

# Sun StorageTek™ 9985V Storage System

## Just the Facts

Sun Internal / Partner Version

October 09, 2007



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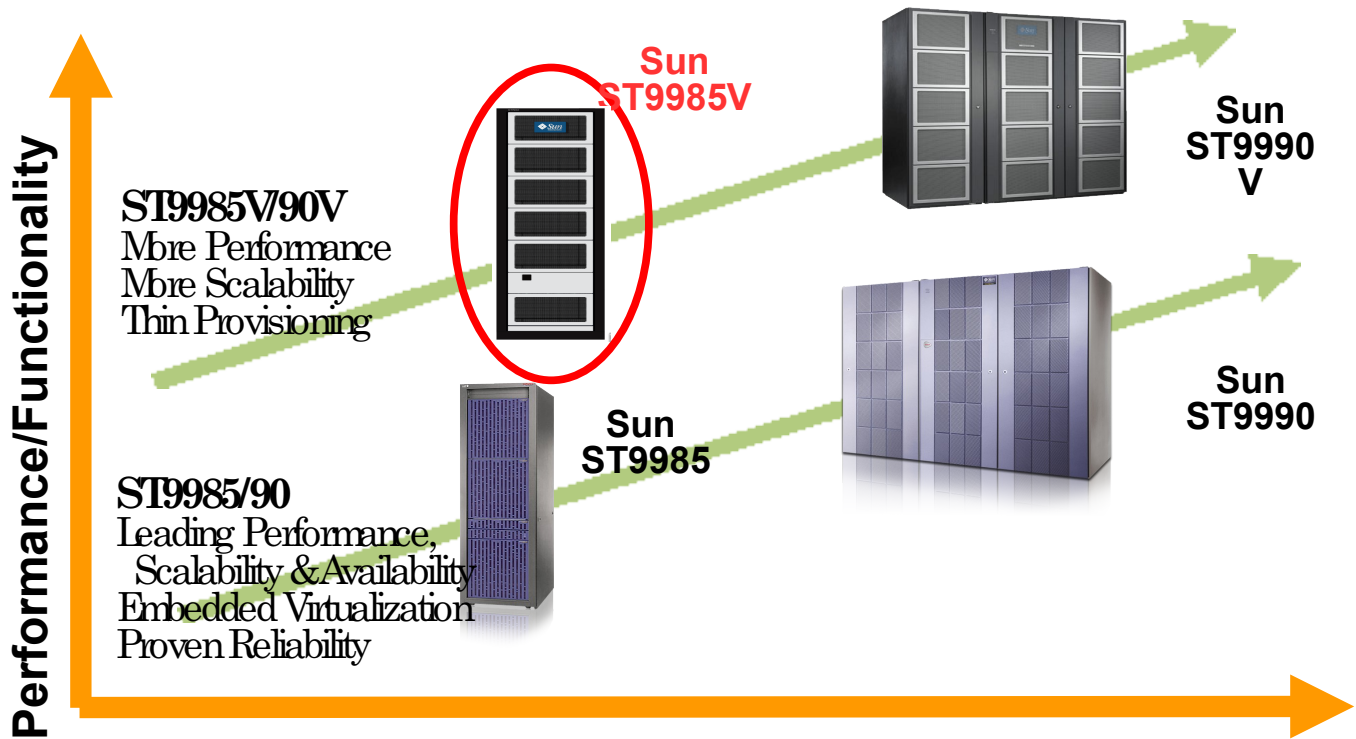
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# Positioning

Figure 1: Sun StorageTek 9985V System



## Introduction

The Sun StorageTek 9985V is the new version of the Sun StorageTek 9985 enterprise storage system. This is along the lines of similar technology refresh of the ST9990 with the ST9990V. Similar to the ST9990V, the Sun StorageTek 9985V will be based on 4th generation cross-bar architecture, 2nd generation embedded virtualization and Thin Provisioning. ST9985V has the same microcode and has all of the same embedded software, virtualization capabilities of the SUN StorageTek 9990V, including mainframe connectivity and mainframe software support, but has been scaled down in capacity, connectivity and performance to meet the needs of its targeted market segments to provide the following key benefits:

