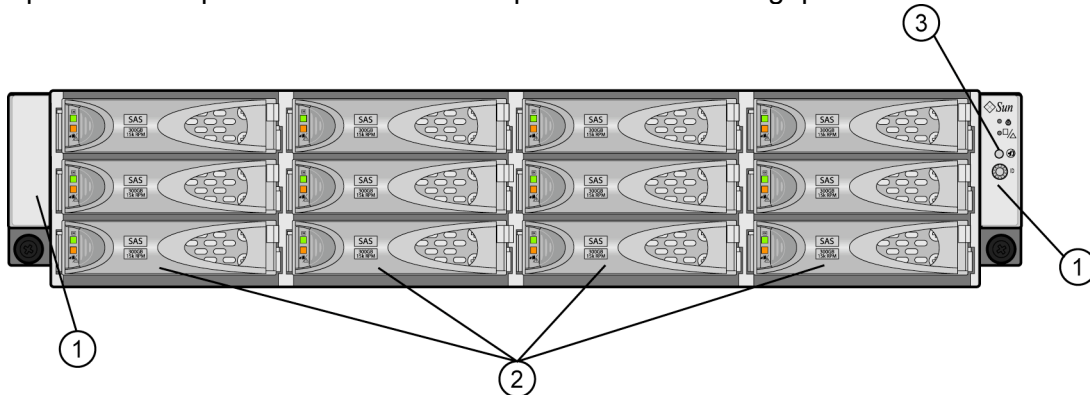


Figure 1. Rear panel,  
Sun Storage J4200 array

### Figure Legend:

- 1 End caps with serial number (left) and status indicators (right)
- 2 Disks
- 3 Audible alarm silence button

## Architecture

The Sun Storage J4200 and J4400 arrays are general purpose, high-availability, cost-effective serial attached SCSI (SAS) devices. The J4200 array is a 2U, 12-disk tray and the J4400 array is a 4U, 24-disk tray. Each supports SAS and Serial Advanced Technology Architecture (SATA II) disk drives.

Because the J4200 array includes redundant I/O control modules, power supplies, and cooling modules, it is a “no single point of failure” solution. Active-active dual controller architecture, hot-swappable hard disks, and dual paths to every hard drive are features the J4200 array has leveraged for high reliability and 24x7 availability.

Each J4200 array system supports up to 48 SAS or SATA II hard disks. Its total storage capacity is up to 7.2 TB for SAS hard disks (600 GB per disk) or 12 TB for SATA II hard disks (1 TB per disk). The J4200 array provides these capacity ranges for SAS drives: 300 GB and 600 GB; and for SATA II drives: 250 GB, 500 GB, 750 GB, and 1 TB.

The J4200/J4400 arrays support 15K SAS drives and 7.2K SATA II drives. You can interconnect up to four J4200/J4400 array trays, with up to 48 drives in interconnected J4200 arrays and up to 96 drives in interconnected J4400 arrays, all of which are designed to fit into a standard 19-inch cabinet. This renders a raw storage capacity of 28.8 TB for SAS disks (600 GB per disk) or 48 TB for SATA II disks (1 TB per disk) for the J4200 array, and 57.6 TB for SAS disks (600 GB per disk) or 96 TB for SATA II disks (1

TB per disk) for the J4400 array.

J4200 arrays are packaged with SAS interconnect cables; one .5-meter SAS interconnect cable comes with both diskless chassis and X-option SAS I/O module orders.

Architectural Features				
What Users Want	Technology/ Design Innovation	What it Is	What it Does	What's Worth Noting
<b>Flexibility in provisioning compute resources for applications</b>	Modular design, interchangeable disk drives, power supplies, fans, and I/O modules	Hardware provisioning is efficient; if one of the redundant components fails to work, the other component will continue to work until the failed one is replaced	Redundant, hot-swappable FRU components ensure efficient resource utilization and operation flexibility	This design feature is exclusive to Sun
<b>System reliability</b>	Redundant, hot-swappable FRUs	Redundant, hot-swappable disk drives, power modules, and cooling modules ensure exceptional reliability; a drive failure is isolated to that drive, without spreading to any other connections	Point-to-point connectivity to each SAS/SATA II disk drive isolates drive failures, increasing reliability and performance	The system will continue to operate without failing
<b>Failover</b>	Multiple data and management connection paths between the server and the J4200 array via HBA card	Multiple connection paths, each with redundant FRU components, help to ensure that the connection is still viable even if one or more paths fail	Automatic failover capability is present in systems requiring continuous availability and a high degree of reliability	More fault-tolerant than ever
<b>High availability and business continuity</b>	Redundant, hot-swappable disk drives, power supplies, cooling modules, and I/O modules	The J4200 array has no single point of failure due to dual I/O modules, redundant host connectivity, and redundant power/cooling; it provides protection against the failure of a FRU component	Decreases downtime by removing single points of failure; keeps application online	Provides continual data access

Architectural Features				
What Users Want	Technology/ Design Innovation	What it Is	What it Does	What's Worth Noting
<b>Ease of management and online upgrades over the network</b>	Configure storage administration via easy-to-use, Sun-developed graphical user interface software (SES Management tool)	Disk firmware can be upgraded without system interruption	Centralized management to monitor and administer the system; manage non-disruptive operations, including firmware upgrades, configuration changes, and more	Currently Sun is the only one that offers online disk/system firmware upgrade features
<b>Fault-tolerant hardware design</b>	100% redundancy on hot-swappable disk drives, power supplies, fans, and I/O modules	When one component fails, the second component will take over the process until the faulty one is repaired, therefore allowing uninterrupted operations	Achieves: >No single point of failure >Fault isolation to the failing component	Fault-tolerance feature is present in high-availability J4200 array
<b>Scalability and performance</b>	High-performance, modular; can be configured to have either high-performance SAS or capacity-intensive SATA storage systems	By daisy-chaining can support up to a maximum of 48 disk drives to meet both performance and capacity requirements	Modular, pay-as-you-grow scalability; use high-performance SAS drives to meet performance requirements	A technology breakthrough since no competitor offers this kind of disk flexibility

## J4000 Array Notes

### Available features for the Sun Storage J4200 array

- Support for up to 4 J4200 arrays in a single cascade for a total of 48 drives; the J4200 array will support up to 4 trays behind each of the two ports of the Sun StorageTek PCIe SAS HBA for a total of 96 drives.
  - Sun StorageTek™ PCIe SAS HBA (SG-(X) PCIE8SAS-E-Z)
  - Sun StorageTek™ Express Module SAS HBA (SG-XPCIE8SAS-EB-Z)
  - With the Sun StorageTek PCIe SAS HBA, or the Sun StorageTek Express Module SAS HBA, scalability to 96 SAS or SATA II disk drives (using 2 cascades of 4 trays each)
  - Sun StorageTek™ SAS RAID HBA (SG(X)PCIESAS-R-EXT-Z)
  - With the Sun StorageTek SAS RAID HBA, scalability to 48 SAS or SATA II drives in four enclosures
- Note:** The Sun StorageTek SAS RAID HBA supports only single-path configurations.
- Common Array Manager software (CAM) version 6.4.1 (or later version)
  - Disk : 2U – 12 drive SAS/SATA II drives attached, 2 disks minimum

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- Multipathing support is available for the J4000 arrays through the associated multipathing drivers:
  - SAS multipath for Solaris 10
  - SATA multipath for Solaris 10
  - SAS/SATA multipath for Linux
  - SAS/SATA multipath for Win2003 (coming soon: Q4CY09 delivery)
  - SAS/SATA multipath for Win2008
- SAS zoning in CAM version 6.4.1 or later
- Multihosting is supported by the SAS zoning capabilities of Common Array Manager software; the J4200 and J4400 arrays will both support up to six hosts and J4500 arrays will support up to four hosts
- Sun Cluster capability: currently there is Sun cluster support for SAS-based J4200 and J4400 array configurations only; Sun cluster support for SATA drives in the J4000 array family is coming soon so please visit the Sun Cluster Roadmap for the release date

### Hardware highlights

- Serial-attached SCSI (SAS)
- 2 RU chassis supporting up to 12 SAS/SATA II HDDs
- Available via ATO factory-configurable and X-option customer-installable selling models
- Available in single or dual I/O module configurations
- Each SAS I/O module contains 3 12 Gb/sec (x4-wide) ports
- Up to 6 12 Gb/sec SAS ports per array
- Each I/O module provides:
  - 2 (x4-wide) SAS host/uplink ports (24 Gb/sec bandwidth)
  - 1 (x4-wide) SAS expansion/host port (12 Gb/sec bandwidth)
- Lower TCO: customer replaceable units (CRUs) for chassis/midplanes, I/O modules, power/cooling units and HDDs
- Low entry price
- Front-mounted drives
- HDDs: 3.5", low-profile form factor
- Dual-ported high-performance SAS disk drives: 300 GB and 450 GB 15 Krpm
- SATA II disk drives: 250 GB, 500 GB, 750 GB, and 1 TB 7.2 Krpm
- Future drives:
  - 600 GB 15 Krpm drive coming in Q4CY09
  - 2 TB 7.2 Krpm drive coming in Q4CY09
- Supports up to 48 SAS or SATA II disk drives
- Supports mix-and-match of drive type and capacity per array
- Supports mix-and-match of J4200 and J4400 arrays in a single cascade

## Hardware-based RAID functionality

- Sun StorageTek SAS RAID HBA with high-performance advanced RAID functionality, including full-hardware RAID support for RAID levels 0, 1, 10, 1E, 5, 6, 50, 5EE, and 60.

## Software-based RAID functionality

- Sun Solaris 10 ZFS with RAID-Z
- Linux RAID
- Application-based software RAID (e.g., Oracle ASM)
- Sun StorageTek RAID Manager software

## Software manageability

**Note:** All software is offered free of usage charges.

- Comprehensive management through Sun StorageTek™ Common Array Manager software (CAM), included with J4000 arrays
- Sun StorageTek™ RAID Manager software provides a single-view tool that supports simple, secure, centralized configuration and monitoring of all HBAs and disk drives in a customer's storage environment (included with Sun StorageTek RAID HBA)
- Auto Service Request (ASR) uses fault telemetry 24x7 to automatically initiate a service request and begin the problem resolution process as soon as a problem occurs (requires CAM to enable the connection)

## High-availability features

- Redundant, hot-swappable components:
  - I/O modules
  - disk drives
  - interconnect cables
  - power/cooling components
- Automated I/O path failover
- Online administration, expansion, configuration
- Global hot spares

## Flash-ready technology

The J4200 and J4400 arrays are all flash-ready. They are already optimized to deliver the next significant boost in application performance through upcoming Flash disk technologies.

## Detailed technical information on the Sun Storage J4000 arrays

User's guides, field guides, and more are posted externally at

[http://www.sun.com/storagetek/disk\\_systems/workgroup/](http://www.sun.com/storagetek/disk_systems/workgroup/)

<http://www.sun.com/products-n->

[solutions/hardware/docs/Network\\_Storage\\_Solutions/Workgroup/](http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/)

<http://docs.sun.com/app/docs/prod/sysexp.disk#hic>



## Performance

The Sun Storage J4200 array offers up to six 3 Gb/sec SAS ports (3 ports per SAS I/O module) which provide up to 72 Gb/sec total bandwidth via four (x4-wide) SAS host/uplink ports (48 Gb/sec bandwidth) and two (x4-wide) SAS expansion/host ports (24 Gb/sec bandwidth), for exceptional performance across all disks. The active-active dual I/O module architecture also supports the system's high performance.

The Sun Storage J4200 and J4400 arrays, coupled with Sun SAS HBAs, have demonstrated world-record SPC-1 array price/performance benchmark capabilities. The Sun Storage J4200 array achieved performance of 3,144.63 SPC-1 IOPS @ \$2.36 \$/SPC-1 IOPS and the Sun Storage J4400 array achieved performance of 7,201.32 SPC-1 IOPS @ \$1.73 \$/SPC-1 IOPS in single-path configuration. These demonstrate true scaling of this product family, with the J4400 array showing a great value for bulk storage needs. See [www.storageperformance.org](http://www.storageperformance.org).

J4000 Array Performance					
Configuration		Throughput MB/sec 512K		Performance IOPS 8K	
Product	Operating Syst.	Seq Read	Seq Write	Ran Read	Ran Write
J4200 array with Sun StorageTek PCIe SAS HBA, SATA HDDs	S10 U5 / Win2003	941	819	1281	1468
J4400 array with Sun StorageTek PCIe SAS HBA, SATA HDDs	S10 U5 / Win2003	1026	886	3113	3441
J4500 array with Sun StorageTek SAS RAID HBA' SATA HDDs	S10 U5	1023	848	6015	6172
J4200 array with Sun StorageTek PCIe SAS HBA, SAS HDDs	S10 U5 / Win2003	1063	1006	3125	2497
J4400 array with Sun StorageTek PCIe SAS HBA, SAS HDDs	S10 U5 / Win2003	1129	1159	6362	5391

**Note:** Values are single-port measurements. Performance results are achieved under ideal circumstances in a benchmark test environment. Actual customer results will vary based on configuration and infrastructure components.

# Reliability, Availability, and Serviceability (RAS): Sun™ Storage J4200 Array

## RAS Features

RAS features of the Sun™ Storage J4200 array include the following:

- High availability due to redundant, hot-swappable components
- Non-disruptive firmware upgrades
- Non-disruptive component (major FRU) replacement
- Dual non-disruptive hot-swappable I/O modules
- Non-disruptive hot-swappable disk drives
- Dual hot-swappable, redundant, and load-sharing power supplies
- Hot-swappable and redundant cooling fans
- RAID protection provided by host software or hardware (Sun StorageTek SAS RAID HBA)
- Automated I/O path failover
- Online administration, expansion, and configuration
- Active-active dual I/O module architecture
- Low CRU count — and the drives, I/O modules, cooling fan modules, and power supplies can be hot-swapped with no tools required
- Support for CRU — customer replaceable units can be hot-swapped and replaced by customers
- Drive auto-detection
- Online firmware upgrades
- Phone home capability via Auto Service Request (ASR)

# Specifications: Sun™ Storage J4200 Array

## Physical Characteristics

I/O module	Dual and single SAS I/O modules
Interfaces/link speeds	Three or six 3 Gb/sec SAS total ports per tray
Bandwidth	Up to 72 Gb/sec total bandwidth: 4 (x4-wide) SAS host/uplink ports (48 Gb/sec bandwidth) 2 (x4-wide) SAS expansion/host ports (24 Gb/sec bandwidth)
RAID levels HW (with RAID HBA) SW (with Solaris/ZFS)	RAID levels 0, 1, 10, 1E, 5, 6, 50, 5EE, 60 RAID levels 0,1,5,6
Drive population	Scales from 2 to 12 hard disk drives per tray
Dynamic capacity expansion	2 to 48 drives, 300 GB to 36 TB
Volume with HW RAID HBA) with Solaris/ZFS	512 TB per LUN Virtually unlimited
Drive slots	A maximum of 12 disks per system with a two-drive minimum; interconnects up to four systems and 48 disk drives 3.5-inch form factor, 1.0-inch height
Redundant, hot-swappable components	2 SAS I/O modules 2 power supply modules 2 fan modules Up to 12 SAS or SATA II disks
System form factor	Internal bays for up to 12 disks
	Rack-mounts in a 19-inch cabinet

## Disk Drives

Form factor	3.5-inch
Interface	SAS SATA
Supported drive types	SAS drives: 300 GB, 450 GB 15,000 rpm SATA II drives: 250 GB, 500 GB, 750 GB, 1TB 7200 rpm

## Dimensions

Height x width x depth	3.44 in. x 17.52 in. x 24.39 in. (87.4 mm x 445.0 mm x 619.39 mm) including bezel and SAS connector; including bezel and power supply handles, depth is 24.03 in. ( 610.4 mm)
Weight (maximum)	61.73 lb. (28 Kg)

## Sun Supported Racks

Sun Rack 900/1000 cabinet (or replacement product)
Sun StorEdge Expansion cabinet
Sun Fire Expansion Cabinet
Any 19-inch wide, 4-post, EIA-compatible rack or cabinet with a front-to-back depth between vertical cabinet rails of 61 cm to 91 cm (24 in. to 36 in.) with threaded or unthreaded cabinet rails

## Airflow Space Characteristics

Front	25 cm
Rear	35 cm
Top	20 cm

## Management, O/S, Connectivity

Management software support	Sun StorageTek™ Common Array Manager software (CAM) Sun StorageTek RAID Manager software
Operating system (O/S) support	Solaris (SPARC and X64), Red Hat Enterprise Linux, SuSE Linux Enterprise Server, Microsoft Windows Server 2003, Microsoft Windows Server 2008
Host connectivity: host/HBA	See <a href="https://extranet.stortek.com/interop/interop">https://extranet.stortek.com/interop/interop</a>

## Power

AC power maximum operating current	9 A max. operating (100 VAC to 127 VAC range), 47 to 63 Hz 4.5 A max. operating (200 VAC to 240 VAC range, 47 to 63 Hz 1.51 A max. operating @ 240 VAC (198 VAC to 264 VAC range), 50 to 60 Hz
Input voltage	88 – 264 VAC
Input frequency	47 – 63 Hz
Output power	500W
Power consumption	106.54 VA; 100.4W
Heat dissipation	344.47 BTU/Hr

## Operating Environment

Heat output	352.8W (1204 BTU/Hr)
Temperature (operating)	35°F to 95°F (0°C to 35°C)
Humidity (non-condensing)	20% to 80% maximum
Altitude	0 to 9843 feet (3000 meters)
Shock	31G +/-5%, with pulse duration of 2.6 ms or less half-sine, bottom side tested only
Vibration	0.25G (peak), 3 to 200 Hz sweep @ ½ octave per minute, bottom side tested only

## Monitoring

Management features	Online software and firmware upgrades Status indicators for SAS I/O module boards, disks, power supplies, and fan modules
Monitoring software	Common Array Manager software
Remote monitoring services	Auto Service Request
Management software	Common Array Manager software

## Electromagnetic Compatibility (EMC) Standards

FCC 47CFR15 Subpart B Class A (USA)
ICES-003 Class A (Canada)
CE Mark including EN55022 Class A, EN55024, EN61000-3-2, and EN61000-3-3 (Europe)
VCCI-03 Class A (Japan)
CCC Class A (China)
BSMI CNS13438 Class A (Taiwan)
C-Tick Mark (Australia and New Zealand)

## Safety Standards

UL/CUL: U.S. with Canada / UL60950-1
TUV Sud: Europe / EN60950-1
CB (by TUV): IEC60950-1
BSMI: Taiwan / CNS14336
CCC: for China

## Supported Host Platforms

Solaris (SPARC and x64)
Red Hat Enterprise Linux
SuSE Linux Enterprise Server
Microsoft Windows Server

## Warranty

Duration	Three years — parts exchange
Phone support	8 a.m.–5 p.m., Mon.–Fri.
Remote services	Auto Service Request
Other	Additional support and extended onsite coverage available through Sun System Pack

# System Requirements: Sun™ Storage J4200 Array

J4000 array family release notes are posted at the following URL:  
<http://docs.sun.com/app/docs/prod/wkgrp.disk#hic>

## Supported Host Platforms

The Sun Storage J4200, J4400, and J4500 arrays support the following host platforms. Note that the support shown below includes boot support for all supported platforms and HBAs.