ST9985V is an evolution of the ST9985 with refinements to existing technology and additional new functionality, as well as higher system performance to further differentiate it from the competition. Building on the proven technical superiority and industry thought leadership established by the ST9990 and ST9985 with its unique embedded virtualization, 100% Data Availability Guarantee, Logical Partitioning, Universal Replicator, and its 4th generation massively scalable crossbar switch architecture; ST9985V is an evolution of those capabilities with greater performance, scalability and even higher levels of availability. New integrated capabilities for thin provisioning and enhancements to its second generation of embedded virtualization will further demonstrate how ST9985V is the most comprehensive and fully integrated storage services platform. With future support for attachments of FICON-based external storage, the ST9985V quickly extends its value with lower storage costs for smaller mainframes. When contrasted with IBM and EMC's piece-meal approach of separate switch-appliance based virtualization and additional layers of software to manage, move and copy data, ST9985V clearly provides the simplest and most integrated storage solution for heterogeneous virtualization, enhanced data protection and TCO reduction.

The ST9985V provides the industry's most fully integrated combination of enterprise-proven hardware and software technologies that unify and simplify the delivery of universal data and storage services across heterogeneous storage platforms. Now customers can benefit from the industry's most scalable storage solutions with superior performance and backed by a set of storage and data services that includes new thin provisioning with ST9900 Dynamic Provisioning™ software, application-centric storage management, and simplified, unified data replication across heterogeneous storage systems. The ST9985V provides as much as 69.2TB of internal storage and up to 96PB with the external heterogeneous storage systems support. Please note that 69.2 TB is the technically correct capacity whereas 72 TB is the rounded up marketing version. As an integral component of the portfolio of ST9900 Services Oriented Storage Solutions, the ST9985V provides an unequalled foundation for matching application requirements to the attributes of different classes of storage, while fully leveraging, and even adding value to, current investments.

New bundling of ST9900 software available on the ST9985V simplifies the purchase, installation and maintenance of ST9900 software for our customers, while streamlining the sales process and freeing up precious sales cycles for other productive activities. The new ST9900 Basic Operating System Software bundle combines ST9900 Device Manager Software, ST9900 Resource Manager Software and ST9900 Virtual Partition Manager software. The number of license keys is dramatically reduced to simplify installation and maintenance. When complemented by services and solutions designed to realize its potential with best storage practices, the ST9985V assists customers in more closely aligning IT and business objectives. In summary, ST9985V unifies data and storage services across heterogeneous storage, supporting industrial-strength virtualization, replication, migration, and single pane-of-glass management. Customers can use just one platform to manage all of their storage systems.

## Key Product Attributes:

- Industry leading scalability, performance and availability for your most demanding enterprise storage and business continuity needs, in a fully integrated storage and data services platform.
- Thin Provisioning for improving storage utilization, simplifying storage provisioning, transparent capacity upgrades, and reducing TCO.
- Embedded Storage Virtualization for massive storage consolidation and management simplicity of up to an unparalleled 96 PB.
- Virtual Partitioning of cache, disk, and I/O for helping organizations meet their security and service level agreements.
- Tiered Storage management for optimizing the alignment of storage costs with business needs and implementing data lifecycle management.
- Remote application with disk-based replication journaling for multi-data center disaster recovery.
- Market proven reliability
- Massive Scalability:
  - Up to 69.2TB (72 TB rounded up mkt capacity) internal, 96PB external
- Market Leading Performance
  - Industry leading 800,000 IOPS and 13.3 GB/s aggregate bandwidth (8.5 data + 4.8 control)
  - Performance Scales with Capacity:
  - Crossbar architecture (4th generation) for max performance and availability
- Market-Proven Availability:
  - Optional 100% Data Availability Guarantee
- Comprehensive Management Suite:
  - Common across ST9900 product line
- Comprehensive Business Continuity Suite:
  - Common across ST9900 product line
- Enables Tiered Storage and Large Scale Consolidation:

- Controller based virtualization
- Policy Driven Storage Management:
  - For data lifecycle management (DLM)
- Thin Provisioning (Dynamic Provisioning):
  - Improve storage utilization, provisioning and transparent capacity upgrades

## **Main Hardware Features**

The ST9985V System provides an excellent combination of increased Performance, Scalability and Capacity.