### Rack servers

- Sun Fire™ X2100M2
- Sun Fire™ X2200M2
- Sun Fire™ X2250
- Sun Fire™ X2270
- Sun Fire™ X4100M2
- Sun Fire™ X4200M2
- Sun Fire™ X4600
- Sun Fire™ X4600M2
- Sun Fire™ V215
- Sun Fire™ V245
- Sun Fire™ V445
- Sun Fire™ X4140
- Sun Fire™ X4150
- Sun Fire™ X4170
- Sun Fire™ X4240
- Sun Fire™ X4250
- Sun Fire™ X4270
- Sun Fire™ X4275
- Sun Fire™ X4440
- Sun Fire™ X4450
- Sun Fire™ X4540
- Sun SPARC Enterprise T1000
- Sun SPARC Enterprise T2000
- Sun SPARC Enterprise T5120
- Sun SPARC Enterprise T5220
- Sun SPARC Enterprise T5140
- Sun SPARC Enterprise T5240
- Sun SPARC Enterprise T5440
- Sun SPARC Enterprise M3000
- Sun SPARC Enterprise M4000
- Sun SPARC Enterprise M5000

- Sun SPARC Enterprise M8000
- Sun SPARC Enterprise M9000

### **Rack server SAS HBAs**

- Sun StorageTek PCIe SAS HBA
- Sun StorageTek SAS RAID HBA

### **Blade servers**

- Sun Blade™ X6220
- Sun Blade™ X6240
- Sun Blade™ X6250
- Sun Blade™ X6270
- Sun Blade™ X6275
- Sun Blade™ X6420
- Sun Blade™ X6450
- Sun Blade™ T6300
- Sun Blade™ T6320
- Sun Blade™ T6340

### **Blade server SAS HBAs**

- Sun StorageTek Express Module SAS HBA

### **Supported Operating Systems**

All Sun Storage J4000 arrays support the following operating systems:

- Solaris 10 U4
- Solaris 10 U5
- Solaris 10 U6
- Solaris 10 U7
- Open Solaris 2009.6
- Win 2003 32/64 bit
- Win 2008
- RHEL 4 U6 32/64 bit
- RHEL 5 U1 32/64 bit
- SUSE 10 SP1 32/64 bit
- SUSE 9 SP3 32/64 bit

## The Sun StorageTek™ Interop Tool

For the latest compatibility information covering HBAs, SAS cables, servers and operating systems, please refer to the Sun Storage Interop Tool, posted at <https://extranet.storitek.com/interop/interop?cmd=report>

The data file can also be obtained by internal Sun employees at <https://onestop.sfbay.sun.com/>

## Supported Sun Enterprise and Application Software

- Sun StorageTek™ Common Array Manager software (CAM)
- Sun Solaris/ZFS
- Sun StorageTek RAID Manager software
- MySQL

## Supported Third-Party Software

- WHCL Certification
- Microsoft Exchange
- Symantec Netbackup software
- EMC Enterprise Backup Software
- SugarCRM
- Veritas Foundation Suite

For the latest supported Sun enterprise and application software, and the latest supported third-party software, please refer to the Sun Storage Interop Tool posted at <https://extranet.storitek.com/interop/interop?cmd=report>

## CAM Management Host Requirements

The external management host where the management software resides has the following system requirements:

- Platform: SPARC or x64 server
- Operating Systems: Solaris 8, 9, 10 SPARC, Solaris 10 x64 Operating Environments, Linux RH 4u2, SuSE 9, SuSE 10, Windows XP Professional SP2, Windows 2000 SP4 and Windows 2003 SP1, Windows 2008
- Disk Space: 500 MB (full installation), 100 MB (minimum install)
- Includes 300 MB in the /opt directory, 200 MB in the /var directory)
- Minimum host memory (2 arrays, 2 users): 512 MB
- Recommended host memory: 1 GB
- Supported browsers:
  - Netscape Navigator 7.2 or higher
  - Microsoft Internet Explorer 5.5 (7 is not supported)
  - Mozilla / Firefox 1.4 or higher



# System Configuration and Management: Sun™ Storage J4200 Array

## Scalability

A key selling feature of the Sun™ Storage J4000 arrays is “start small, grow big” scalability. Scalability in the storage domain allows IT managers to respond to their constantly changing storage environments. By starting small, with the flexibility to dynamically grow, the Sun Storage J4000 arrays allow users to make additional investments in infrastructure only when their data growth necessitates it. Designed with replaceable components and key-enabled software features, the J4000 arrays permit organizations to easily increase capacity and storage capabilities if and when they need to.

The Sun Storage J4000 arrays connect directly to servers via one or more SAS interfaces and provide external disk storage to the servers. Customers can connect the J4000 array family to one of three types of qualified operating server environments: Solaris, Linux, or Windows. The software management utility included with each J4000 array, Common Array Manager software (CAM), also runs in Solaris, Linux, or Windows environments.

## Available in two forms

The J4200 and J4400 arrays are both available in two forms: a) Via customized factory-configured assemble-to-order (ATO) combinations, which are formed by an aggregation of part numbers and shipped to the customer preassembled; or b) Via X-option standalone customer-installable part numbers that are ordered and shipped for customer assembly of the arrays on site. (See Order Configuration section for more details on these two options.)

## Mix-and-Match Functionality

New J4200 and J4400 array functionality support includes:

- Mix and match of SAS/SATA drives in a single JBOD array
- Mix and match of J4200 and J4400 arrays in a single JBOD cascade

Mixing and matching of SAS/SATA drives in a single J4200 or J4400 array is currently supported both as x-option configurations and for factory integrated (XATO) configurations. Similarly, mixing and matching of different drive capacities in a single J4200 or J4400 array is currently supported both as x-option configurations and for factory integrated (XATO) configurations.

Mixing and matching of J4200 and J4400 arrays in a single cascade is supported with the following rules:

- No more than a total of four J4200 arrays in a single cascade
- When connected to the Sun StorageTek PCIe SAS HBA, or the Sun StorageTek Express Module SAS HBA, users are limited to 96 drives in a single cascade behind each SAS port on this card, for a total of 192 drives behind a single SAS HBA card
- When connected to the Sun StorageTek SAS RAID HBA users are limited to a total of 96 drives

## Array Configuration Features

J4200 and J4400 array configurations are based on the following features:

- SAS I/O module: 1 or 2 per array
- AC power: Standard 2 \* redundant AC power supplies per array
- Fan unit: J4200 - Standard 2 \* redundant cooling fans per array; J4400 - Cooling fans are integrated into the J4400 power supplies
- Disk drives:
  - J4200/J4400 arrays – 300 GB and 450 GB 15 Krpm SAS drives
  - J4200 arrays – 250 GB 7.2 Krpm SATA II drives
  - J4200/J4400 arrays – 500 GB, 750 GB, and 1 TB 7.2 Krpm SATA II drives
  - Future drives:
    - 600 GB 15 Krpm drive coming in Q4CY09
    - 2 TB 7.2 Krpm drive coming in Q4CY09

The J4200 and J4400 array diskless chassis (X-option and ATO PN) ships with the following:

- 1 \* .5m SAS interconnect cable
- 2 \* redundant AC power supplies
- 2 \* redundant cooling fans (for the J4400, cooling fans are integrated into the power supplies)
- 1 \* SAS I/O module
- Air management sleds: "Non-selectable" system-determined parts (quantity based on number of drives selected)
- Accessory kit which contains the following:
  - HW Installation Guide (documentation)
  - Accessing Documentation (documentation)
  - Important Safety Information for Sun Hardware Systems(documentation)
  - Obtaining the Common Array Manager software (documentation)

**Note:** J4200/J4400 array rail kits are sold separately.

## Cabling for the Sun Storage J4200 Array

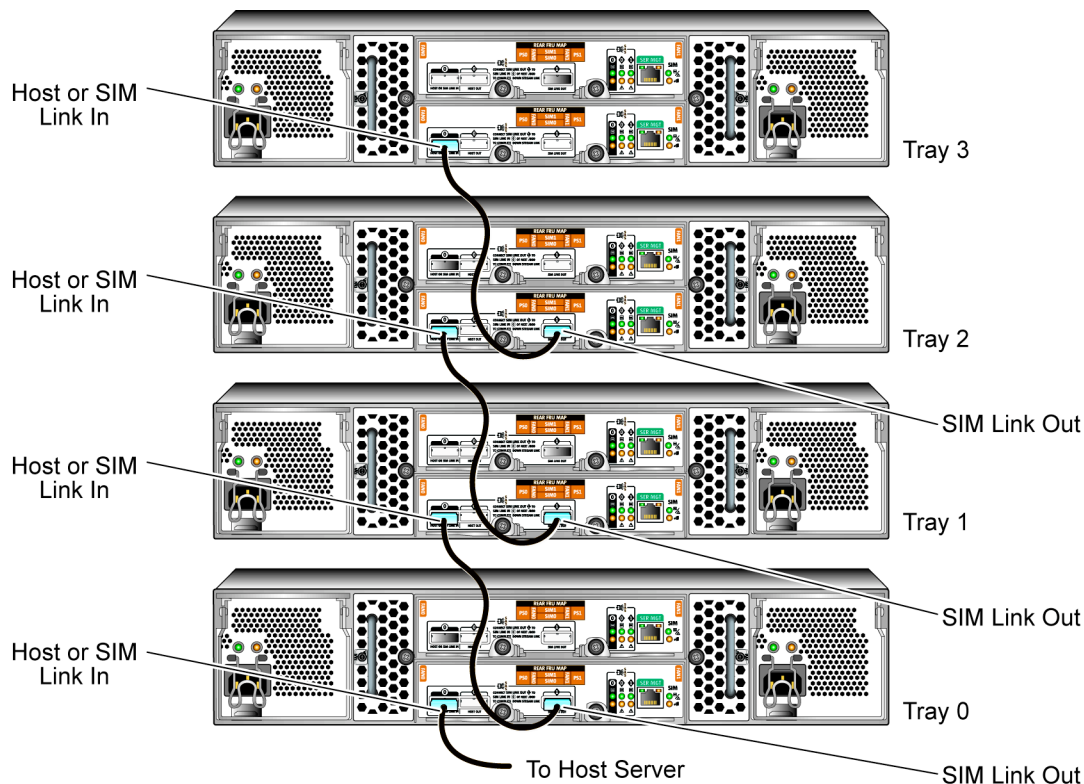


Figure 2. Cabling configuration for the Sun Storage J4200 array

The J4200/J4400 arrays support 15K SAS drives and 7.2K SATA II drives. Each J4200 array supports up to 12 SAS or SATA II hard disks. The J4200 array provides these capacity ranges for SAS drives: 300 GB, 450 GB and 600 GB; and for SATA II drives: 250 GB, 500 GB, 750 GB, and 1 TB. Its total storage capacity is 7.2 TB for SAS hard disks (600 GB per disk) or 12 TB for SATA II hard disks (1 TB per disk).

Refer to the Sun Storage J4200/J4400 Array Release Notes posted at <http://docs.sun.com/app/docs/coll/j4200> for a current listing of supported drives.

You must have at least two drives in either array. You can interconnect up to four J4200/J4400 array trays, with up to 48 drives in interconnected J4200 arrays and up to 96 drives in interconnected J4400 arrays, all of which are designed to fit into a standard 19-inch cabinet.

This renders a raw storage capacity of 28.8 TB for SAS disks (600 GB per disk) or 48 TB for SATA II disks (1 TB per disk) for the J4200 array, and 57.6 TB for SAS disks (600 GB per disk) or 96 TB for SATA II disks (1 TB per disk) for the J4400 array.

The J4200/J4400 arrays are available for Solaris, Linux, and Windows operating systems. Refer to the Sun StorageTek Common Array Manager User Guide for the J4000 Array Family posted at <http://docs.sun.com/app/docs/coll/cam6.4=en> for information about the management software.

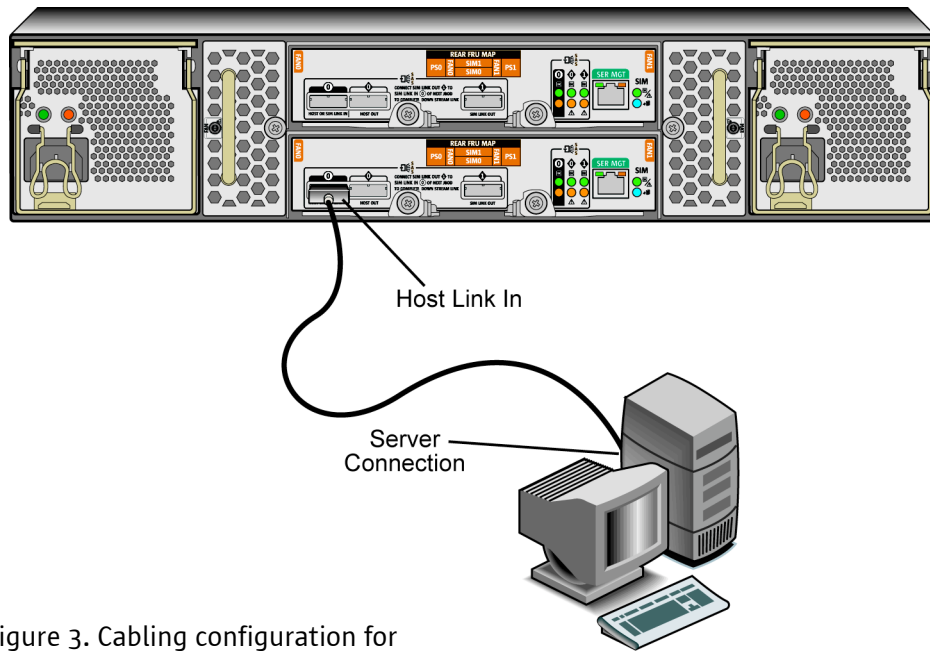


Figure 3. Cabling configuration for Sun Storage J4200 array

The J4000 array trays can be installed into the following cabinets:

Sun Rack 900/1000 cabinet (or replacement product)

Sun StorEdge Expansion cabinet

Sun Fire Expansion cabinet

Any 19-inch wide, 4-post, EIA-compatible rack or cabinet with a front-to-back depth (between vertical cabinet rails) of 61 cm to 91 cm (24 in. to 36 in.). The cabinet can have threaded or unthreaded cabinet rails.

### Cable

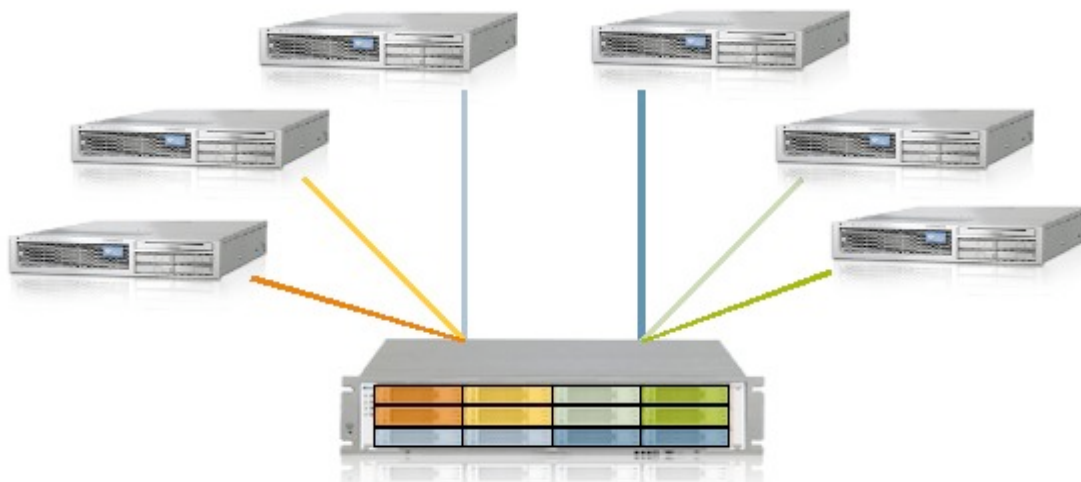
SAS interconnect cable lengths which are supported on the J4200 arrays are .5m, 1m and 2m. Sun is investigating the possibility of adding additional support for SAS cable lengths greater than 2m for the J4200 arrays. Support for additional SAS cable lengths will be added and communicated via subsequent announcement. (Please refer to the ordering section of this document for specific part numbers.)

The J4000 arrays come packaged with SAS interconnect cables. For the J4200 array, one .5 meter SAS interconnect cable comes with both diskless chassis and X-option SAS I/O module orders.

### Multiple Configurations

Because the J4000 arrays permit multipathing and have multihost capabilities, a variety of configurations are possible. The following illustrations and information are provided to show the strengths of various configurations.

### Single path: single J4000 array

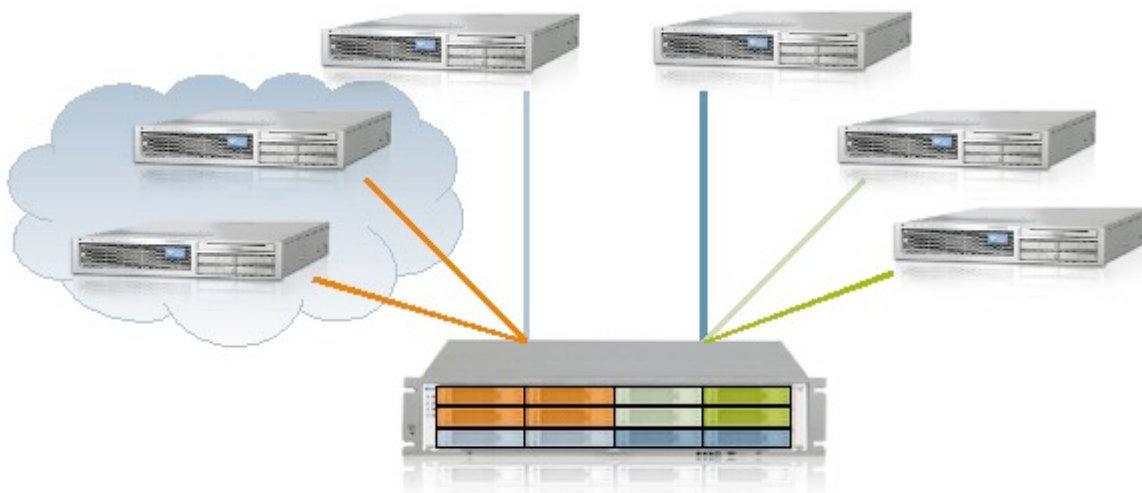


The preceding illustration shows what CAM version 6.4.1 (or later) can do as a zoning manager. It provides security so different hosts and applications don't write over each other's data, permitting users to zone certain drives to certain initiators so that only the correct initiators can see or access these drives.

Three SAS ports per I/O module and two I/O modules mean six-host single-path connectivity. Users can set zones at the drive level, permitting the host to see just one drive or many drives, or zone each drive to be seen by each host. This zoning flexibility is unique; the J4000 arrays aren't hard-coded like the competition.

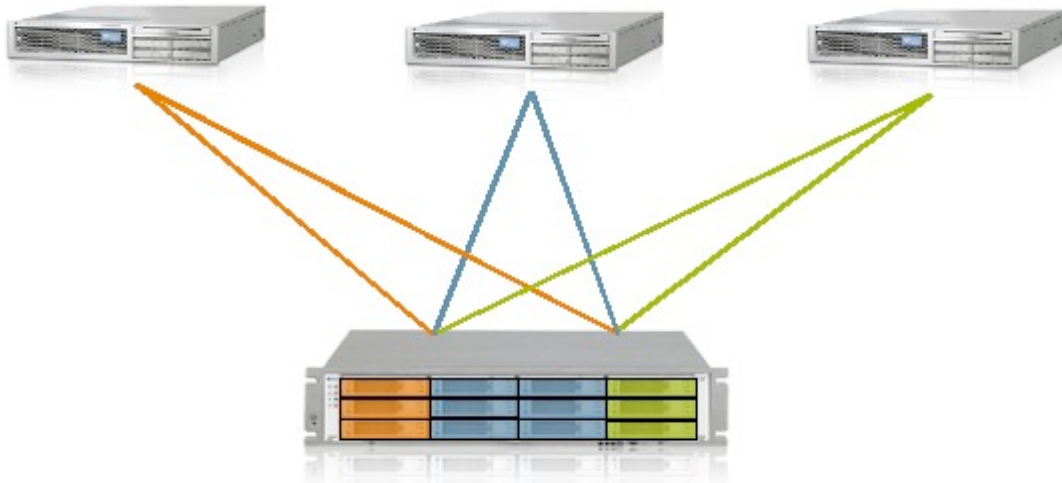
### Single path: single J4000 array with 2-node cluster

CAM allows users to set multiple hosts (a cluster) to see the same set of drives; this zoning functionality permits users to zone for high availability at the application layer, as shown in the following illustration.