The following features will be available at time of announcement:

- \* 13.3 GB/sec Aggregate System Bandwidth
- \* 800,000 IOPS Maximum
- \* 69.2 TB (w/300 GB HDD) Internal raw capacity (The marketing number is 72 TB, rounded up)
- \* 240 Disk drives
- \* 64 GB Data Cache Memory
- \* 16 GB Shared Memroy (Control Cache Memory)
- \* 48 FC connections
- \* 24 FICON, 24 ESCON connections
- \* 8 Virtual Partitions (Virtual Storage Machines)
- \* 65,536 Logical devices (Open Systems and z/OS)
- \* 96 PB External Storage Support
- \* Dynamic Provisioning (Thin Provisioning)
- \* ST9900 Series Software Suite

Not all ST9985V features will be available at GA. The following will be available post GA(date TBD):

C-NAS, UR 4X4X4 and UR 6X6, iSCSI, CDP

## Main Software Features

All ST9985V software is leverageable from the ST9990V and offered as suite bundles or as stand alone. (Although the same software is usable on multiple generations of the ST9900 systems, each generation has a separate and distinct set of part numbers. The ST9985V has its own set of part numbers. This means that you can not use a SW part number from the ST9990V on the ST9985V.)

ST9900 Basic Operating System (BOS) Suite replaces Device & Resource Manager Suite

- Includes Device Manager and Resource Manager Suite
- Includes Virtual Partition Manager with support for up to 4 partitions
- Includes Server Priority Manager

ST9900 BOS Virtual Suite (BOS V)

- Includes Universal Volume Manager
- Includes Virtual Partition Manager for up to 32 partitions (but on the ST 9985V, only up to 8 partitions are allowed, on the ST 9990 V, up to 32 partitions are allowed).

ST9900 Disaster Recovery Suite to replace current TrueCopy suite

- Includes TrueCopy Sync + HUR for both Open and Z/OS

ST9900 Disaster Recovery Extended Suite to replace current HUR Suite

- Include TrueCopy Sync + HUR with advanced function: 3DC for Open and z/OS and 4x4 for z/OS only

ST9900 In-System Replication

- Includes ShadowImage for Open and z/OS and CoW for Open

ST9900 Compatible FlashCopy version 2

ST9900 Dynamic Provisioning

ST9900 Continuous Data Protection (Future estimated 1HCY08)

ST9900 Compatible PAV

ST9900 Business Continuity Manager

ST9900 CrossOS File Exchange (RapidXchange HMDE)

ST9900 HiCommand Tuning Manager

ST9900 Tiered Storage Manager

ST9900 HiCommand Replication Monitor

ST9900 HiCommand Protection Manager

ST9900 Dynamic Link Manager

Sun StorageTek 9900 Basic Operating System (BOS)- This suite was created to deliver the storage return on investment, security, and quality of service to applications that your organization requires. And the Basic Operating System Virtualization software enables the ST9985Vs unique embedded virtualization capabilities and allows customers to take advantage of ST9900 storage management and data mobility capabilities—within a single system or across an entire heterogeneous storage pool. Using Basic Operating System, one administrator can manage an entire storage infrastructure from a single pane of glass or you can choose to designate multiple storage administrators who can optionally manage only a particular set of storage resources that is made accessible to them.



The primary Basic Operating System interface, Device Manager software, utilizes an easy-to-use and intuitive graphical user interface to centrally manage the ST9985V along with all other Sun ST/SE9900 storage systems. A complete command line interface is also included. Through Device Manager software, Basic Operating System provides user, logical, physical, and host management views that enable provisioning and storage pooling for primary and secondary storage. It offers multiple levels of security for disks, ports, and administrators and its reporting capabilities enable capacity analysis based on server or application, or physical storage class usage.

In complex infrastructures where many servers are connected to a storage system, it's often essential that business-critical applications get their own required storage bandwidth. With Basic Operating System you can control bandwidth at the port level in addition to being able to create up to 4 individual virtual partitions (virtual private storage machines) to ensure that critical application servers have prioritized access to their required storage quality of service. And with Basic Operating System V you get the additional capability to create up to 32 secure virtual private storage machines. (Note that the ST 9985 V can have up to 8 of these partitions and the ST 9990V can have up to 32 of these partitions. This means shared storage can be securely compartmentalized where needed.