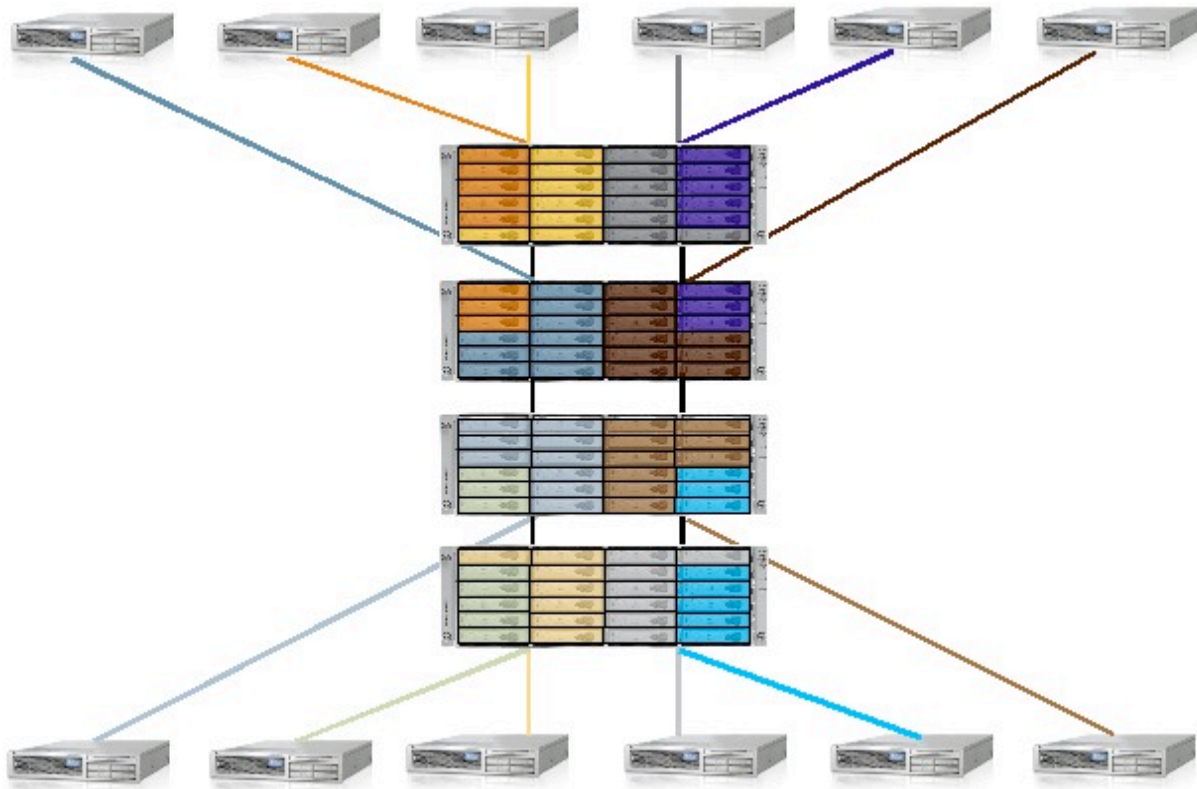
## Multipath: single J4000 array

The following illustration shows the use of the J4000 array in multipathing. If an I/O module goes down, a cable is cut or malfunctions (in other words, if one path fails) there is another path.



The SAS I/O module (SIM) on the back of each J4200 or J4400 array tray has two cards, each with three ports. Multipathing is achieved through these two Sun SAS HBA cards in each host (server). Note that the Sun PCIe RAID card does not support multipath configurations.

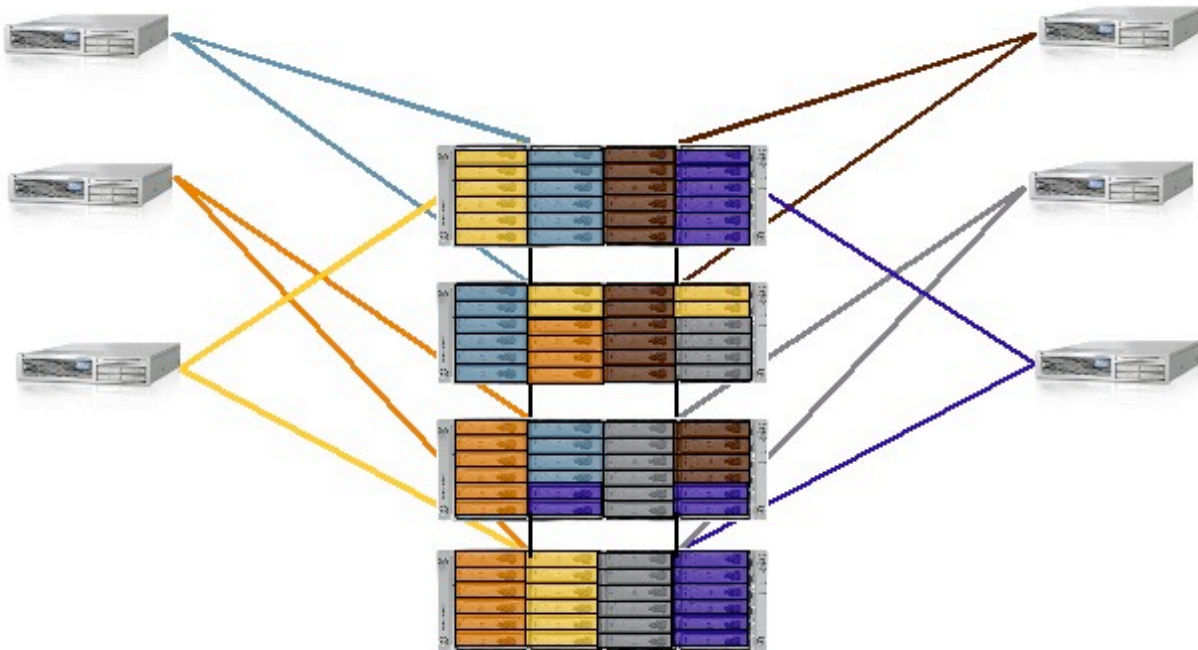
## Single path: cascade of four J4000 arrays



The preceding illustration shows four J4400 arrays (totaling 96 drives) in a high-availability cascade configuration. Users can connect any available port on this four-tray cascade to hosts; there are a total of 12 available SAS ports. Twelve hosts connected to a cascade of 96 drives is great for storage consolidation without the cost or complexity of a storage area network (SAN) storage solution.

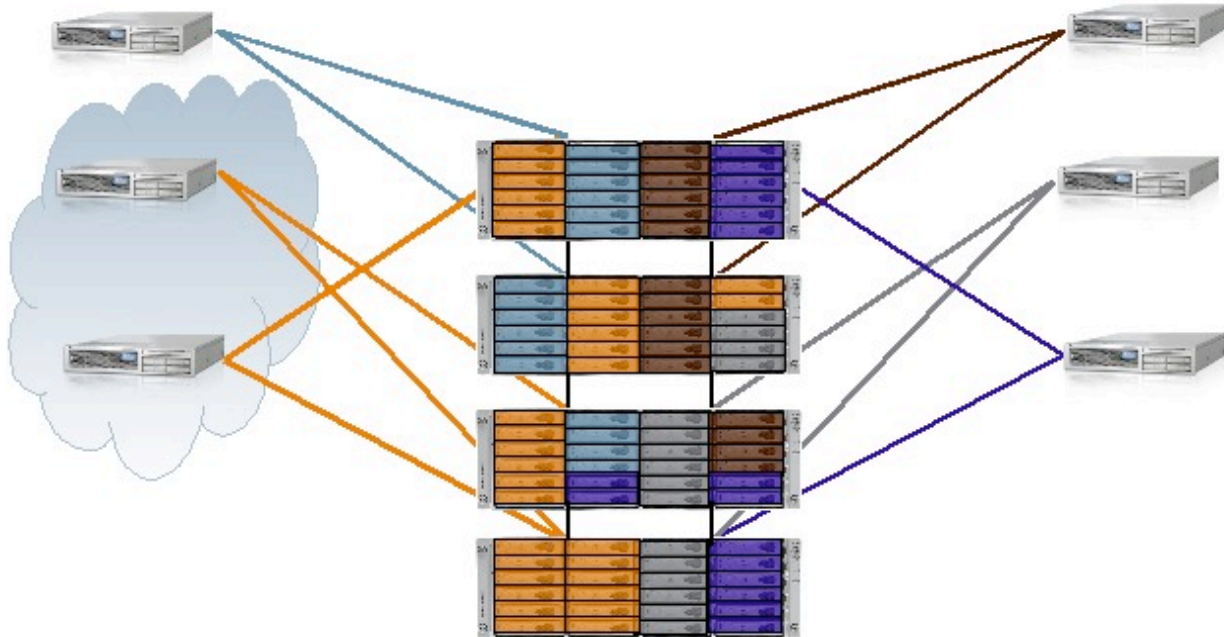
### **Multipath: cascade of four J4000 arrays**

The following illustration shows one-half as many hosts as in the single-path illustration before it, with each host taking two ports (one for each path). Users can mix single-path and multipath connectivity with these arrays, limited only by the number of available SAS ports.



## Multipath: cascade of four J4000 arrays with 2-node cluster

Sun Cluster currently only works with SAS drives, not SATA, due to SATA affiliation. Unlike SAS, SATA doesn't supply the full SCSI command set so it only supports limited commands. The result is that once one host sets up connection with a particular drive, no other host can connect. Unless the customer's clustering software supports SATA drives, it is not recommended that the customer use SATA drives for clustering. The following illustration shows clustering in a cascade of four J4000 arrays.



## Configuration Flexibility

Using Sun StorageTek RAID Manager software for disk management permits users to create logical drives using any combination of the disks in a Sun Storage J4000 array. Sun's StorageTek RAID Manager software enables easy, remote configuration, monitoring, and management of RAID arrays through secure encrypted communications.

RAID Manager can provide configuration flexibility for any J4000 array if it is used to assist with the following:

- Viewing and identifying daisy-chained storage J4400 arrays
- Switching cables or making new connections
- Deleting a logical drive without deleting a partition
- Returning a non-failed drive to a ready state

In addition, when Solaris/ZFS is used with the J4000 arrays, it provides scalability and ease of management for the array configuration. With it, additional capacity can be added to the file system without system interruption. Users can cascade these switched arrays for up to 96 TB capacity in a single cascade. The array can grow and shrink file system capacity without administration, using data pools, not volumes.



## RAID

In the J4000 array family, RAID protection is provided by host software or by hardware (Sun StorageTek SAS RAID HBA). The level of support for RAID is determined by the host volume management stack. RAID is determined by the HBAs and their respective applications.

Users of J4000 arrays have two outstanding options for RAID functionality: they can opt for hardware-based RAID, using the Sun StorageTek SAS RAID HBA in conjunction with Sun StorageTek RAID Manager software, or opt for software-based RAID using Solaris/ZFS.

### Hardware-based RAID functionality solution

- Sun StorageTek SAS RAID HBA with high-performance advanced RAID functionality, including full-hardware RAID support for RAID levels 0, 1, 10, 1E, 5, 6, 50, 5EE, and 60; must be used with RAID Manager software (included at no additional charge)

### Software-based RAID functionality

- Sun Solaris 10 ZFS with RAID-Z with support for RAID levels 0, 1, 5, and 6
- Sun Solaris/ZFS with RAID-Z with support for RAID levels 0, 1, 5, and 6

The StorageTek SAS RAID HBA ships with Sun StorageTek RAID Manager software. RAID Manager software should only be used to set up RAID features (for example: LUNs, RAID levels, volumes).

When used with the J4000 arrays, ZFS provides data integrity and security, scalability, and ease of management. ZFS spreads writes across all available disks (additional disks are added to the ZFS stripe width automatically). With ZFS, data is written to the first free block — there is no waiting for disk rotational latency and head movement. ZFS delivers intelligent prefetch: it predicts the next data and pre-caches it. And ZFS offers RAID-Z with support for RAID levels 0, 1, 5, and 6.

### Role of CAM in relation to RAID Manager and Solaris/ZFS software

Sun StorageTek Common Array Manager software (CAM) version 6.4.1 or later should be used to perform all the J4000 array family component and environmental reporting, service advisor functions, and Auto Service Requests (ASR). CAM version 6.4.1 or later also provides the ability to upgrade SAS I/O modules and HDD firmware for the J4000 arrays.

CAM version 6.4.1 or later should be used to manage the J4200, J4400, and J4500 arrays.

### Appropriate RAID levels

Selection of the correct RAID level is equally critical in order for each application to meet the required data availability, performance, and capacity requirements. RAID 5 is generally considered to be the best balance of cost, performance, and availability. (See the Best Practices section for a table that outlines the trade-offs of the various supported RAID configurations.)

## Management Software

### Sun StorageTek™ Common Array Manager software

Sun StorageTek™ Common Array Manager software (CAM), the standard management software for the Sun Storage J4000 arrays, is a powerful yet easy-to-use Java-based GUI which provides centralized administration for the J4000 arrays and any other Sun storage arrays the customer may deploy. StorageTek Common Array Manager software enables online administration, a consistent interface across all operating systems, and the ability to monitor

and manage one or all arrays from any location on the network.

With features like Storage Pooling and a built-in performance utility, this software simplifies administration and enables comprehensive management of multiple arrays, including arrays from the Sun ST2500 and Sun ST6000 families (e.g., ST2540, ST2530, ST6140 and ST6540). CAM is included with the J4000 arrays at no additional licensing or maintenance cost. More information on CAM functionality is available in the next subsection, "Common Array Manager Tools."

CAM support for the J4000 array family is available with the Sun StorageTek PCIe SAS HBA, or the Sun StorageTek Express Module SAS HBA, and the Sun StorageTek SAS RAID HBA. Sun StorageTek CAM version 6.4.1 or later should be used to manage the J4200, J4400, and J4500 arrays.

The latest version of CAM is now posted on the SDLC at [www.sun.com/download](http://www.sun.com/download)

CAM documentation is available at <http://docs.sun.com/app/docs/coll/cam6.4.1?1=en>

## Sun StorageTek™ RAID Manager software

Sun StorageTek™ RAID Manager software comes with the Sun StorageTek SAS RAID HBA. It is to be used in conjunction with Sun StorageTek Common Array Manager software and the SAS RAID HBA. RAID Manager software is a full-featured GUI software application, a single-view tool that supports simple, secure, centralized configuration and monitoring of all RAID HBAs and disk drives in a customer's storage environment. It enables easy remote configuration, monitoring, and management through secure encrypted communications.

RAID Manager is highly intuitive, simplifying RAID array creation and management through the use of mouse-based navigation, single-pass configuration wizards, pop-up tips, and context-sensitive online help. The software supports an extensive set of RAID types, including RAID levels 0, 1, 10, 1E, 5, 6, 50, 5EE, and 60. It enables storage administrators to group disk drives into logical arrays and build in redundancy to safeguard business-critical data and improve system performance.

Sun StorageTek RAID Manager software should only be used to set up all RAID features (e.g., LUNs, RAID levels, volumes, etc.). CAM version 6.4.1 or later should be used to perform all the J4000 array family component and environmental reporting, service advisor and Auto Service Request (ASR) functions, etc. CAM version 6.4.1 will also provide the ability to upgrade SAS I/O modules and HDD firmware for the J4000 arrays.

**Note:** A command line utility is available in addition to the StorageTek RAID Manager software to assist in the configuration and management of the Sun StorageTek SAS RAID HBA.

**IMPORTANT:** Customers must install Sun StorageTek Common Array Manager software to take full advantage of the features/functionality of the StorageTek RAID Manager software. CAM will provide fault detection, firmware upgrade capability, and remote serviceability, through Auto Service Request (ASR), to the J4000 arrays.

## Sun Solaris™ ZFS

For Solaris installations, ZFS automates common administrative tasks, protecting data from corruption and providing virtually unlimited scalability. ZFS uses virtual storage pools to make it easy to expand or contract the J4000 arrays simply by adding or deleting drives. ZFS will significantly reduce costs by streamlining storage administration and allowing resources to be shared among file systems. The time required to perform some functions will be reduced by orders of magnitude — from hours to just seconds.

For best-practices information for configuring the J4000 arrays with ZFS, please refer to the BlueNotes document entitled "Configuring J4000 and ZFS in Ten Minutes" posted at

<http://www.sun.com/blueprints>. Keep this valuable URL for future reference, because the BluePrints Web site contains technical best practices, derived from the real-world experience of Sun experts, for getting the most out of Sun solutions.

More information about the use of ZFS with Oracle can be found at

<http://blogs.sun.com/roch/>

<http://blogs.sun.com/realneel/>

[http://www.solarisinternals.com/wiki/index.php/ZFS\\_Evil\\_Tuning\\_Guide](http://www.solarisinternals.com/wiki/index.php/ZFS_Evil_Tuning_Guide)

More information about the use of ZFS with databases can be found at:

[http://www.solarisinternals.com/wiki/index.php/ZFS\\_for\\_Databases#Limitations](http://www.solarisinternals.com/wiki/index.php/ZFS_for_Databases#Limitations)

<https://onestop.sfbay.sun.com/perf-roundtable/Presos/PerfRT-1007.pdf>

[http://www.solarisinternals.com/wiki/index.php/ZFS\\_Best\\_Practices\\_Guide](http://www.solarisinternals.com/wiki/index.php/ZFS_Best_Practices_Guide)

## **Further management software information**

For more information about the software that is used to manage the J4000 arrays, please refer to the following URLs:

Sun StorageTek Common Array Manager software:

[http://www.sun.com/storagetek/management\\_software/resource\\_management/cam/](http://www.sun.com/storagetek/management_software/resource_management/cam/)

Solaris/ZFS: [http://www.sun.com/software/solaris/zfs\\_learning\\_center.jsp](http://www.sun.com/software/solaris/zfs_learning_center.jsp)

Sun StorageTek RAID Manager software: <http://docs.sun.com/app/docs/prod/storedge.raid#hic>

## **Common Array Manager Software Tools**

Sun's StorageTek Common Array Manager software is the primary interface for configuring and managing the Sun Storage J4200 array, although the allocation and use of storage space is done by the applicable tools (such as Solaris/ZFS).

### **Remote CLI client**

The Sun Storage J4200 array can also be configured and managed using the remote command line interface (CLI) client. The CLI provides the same control and monitoring capability as the Web browser and it is also scriptable for running frequently performed tasks. The remote CLI client is available for Solaris, Windows, and several other operating systems. See the Sun Storage J4200 Array Release Notes for details on the supported operating system platforms.

### **Remote management proxy**

StorageTek Common Array Manager software can be configured to use a remote proxy option which reduces its footprint to less than 40 MB; this provides single-pane-of-glass management for all J4000 arrays in the datacenter. This includes the ability to upgrade array firmware from the centralized location.

### **Multipathing**

With multipathing, also called multipath failover, an array or network can detect when an adapter has failed and automatically switch access to an alternate adapter. Multipathing enables high-availability configuration because it helps to ensure that the data path remains active. Multipathing also helps increase performance of multi-I/O module disk arrays by spreading I/O among multiple paths into the array. With the array, common arrays use multipathing by default. To complete the data path, data hosts also need the ability to multipath;

therefore, all data hosts need a multipathing driver.

Multipathing support is available for the J4000 arrays via the following associated multipathing drivers:

- SAS multipath for Solaris 10
- SATA multipath for Solaris 10
- SAS/SATA multipath for Linux
- SAS/SATA multipath for Win2003 (coming soon: Q4CY09)\*
- SAS/SATA multipath for Win2008

J4200/J4400/J4500 Array Multipath Support		
Operating System	Multipath Driver	Target Support Date
Solaris 10/U7	SAS and SATA	Today
RedHat 5.2	SAS and SATA	Today
SUSE 10 sp2	SAS and SATA	Today
Windows 2003	SAS and SATA	Q42009
Windows 2008	SAS and SATA	Today

**\*Please note:** Windows 03 doesn't have multipath drivers. Sun is creating its own multipath drivers for Windows 2003. The other operating systems all natively have SAS and SATA multipath drivers.

### Heterogeneous hosts

A heterogeneous hosts feature allows the array to tailor its behavior (such as LUN reporting and error conditions) to the needs of the host operating system. This provides each individual host with the view of the storage system that it would experience if it had exclusive access to the array. The host types can be completely different operating systems, such as Solaris, Linux, and Windows, or variants of the same operating system, e.g. clustered and not-clustered.

Multihost support requires SAS zoning capabilities that are provided by Common Array Manager software v6.4.1 or later. Each J4200 array or J4400 array will support up to six hosts; each J4500 array will support up to four hosts.

Multihost Support Matrix				
Single-Path Planned Host Connectivity				
Product	Single Tray	Cascade		
		2 Trays	3 Trays	4 Trays
J4200 array	6 hosts	8 hosts	10 hosts	12 hosts
J4400 array	6 hosts	8 hosts	10 hosts	12 hosts
J4500 array	4 hosts	4 hosts	N/A	N/A

Multihost Support Matrix	
Multipath Planned Host Connectivity	
	Cascade

<b>Multihost Support Matrix</b>				
<b>Multipath Planned Host Connectivity</b>				
<b>Product</b>	<b>Single Tray</b>	<b>2 Trays</b>	<b>3 Trays</b>	<b>4 Trays</b>
<b>J4200 array</b>	3 hosts	4 hosts	5 hosts	6 hosts
<b>J4400 array</b>	3 hosts	4 hosts	5 hosts	6 hosts
<b>J4500 array</b>	2 hosts	2 hosts	N/A	N/A



# Best Practices for the Sun™ Storage J4200 Array

## Planning and Acquisition

If possible, it is best to have a proper understanding of the applications and their requirements before investing in storage resources in order to ensure a satisfactory outcome. Sometimes there are factors that impede planning, such as severe budgetary limitations, management mandates for storage consolidation, and the pre-assignment of re-deployed hardware that “will just have to do the job.” Ideally, however, business and technical trade-offs should be considered. When the available resources are selected on the basis of what is needed for the application, results are better.