Licensing for BOS is by frame; this mean by both the primary rack and the expansion rack

Operationally, Basic Operating System's Performance Monitor provides a fundamental view of the performance data provided by the storage system components, including physical disks, channel processors, and storage processors. The data helps you to make informed decisions regarding storage tuning and load balancing.

- Sun StorageTek 9900 BOS Virtual (BOS V) - The BOS V is an upgrade to the BOS and adds the Unique ability to virtualize externally attached storage subsystems to the ST9985V system creating a single heterogeneous pool of tiered storage. This enables simplified storage management, increases utilization, increases efficiency, improves service levels, simplifies data migration and helps meet compliance demands. With BOS V Virtual Partitions are expanded - up to 32 storage, cache and IO ports partitions. Note that the ST 9985 V can have up to 8 of these partitions and the ST 9990V can have up to 32 of these partitions.
- Sun StorageTek 9900 HiCommand Tuning Manager and Sun StorageTek 9900 HiCommand Device Manager - Targeted for users managing multiple storage arrays including the ST9990, ST9985, ST9910, ST9960, ST9970 and ST9980 in open or shared environments. HiCommand quickly discovers the key configuration attributes of storage systems and allows users to begin proactively managing complex and heterogeneous storage environments quickly and effectively using an easy-to-use browser-based GUI. HiCommand enables remote storage management over secure IP connections and does not have to be direct-attached to the storage system. HiCommand is a suite of several management tools. Two of the most significant are HiCommand Tuning Manager and Device Manager. HiCommand Tuning Manager allows the customer monitor and manage various capacity, performance, service level parameters. HiCommand Device Manager allows the customer to manage disparate systems from the same graphical user interface.(Part numbers for Tuning manager will be announced in August 2007) (The Device Manager base kit and trial license Part numbers for the ST9990/85/80/70/60/10 are also included in this announcement) (Device manager for the ST9985V is included in the BOS Suite)
- Sun StorageTek 9900 Dynamic Link Manager (SDLM) software, is multi-pathing software which resides on the host server. It provides functions for distributing the load across multiple paths and switching to another path if there is a failure in a path in use. The load balancing and path failover capabilities of SDLM improve the overall performance and reliability of the system. (Part numbers for the ST9990V/ST9985V/90/85/80/70/60/10 are included in this announcement.)
- Sun StorageTek 9900 ShadowImage In-System Replication – Includes ShadowImage for Open and z/OS and CoW for Open. Allows the user to create internal copies of volumes for a wide variety of purposes including offline backup and application testing.

- Sun StorageTek 9900 Disaster Recovery Suite - Includes TrueCopy Sync+ HUR for both Open and Z/OS. Sun StorageTek 9900 TrueCopy Remote Replication provides data replication to other Sun StorageTek 9900 series subsystems over local or long distance connections. The added copies may be used to help enable disaster recovery, data mining, backup, testing, etc. It provides synchronous remote replication operations.
- Sun StorageTek 9900 Disaster Recovery Extended Suite – Includes TrueCopy Sync + HUR with advanced function: 3DC for Open and z/OS and 4x4 for z/OS only.
- Sun StorageTek 9900 Performance Monitor - Monitors disk subsystem and allows the user to obtain statistics about resources in the disk subsystem and statistics about workloads on disk and ports. (no orderable part numbers, this feature is embedded within the BOS Suite)
- Sun StorageTek 9900 Server Priority Manager - Allows open-systems users to designate prioritized ports, or World Wide Names(WWN's), (e.g. for production servers) and non-prioritized ports (e.g. for development servers) and set thresholds and upper limits for the I/O activity of these ports, or WWN's. (no orderable part numbers, this feature is embedded within the BOS Suite)
- Sun StorageTek 9900 Data Retention Utility - The LDEV Security feature of the ST9990 subsystems allow the user to restrict host access to the logical devices (LDEVs) on the ST9990 subsystem. Key in retaining data intact for regulatory compliance requirements. (no orderable part numbers, this feature is embedded within the BOS Suite as it is within the Resource Manager Suite)
- Sun StorageTek 9900 Data Retention Utility for IBM z/OS – LDEV Security: The LDEV Security feature of the SE9990 subsystems allow the user to restrict z/OS host access to the logical devices (LDEVs) on the SE9990 subsystem. (no orderable part numbers, this feature is embedded within the BOS Suite as it is within the Resource Manager Suite)
- Sun StorageTek 9900 Compatible PAV - Enables the z/OS host system to issue multiple I/O requests in parallel to single logical devices (LDEV's) in the ST9985V subsystem to improve mainframe performance by eliminating IOSQ delays.
- Sun StorageTek 9900 Multiplatform Backup - Allows the user to implement mainframe-based backup procedures and standards for the open system data stored on the multiplatform ST9990V, ST9985V, ST9990, ST9985, SE9980 and SE9970 subsystem.
- Sun StorageTek 9900 Business Continuity Manager - Targeted for the z/OS host environment, this software provides a centralized infrastructure for managing copy operations.
- Sun StorageTek 9900 Business Continuity Manager Extended CT Group - A consistent facility for managing mainframe copy operations.
- Sun StorageTek 9900 Business Continuity Manager Extended Remote Control
- Sun StorageTek 9900 Database Replication for IBM z/OS - DB2 replication facility.
- Sun StorageTek 9900 Mainframe Connection - To connect a ST9985V to a mainframe. This is a license.
- Sun StorageTek 9900 Cross-OS File Exchange - Enables data stored on the ST9900 series products to be converted and transferred between z/OS and open-system platforms.
- Sun StorageTek 9900 Cross-OS File Exchange Code Converter - Open to mainframe file transfer.
- Sun StorageTek 9900 Dataset Replication for IBM z/OS - Provides split volume and copy operations. (no orderable part numbers, this feature is embedded within the BOS Suite as it is within the Resource Manager Suite)

## Key Messages

1. Today's 24x7 global enterprises are not only confronted with escalating data growth but demand for the highest level of data availability, long-term data protection and retention driven by numerous government and regulatory agency requirements. They are also challenged to improve application performance and availability, business continuity, data protection, and simplify the management of increasingly complex storage infrastructures. Sun StorageTek™ 9985V with its market proven crossbar switch architecture and embedded virtualization technology, extends the enterprise-class functionality and performance—virtualization of external storage, logical partitioning, and universal replication—introduced with its award winning predecessor, the Sun StorageTek 9990. With added Thin Provisioning functionality for optimizing storage utilization and reducing TCO, this massive-capacity system further assists storage managers in their mission to simplify storage administration, improve performance, and reduce overall costs.
2. An enterprise's information is one of its most critical assets, and an intelligent and holistic approach must be applied to manage information from creation to deletion. Sun provides the Information Ecosystem for end-to-end data management, including a portfolio of storage arrays and systems to help customers ensure the right data is in the right place at the right time.
3. The StorageTek 9985V is the evolutionary successor to the StorageTek 9985 system. It shares the same crossbar architecture, embedded virtualization, software, and connectivity protocols. The StorageTek 9985V is the right choice for customers who have an existing investment in StorageTek 9900 systems and software, and want a compatible system for new deployments.
4. The StorageTek 9985V is the follow on product for Sun StorageTek 9985.
5. The StorageTek 9985V provides mainframe virtualization capability with external FICON storage systems support (available post launch) just as it did successfully for years in Open Systems with Fibre Channel external storage systems support.

## Detailed Messages

1. An enterprise's information is one of its most critical assets, and an intelligent and holistic approach must be applied to manage information from creation to deletion. Sun provides the Information Ecosystem for end-to-end data management, including a portfolio of storage arrays and systems to help customers ensure the right data is in the right place at the right time.

Arrays and systems from entry-level to data center, providing the performance/availability/scalability/cost balance to meet customers' needs. (SE3000, SE6000, SE9000)

We offer everything needed for the Information Ecosystem -- for data at work, at motion and at rest – from the flexibility of Java Card computing to the peace of mind of industry leading identity management and security solutions available across a range of integrated servers, software, storage and services.