## Applications Well Understood

Two typical classification methods are based on the access patterns for the data.

- Transaction processing is interactive online communication with record-oriented data.
  - Example applications: order entry or an airline reservations system
  - Transaction processing characteristically employs short records or blocks asynchronously and randomly accessed.
  - Performance is measured in terms of I/O operations per second, or IOPS
- Data streaming reflects the continuous intake, processing, or output of data
  - Example applications: satellite data collection or media serving
  - Data streaming more classically uses very large data blocks that are sequentially accessed
  - Performance is measured in terms of MB/sec
- Some applications require a combination of the two patterns above. The Sun Storage J4200 array is well-suited for both transactional and streaming data patterns as long as the array is configured to best address the performance characteristics of each.

## How Many Drives Are Required?

The design of the Sun Storage J4000 arrays provides the user with scalability that can be predictably configured for most applications. The reason for this is that in addition to its explicit objective of maximum availability, the RAID architecture provides exceptional parallelism and extensive overlap of I/O operations in addition to the use of intrinsically fast components. Use of J4000 arrays also results in low times for data access.

A transaction processing application designed around a relational database normally requires several random accesses for modest amounts of data with each access. Overall performance of this application is said to be IOPS-bound, because input/output overhead is a function of transaction rate, but that could possibly be enhanced through performance optimization techniques.

Other applications, such as data acquisition for signal processing, are bandwidth-oriented or throughput-oriented. There are few accesses for very large blocks of data, primarily in sequential order. IOPS are not as significant here; what is important is the continuous streaming of large volumes of data. Performance requirements, in this case, are measured in terms of MB/sec.

While numerous factors come into play, the most common is this: the more disk drive spindles that data can be spread across, the faster the time to access a particular record. For planning purposes, if the number of IOPS the target uses is known, it is possible to estimate future IOPS requirements based on business growth.

Try to plan a storage solution around a key application. Remember that it might be an incorrect assumption to use the notion of buying the largest drive size because it provides more capacity. If the application demands a maximum level of performance, select the higher spindle count with lower capacity. It is also important to note that when Data Snapshot is utilized, the incremental drive requirement for this function should be taken into consideration separately.

## Which RAID Level is Best for the Application?

The selection of a RAID level is critical so each application can meet its data availability, performance, and capacity requirements. RAID 5 is generally considered to be the best balance of cost, performance, and availability. The following table outlines the trade-offs of the various supported RAID configurations.

RAID Levels Comparison				
	RAID - 0	RAID - 1 & 1+0	RAID - 3	RAID - 5
<b>Description</b>	Data is striped across multiple drives	Data is mirrored to another drive	Data is distributed across multiple drives; parity info is written to one disk in the group	Drives operate independently with data and parity blocks distributed across all drives in the group
<b>Minimum number of drives</b>	1	2	3	3
<b>Maximum number of drives</b>	30	30	30	30
<b>Usable capacity (as a % of raw capacity)</b>	100%	50%	66.67% to 96.7%	66.67% to 96.7%
<b>Application</b>	IOPS and MB/sec	IOPS	MB/sec	IOPS and MB/sec
<b>Advantages</b>	Performance – due to parallel operation of the access	Performance – because multiple requests can be fulfilled simultaneously	High performance for large, sequentially accessed files; parity utilizes a small portion of raw capacity	Reads, small IOPS, many concurrent IOPS, and random I/Os; parity uses a small portion of raw capacity
<b>Disadvantages</b>	No redundancy – one drive fails, data is lost	Double the drive cost	Degraded performance with 8-9 I/O threads, random IOPS, and smaller, more numerous IOPS	Demanding writes

The RAID level for one or all of the volume groups affects cost, performance, and data recovery times.

- **RAID 0:** uses the least amount of storage, requiring no capacity for redundancy or parity protection.
  - The least-expensive solution because no additional hardware for data protection or recovery is needed; this does not take into account the cost of recovery from data loss
  - A high-performance solution because there is no overhead to manage redundancy that does not exist
  - Rarely selected as the level of choice for business-critical data
- **RAID 1 (and 1+0):** requires twice the capacity of the actual data and is therefore the most expensive
  - Using two complete copies of a volume, data recovery is not only ensured, but data access operates very quickly because the controller has the choice of accessing data from either set of drives
  - Recovery from data or hardware loss is relatively quick because the failed set can be rapidly recovered from the surviving set of data without requiring mathematical algorithms
- **RAID 3 or 5:** has some capacity compromise among the above RAID levels since a parity drive is required for each volume group between 5 and 29 drives
  - Failed devices or data errors can be recovered through mathematical analysis of the surviving data
  - Low parity ratios (e.g. 4+1) result in lower cost savings but good recovery times; higher parity ratios (e.g. 15+1) are less costly than lower-ratio solutions, but will require a lengthier error-recovery time

With the J4200 array, RAID groups within the same array do not have to use the same RAID level and do not require the same spindle counts, parity ratios, or block sizes. It is also important to note that IOPS for most applications are skewed much more heavily toward reads than writes. Applications that typically exhibit more of a write bias, such as greater than 20 to 25 percent write operations, may be better suited to RAID 1 or 1+0.

The business decision regarding which RAID level and parity level to choose should be well thought-out and based on the requirements of the application and organization.

## Server Hardware – Bus Bandwidth and HBAs

An important limiting factor in I/O performance is the I/O capability of the server hosting the application. The aggregate bandwidth from the server to the array is measured in MB/sec and consists of the total capability of the bus(es) to which the array is connected.

Multiple HBAs on this bus share a single source of I/O bandwidth and each HBA can have multiple SAS ports which typically operate at 1 Gb/sec, 2 Gb/sec, 3 Gb/sec or 4 Gb/sec respectively. Therefore the ability to drive a storage array can be throttled by either the server bus or the HBAs.

When a server is configured, or whenever I/O performance is analyzed, it is important to understand how much server bandwidth is available and which devices share that bandwidth. If the aggregate maximum bandwidth of the HBAs exceeds that of the server, then the server can



become a throughput bottleneck. If the aggregate throughput is lower, however, it might be possible to increase the throughput of an application by adding additional HBAs to the server, or replacing lower-performance HBAs with faster ones, or reassigning the fastest HBAs to the applications that can take advantage of their higher performance.

The following scalability details are associated with the currently available SAS host bus adapters (HBAs):

- Using the Sun StorageTek PCIe SAS HBA, or the Sun StorageTek Express Module SAS HBA, the J4200 array scales to 96 SAS or SATA II disk drives (two cascades of four J4200 arrays).
- Using the Sun StorageTek SAS RAID HBA, the J4200 array scales to 48 SAS or SATA II disk drives.

For the most up-to-date list of supported HBAs, refer to the Sun Interop tool. Contact the Sun Product Manager for additional information.

## Ordering Information: Sun™ Storage J4200 Arrays

Ordering information and part numbers for the Sun™ Storage J4200 array are provided in this section.

### Shipping Configuration Details

The J4200 arrays are available in two forms:

- 1) via customized, factory-configured assemble-to-order (ATO) combinations, which are formed by an aggregation of part numbers and shipped to the customer preassembled
- 2) via X-option standalone customer-installable part numbers that are ordered and shipped for customer assembly of the arrays onsite

J4200 array configurations are based on the following features:

- SAS I/O module: 1 or 2 per array
- AC power: Standard 2 \* redundant AC power supplies per array
- Fan unit: Standard 2 \* redundant cooling fans per array
- Disk drives:
  - 300 GB and 450 GB 15 Krpm SAS drives
  - 250 GB, 500 GB, 750 GB, and 1TB 7.2 Krpm SATA II drives
  - Future drives:
    - 600 GB 15 Krpm drive coming in Q4CY09
    - 2 TB 7.2 Krpm drive coming in Q4CY09

The J4200 array diskless chassis (X-option and ATO PN) ships with the following:

- 1 \* .5m SAS interconnect cable
- 2 \* redundant AC power supplies
- 2 \* redundant cooling fans
- 1 \* SAS I/O module
- Air management sleds: Non-selectable system-determined parts (quantity based on the number of drives selected)
- Accessory kit which contains the following:
  - .5m SAS interconnect cable
  - HW Installation Guide (documentation)
  - Accessing Documentation (documentation)
  - Important Safety Information for Sun Hardware Systems (documentation)
  - Obtaining the Common Array Manager software (documentation)

Refer to the ordering section of this document for part number details.

**Note:** J4200/J4400 array rail kits are sold separately.

### Shipping Lead Times

Shipping lead times for J4200/J4400 array ATO orders:

Americas — Standard 6-day lead time

EMEA and APAC — Standard 8-day lead time

For J4200/J4400 array X-option orders:

Americas, EMEA, and APAC — Standard 4-day lead time

**Please note:** In compliance with Demand Supply Initiative 10.0, "ASAP" as a requested delivery date will no longer be allowed. If a customer requests delivery on a specific date, then Ops will assign a shipment schedule based on that date. If the requested delivery date is inside standard lead times, Ops will assign a shipment schedule date based on a fixed lead time unless approved for expedited handling.

## Marketing Part Numbering Scheme

The base J4200 array diskless system configuration, from which all J4200 arrays are configured, can be determined from the components of each part number. Here is an example part number with each character defined.

Example part number = XTA4200R00A10DISK

X = X-option

T = Sun StorageTek family product designator

A = Revision level

4200 = Product class/Model number (SAS switched array)

R = Physical configuration: rack-ready (X-Option PTO or XATO)

00 = Switched array only

A = Power supply: A = AC

2 = Number of I/O modules per array: 1 = 1 SAS I/O module

0disk = no disk drives included

## Configuration Matrix / Marketing Part Numbers

### Ordering details and marketing part numbers

For technical validation and quality assurance, it is recommended that orders for the Sun Storage J4200 array be configured through the WebDesk Configurator tool. (Sun UAP for storage is not available through Partner WebDesk.)

There are three URLs for WebDesk, depending on the geography:

- AMER = <http://webdesk.central>
- APAC = <http://webdesk.singapore>
- EMEA = <http://webdesk.holland>

### WebDesk Configurator

When the Sun or Sun Partner technical sales representative is customizing factory-configured ATO selectable options/features or selectable X-options for the J4200 or J4400 arrays, the Sun Microsystems configuration tool, WebDesk/Partner WebDesk Configurator, will enforce the necessary structuring and technical requirements. Please note that the Services pricing generated will be a monthly price.

Each J4200/J4400 array must consist of the following combination of ATO or X-option

components:

### Step 1 (required)

Select the base diskless chassis (quantity of 1):

J4200 array: TA4200R00A10DISK (ATO)

J4400 array: TA4400R00A10DISK (ATO)

J4200 array: XTA4200R00A10DISK (X-option)

J4400 array: XTA4400R00A10DISK (X-option)

**Note:** Diskless chassis part numbers above include two redundant AC power supplies, two redundant cooling fans, one SAS I/O module, and one .5m SAS interconnect cable.

### Step 2 (required)

Select localized power cords:

**Note:** Two power cords are required per array and these must be ordered separately as zero-cost X-options.

### Step 3 (required)

Select drive type/quantity:

Qty 1 \* 300GB 15Krpm SAS: (X)TA-SS1NJ-300G15K (J4200/J4400 array)

Qty 6 \* 300GB 15Krpm SAS: XTA6SS1NJ-300G15K (J4200/J4400 array)

Qty 1 \* 450GB 15Krpm SAS: (X)TA-SS1NJ-450G15K (J4200/J4400 array)

Qty 6 \* 450GB 15Krpm SAS: XTA6SS1NJ-450G15K (J4200/J4400 array)

Qty 1 \* 250GB 15Krpm SATA II: (X)TA-ST1NJ-250G7K (J4200 array only)

Qty 6 \* 250GB 15Krpm SATA II: XTA6ST1NJ-250G7K (J4200 array only)

Qty 1 \* 500GB 7.2Krpm SATA II: (X)TA-ST1NJ-500G7K (J4200/J4400 array)

Qty 6 \* 500GB 7.2Krpm SATA II: XTA6ST1NJ-500G7K (J4200/J4400 array)

Qty 1 \* 750GB 7.2Krpm SATA II: (X)TA-ST1NJ-750G7K (J4200/J4400 array)

Qty 6 \* 750GB 7.2Krpm SATA II: XTA6ST1NJ-750G7K (J4200/J4400 array)

Qty 1 \* 1TB 7.2Krpm SATA II: (X)TA-ST1NJ-1T7K (J4200/J4400 array)

Qty 6 \* 1TB 7.2Krpm SATA II: XTA6ST1NJ-1T7K (J4200/J4400 array)

**Note:**

1) You must select a minimum quantity of two and a maximum quantity of 12 for the J4200 array.

2) Air management sleds (AMS) (i.e., drive bay filler panels) will be automatically added at no charge to the customer and configured in the factory to fill empty drive bay slots for ATO orders. For X-option orders, appropriate quantities of the "non-selectable" zero-dollar AMS part number (XTA-JBOD-6AMS) will be systematically determined (based on number of drives selected) by Sun's WebDesk/Partner WebDesk configuration tool and added to the X-option configuration output.

3) When configuring more than a quantity of 6 X-option drives, please be sure to use the 6-pack X-option drives part number (e.g. PN "XTA6...") to minimize excessive packaging and expedite shipment.

### Step 4 (required)

Select one or two SAS I/O modules for the chassis type:

J4200 array - TA-4200-IOM (ATO)

J4400 array - TA-4400-IOM (ATO)

J4200 array - XTA-4200-IOM (X-option)

J4400 array - XTA-4400-IOM (X-option)

**Note:**

1) ATO and X-option diskless chassis product numbers include one SAS I/O module. A quantity of 1 of the following items will add a second I/O module to the configuration.

2) The following SAS I/O module options include one .5m SAS interconnect cable.

**Step 5** (required)

Select appropriate universal rackmount rail kit:

XTA-4200-2URK-19U (X-option only)

XTA-4400-4URK-19U (X-option only)

Please note that the following, steps 6 and 7, are addressed via the "Connections" link on the J4200/J4400 array configuration UI.

**Step 6** (optional)

Select optional X-option SAS interconnect cables of varying lengths if required:

XTA-0.5M-SAS (Support for J4200 and J4400 array)

XTA-1.0M-SAS (Support for J4200 and J4400 array)

XTA-2.0M-SAS (Support for J4200 and J4400 array)

XTA-3.0M-SAS (Support for J4400 array)

XTA-6.0M-SAS (Support for J4400 array)

**Step 7** (optional)

Select supported SAS host bus adapter:

SG-(X)PCIE8SAS-E-Z: Sun StorageTek PCIe SAS HBA

SG-XPCIE8SAS-EB-Z: Sun StorageTek Express Module SAS HBA

SG(X)PCIESAS-R-EXT-Z: Sun StorageTek SAS RAID HBA

## Sun™ Storage J4200 Array Marketing Part Numbers

Marketing Part Number	Description
<b>Sun Storage J4200 array: X-option rack-ready diskless chassis</b>	
XTA4200R00A10DISK	Sun™ Storage J4200 array, Rack-Ready chassis, No drives, 1 * SAS I/O module, 2 * redundant AC power supplies and 2 * redundant cooling fans; includes 1 * .5m SAS interconnect cable; RoHS-5
<b>Sun Storage J4200 array: rack-ready diskless chassis, customized ATO</b>	
TA4200R00A10DISK	Sun Storage J4200 array, Rack-Ready chassis, No drives, 1 * SAS I/O module, 2 * redundant AC power supplies and 2 * redundant cooling fans; includes 1 * .5m SAS interconnect cable; RoHS-5, (For ST-J4200-FAMILY factory configuration only)

Marketing Part Number	Description	Category
<b>Sun Storage J4200 array component selections</b>		
XTA-4200-IOM	1 * Sun™ Storage J4200 SAS I/O module; includes 1 * .5m SAS interconnect cable; RoHS-5	I/O Modules
TA-4200-IOM	1 * Sun™ Storage J4200 SAS I/O module; includes 1 * .5m SAS interconnect cable; RoHS-5, (For ST-J4200-FAMILY factory configuration only)	
SG-XPCIESAS-R-EXT-Z	Sun StorageTek™ 8-port external SAS PCI-Express host bus adapter; RoHS 6. X-option	HBAs
SG-XPCIE8SAS-E-Z	Sun StorageTek™ 8-port external SAS RAID host bus adapter with RAID 0, 1, 1E, 10, 5, 5EE, 50, 6, 60 support, 256 MB of onboard memory and 72 hour battery-backed write cache; RoHS 6; X-option	
SG-XPCIE8SAS-EB-Z	Sun StorageTek (TM) SAS Host Bus Adapter, ExpressModule form factor, Eight Port, RoHS 6 compliant	
XTA-ST1NJ-500G7K	1 * Internal 500 GB 7.2 Krpm SATA HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6	Hard Disk Drives
TA-ST1NJ-500G7K	1 * Internal 500 GB 7.2 Krpm SATA HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6, (For ST-J4200-FAMILY and ST-J4400-FAMILY factory configuration only)	
XTA-ST1NJ-750G7K	1 * Internal 750 GB 7.2 Krpm SATA HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6	
TA-ST1NJ-750G7K	1 * Internal 750 GB 7.2 Krpm SATA HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6, (For ST-J4200-FAMILY and ST-J4400-FAMILY factory configuration only)	
XTA-ST1NJ-1T7K	1 * Internal 1TB 7.2 Krpm SATA HDD, 3.5" X 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6	
TA-ST1NJ-1T7K	1 * Internal 1TB 7.2 Krpm SATA HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6, (for ST-J4400-FAMILY and ST-J4200-FAMILY factory configuration only)	
XTA-ST1NJ-2T7K	1 * Internal 2 TB 7.2 Krpm SATA HDD, 3.5" X 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6	
TA-ST1NJ-2T7K	1 * Internal 2 TB 7.2 Krpm SATA HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6, (for ST-J4400-FAMILY and ST-J4200-FAMILY factory configuration only)	
XTA-SS1NJ-300G15K	1 * Internal 300 GB 15 Krpm SAS HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6	
TA-SS1NJ-300G15K	1 * Internal 300 GB 15 Krpm SAS HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6 (For ST-J4200-FAMILY and ST-J4400-FAMILY factory configuration only)	
XTA-SS1NJ-450G15K	1 * Internal 450 GB 15 Krpm SAS HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6	

Marketing Part Number	Description	Category
<b>Sun Storage J4200 array component selections</b>		
TA-SS1NJ-450G15K	1 * Internal 450 GB 15 Krpm SAS HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6; (For ST-J4200-FAMILY and ST-J4400-FAMILY factory configuration only)	
XTA-SS1NJ-600G15K	1 * Internal 600 GB 15 Krpm SAS HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6	
TA-SS1NJ-600G15K	1 * Internal 600 GB 15 Krpm SAS HDD, 3.5" x 1" drive with bracket for Sun™ Storage J4200 and J4400; RoHS-6; (For ST-J4200-FAMILY and ST-J4400-FAMILY factory configuration only)	
XTA6ST1NJ-500G7K	6 * Internal 500 GB 7.2 Krpm SATA HDD, 3.5" x 1" drives with brackets for Sun™ Storage J4200 and J4400; RoHS-6	
XTA6ST1NJ-750G7K	6 * Internal 750 GB 7.2 Krpm SATA HDD, 3.5" x 1" drives with brackets for Sun™ Storage J4200 and J4400; RoHS-6	
XTA6ST1NJ-1T7K	6 * Internal 1TB 7.2 Krpm SATA HDD, 3.5" x 1" drives with brackets for Sun™ Storage J4200 and J4400; RoHS-6	
XTA6ST1NJ-2T7K	6 * Internal 2 TB 7.2 Krpm SATA HDD, 3.5" x 1" drives with brackets for Sun™ Storage J4200 and J4400; RoHS-6	
XTA6SS1NJ-300G15K	6 * Internal 300 GB 15 Krpm SAS HDD, 3.5" x 1" drives with brackets for Sun™ Storage J4200 and J4400; RoHS-6	
XTA6SS1NJ-450G15K	6 * Internal 450 GB 15 Krpm SAS HDD, 3.5" x 1" drives with brackets for Sun™ Storage J4200 and J4400; RoHS-6	
XTA6SS1NJ-600G15K	6 * Internal 600 GB 15 Krpm SAS HDD, 3.5" x 1" drives with brackets for Sun™ Storage J4200 and J4400; RoHS-6	
XTA-4200-2URK-19U	Sun™ Storage J4200 2U universal rack rail kit; RoHS-5	Rail Kit
XTA-4200-2UAC-KIT	1 * Sun™ Storage J4200 2U AC power supply module; RoHS-5	Power Supply
XTA-4200-2UFAN-KIT	1 * Sun™ Storage J4200 2U fan module; RoHS-5	Fan Module
XTA-JBOD-6AMS	6 * Sun™ Storage J4200 and J4400 air management sleds; RoHS-5	Sleds
XTA-0.5M-SAS	Sun™ Storage 0.5m, mini, shielded, SAS cable; For connection between array and host; RoHS-6	Cables
XTA-1.0M-SAS	Sun™ Storage 1.0m, mini, shielded, SAS cable; For connection between array and host; RoHS-6	
XTA-2.0M-SAS	Sun™ Storage 2.0m, mini, shielded, SAS cable; For connection between array and host; RoHS-6	

### IBB options

Marketing Part Number	Trade-in Allowances
ALW-05-DO-J4	UAP 5% allowance for qualified trade-ins of Sun systems.

Marketing Part Number	Trade-in Allowances
ALW-05-DZ-J4	UAP 5% allowance for qualified trade-ins of non-Sun systems.
ALW-10-DO-J4	UAP 10% allowance for qualified trade-ins of Sun™ systems.
ALW-10-DZ-J4	UAP 10% allowance for qualified trade-ins of non-Sun™ systems.
ALW-15-DO-J4	UAP 15% allowance for qualified trade-ins of Sun™ systems.
ALW-15-DZ-J4	UAP 15% allowance for qualified trade-ins of non-Sun™ systems.
ALW-20-DO-J4	UAP 20% allowance for qualified trade-ins of Sun™ systems.
ALW-20-DZ-J4	UAP 20% allowance for qualified trade-ins of non-Sun™ systems.

### Services

Part Number	Installation Service
EIS-4200JBOD-E	Installation of Sun™ Storage J4200 array during local business hours; one part number per JBOD
EIS-4200JBOD-E-AH	Installation of Sun™ Storage J4200 array after local business hours; one part number per JBOD
EIS-DEINST4200-E	Installation of Sun™ Storage J4200 array during local business hours; one part number per JBOD
P-EIS-4200JBOD-E	FOR IDO PARTNER PURCHASE ONLY: Installation of Sun™ Storage J4200 array during local business hours; one part number per JBOD

### One-price coverage

With a SunSpectrum Service Plan you get all the essential services you need for one price per product per year. For information specific to the J4200 array, refer to: <http://www.sun.com/service/support/products/storage/>

The part numbers that follow can be used to upgrade a system warranty to the given level of SunSpectrum<sup>SM</sup> service for each specified product. (Customers should check with their local Sun Services representative for program and feature availability in their areas.)

Part Number	SunSpectrum <sup>SM</sup> Instant Upgrade (Warranty Upgrade) Service (Available through Sun WebDesk configuration/quoting tool)
IWU-STJ4200-1B	This part number corresponds to the following 11i Service item: BRNZ-STK-SVC. Sun StorageTek™ J4200 upgrade to Bronze Support for 1 year.
IWU-STJ4200-1G	This part number corresponds to the following 11i Service item: GOLD-STK-SVC. Sun StorageTek™ J4200 upgrade to Gold Support for 1 year.



Part Number	SunSpectrum <sup>SM</sup> Instant Upgrade (Warranty Upgrade) Service (Available through Sun WebDesk configuration/quoting tool)
IWU-STJ4200-1P	This part number corresponds to the following 11i Service item: PLAT-STK-SVC. Sun StorageTek™ J4200 upgrade to Platinum Support for 1 year.
IWU-STJ4200-1S	This part number corresponds to the following 11i Service item: SLVR-STK-SVC. Sun StorageTek™ J4200 upgrade to Silver Support for 1 year.
IWU-STJ4200-24-1G	This part number corresponds to the following 11i Service item: GOLD-7X24-STK-SVC. Sun StorageTek™ J4200 upgrade to Gold Support + 24x7 onsite support for 1 year.
IWU-STJ4200-24-2G	This part number corresponds to the following 11i Service item: GOLD-7X24-STK-SVC. Sun StorageTek™ J4200 upgrade to Gold Support + 24x7 onsite support for 2 years.
IWU-STJ4200-24-3G	This part number corresponds to the following 11i Service item: GOLD-7X24-STK-SVC. Sun StorageTek™ J4200 upgrade to Gold Support + 24x7 onsite support for 3 years.
IWU-STJ4200-2B	This part number corresponds to the following 11i Service item: BRNZ-STK-SVC. Sun StorageTek™ J4200 upgrade to Bronze Support for 2 years.
IWU-STJ4200-2G	This part number corresponds to the following 11i Service item: GOLD-STK-SVC. Sun StorageTek™ J4200 upgrade to Gold Support for 2 years.
IWU-STJ4200-2P	This part number corresponds to the following 11i Service item: LAT-STK-SVC. Sun StorageTek™ J4200 upgrade to Platinum Support for 2 years.
IWU-STJ4200-2S	This part number corresponds to the following 11i Service item: SLVR-STK-SVC. Sun StorageTek™ J4200 upgrade to Silver Support for 2 years.
IWU-STJ4200-3B	This part number corresponds to the following 11i Service item: BRNZ-STK-SVC. Sun StorageTek™ J4200 upgrade to Bronze Support for 3 years.
IWU-STJ4200-3G	This part number corresponds to the following 11i Service item: GOLD-STK-SVC. Sun StorageTek™ J4200 upgrade to Gold Support for 3 years.
IWU-STJ4200-3P	This part number corresponds to the following 11i Service item: PLAT-STK-SVC. Sun StorageTek™ J4200 upgrade to Platinum Support for 3 years.
IWU-STJ4200-3S	This part number corresponds to the following 11i Service item: SLVR-STK-SVC. Sun StorageTek™ J4200 upgrade to Silver Support for 3 years.

**Please note:** The recommended service level is Gold. Availability of service varies by country. SunSpectrum Support applies to the chassis only; options assume the support contract of the chassis they are placed in. Please contact your local service representative for more information, or refer to the following URL:  
<http://www.sun.com/servicessolutions/>

Part Number	SunSpectrum <sup>SM</sup> Instant Upgrade (Warranty Upgrade) Service (Available through Oracle 11i configuration/quoting tool)
GOLD-7X24-STK-SVC	Gold 24/7 StorageTek™ Service Plan; for Oracle 11i only
GOLD-STK-SVC	Gold StorageTek™ Service Plan; for Oracle 11i only
PLAT-STK-SVC	Platinum StorageTek™ Service Plan; for Oracle 11i only

Part Number	SunSpectrum <sup>SM</sup> Instant Upgrade (Warranty Upgrade) Service (Available through Oracle 11i configuration/quoting tool)
BRNZ-STK-SVC	Bronze StorageTek™ Service Plan; for Oracle 11i only
SLVR-STK-SVC	Silver StorageTek™ Service Plan; for Oracle 11i only

**Note:** For correct pricing, please cross-reference each 11i service item with the following Product Family Group Code (PFGC) in the price file: STJ4200.

Part Number	Sun System Packs
ALW-02-M-J4200	Integrated Services Allowance Sun™ Storage J4200. ALW code applies ONLY when purchasing base hardware unit and Sun Spectrum In Warranty Upgrade (IWU) on the same order. Additional parts purchased in connection with base hardware unit and IWU on the same order also qualify for ALW code. Parts purchased on a separate order without a base hardware unit and without an IWU do not qualify for an ALW allowance.

### IBB Upgrade Advantage Trade-in Program

There is an IBB Upgrade Advantage trade-in program for the Sun Storage J4000 array family of products. Qualified Sun and non-Sun systems are eligible for trade-in credit when purchasing new J4000 arrays, and trade-in allowances range from 5 to 20 percent, depending on the return. For more information, please visit one of the following pages:

<http://www.sun.com/tradeins/offerings/j4000/>

[partner.sun.com/ibb/offerings/j4000/](http://partner.sun.com/ibb/offerings/j4000/)

[ibb.eng/offerings/j4000/](http://ibb.eng/offerings/j4000/)

The following systems are eligible for UAP trade-in. If your trade-in is not on this list, please contact [uap@sun.com](mailto:uap@sun.com) to determine eligibility.

Sun StorageTek 3120

Sun StorageTek 3320

Sun StorageTek 3510

Sun StorageTek 3511

HP "MSA" Series

Dell "MD" Series

IBM "EXP" Series

## Service and Support: Sun™ Storage J4200 Array

### Optional – Sun Enhanced Services

The Sun™ Storage J4200 array models have an optional enhanced services package, which allows customers to rapidly implement complex data storage environments. This extended service package helps ensure the use of sound storage installation and configuration practices, thereby allowing Sun to put in place the support infrastructure that is required to maintain the

most demanding enterprise or data center environment.

## CRU Policy

The Sun Storage J4000 arrays are entirely CRU-based, which means regardless of warranty or contract status, the customer will receive a replacement part rather than an onsite engineer as standard practice. The majority of cases involving a CRU can be resolved by sending parts within the response times stated. However, there may be cases where Sun will send an engineer onsite to resolve the problem, including cases where the customer cannot install the part and requires Sun to do so.

## Enterprise Installation Services (EIS)

Installation Services allow the customer to accelerate the deployment of IT assets by utilizing Sun's proven best practices. Sun will rack, cable, and connect the asset to the host. We will also help the customer set up its storage device with the proper RAID configuration to meet customer business needs. (See the section called Ordering Information/Marketing Part Numbers, in this document, for specific installation services and part numbers.)

## Warranty

The following table gives warranty details for the Sun Storage J4200 array:

Warranty: Sun Storage J4200 Array						
Repair Support Duration	Software Support Duration	Phone Coverage		Hardware Coverage		
		Hours of Coverage	Call-Back Response Time	Hours of Coverage	Response Time	Delivery Method
3 years	N/A	M-F, 8-5	Customer-defined priority: P1 – within 4 hours P2 – within 8 hours P3 – within NBD	N/A	Target parts delivery within 5 to 7 days for direct countries	Customer-replaceable parts exchange only

Defective media support: 90 days.

Please refer to <http://www.sun.com/service/support/warranty/>

for complete product warranty information, and visit

<http://www.sun.com/service/support/sunspectrum>

for descriptions of comprehensive warranty upgrade options.

## SunSpectrum<sup>SM</sup> Service Plans

SunSpectrum<sup>SM</sup> Service Plans are innovative and flexible service offerings that allow customers to choose the levels of service best suited to their needs, ranging from mission-critical support for maximum solution availability to backup assistance for self-support customers. The SunSpectrum Service Plans provide a simple pricing structure in which a single fee covers support for an entire system, including related hardware and peripherals and Solaris<sup>TM</sup> Operating Environment software. Customers should check with their local Sun Enterprise

Services representatives for program and feature availability in their areas.

SunSpectrum Service Plans are available both during and after the warranty program. A customer may choose to upgrade its service and support agreement to meet its business needs by purchasing a SunSpectrum Service Plan. There are four levels of SunSpectrum support contracts, ranging from SunSpectrum Bronze<sup>SM</sup> level to SunSpectrum Platinum<sup>SM</sup> level. The recommended Service Plan level for the Sun Storage J4200, J4400, and J4500 arrays is SunSpectrum Gold.<sup>SM</sup>

For more information on the SunSpectrum Service Plans refer to the following URL:

<http://www.sun.com/servicessolutions/>

## **SunSpectrum<sup>SM</sup> Instant Upgrades (Warranty Upgrades)**

As a service offering designed to allow customers to choose the levels of service most suited to their needs, the SunSpectrum program is also upgradeable. Customers can choose to upgrade their service and support agreements to accommodate changing business needs by purchasing a SunSpectrum Instant Upgrade. The SunSpectrum program provides a simple pricing structure in which a single fee covers support for an entire system, including related hardware and peripherals, the storage environment firmware, and telephone support.

SunSpectrum Instant Upgrades are available both during and after the warranty program. The four levels of SunSpectrum Instant Upgrades range from SunSpectrum Bronze level to SunSpectrum Platinum level. (See the section called Ordering Information/Marketing Part Numbers, in this document, for specific Instant Upgrade Services and part numbers.)

## **Integrated Services (Sun System Packs)**

In order to make it easier for all J4200 array customers to acquire SunSpectrum contracts with their hardware purchases, a Sun System Pack is available for the J4200 array. Sun System Packs incorporate Sun's highly reputable SunSpectrum Service Plans for Storage in predictably priced packages that offer additional cost advantages when purchased jointly with hardware.

Sun System Packs combine the storage hardware (J4000 arrays) with a Sun support plan as one offering. This offering delivers significant advantages over traditional warranty plans through higher-value services including better service coverage, automatic firmware updates, and training credits — all of which enable customers to accelerate performance and get the most value from their IT assets from day one.

Pricing for Sun System Packs is predictable and transparent, lower than the cost of purchasing the server and services individually, and in some cases, even lower than the cost of the product with a basic warranty.

All Sun System Packs are supported with Performance Rate Cards (publicly viewable at [www.sun.com/systempacks](http://www.sun.com/systempacks)) that provide comparisons of savings and benefits available through integrated purchases of hardware and software, with the cost and benefits of separate purchase of the same hardware and services components.

## **Additional benefits of Sun System Packs**

Customer use of SunSpectrum Support as part of the overall solution creates a consistent business relationship, with services for managing the reliability, availability, and predictability of Sun technology.

Transitioning from a warranty and break/fix environment to a SunSpectrum support

environment provides such benefits as lower total cost of support, improved system availability, and improved system administrator productivity.

Customers can dictate the appropriate Sun support response time and have their service requests receive the correct priority at the Sun Solution Center, through their support-level choices. The flexibility to choose a level of service that matches the criticality of each product, coupled with Sun support engineers' proven expertise and responsiveness — and consistent service quality — results in a level of service that matches customer business requirements.

Sun<sup>SM</sup> System Performance Packs bring these additional benefits:

- Sun System Packs help customers to derive maximum value from their business IT investments by purchasing hardware and services together for less than the price of the components purchased separately.
- Sun System Packs are available whether customers are purchasing new hardware or refreshing their systems, and can be incorporated into existing support contracts.
- Customers get MORE from their IT assets and accelerate IT performance from day one by combining services with their storage purchases.
- For an incentive allowance of 2%, the following allowance code for the J4200 array can be applied at point of sale with the purchase of a hardware contract: ALW-02-M-J4200.

For more information, visit [www.sun.com/systempacks](http://www.sun.com/systempacks).

### **Up-selling points**

The J4000 array Sun System Performance Packs are an essential first step to broadening the discussion with Sun's existing and potential customers, to build a recurring business relationship.

To help businesses realize the competitive advantage and operating efficiencies available today, Sun is tearing down the barriers of cost and complexity traditionally associated with acquiring and managing IT, by offering radical simplicity, predictability, and affordability.

A study by Forrester Research's TEI Consulting Team cited an estimated ROI saving of up to 67 percent for a typical company using Sun's support services. Findings included lower total cost of support, improved systems availability, and improved system administrator productivity as compared to a break/fix environment. For more information see

[http://www.sun.com/service/serviceplans/sunspectrum/forrester\\_05.05.05.pdf](http://www.sun.com/service/serviceplans/sunspectrum/forrester_05.05.05.pdf)

Sun System Packs provide a solid starting point for expanding the sales discussion to include Sun's extensive capabilities as a full-service provider.

### **One-price coverage**

With a SunSpectrum Service Plan you get all the essential services you need for one price per product per year.

For information specific to the Storage J4500 array, refer to:

<http://www.sun.com/service/support/products/storage/>

### **Education**

For further information on courses visit the Sun Ed Web site at <http://www.sun.com/service/suned>, or to order, call 1-800-422-8020.

## Professional Services

See the Professional Services catalog at <https://icexchange.central.sun.com/> for other services and the latest updates on the Sun Services that follow.

## Consulting Services

Sun™ Client Services can offer multiple levels of consulting services to ensure a smooth data migration from Sun StorageTek arrays to the Sun Storage J4200 array. Sun Professional Services offers a wide range of data management and migration services to accommodate most customer environments and circumstances. Contact Sun Client Services for further details and quotes for a specific customer environment.

Sun also offers a wide variety of consultative services that will help the customer architect its J4200 array into existing storage infrastructures. These services are generally custom-priced engagements to assist with the design and implementation of larger storage architectures. They can also assist with analysis of total cost of ownership (TCO), with storage migration, with comprehensive review of backup and recovery procedures, with data replication design and implementation, and with security issues.

## Host-Based Data Migration Service

Sun's Host Based Data Migration (HBDM) Service makes relocation or consolidation of data simple and non-disruptive to the customer's business. Whether a customer is refreshing its Sun servers and disk hardware or adopting Sun systems for the first time, the HBDM service is easy to implement, flexible, and transparent to applications that require access to the data. Sun data migration capabilities are vendor-neutral and application-agnostic; Sun can move data in both mainframe and open systems environments, and move it locally (SAN or direct attach) or globally (via TCP/IP). Whatever the data migration need, Sun Storage Services provides expert project planning and delivery, so end users no longer have to risk data loss or corruption, or incur expensive downtime, in order to move their data.

## Backup and Recovery Service

The Sun StorageTek™ Backup and Recovery Consulting Custom Service includes an analysis of the customer's current backup and recovery environment with recommendations on how to improve performance, backup window, and hardware/software upgrades and migrations; how to implement a backup strategy; or how to completely outsource a customer's data backup needs. Such a custom engagement must be tailored to the customer's requirements to determine scope and price.

## Business Continuity and Disaster Recovery Services

The Sun StorageTek™ Business Impact Analysis (BIA) service will help a customer gather the necessary business information, and identify the associated operational and financial impacts, in the event of a business disruption. Findings are analyzed and documented in a business impact analysis report that includes recommendations and suggested solutions. This is a 1-to-2-week fixed-price engagement limited to one customer location and three business units at that location.

A custom version of this service is also available.

## Storage Assessment Services Suite (formerly Business Value Assessments or BVA)

The Assessment suite comprises three incremental services. The customer starts with the fundamental offer and can purchase the additional services as needed.

**Sun StorageTek™ Storage Management Productivity Discovery Base Service** will assess the current state of the customer's storage environment. It results in a written report that will document any potential areas for increased efficiency or improvement. This is a fixed-fee engagement and limited to 1 site, 5 hosts, 2 disk subsystems, 1 backup master server, 1 Automated Cartridge System Library Software (ACSL) server (if applicable), 2 SAN switches, 1 database, and 6 customer staff interviews.

A custom version of this service is available when the Base Service does not fit the scope of the customer's requirements.

**Sun StorageTek™ Storage Management Architecture Review Service** is a technical deep dive into the storage, process, and management of the customer's storage infrastructure. The output of the review is a report — focused on disc, tape, and the networking SAN infrastructure — providing specific actionable steps so the customer can improve the reliability, utilization, and performance of its storage subsystems. This custom engagement must be tailored to the customer's requirements to determine scope and price.

**Sun StorageTek™ Storage Management Optimization Service** focuses on mitigating difficulties and improving the overall performance of the customer's storage infrastructure. This service is designed to help the customer implement the recommendations documented in the Sun StorageTek™ Storage Management Architecture Review Service ( WW-PS-BVA02-CUSTOM). This custom engagement must be tailored to the customer's requirements to determine scope and price.

A Disk Implementation Service is not available for the J4200 arrays. Large or heterogeneous deployments may be supported as stand-alone Professional Services engagements.