2. The StorageTek 9985V is the evolutionary successor to the StorageTek 9985 system. It shares the same crossbar architecture, software, and connectivity protocols. The StorageTek 9985V is the right choice for customers who have an existing investment in StorageTek 9900 systems and software, and want a compatible system for new deployments.

The Sun StorageTek 9985V system provides all the enterprise class features and the market proven availability of the StorageTek 9900 family

The Sun StorageTek 9985V system leverages customers existing StorageTek 9900 investments by utilizing the same storage management tools and the same replication software as the Sun StorageTek 9990 system.

The Sun StorageTek 9985V provides storage virtualization. Customers can attach their existing storage systems from various vendors to the StorageTek 9985V which then appear as if they were part of the same system. This capability helps customer more effectively utilize and actually add value to their existing storage investments. (implemented by StorageTek 9900 Universal Volume Manager software)

The Sun StorageTek 9985V can help customers lower the cost of storage and meet data lifecycle management (DLM) objectives by implementing a tiered storage infrastructure. Data can be moved from tier 1 high performance fibre channel disks to lower performance tier 2 serial ATA disks based on the value of the data over its lifecycle. (implemented by StorageTek 9900 Universal Volume Manager and StorageTek 9900 Tiered Storage Manager software)

The Sun StorageTek 9985V helps customers meet service level agreements by logically partitioning system resources – disk, ports and cache. Up to 8 Virtual Private Storage Machines (VPSMs) can be created on a StorageTek 9985V, allowing customers to dedicate storage resources to applications according to service level agreements. Note that the ST 9985V has a maximum of 8 partitions. VPSMs are a natural compliment to Solaris Containers, which logically partition resources on Sun Fire servers. Effectively managing service level agreements is essential to creating a utility storage model where enterprises can charge departments or customers according to their actual usage of IT resources. (implemented by StorageTek 9900 Virtual Partitioning Manager)

The Sun StorageTek 9985V system utilizes an advanced replication software that leverages disk based journaling, and “pulls” the copy from the primary, enabling “no-data-loss” replication and the ability to survive a downed link. (implemented by StorageTek 9900 Universal Replicator software)

- The Sun StorageTek 9985V system can also be a lower cost replication target for 3 data center disaster recovery plans based on StorageTek 9900 systems. The Sun StorageTek 9985V system provides a “Universal Replication Layer” with any-to-any replication. (implemented by StorageTek 9900 Universal Replicator and StorageTek 9900 ShadowImage software). Recently, this multi-hop replication capability has been enhanced with
- Delta Resync capability to maximize not only Recovery Time Objective (RCO), but Recovery Point Objective (RPO) as well.

### 3. The StorageTek 9985V can help lower the cost of storage for enterprises with investments in mainframe applications

Native mainframe connectivity (FICON and ESCON) has been increased to 24 ports each (24 FICON and 24 ESCON ports each) on the ST 9985V system.

Universal Replicator allows the attachment and virtualization of SATA devices

Virtual Private Storage Machines are a natural complement to mainframe LPARs

## **Key Messaging Statements with Respect to Current Product Line**

The ST9985V is positioned as the very high-end Data Center product within Sun’s existing ST9900 enterprise product family delivering highest performance, scalability and thin provisioning. It will co-exist with the ST9990 throughout FY2008 and eventually replace the ST9990 in FY2009 or toward the end of FY2008.

## **Key Messaging Statements with Respect to Competition**

The Sun StorageTek 9985V will be targeted at the high-end enterprise market, and the data center in particular. It will represent the mid enterprise of Sun’s StorageTek 9900 Series of products.

ST9985V will compete in mid enterprise storage market, dominated by Open Systems Fibre Channel SANs and the IBM z/OS FICON/ESCON mainframe environment. ST9985V’s primary competitors remain the EMC Symmetrix DMX-3 Series and EMC InVista virtualization controller, IBM TotalStorage DS8000 series, and IBM SAN Volume Controller for virtualization. Unlike the Sun ST9985V and (and the whole ST9900 family) that has embedded storage virtualization, both IBM and EMC have to rely on separate external appliances (IBM SVC) and switches (EMC InVista) for this capability.