## Glossary

<b>1U or RU</b>	One rack unit as defined by the Electronic Industries Alliances (EIA). A vertical measurement equal to 1.75 inches.
<b>ATA</b>	AT-Attachment. A type of hardware interface widely used to connect hard disks, CD-ROMs, and tape drives to a PC.
<b>Chipkill™</b>	ChipKill, or advanced ECC memory, is an IBM xSeries memory subsystem technology that increases memory reliability several times over, helping to reduce the chances of system downtime caused by memory failures.
<b>ECC</b>	Error correcting code. A type of memory that corrects errors on the fly.
<b>Ethernet 10/100/1000Base-T</b>	The most widely used LAN access method defined by the IEEE 802.3 standard; uses standard RJ-45 connectors and telephone wire. 100Base-T is also referred to as Fast Ethernet. And 1000Base-T is also referred to as Gigabit Ethernet.
<b>FRU</b>	Field replaceable unit.
<b>Hot-pluggable</b>	A feature that allows an administrator to remove a drive without affecting hardware system integrity.
<b>Hot-swappable</b>	A feature that allows an administrator to remove and/or replace a device without affecting software integrity. This means that, while the system does not need to be rebooted, the new component is not automatically recognized by the system.
<b>IKE</b>	Internet Key Exchange. A method for establishing a security association that authenticates users, negotiates the encryption method, and exchanges the secret key. IKE is used in the IPSec protocol.
<b>I/O</b>	Input/output. Transferring data between the CPU and any peripherals.
<b>IPSec</b>	IP Security. A security protocol from the IETF (Internet Engineering Task Force) that provides authentication and encryption over the Internet. Unlike SSL, which provides services at layer 4 and secures two applications, IPSec works at layer 3 and secures everything in the network.
<b>IPMI</b>	Intelligent Platform Management Interface. System management architecture for providing an industry-standard interface and methodology for system management.
<b>L2 cache</b>	Also referred to as Ecache or external cache. A memory cache external to the CPU chip. The AMD Opteron processor integrates 1 MB of L2 cache per CPU.
<b>MTBF</b>	Mean time between failures. The average time a component works without failure.
<b>RAM</b>	Random access memory.
<b>SATA</b>	Serial ATA. The resulting evolution of the ATA (IDE) interface from a parallel to a serial and from a master-slave to a point-to-point architecture with data transfer speeds up to 1.5 Gb/sec.
<b>SCSI</b>	Small Computer Systems Interface. Pronounced “scuzzy.” An ANSI standard hardware interface that allows the connection of up to 15 peripheral devices to a single bus.
<b>SNMP</b>	Simple Network Management Protocol. A set of protocols for managing complex networks. The first versions of SNMP were developed in the early 80s. SNMP works by sending messages, called protocol data units (PDUs), to different parts of a network. SNMP-compliant devices, called agents, store data about themselves in Management Information Bases (MIBs) and return this data to the SNMP requesters.
<b>X86</b>	Refers to the Intel 8086 family of microprocessor chips as well as compatible microprocessor chips made by AMD and others.



## Materials Abstract: Sun™ Storage J4200 Array

All materials are available on SunWIN except where otherwise noted. For updated white papers, Solution Briefs, and BluePrints, go to [http://www.sun.com/storage/disk\\_systems/expansion/resources.jsp](http://www.sun.com/storage/disk_systems/expansion/resources.jsp)

J4200 Array Collateral and other Product Information				
Collateral	Description	Purpose	Distribution	Number
<b>Product Literature</b>				
Sun Storage J4200 Array, Just the Facts (JTF)	Reference guide, FAQs (this document)	Training Sales Tool	SunWIN, Reseller Web	SunWIN #530138
Sun Storage J4200 Array, Customer Presentation	Customer presentation	Sales Tool	SunWIN, Reseller Web	SunWIN #535195
Sun Storage J4000 Array Family Data Sheet	Data sheet	Sales tool	SunWIN, Reseller Web, COMAC	SunWIN #530137
J4000 White Paper	White paper	Sales tool	SunWIN, Reseller Web	SunWIN #531955
<b>References</b>				
Sun StorageTek SAS RAID HBA Data Sheet	Data sheet	Sales tool	SunWIN, Reseller Web, COMAC	SunWIN #507566
Sun StorageTek RAID Manager Software Data Sheet	Data sheet	Sales tool	SunWIN, Reseller Web, COMAC	SunWIN #507568
Sun Storage J4000 Beat Sheet	Beat sheet	Sales tool	SunWIN, Reseller Web	SunWIN #535222
Sun Open Storage for MySQL Database Projects	Solution brief	Sales tool	SunWIN, Reseller Web	SunWIN #537815
Reduce the Cost of Microsoft Exchange Mailboxes with Sun Servers and Storage	Solution brief	Sales tool	SunWIN, Reseller Web	SunWIN #537816
Sun Storage J4400 and Enterprise Backup Software	Solution brief	Sales tool	SunWIN, Reseller Web	SunWIN #537818
Sun Storage J4400 and Netbackup	Solution brief	Sales tool	SunWIN, Reseller Web	SunWIN #537817
Sun Storage J4000 Message Source	Messaging	Sales tool	SunWIN, Reseller Web	SunWIN #535196
Sun System Packs Overview	Service overview	Sales tool	SunWIN, Reseller Web	SunWIN #459665
Sun System Packs Sales Guide	Sales guide	Sales tool	SunWIN, Reseller Web	SunWIN #461070
Sun System Pack Customer Presentation	Presentation	Sales tool	SunWIN, Reseller Web	SunWIN #459666

Sun Storage J4200 Array : Just the Facts  
Sun Confidential: Internal and Sun Channel Partners Use Only



## J4200 Array Collateral and other Product Information

External Web Sites	URL
Sun Web Site	<a href="http://www.sun.com">http://www.sun.com</a>
Sun Network Storage Main Page	<a href="http://www.sun.com/storage/">http://www.sun.com/storage/</a>
Sun Storage J4200 array Main Page	<a href="http://www.sun.com/storagetek/disk_systems/expansion/index.jsp">http://www.sun.com/storagetek/disk_systems/expansion/index.jsp</a>
Sun Storage J4200 array Marketing URL	<a href="http://www.sun.com/storagetek/disk_systems/expansion/4200/">http://www.sun.com/storagetek/disk_systems/expansion/4200/</a>
Sun Startup Essentials program	<a href="http://www.sun.com/emrkt/startupessentials/products.jsp">http://www.sun.com/emrkt/startupessentials/products.jsp</a>
Sun SPA Rewards "Win-Win" program	<a href="https://www.sunpartnerrewards.com/mipaxwar/pax/do/pageDisplay?programOid=29549374996876&amp;templatePageOid=31177167601877">https://www.sunpartnerrewards.com/mipaxwar/pax/do/pageDisplay?programOid=29549374996876&amp;templatePageOid=31177167601877</a>
Sun IBB program	<a href="https://central.sun.net/http://ibb.eng.sun.com/">https://central.sun.net/http://ibb.eng.sun.com/</a>
Interactive Animation Tool	<a href="http://www.sun.com/storagetek/disk_systems/expansion/4200/gallery">http://www.sun.com/storagetek/disk_systems/expansion/4200/gallery</a>
List of available services, comparison of Sun System Pack pricing to pricing of individual components in local currency, net savings	<a href="http://piglet.uk">http://piglet.uk</a>
SugarCRM and J4200 Solution Blog	<a href="http://blogs.sun.com/vanga">http://blogs.sun.com/vanga</a>
<p><b>Note:</b> For updated product and CAM documentation, white papers, Solution Briefs, and BluePrints, go to <a href="http://www.sun.com/storage/disk_systems/expansion/resources.jsp">http://www.sun.com/storage/disk_systems/expansion/resources.jsp</a></p>	
Internal Web Sites	URL
Sun Storage J4200 array OneStop	<a href="https://onestop.central.sun.com">https://onestop.central.sun.com</a>
Sun System Packs collateral, FAQs, and Quote/Book/Bill/Entitlement Guide	<a href="http://mysales/sunsystempacks">http://mysales/sunsystempacks</a>
Further Assistance	
J4200 array expert alias	<a href="mailto:jbod-interest@sun.com">jbod-interest@sun.com</a>

# Internal Information: Sun™ Storage J4200 Array

## Product Announcement

***The following pages are Sun Proprietary — Confidential: Internal Use Only***

Sun Microsystems, Inc. proudly offers the Sun™ Storage J4200, J4400, and J4500 arrays with Integrated Services (Sun System Packs). Sun's J4000 array family is designed and engineered to provide unprecedented data integrity and scalability in high-capacity, low-cost storage that extends your server's storage capabilities.

The J4200 and J4400 arrays are available in customized factory-configured assemble-to-order (ATO) combinations as well as X-option standalone customer-installable part numbers that are ordered and shipped for customer assembly of the arrays on-site. The J4500 arrays are available in standard fully populated system configurations represented by a single pre-defined part number. The J4000 array family fulfills a wide variety of network computing storage requirements and is especially well suited for customers in need of economical and reliable server attached storage for Web 2.0, BIDW, Video/Multi-Media and Surveillance, HPC, Tier 2-3, and D2D2T applications.

## Partner Information

This section contains information for Sun partners. The information in this section should be shared with Sun partners, Sun sales reps, and Sun SEs. This section should not be shared with Sun end-user customers.

### Partner business proposition

The Sun™ Storage J4000 array family is an ideal storage component for Sun's partners due to its simplicity of integration, reliability, and industry-leading price/performance. The following highlights some of the specific benefits for partners.

### Competitive margins

Partners can receive more margin with the Sun Storage J4000 array family than with competitive products in its class, on average. These cost savings are attributable to low acquisition costs, server-oriented management, ease of deployment, and a single point of service.

### Up-sell/cross-sell opportunities

The J4000 array is the perfect offering to up-sell from legacy array platforms. For example, the J4200 array is a perfect up-sell from the existing 3120 array in terms of being able to offer larger data capacity sets, smaller footprint, and lower price point.

### Ease of integration

The Sun Storage J4000 array was designed with ease of integration for partners in mind. It supports Solaris/ZFS and heterogeneous operating systems (Solaris, Windows, Linux) as well as multiple server, tape, and ISV platforms. It provides partners the flexibility to integrate in multiple environments and to easily attach to a sale. The J4000 array family is a profitable addition to any partner's portfolio.

### Easy to sell

The Sun Storage J4000 array family has a short sales cycle. It is easy to install (customer-installable) and configure, and is easy to service via customer replaceable units. The Sun

Storage J4000 arrays have an easy plug-and-play methodology so a partner can quickly get the unit up and running. Due to the nature of this product and its ease of installation, the Sun Storage J4000 arrays require minimal training investment from both a sales and a technical sales standpoint.

### **J4000 array Sun<sup>SM</sup> System Performance Packs**

Sun<sup>TM</sup> System Packs create opportunities for partners to protect and grow their businesses by enabling them to offer a more attractively priced combination of hardware and support when the two are sold together.

Sun Systems Packs provide a new opportunity for all partners to grow their business and Sun incentives under the Partner Rewards Programs.

Sun System Packs improve partners' competitiveness by allowing them to:

- Accelerate the end-user's procurement decision
- Effectively access new accounts with increased value-based offers
- Strengthen and extend existing customer relationships by bringing improved pricing with new purchases
- Deliver higher-value services to close gaps or extend customer capabilities in desired support
- Proactively address margin erosion from static or declining hardware prices by shifting to long-term service relationships.

#### **Availability to all partners**

The Sun Storage J4000 array family and Sun System Performance Packs are available to ALL partners.

#### **Partner certification and training**

No certification is required. Partner eligibility to sell will be determined by Partner status under the Sun Partner Advantage (SPA) program.

#### **Sun product training portal**

Web-based training on Sun Storage solutions is available to Sun Channel Partners worldwide on the Sun iForce Partner Portal:

1. Log into <http://mysun.sun.com>
2. Click on Web Based Training in the Partner Competency section.

**Note:** If you don't have a My Sun Username, register at <https://pwregister.sun.com>

View new product training and update training modules in the "What's New" section on the main Sun Product Training Portal screen.

The elevator pitch for the J4000 array family is available at

<http://learning.sun.com/video/>

All recordings for J4000 array training will be available at

<http://mylearning.central.sun.com/portal/ssu/>

#### **Available training courses**

For Sun Storage J4200, J4400, and J4500 array administration, the Web-based customer technical training course number is WET-5061. The internal employee and partner technical training course number is WZT-5061. The course is available at <http://www.sun.com/training>

The following internal employee accreditations are available for the J4000 array family:

- WZO-1597 J4000 Family Sales Essentials
- WZO-1598 J4000 Family Technical Essentials

The following Sales Essentials and Technical Essentials training courses are part of the SPA program:

- WZO-4016 Sun J4000 Series Sales Essentials
- WXI-4016 Sun J4000 Series Sales Essentials Assessment
- WZO-4017 Sun J4000 Series Technical Essentials
- WXI-4017 Sun J4000 Series Technical Essentials Assessment

## **Cross-sell and up-sell opportunities**

### **Sun's servers, workstations, and software**

See "Product Details" section of this document.

### **Sun storage**

- SAS HBAs
- Tape libraries
- Hard disk drives

### **Sun System Performance Packs**

The J4000 array Sun System Performance Packs are an essential first step to broadening the discussion with Sun's existing and potential customers, to build a recurring business relationship.

To help businesses realize the competitive advantage and operating efficiencies available today, Sun is tearing down the barriers of cost and complexity traditionally associated with acquiring and managing IT, by offering radical simplicity, predictability, and affordability.

A study by Forrester Research's TEI Consulting Team cited an estimated ROI saving of up to 67 percent for a typical company using Sun's support services. Findings included lower total cost of support, improved systems availability, and improved system administrator productivity as compared to a break/fix environment. For more information see

[http://www.sun.com/service/serviceplans/sunspectrum/forrester\\_05.05.05.pdf](http://www.sun.com/service/serviceplans/sunspectrum/forrester_05.05.05.pdf)

Sun System Packs provide a solid starting point for expanding the sales discussion to include Sun's extensive capabilities as a full-service provider.

## **Support Services**

Where available, customers will be able to upgrade their warranties to the SunSpectrum<sup>SM</sup> Platinum<sup>SM</sup>, Gold<sup>SM</sup>, Silver<sup>SM</sup>, and Bronze<sup>SM</sup> support levels. Contact your local Sun Services sales representative for details.

### **SunSpectrum<sup>SM</sup> Service Plans**

With decades of systems and storage expertise, Sun knows how to store your data securely, manage it intelligently, and provide ready access to it all so you can maximize its use to grow your business and gain competitive advantage. Our reliable services and support give you confidence that your information will be available when you need it and your business will be resilient in the face of change.

SunSpectrum<sup>SM</sup> Service Plans are available both during and after the warranty period. A customer may choose to upgrade its service and support agreement to meet its business needs

by purchasing a SunSpectrum Service Plan. The recommended level of support for the J4000 arrays is the Sun Spectrum Gold<sup>SM</sup> Service Plan.

For more information on the SunSpectrum Service Plans refer to the following URL:  
<http://www.sun.com/service/serviceplans/index.jsp>

## Enterprise Installation Services (EIS)

Installation Services allow the customer to accelerate the deployment of its IT assets by utilizing Sun's proven best practices.

Sun will rack, cable, and connect the asset to the host. Sun will also help the customer set up its storage device with the proper RAID configuration to meet its business needs.

**Note:** On January 28, 2008, Sun introduced a new ERP system. Because of this implementation, many part numbers may have changed. In order to quote a support service price, you will need to use a service item (Gold, Silver, etc.), which reflects the service level, and a product family group code (PFGC). Together these two items will drive the price. You may find the service items in the ordering section of this document.

The group codes for these products are:

STJ4200  
STJ4400  
S4500J24  
S4500J36  
S4500J48

The available service items for these products are:

PLAT-STK-SVC  
GOLD-7X24-STK-SVC  
GOLD-STK-SVC  
SLVR-STK-SVC  
BRNZ-STK-SVC

## J4200 Array Sales Program Overviews

### Supported programs

All four of the following programs are available for the J4000 array family:

- Try and Buy: [www.sun.com/tryandbuy/](http://www.sun.com/tryandbuy/)
- Startup Essentials: [www.sun.com/emrkt/startupessentials/index.jsp](http://www.sun.com/emrkt/startupessentials/index.jsp)
- Sun Partner Rewards: [www.sunpartnerrewards.com](http://www.sunpartnerrewards.com)
- Install Base Business (IBB): <https://central.sun.net/http://ibb.eng.sun.com/>

### Try and Buy Program

[www.sun.com/tryandbuy/](http://www.sun.com/tryandbuy/)

Program objectives:

- Increase disk storage sales
- Build a beachhead into potential accounts

- Win over the customer — create a steady revenue stream

Program details:

- Switched array offerings: J4000 arrays
- Free 60-day product trials via evaluation units (risk-free)
- Customer pays invoice if customer keeps products past 60 days

Program education:

- “Try and Buy” success stories from customers
- Uncensored performance results from other evaluators
- Video overview (program primer)

## Startup Essentials Program

<http://www.sun.com/emrkt/startupessentials/index.jsp>

Program objectives:

- Deliver “value-based” storage to U.S. startups
- Build a beachhead into potential accounts
- Win over the customer — create a steady revenue stream

Program details:

- Switched array disk offerings: J4000 arrays
- Target Web 2.0 and next-generation Internet services companies
- Products offered “just above cost” to qualifying companies

Program education:

- Technical support via email and Web-based training
- Help developers learn new technologies and development tools
- Access no-cost Solaris 10 and other open source operating systems
- Direct Web-based purchasing through online Sun Store

## Sun Partner Rewards Program

[www.sunpartnerrewards.com](http://www.sunpartnerrewards.com)

Program objectives:

- Turn Modular Disk install base into new sales opportunities
- Maintain footprint and continue to grow customer accounts

Program details:

- Modular disk offerings: STXXXX, ST6140, ST6540
- Use UAP to upgrade legacy modular disk products (e.g. 6920)
- Use UAP to migrate competitor disk products (e.g. HP, IBM, EMC)

Program education:

- Intuitive online trade-in calculator to calculate trade-in allowances
- “Sample Savings” tool to get visibility into ROI examples

- RMA Process Primer
- Support via email and phone service: guidance and troubleshooting

## Sun Install Base Business (IBB) Program

<https://central.sun.net/http://ibb.eng.sun.com/>

Program Objectives:

- Turn Modular Disk install base into new sales opportunities
- Maintain footprint and continue to grow customer accounts

Program details:

- Modular Disk offerings: STXXXX, ST6140, ST6540
- Use UAP to upgrade legacy modular disk products (e.g. 6920)
- Use UAP to migrate competitor disk products (e.g. HP, IBM, EMC)

Program education:

- Intuitive online trade-in calculator to calculate trade-in allowances
- "Sample Savings" tool to get visibility into ROI examples
- RMA Process Primer
- Support via email and phone service: Guidance and troubleshooting

## IBB Upgrade Advantage Trade-in Program

There is an IBB Upgrade Advantage trade-in program for the Sun Storage J4000 array family of products. Qualified Sun and non-Sun systems are eligible for trade-in credit when purchasing new J4000 arrays, and trade-in allowances range from 5 to 20 percent, depending on the return. For more information, please visit one of the following pages:

<http://www.sun.com/tradeins/offerings/j4000/>

[partner.sun.com/ibb/offerings/j4000/](http://partner.sun.com/ibb/offerings/j4000/)

[ibb.eng/offerings/j4000/](http://ibb.eng/offerings/j4000/)

The following systems are eligible for UAP trade-in. If your trade-in is not on this list, please contact [uap@sun.com](mailto:uap@sun.com) to determine eligibility.

Sun StorageTek 3120

Sun StorageTek 3320

Sun StorageTek 3510

Sun StorageTek 3511

HP "MSA" Series

Dell "MD" Series

IBM "EXP" Series

## Competitive Information

General competition for the J4000 array family:

- HP MSA 20/30/50/60/70/500/1000/1500/etc.



- Dell PowerVault 220S/MD1000
- IBM EXP 12S/24/3000/420

The Sun Storage J4200 array is targeted at those customers who require low-cost, high-quality storage using simple add-on-disk to extend their server storage capacities. Primary competitors are the HP MSA 60, the IBM EXP 3000, and the Dell MD 1000. Positioned against these products the J4200 array delivers substantial competitive advantages.

### Open storage environments

The J4000 switched array family can be as little as 1/10th the cost of alternative storage arrays; it frees customers from reliance on proprietary, higher-priced storage hardware and software offered by such competitors as EMC, HP, and IBM. J4000 arrays simplify your customer's storage solution by providing improved storage density, connectivity, and capacity while utilizing lower power consumption.

### Traditional storage environments

The J4000 switched array family provides heterogeneous support across a wide variety of operating environments that include Solaris, Linux, and Windows. For customers who want hardware RAID and support for heterogeneous operating system environments, J4000 arrays, combined with the low-cost StorageTek SAS RAID HBA, provide a high level of performance and reliability in comparison to similar HBA RAID products. In traditional environments as well, J4000 arrays offer up to 2 times the storage density, 3 times the connectivity, 2 times the availability, and up to 4 times the available capacity of competitive products.