All of the other enterprise storage vendors, including 3ParData, currently market their high-end arrays to compete directly with the current ST9990 and ST9985. Although IBM’s SAN Volume Controller is not a storage array but rather a storage virtualization appliance, IBM is positioning it and equipping it with features and functionality that may place it in direct competition in some situations with the ST9990/85 and will likely

continue to do so against ST9985V. Similarly, the EMC InVista is positioned as a storage virtualization solution leveraging the integration with various FC switch vendors and, in particular, integration with Cisco directors. Based on industry analysts' latest assessments of virtualization solutions, IBM SVC was proven to lack enterprise-level functionality and reliability and EMC's InVista downgraded to caution due to lack of customer acceptance. Sun's embedded ST9900 virtualization was recognized by these analysts as the most elegant, simple and scalable.

### **ST9985V Competitive Advantages**

- Best Scalability, Availability and Performance
  - Up to **96 PB**, 100% Data Availability Guarantee, Up to **800,000 IOPS** and **13.3 GB/s** int. bandwidth
- Best Storage Virtualization
  - Embedded, Enterprise-proven (no appliances/switches)
  - Recognized as the most elegant, simple and scalable by leading analysts
- Best Replication
  - Only storage-based replication engine to use disk journaling and pull technology for high performance, guaranteed data integrity and fast recovery
  - Only platform that can use the same replication, copy, and data movement software solutions across a heterogeneous storage pool
- Best Flexibility
  - Up to 8 dynamically re-configurable virtual storage systems (virtual partitions)  
(Note that the ST 9985 V system can support up to 8 partitions, and the ST 9990 V can support up to 32 partitions.)
  - Flexible RAID configurations
  - Sophisticated cache management to minimize cost with active-active mirror protection
- Enterprise-level Thin Provisioning
  - For storage utilization and storage allocation efficiency

### **Competitive Comparisons**

Current primary competitors are the IBM DS8300 Turbo and the EMC DMX3. Neither have embedded controller based storage virtualization and need to depend on a separate appliance based virtualization solution, such as IBM's San Volume Controller, or a separate switch based virtualization solution, such as EMC's InVista. Unlike the ST9900V, neither support mainframe (FICON) virtualization.

## **Sun StorageTek 9985V – Key Features**

Customers are using the Sun ST9985V, Sun ST9990V, Sun ST9990, and ST9985 disk systems to support the largest and most critical data center environments. These systems provide performance, scalability and flexibility along with many powerful features that are not found in any other disk systems. These are some of the most valuable differentiating features.

## **Universal Volume Manager (UVM)**

The Sun ST9900 Series, with UVM option, natively supports external disk virtualization. With UVM, customers can move their data to other disk systems without disrupting the application. UVM is vendor agnostic, so customers are not locked into Sun storage and choose the best fit for their requirements. Because UVM is embedded in the microcode of every ST9900, customers can implement disk virtualization without adding any new devices to their environment. Only the license key needs to be purchased to make UVM operational. With UVM, a single 9985V can support up to 96 petabytes of external storage (32 petabytes for ST9990 and 16 petabytes for ST9985)

EMC's DMX-3 product does not support any external disk virtualization. EMC customers would have to buy an extra virtualization product including new hardware, new networking and new software. EMC has been selling the InVista SAN Virtualization product, but after a year on the market, only a small handful have been sold.

IBM's DS8000 does not support any external disk virtualization either. IBM sells the SAN Volume Controller (SVC) which is a virtualization appliance. The SVC is primarily aimed at midrange environments. IBM customers have to install the SVC in addition to the DS8000. Many SVC's would be required to support large data center requirements. In practice, the SVC is used primarily for data migrations.

## **Virtual Partition Manager (VPM)**

Enterprise class disk systems are typically shared by dozens to hundreds of servers. The applications requirements and quality of service (QoS) vary tremendously, so customers must have control of the disk resources dedicated to each server. It is essential to fence off the resources required by the most critical applications, so disk administrators can guarantee their performance, and protect them from demand spikes from lower priority applications like large batch data transfers.

Sun ST9990/90/85V customers can use VPM to set up as many as 32 (8 for ST9985) separate Virtual Private Storage Machines or Virtual Partitions to manage complex mixes of application performance requirements. Instead of buying more disk systems, Sun customers have mature and sophisticated tools to maximize the systems they already own.