## Sun Storage J4000 Arrays, Switched Arrays vs Competition: Beat Sheet

The latest version of the following tables are posted at *J4000 Beat Sheet*, SunWIN #535222.

### Sun™ Storage J4000 Array Family vs. the Competition: Quick Positioning

<b>J4000 Array Family</b>	<p><b>Market-leading scalability</b> – Scales from 300 GB to 192 TB</p> <p><b>Breakthrough economy</b> – 90 percent less than traditional disk arrays, approximately \$1/GB list price</p> <p><b>Price/performance</b> – J4200 and J4400 arrays coupled with Sun SAS HBAs have demonstrated world-record SPC-1 array price/performance benchmark capabilities.</p> <p><b>Market-leading connectivity</b> – Up to 6 SAS ports for the J4200 and J4400 arrays; 4 SAS ports for the J4500 array</p> <p><b>Simplicity</b> – No SAN, attaches directly to server</p> <p><b>Flexibility</b> – Customer can add SAS disk for performance or SATA II disk for capacity</p> <p><b>Availability</b> – Hot-swappable and redundant components</p>		
<b>Sun™ Storage J4200 Array</b>	<b>Sun™ Storage J4400 Array</b>	<b>Sun™ Storage J4500 Array</b>	
<p>&gt;Best for low entry cost – \$3200</p> <p>&gt;Smallest size – 2U, 12 drive enclosure</p> <p>&gt;High connectivity – 6 ports x 12 Gb/s (x4-wide SAS ports)</p> <p>Scales to 48 TB</p>	<p>&gt;Best for high performance or bulk capacity</p> <p>&gt;Scales to 192 TB</p> <p>&gt;High performance – 15 Krpm SAS or High capacity – 1 TB SATA</p>	<p>&gt;Best for bulk dense storage</p> <p>&gt;Highest capacity in its class – 48 TB per tray</p> <p>&gt;Highest scalability in its class – 192 TB</p> <p>&gt;Highest density in market – 12 TB/RU</p> <p>&gt;Optimized for low-cost SATA drives</p>	

## The Competition

Vendor	Product	Description
HP	MSA50, MSA70 – 2.5" disk trays	<ul style="list-style-type: none"> <li>&gt;Very small and dense</li> <li>&gt;Very low capacity and scalability</li> <li>&gt;No redundancy, only a single I/O module</li> <li>&gt;Low connectivity - single host port</li> </ul>
HP	MSA60 – 3.5"	<ul style="list-style-type: none"> <li>&gt;Similar to J4200 array</li> <li>&gt;Much lower host connectivity — only 2 host ports</li> <li>&gt;Only 25% of the scalability of the J4400 or J4500 arrays</li> </ul>
IBM	EXP3000	<ul style="list-style-type: none"> <li>&gt;Similar to the J4200 array, with much lower host connectivity</li> <li>&gt;Much higher cost than J4200 array</li> <li>&gt;Only 25% of the scalability of the J4400 or J4500 array</li> </ul>
Dell	MD1000	<ul style="list-style-type: none"> <li>&gt;Similar to the J4200 array, with much lower host connectivity; 50% less</li> <li>&gt;Scales to 45 TB in 9 RU — a single J4500 array tray is 48 TB in 4 RU (3 more TB in less than 1/2 the footprint)</li> </ul>

## Sun Switched Arrays vs Competition: Comparison Matrix

	J4200	J4400	J4500	EXP3000	MD1000	MSA60	MSA50	MSA 70
Disks per tray	12	24	48	12	15	12	10	25
Size	2U	4U	4U	2U	3U	2U	1U	2U
Disk form factor	3.5"	3.5"	3.5"	3.5"	3.5"	3.5"	2.5"	2.5"
Max. expansion trays	4	8	4 *	4	3	4	2	2
Max. number of drives	48	192	0	48	45	48	20	50
Max. total capacity (TB)	36	192	0	36	33.75	36	2.92	7.3
SAS disk capacities (GB)	73, 146,300 15K	146,300 15K 400 10K	N/A	73, 146,300 15K	36, 73, 146, 300 15K 300 10K	73, 146,300 15K	72,146 10K 36,72 15K	72,146 10K 36,72 15K
SATA disk capacities (GB)	250,500,750, 1000 7K	500,750,1000 7K	500,750,1000 7K	500,750 7K	250,500,750, 1000 7K	250,500,750, 1000 7K	60,120 5K	60,120 5K
Host I/F type	SAS	SAS	SAS	SAS	SAS	SAS	SAS	SAS
Max. number of SAS ports	6	6	4	2	4	4	1	1 or 2
Number of I/O modules	1 or 2	1 or 2	1 or 2	1	2	1 or 2	1	1 or 2
Redundant power	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Redundant cooling	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Hot-swap components	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OS support	Solaris, Windows, Linux	Solaris, Windows, Linux	Solaris, Windows, Linux	Windows, Linux, Netware, Vmware	Windows, Linux	Windows, Linux, Netware, HP-UX, Open VMS, Solaris	Windows, Linux, Netware	Windows, Linux, Netware, HP-UX, Open VMS, Solaris
List price range (\$1000s)	\$3.4 - \$14.4	\$8.5 - \$26.6	\$28 - \$56	\$10 - \$33	\$6.6 - \$26	\$8.4 - \$28.2		
List price (\$1000s) 12 x 500 GB, single I/O M	\$7.5			\$8.0	\$6.0	\$7.2		
List price (\$1000s) 24x500 GB, dual I/O M		\$13.1		\$16.0	\$13.0	\$15.2		
List price (\$1000s) 48x1000 GB			\$56.0	\$70.3	\$42.3	\$46.7		
Size 48 x1000 GB			4U	8U	12U	8U		

Source for cost data: Ideas International, July 2008.

## Key General Differentiation of J4000 Arrays vs. Competitors' Products

- 4 times more scalability than competing solutions, including HP MSA, Dell MD or IBM EXP
- Port connectivity and aggregate bandwidth:
  - 3 times more than Dell MD1000, HP MSA60, or IBM EXP3000
  - 50% more than Dell MD1000, HP MSA60, or IBM EXP3000
- Only vendor offering support for high-availability configurations with multihost connectivity
- And it gets even better when used with Solaris/ZFS

Sun Storage J4200 Array : Just the Facts  
Sun Confidential: Internal and Sun Channel Partners Use Only



The following two tables show additional differentiators based on key hardware- and software- related areas:

Sun Hardware Differentiators	
Customer Needs/Drivers	Unlike the Competition
Storage density	Up to 2 times the storage density of MSA60 or IBM EXP3000. (Competition needs two trays to achieve same density as the J4400 array.) The J4500 array is only 4 RU vs 8 RU for HP and IBM and 9 RU for Dell.
Flexibility	3 times the host connectivity of MSA60 or IBM EXP3000
Scalability	Up to 10 times more spindles than MSA 60 or IBM EXP3000

Sun Software Differentiators	
Customer Needs/Drivers	Unlike the Competition
Simple management	50% less time to provision than MSA 60 or IBM EXP3000 with traditional hardware-based host RAID
Reliable data protection	Over 30% higher data integrity than MSA 60 or EXP 3000
Flexibility/Longevity	Proprietary approaches from competitors
Breakthrough pricing	List prices at about \$1 per gigabyte, below the competition

## How do I win against HP MSA 60

### Top attack points against HP MSA 60

- The HP MSA 60, although it is similar to the J4200 array, has much lower host connectivity than the J4200 array offers: only 2 host ports. To date, the MSA 60 does not support SAS zoning functionality, which secures data when connecting to multiple hosts.
- The MSA 60 doesn't scale as well as the J4400 or J4500 arrays; it is limited to 48 TB total expansion.
- The HP MSA 60 does not support SAS zoning, which provides secure data connectivity to multiple host configurations.
- The HP MSA 60 does not support multihost connectivity due to nonexistent zoning functionality.

### Other weaknesses and attack points against HP

- The HP MSA 60 is an old product, needing upgrade. Its price point and feature set are not outstanding like the price point and feature set for the J4200 array.
- HP typically charges for upgraded management capabilities, which are free with the J4200 array.
- HP's reliability is not good; with the HP MSA 60 there is more potential for failure because there isn't the redundancy that Sun offers in the dual design of the J4200 array.
- J4200/J4400 arrays offer 50% more ports and up to 12 times the host connectivity of the

HP MSA 60. The J4500 array offers 4 times the host connectivity.

- HP has been the leader in this market space yet it has not offered any SAS zoning functionality at all, which leads one to wonder about HP's level of commitment to growing the functionality of this product line.

#### **Top points HP will use against Sun Storage J4200 array**

- The HP MSA 60 is tried and true with a good install base and its kinks are worked out.
- HP has the MSA 60 strongly entrenched in the channel, with strong customer and partner loyalty. HP puts lots of money into the channel, unlike Sun.

#### **How to counter HP's claims**

- The HP MSA 60 is getting old; the J4200 array offers a better feature set at a better price point and greater long-term scalability. Common Array Manager software is the management software for all J4000 array platforms; it sets a new standard by providing powerful intuitive management capabilities at no additional charge.
- It is no longer the case that HP's channel activity is much greater than Sun's. Sun is using lots of resources, working to strengthen the channel as well as to enhance its price point and feature sets. Sun is confident that the quality of its products and the extent of its channel activities will result in Sun's taking market share from HP over time.
- Sun has stringent quality requirements, much more so than HP does. Sun puts its new releases through a huge battery of tests to make sure of quality before releasing a product. Sun is spending time and money for these tests and quality procedures, and the results are industry-leading price/performance benchmarks.

### **How do I win against IBM EXP3000**

#### **Top attack points against IBM EXP 3000**

- The IBM EXP3000 is similar to the J4200 array, although it has much lower host connectivity and scalability than the J4000 array family. To date, the EXP3000 does not support SAS zoning functionality, which secures data when connecting to multiple hosts.
- The IBM EXP3000 has a higher price than the J4200 and J4400 arrays.
- The EXP3000 does not approach the scale of the J4400 or J4500 arrays; it is limited to 48 TB total expansion.
- The IBM EXP3000 does not support SAS zoning, which provides secure data connectivity to multiple-host configurations.
- The IBM EXP3000 does not support multihost connectivity due to nonexistent zoning functionality.

#### **Other weaknesses and attack points against IBM**

- The IBM EXP3000 is an old product, needing upgrade. Its price point and feature set are not outstanding like the price point and feature set for the J4200 array.
- In general, IBM storage has a high entry and acquisition cost.
- The incremental charges associated with management software for the IBM EXP3000 add up to a high price tag there as well.
- J4200/J4400 arrays offer 50% more ports and up to 12 times the host connectivity of the IBM EXP3000. The J4500 array offers 4 times the host connectivity.

- IBM has been in this market space for some time yet it has only one product and it has not offered any SAS zoning functionality at all, which leads one to wonder about IBM's level of commitment to this product category.

#### **Top points IBM will use against Sun Storage J4200 array**

- The IBM EXP3000 is tried and true with a good install base and its kinks are worked out.
- IBM has the EXP3000 strongly entrenched in the channel, with strong customer and partner loyalty. IBM puts lots of money into the channel, unlike Sun.

#### **How to counter IBM's claims**

- The IBM EXP3000 is getting old; the J4200 array offers a better feature set at a better price point with greater long-term scalability. Common Array Manager software is the management software for all J4000 array platforms; it sets a new standard by providing powerful intuitive management capabilities at no additional charge.
- It is no longer the case that IBM's channel activity is much greater than Sun's. Sun is using lots of resources, working to strengthen the channel as well as to enhance its price point and feature sets. Sun is confident that the quality of its products and the extent of its channel activities will result in Sun's taking market share from IBM over time.
- Sun has stringent quality requirements, much more so than IBM does. Sun puts its new releases through a huge battery of tests to make sure of quality before releasing the product. Sun is spending time and money for these tests and quality procedures, and the results are industry-leading price/performance benchmarks.

#### **How do I win against Dell MD 1000**

##### **Top attack points against Dell MD 1000**

- The Dell MD 1000 is similar to the J4200 array, although it has much lower host connectivity. To date, the MD 1000 does not support SAS zoning functionality, which secures data when connecting to multiple hosts.
- The Dell MD 1000 does not approach the scale of J4400 or J4500 arrays; it is limited to 45 TB total expansion.
- The MD 1000 offers extremely limited hard-coded zoning functionality and only two-host connectivity.

##### **Other weaknesses and attack points against Dell**

- Dell is just a distributor for EMC products, and as such it will always be dependent on EMC for future upgrades, bug fixes, features, etc. Dell doesn't add to the intellectual property or control it.
- Storage is a secondary business to Dell. Dell offers these storage devices as server-attach options and it is not a primary focus in their competencies. Would you consider buying your storage array from the same company that sells MP3 players and televisions?
- Since Dell distributes EMC products, Dell and its customers are locked into EMC's proprietary hardware. They have no choice but to live with EMC pricing, features, bug-fix schedules and so on. Also, customers tend to be locked into EMC proprietary software, and all new releases, upgrades etc. are charged for. While the market moves toward open source, Dell and EMC still have a business model that locks customers in and

keeps them paying.

- Compared to the Dell MD 1000 the J4200 and J4400 arrays offer 50% more host ports per array and up to 6 times the host connectivity in a 4-tray cascade; the J4500 array offers two times the host connectivity.
- Unlike the Dell MD 1000 which hard-codes zoning into a 7- and an 8-drive domain, the software zoning implemented in Common Array Manager for the J4000 arrays enables greater flexibility to carve up the number of drives per domain at the individual drive level.

#### **Top points Dell will use against the Sun Storage J4200 array**

- Sun talks a great story, and has a good vision, but will it really help the bottom line?
- According to IDC, Dell out-sells Sun in storage for open systems.
- Dells tells customers that Sun still focuses on proprietary hardware delivery.

#### **How to counter Dell's claims**

- Sun's open source hardware and software really do help the bottom line. The market is moving that way, and Sun is just ahead of the curve, as usual, seeing the market trend and delivering what customers want. Open storage is saving customers money right now, today.
- In some areas, Dell does out-sell Sun in storage. However, this is not Dell selling its own IP as it is rebranded from EMC — they are more of a channel partner for EMC.
- Sun is ahead of Dell in using AMD Opteron processors by almost 1 year. Sun has some of the most compatible open systems in the market and leads the storage market in UNIX sales.

## Frequently Asked Questions (External): Sun™ Storage J4200 Array

### Q. What is Sun Open Storage and how will it benefit Sun's customers?

A. Sun Open Storage combines industry-standard hardware and open source software to completely change the economics of high-performance, enterprise-class storage. Sun's technology frees you from purchasing expensive proprietary systems that lock you into a single architecture or vendor.

### Q. How does the J4000 array family address customers' business needs?

A. The following information highlights customer business requirements and the means by which the J4000 array family delivers in response to those needs via Sun hardware and Sun software:

Sun J4000 Array Hardware	
Customer Needs/Drivers	J4000 Array Family Delivers
Price/performance	<\$1/GB with up to 72Gb/sec of total bandwidth
Storage density	6 HDD/RU (J4200/J4400 arrays) and 12 HDD/RU (J4500)
Flexibility	Additional port fanout (3 to 6 ports)
Scalability	2 to 192 drives

Sun Software	
Customer Needs/Drivers	J4000 Array Family Delivers
Simple management	Simplify your storage management with Common Array Manager (CAM), which provides traditional storage midrange-class features (call home, service provider, monitoring/reporting, etc.) along with single-pane-of-glass management for all the J4000 arrays in your data center
Reliable data protection	Leverage storage functionality in applications or your operating system to provide reliable software data protection. For hardware data protection that stands the test of time, utilize the Sun StorageTek RAID HBA card.
Flexibility/Longevity	Leverage our expertise with a 6th-generation CAM management tool that meets your business requirements
Breakthrough pricing	It's FREE — download CAM today and start saving

### Q. What are some of the key customer applications that the J4000 array family is well-equipped to address?

A. The following are some of the key applications addressed by each of the J4000 array products:

J4200 array



- Low-cost SAS/SATA storage
- Email
- Oracle
- Incremental server storage
- Multihost connectivity
- Cost-effective data protection

#### J4400 array

- Bulk SAS/SATA storage
- Multihost connectivity
- High-performance computing
- Email
- Oracle
- Cost-effective data protection
- BIDW
- Video/Multimedia
- D2D2T

#### J4500 array

- Dense bulk SATA storage
- Multihost connectivity
- Cost-effective data protection
- Video/Surveillance
- Tier 2/3
- D2D2T
- Web 2.0

For those customers who require low cost and high-quality storage using simple add-on disk to extend their server storage capacities, the Sun Storage J4200 array is an ideal fit. For those customers seeking high-performance bulk storage with lowest \$/GB, the J4400 array is an ideal fit. For extremely dense requirements where density is key, the J4500 array is an ideal fit.

### **Q. What management software will be available for customers to configure and manage the J4000 arrays?**

A. The following are available via download, with no additional charge:

#### **Sun StorageTek™ RAID Manager software**

This is to be used in conjunction with the installation of Sun StorageTek Common Array Manager software and the Sun StorageTek SAS RAID HBA. This software provides configuration and management capabilities. It includes a full-featured GUI software application and provides a single-view tool that supports simple, secure, centralized configuration and monitoring of all RAID HBAs and disk drives in a customer's storage environment. The software enables storage administrators to group disk drives into logical arrays and build in redundancy to safeguard business-critical data and improve system performance.

**Note:** A command line utility is available in addition to the StorageTek RAID Manager software to assist in the

configuration and management of the Sun StorageTek SAS RAID HBA.

**IMPORTANT:** Customers must install Sun StorageTek Common Array Manager software to take full advantage of the features/functionality of the StorageTek RAID Manager software. CAM will provide firmware upgrade capability and remote serviceability, through Auto Service Request (ASR), to the J4000 arrays.

### **Sun StorageTek™ Common Array Manager software version 6.4.1**

CAM support for the J4000 array family is available with the Sun StorageTek PCIe SAS HBA, or the Sun StorageTek Express Module SAS HBA, and the Sun StorageTek SAS RAID HBA.

Sun StorageTek™ Common Array Manager software (CAM) is the standard management software for the Sun Storage J4000 arrays. With features like storage pools and a built-in performance utility, this software simplifies administration and enables comprehensive management of multiple arrays in addition to the J4000 array family (e.g., ST2540, ST2530, ST6140 and ST6540). CAM is included with the J4000 arrays at no additional licensing or maintenance cost.

### **Q. Is there a source of best-practices information for configuring the J4000 arrays with Solaris/ZFS?**

A. Yes. Please refer to the BlueNotes document entitled "Configuring J4000 & ZFS in Ten Minutes" posted at <http://www.sun.com/blueprints>. Keep this valuable URL for future reference, because the BluePrints Web site contains technical best practices, derived from the real-world experience of Sun experts, for getting the most out of Sun solutions.

### **Q. Where can more comprehensive information about Solaris/ZFS be obtained?**

A. Please access the following URLs for a deeper understanding of Sun's ZFS offering:

[Sun.com](http://www.sun.com)

[http://www.sun.com/software/solaris/data\\_management.jsp](http://www.sun.com/software/solaris/data_management.jsp)

Learning Center

[http://www.sun.com/software/solaris/zfs\\_learning\\_center.jsp](http://www.sun.com/software/solaris/zfs_learning_center.jsp)

How-to guides

<http://www.sun.com/software/solaris/howtoguides/zfshowto.jsp>

Data sheet

<http://www.sun.com/software/solaris/ds/zfs.jsp>

Big Admin

<http://www.sun.com/bigadmin/topics/zfs/>

OpenSolaris

<http://opensolaris.org/os/community/zfs/>

Documentation

<http://opensolaris.org/os/community/zfs/docs/>

Best practices

[http://www.solarisinternals.com/wiki/index.php/ZFS\\_Best\\_Practices\\_Guide](http://www.solarisinternals.com/wiki/index.php/ZFS_Best_Practices_Guide)

Training class

<http://www.sun.com/training/catalog/courses/SA-229-S10.xml>

**Q. What are the details of the bulk horizontal scalability of the J4000 array family products behind a single PCIe slot?**

A. The following scalability details are associated with the currently available SAS host bus adapters (HBAs):

Sun StorageTek PCIe SAS HBA or the Sun StorageTek Express Module SAS HBA

- J4200 arrays will scale to 48 SAS or SATA II disk drives behind each physical SAS port (96 total drives)
- J4400 arrays will scale to 192 SAS or SATA II drives (using 2 cascades of 4 trays each)
- J4500 arrays will scale to 192 SATA II drives (using 2 cascades of 2 trays each)

**Note:** The J4200 array will support up to 4 trays behind each port of these SAS HBA cards.

Sun StorageTek SAS RAID HBA

- J4200 arrays will scale to 48 SAS or SATA II disk drives
- J4400 arrays will scale to 96 SAS or SATA II drives
- J4500 arrays will scale to 96 SATA II drives

**Q. Are the following SAS host bus adapters (HBAs) and SAS host interconnect cables available to support the connectivity of the J4000 arrays?**

- Sun StorageTek PCIe SAS HBA or Sun StorageTek Express Module SAS HBA
- Sun StorageTek SAS RAID HBA

A. Yes.

The Sun StorageTek PCIe SAS HBA and the Sun StorageTek Express Module SAS HBA are available for support connectivity.

The Sun StorageTek SAS RAID HBA is available to provide SAS connectivity for the J4000 arrays with high-performance advanced hardware RAID functionality, including full-hardware RAID support for RAID levels 0, 1, 10, 1E, 5, 6, 50, 5EE, and 60 as well as storage management.

For more comprehensive details about these SAS HBAs, refer to the associated Sun Product Introductions.

A variety of SAS host interconnect cable lengths are also being made available (see the Ordering Information section of this document for details).

**Q. Is Sun Cluster available for the J4200/J4400/J4500 arrays?**

A. Solaris support for high-availability SAS-drive-based J4200 and J4400 arrays is available now. Because of affiliation issues, clustering is not supported for J4000 arrays with SATA drives.

The time lines for the support of high-availability SATA-drive-based J4200, J4400, and J4500 array configurations will be communicated in a subsequent announcement.

**Q. Do the J4200/J4400 array diskless chassis X-option and assemble-to-order (ATO) factory-configured offerings, and the J4500 array standard fixed-system configurations, come packaged with rackmount rail kits?**

A. The J4200 and J4400 array diskless chassis X-option and ATO configurations do NOT include rackmount rail kits. Customers will need to order the following parts separately to meet

their rail kit requirements:

Sun Part Number/Description:

XTA-4200-2URK-19U Sun Storage J4200 2U universal rack rail kit

XTA-4400-4URK-19U Sun Storage 4400 4U universal rack rail kit

The J4500 array standard fixed system configurations come packaged with slide rail kits.

**Q. Do the J4000 arrays support multipathing?**

A. Yes. Multipathing support is available for the J4000 arrays via the the following associated multipathing drivers:

- SAS multipath for Solaris 10
- SATA multipath for Solaris 10
- SAS/SATA multipath for Linux
- SAS/SATA multipath for Win2003 (coming soon: Q4CY09)
- SAS/SATA multipath for Win2008

**Q. Is multihost support available for the J4000 arrays?**

A. Yes. Multihost support comes from the SAS zoning capabilities provided by Common Array Manager software version 6.4.1 or later. The J4200 and J4400 arrays can each support up to 6 hosts. The J4500 arrays can support up to 4 hosts.

**Q. How do assemble-to-order (ATO) and X-option configurations for the J4200 and J4400 arrays need to be structured and how can customers be sure the configurations ordered are technically valid?**

A. When the Sun or Sun Partner technical sales representative is customizing factory-configured ATO selectable options/features or selectable X-options for the J4200 or J4400 arrays, the Sun Microsystems configuration tool, WebDesk/Partner WebDesk Configurator, will enforce the necessary structuring and technical requirements. See Ordering Information section for details.

**Q. What management software should be used when a J4000 array is attached to the Sun StorageTek PCIe SAS HBA card or Sun StorageTek Express Module SAS HBA?**

A. Sun StorageTek CAM version 6.4.1 (or later) supports the J4200, J4400, and J4500 arrays when connected to the PCIe SAS HBA card or Express Module HBA.

**Q. What management software tools should be used when connecting the J4000 arrays to the PCIe SAS RAID HBA card?**

A. The SAS RAID HBA card comes with Sun StorageTek RAID Manager software that should only be used to set up all RAID features (e.g., LUNs, RAID levels, volumes, etc.). CAM version 6.4.1 or later should be used to perform all the J4000 array family component and environmental reporting and provide service advisor and Auto Service Request (ASR) functions. CAM v6.4.1 will also provide the ability to upgrade SAS I/O modules and HDD firmware for the J4000 arrays.

**Q. Are the J4200/J4400 arrays going to support flash disk technology?**

A. The J4200/J4400 arrays are flash-ready. All these arrays are already optimized to deliver the next significant boost in application performance through upcoming flash disk technologies.

**Q. How is each of the J4000 array products offered and what are their expected lead times for shipping?**

A. The J4200 and J4400 arrays are both available in two forms: a) via customized factory-configured assemble-to-order (ATO) combinations, which are formed by an aggregation of part numbers and shipped to the customer preassembled or b) via X-option standalone customer-installable part numbers that are ordered and shipped for customer assembly of the arrays on site.

Shipping lead times:

**J4200/J4400 array ATO orders**

Americas: Standard 6-day lead time

EMEA/APAC: Standard lead time of 8 days

**J4200/J4400 array X-option orders**

Americas, EMEA, APAC: Standard 4-day lead time

B. The J4500 array is only available in standard fully populated standalone system configurations represented by a single predefined part number.

These configurations ship to the customer preassembled. J4500 array orders have a standard lead time of 4 days for the US, 6 days for APAC and 8 days for EMEA.

Refer to the Ordering Information section of this document for part number details.

**Q. Does Sun support the mixing of drive types (SAS & SATA II) for tiered storage in the same J4200 or J4400 array enclosure?**

A. Yes, Sun supports the mixing of different drive types and capacities in the same enclosure, for the J4200 and J4400 arrays.

**Q. Does Sun support the mixing of J4200 and J4400 arrays in a single cascade?**

A. Yes, Sun supports the mixing of J4200 and J4400 arrays in a single cascade. Note that no more than a maximum of 4 J4200 arrays per cascade are supported and the number of drives in a single cascade must be within the HBA's stated number of supported drives.

**Q. What RAID Levels are supported by Solaris/ZFS?**

A. RAID levels 0, 1, 5, and 6

**Q. What are some of the key features that Solaris/ZFS provides when used with the J4000 arrays?**

A. When used with the J4000 arrays, ZFS provides

- Data integrity and security
  - No corruption (transitional copy-on-write model)
  - Everything is checksummed
  - Virtually unlimited snapshots
- Scalability

- Additional capacity added to file system without system interruption
- Up to 96 TB capacity in a single cascade
- Ease of management
  - Grow and shrink file system capacity without administration
  - Pools, not volumes
- Breathtaking performance
  - Spreads writes across all available disks (additional disks added to ZFS stripe width automatically)
  - Data written to first free block (no waiting for disk rotational latency and head movement)
  - Intelligent prefetch – predicts next data and pre-caches it
- RAID-Z

**Q. What hardware features make up each of the J4200/J4400 arrays and what does each diskless chassis ship with?**

A. J4200 and J4400 array configurations are based on the following features:

- SAS I/O module: 1 or 2 per array
- AC power: Standard 2 \* redundant AC power supplies per array
- Fan unit: J4200 - Standard 2 \* redundant cooling fans per array; J4400 - Cooling fans are integrated into the J4400 power supplies
- Disk drives:
  - J4200/J4400 arrays – 300 GB, 450 GB 15 Krpm SAS drives
  - J4200 array – 250 GB 7.2 Krpm SATA II drives
  - J4200/J4400 arrays – 500 GB, 750 GB, and 1 TB 7.2 Krpm SATA II drives
  - Future drives:
    - 600 GB 15 Krpm drive coming in Q4CY09
    - 2 TB 7.2 Krpm drive coming in Q4CY09

The J4200/J4400 array diskless chassis (X-option and ATO PN) ships with the following:

- 1 \* .5m SAS interconnect cable
- 2 \* redundant AC power supplies
- 2 \* redundant cooling fans (for the J4400, cooling fans are integrated into the power supplies)
- 1 \* SAS I/O module
- Air management sleds: "Non-selectable" system-determined parts (quantity based on number of drives selected)
- Accessory kit which contains the following:
  - .5m SAS interconnect cable
  - HW Installation Guide (documentation)
  - Accessing Documentation (documentation)

- Important Safety Information for Sun Hardware Systems(documentation)
- Obtaining the Common Array Manager software (documentation)

**Note:** J4200/J4400 array rail kits are sold separately.

**Q. Is the J4000 array family a good fit for open storage deployments?**

A. The J4000 array family is ideally suited for open storage deployments in highly scalable and high-performance storage infrastructures, reducing costs for the customer by up to 90 percent over proprietary alternatives.

**Q. Where can one find more information about the software that is used to manage the J4000 arrays?**

A. For more information, please refer to the following URLs for the available management software:

Sun StorageTek Common Array Manager software:

[http://www.sun.com/storagetek/management\\_software/resource\\_management/cam/](http://www.sun.com/storagetek/management_software/resource_management/cam/)

Solaris/ZFS: [http://www.sun.com/software/solaris/zfs\\_learning\\_center.jsp](http://www.sun.com/software/solaris/zfs_learning_center.jsp)

Sun StorageTek RAID Manager software: <http://docs.sun.com/app/docs/prod/storedge.raid#hic>

**Q. Do the J4000 arrays come packaged with SAS interconnect cables?**

A. Yes. Details are as follows:

J4200/J4400 array: One .5-meter SAS interconnect cable comes with both diskless chassis and X-option SAS I/O module orders.

J4500 array: Two 2-meter SAS interconnect cables are provided with each standard-configuration J4500 array order. (Each J4500 array standardly comes with one I/O module.)

**Q. What is the difference between a CRU and a FRU?**

A. Field replaceable units (FRUs) are typically replaced by Sun-authorized and Sun-trained personnel. A customer replaceable unit (CRU) has been designed to be easily replaced by the customer. FRUs and CRUs are easily identified in the Sun System Handbook, available to customers with a Sun Service Plan.

**Q. How will customers receive replacement CRUs in the event of a failure?**

A. A customer will open a service call with Sun. A Sun technician will confirm the CRU failure and schedule shipment of a replacement CRU to the customer with a prepaid return label. The customer will remove the failed CRU and return it to Sun in the box in which the new unit was shipped, utilizing the prepaid return label.

**Q. How will a customer know how to replace the CRU?**

A. Instructions for removal and replacement are available via the Service Advisor which is accessible through StorageTek Common Array Manager software. For easy reference, hardcopy removal and replacement instructions will also be provided as part of the CRU shipment.

**Q. Are installation services available for this product?**

A. Yes. While the system is "customer installable," Sun offers installation services to help accelerate the deployment of this asset.

**Q. What are the deliverables of these installation services?**

A. Our installation services cover the following:

- Racking and cabling
- Connection to host
- Test for I/O
- RAID setup

**Q. Are the Sun Storage J4000 arrays localization (L10N) and internationalization (I18N) compliant?**

A. Yes, they are internationalization (L18N) compliant by FCS and localization (L10N) compliant.

**Q. Does Sun StorageTek Common Array Manager software (CAM) support all J4000 arrays?**

A. Yes. Sun StorageTek Common Array Manager software (CAM) version 6.4.1 supports all J4000 arrays.

**Q. What CRUs are available with the J4000 arrays?**

A. Customer replaceable units (CRUs) are available for chassis/midplanes, I/O modules, power, cooling units, and disk drives.

**Q. What languages does the Sun Storage J4000 array software and documentation support?**

A. English, French, Japanese, and Simplified Chinese are the languages currently supported. Strategy for further localization is reviewed on a periodic basis.

**Q. Are the J4000 array products fully regulatory-compliant to be sold worldwide?**

A. Yes, the J4000 array products are fully regulatory compliant.

**Note:** any country-specific regulatory compliance restrictions will be communicated outside of this document.

**Q. What are the J4200/J4400 array high-availability features?**

A. J4200/J4400 array high-availability features include the following:

- Redundant, hot-swappable components:
  - I/O modules
  - disk drives
  - interconnect cables
  - power/cooling components
- Automated I/O path failover



- Online administration, expansion, configuration
- Global hot spares

**Q. What HBAs, SAS cables, servers, and operating systems are supported by the J4000 array family?**

A. For the latest compatibility information covering HBAs, SAS cables, servers and operating systems, please refer to the following:

Sun Storage Interop Tool, posted at <https://extranet.storitek.com/interop/interop?cmd=report>

J4000 array family release notes, posted at <http://docs.sun.com/app/docs/prod/wkgrp.disk#hic>

**Q. Are the J4000 arrays and all X-option part numbers supported by the J4000 array family compliant with the European Union (EU) parliament and China "Restriction of Hazardous Substances" (RoHS) directives?**

A. Yes. Note that the J4000 array family will be taking the lead-in-solder exemption to the RoHS directive. As a result, "RoHS-5" is indicated in many of the J4000 array family product descriptions.

**Q. Where can I find detailed technical information on the Sun Storage J4000 arrays?**

A. User's guides, field guides, and more are posted externally at

[http://www.sun.com/storagetek/disk\\_systems/workgroup/](http://www.sun.com/storagetek/disk_systems/workgroup/)

[http://www.sun.com/products-n-solutions/hardware/docs/Network\\_Storage\\_Solutions/Workgroup/](http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/)

<http://docs.sun.com/app/docs/prod/sysexp.disk#hic>

**Q. What are Sun System Packs?**

A. These are offers that bundle hardware (in this case, a storage device) with services to make it easier for customers to buy the relevant services at the time of hardware purchase.

**Q. How do Sun System Packs benefit customers?**

A. Sun offers preferred pricing for the joint purchase of hardware and services. The pricing comparisons for joint purchase versus separate purchase are presented in System Pack Rate Cards, viewable at [sun.com/systempacks](http://sun.com/systempacks)

**Q. Do customers have the choice to purchase support under business-as-usual terms?**

A. Yes. Customers may opt to purchase a standard warranty only, or buy a recommended service plan. A recommended service plan purchased with J4000 array family hardware always adds up to a lower total cost than buying it separately, post-sale, and may sometimes cost the same as the basic product with warranty. Customers should compare all options.

**Q. Are all customers eligible for Sun System Pack pricing?**

A. Yes. Any customer who buys a J4000 array jointly with a support plan is automatically entitled to Sun System Performance Pack Pricing.

**Q. How do I find out what my System Pack discount is?**

A. This is provided by your sales representative or agent. System Pack discounts are preset, consistent for all customers, and not subject to change by any sales representative.

**Q. Can I incorporate a Sun System Pack purchase into my existing support contract?**

A. Yes. You should identify the contract to which your new purchase should be added.

**Q. How do I find out which other Sun products are eligible for Sun System Pack pricing?**

A. Review the most current list at [www.sun.com/systempacks](http://www.sun.com/systempacks). New products are being added on an ongoing basis.

**Q. Which SAS interconnect cable lengths are supported on the J4200, J4400, and J4500 arrays?**

A. The supported cable lengths are as follows:

- J4200 array: Supports .5m, 1m ,and 2m SAS cables
- J4400 array: Supports .5m, 1m, 2m, 3m, and 6m SAS cables
- J4500 array: Supports 2m, 3m, and 6m SAS cables

Sun is targeting to phase in a new J4200 array SIM that will support cable lengths of up to 6 meters by early Q4CY09.

Support for additional SAS cable lengths will be communicated via subsequent announcements. Please refer to the ordering section of this document for specific part numbers.

**Q. What is an Allowance (ALW) Code?**

A. The allowance code is a Sun System Pack discount that applies to the hardware when a support contract is also purchased at point of sale.

**Q. Is the allowance code (ALW) the same for all J4000 arrays?**

A. No. Each product has a unique Allowance (discount) Code. However, the discount amount is part of the code and different allowance codes may offer a similar discount.

**Q. What are the applicable allowance codes for J4000 array family Sun System Performance Packs?**

A. The applicable allowance codes are:

- Sun Storage J4200 array => ALW-02-M-J4200 (2% incentive allowance)
- Sun Storage J4400 array => ALW-02-M-J4400 (2% incentive allowance)
- Sun Storage J4500 array => ALW-03-M-J4500 (3% incentive allowance)

**Q. Are the J4000 arrays offered as part of the Sun Startup Essentials and Try and Buy programs?**

A. Yes. The J4200, J4400, and J4500 arrays are offered as part of both programs.

**Q. Are partners required to take training to sell Sun System Packs?**

A. Yes. Positioning, sales, and QBBE (quote, book, bill, entitlement) training for Sun System Packs is necessary to help partners effectively sell to, and service, their customers' needs.

**Q. Where can partners access training?**

A. Training is made available through the Sun Partner Web site, under System Packs.

**Q. Are the Allowance (ALW) Codes the same for partners?**

A. Yes, the System Pack discount (ALW) is the same whether the Sun System Pack is sold through direct or partner sales.

## Frequently Asked Questions (Internal): Sun™ Storage J4200 Array

### **Q. Are there Enterprise Installation Services (EIS) part numbers for the Sun Storage J4000 array products?**

A. Yes. These part numbers are listed in the Ordering Information section of this document.

### **Q. What advice can be provided to Sun ISO Sales and Storage Sales Representatives regarding the respective J4000 array value propositions and key solutions as focused data points to provide incentive and support sales opportunities?**

A. The following is some basic information on the subject:

#### **Sun ISO sales:**

##### Value proposition

- Good revenue/margin in a fast-growing segment (reduce OP-EX/CAP-EX)
- Makes Sun servers more competitive
- Server-oriented management
- Easy to sell and deploy

##### Key solutions

- Target customers in need of economical and reliable server-attached storage
- Configure/bundle with Sun's broad line of SAS servers
- Target applications: Web 2.0, BIDW, video/multi-media and surveillance, HPC, Tier 2-3, D2D2T, and file/print applications

#### **Sun storage sales:**

##### Value proposition

- Good revenue/margin in a fast-growing segment
- Sun's product, with sizable differentiation
- Common management shared by the J4000 array and Modular lines
- Easy to sell and deploy

##### Key solutions

- Target customers in need of economical and reliable server-attached storage
- Cross-sell software, tape, and services
- Target applications: Web 2.0, BIDW, video/multi-media and surveillance, HPC, Tier 2-3, D2D2T, and file/print applications

>**Note:** See the Positioning section in this document for information on this subject.

### **Q. Where can I find detailed technical information on the Sun Storage J4000 arrays?**

A. Users' Guides, Field Guides, and more are posted internally at

<http://onestop.sfbay.sun.com/storage/>

<http://pts-storage.west/>

[http://mysales.central/public/storage/products/workgroup/  
http://xmen.east/](http://mysales.central/public/storage/products/workgroup/http://xmen.east/)

And externally at

<http://www.sun.com/storage/workgroup/>

<http://docs.sun.com/app/docs/prod/sysexp.disk#hic>

[http://www.sun.com/products-n-  
solutions/hardware/docs/Network\\_Storage\\_Solutions/Workgroup/](http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/)

**Q. How do I use the Sun System Pack rate card?**

A. Use the rate card to prove the cost/benefit of integrated hardware and service sales and remove any price-based objections for a support contract. Sell the customer on the added support value available on the same budget and also look to move the customer to a higher support level as the budget impact is softened by the System Pack discount.

**Q. How do I use the ALW discount?**

A. The ALW discount is the additional reduction in price that must be added to any customer-applicable discounts to ensure that the System Pack discount is included in the customer's pricing. You must advise the customer of the discount amount and specific wording is to be added to the quote. (See next answer.)

**Q. What must the customer reference on its PO to receive the ALW discount?**

A. "A 2% or 3% Integrated Service Allowance (with one of the following within brackets: ALW-02-M-J4200, ALW-02-M-J4400 or ALW-03-M-J4500) has been subtracted from line 1.0 in addition to contractual discount."

- Sun Storage J4200 array => ALW-02-M-J4200 (2% incentive allowance)
- Sun Storage J4400 array => ALW-02-M-J4400 (2% incentive allowance)
- Sun Storage J4500 array => ALW-03-M-J4500 (3% incentive allowance)

**Q. How do I leverage the Sun System Pack offer on J4000 arrays?**

A. The Sun System Performance Pack offers a mechanism to deliver cost/benefit to your customer through preferred integrated sales, to increase value through more support coverage within the same or lower budget, and to reset comparisons with the competition with a solution that goes beyond break-fix and standard business hours.

**Q. Are there any key contacts available for technical discussions regarding the J4000 arrays?**

A. Yes, feel free to contact one of the Data Management Ambassadors (DMAs) for assistance.

**Q. In addition to the Solaris/ZFS information in this document, are there internal references that can be accessed?**

A. Yes, internal audiences can locate additional information at the following URL:

<https://onestop.sfbay.sun.com/technology/zfs.shtml?menu>