EMC has just announced their initial partitioning features, Dynamic Cache Partitioning and Symmetrix Priority Control. These new tools are relatively simple and lack the fine-grained, end to end QoS control available in VPM and unlike the ST9900 VPM that provides up to 32 full virtual partitions of not only cache, but disk and IO ports, EMC can only partition cache and is limited to only 8 partition at that. IBM DS8000's offer only 2 partitions that divide the array resources in half. Unlike the ST9900 where the virtual partitions are dynamic and can be configured and changed by the customer, IBM 2 partitions are factory preset and can not be changed by the customer, There is no flexibility to assign each application the resources and priority that it needs.

## **Universal Replicator (UR)**

The ST9900 Family Universal Replicator feature leads the industry in robust remote replication. It delivers completely reliable and consistent replication over vast distances and overcoming instability in WAN connections. By using disk journaling and pull technologies, UR can survive link outages with complete consistency at the remote target, and without overloading the local system. Sun's Delta Resync feature allows three data center configurations to rapidly establish full redundancy following a failover from the primary site.

EMC's SRDF/A remote replication product was designed to store remote writes in local memory. When a link goes down, local cache can be consumed rapidly. EMC recently introduced disk journaling in a SRDF/A Delta

Set extension, but still lacks pull technology to off-load the local system and maximize available data bandwidth. EMC does not support Delta Resync for 3 data center failovers.

IBM's Global Mirror replication product can maintain data consistency at the remote site, but requires local processing. It lacks Sun's Delta Resync capabilities and the sophisticated disk journaling with pull technologies available in Sun UR.

### **Flexible RAID Configuration**

Sun ST9900 customers can adjust each RAID group on the entire 9985V/9985V/90/98 frame to meet their requirements. For example, although many applications can use a RAID-5 (7+1) configuration, others may need a smaller or larger set.

EMC's DMX-3 has a very rigid RAID configuration rules. Customers must select a single RAID-5 configuration for the entire system, so they cannot optimize configurations for each application.

IBM's DS8000 supports multiple RAID configurations.

### **Sophisticated Cache Management**

Sun's ST9990 uses a sophisticated dynamic cache algorithms to maximize the use of expensive cache memory. It eliminates unnecessary read mirroring while still fully protecting every write with an active-active mirror.

EMC's DMX was originally designed without mirrored cache. In the DMX-3, EMC introduced mirrored cache, but used an simplistic and very wasteful model that mirrors all cache, both reads and writes, so no more than half the DMX cache can be used for data. The EMC mirroring is active-passive, so the mirrored cache cannot be used to increase write performance.

### **Dynamic Provisioning (Thin Provisioning)**

ST9990V and ST99895V are the first and only enterprise storages to support thin provisioning. Dynamic Provisioning is not unique in the industry, but at this moment in time neither EMC, nor IBM has delivered a thin provisioning solution. Network Appliance is the only major storage vendor with thin provisioning. 3parDATA and some smaller niche players also have a thin provisioning offering.

Dynamic Provisioning software allows customers to allocate "virtual" disk storage based on their anticipated future needs, but with less physical disk initially required. Additional physical disks can be purchased later and installed transparently without an application service interruption. Dynamic Provisioning improves storage utilization, eliminates application service interruptions during physical disk capacity upgrades, simplifies administration and reduces TCO.

## **General Availability**

## Hardware

This chart indicates, at a high level, what is available at GA (October 16, 2007).

Feature	ST9985	ST9985V <i>First General Availability Release</i>
<b>Performance</b>	700,000 IOPS	800,000 IOPS
<b>Cache Memory</b>	Minimum: 4GB Maximum: 64GB	Minimum: 4GB Maximum: 64GB
<b>Maximum Cache Path Bandwidth</b>	8.5GB/second	8.5GB/second
<b>Shared Memory</b>	Minimum: 3GB Maximum: 6GB	Minimum: 4GB Maximum: 16GB
<b>Maximum Shared Memory Path Bandwidth</b>	3.6GB/second	4.8GB/second
<b>Total Maximum Bandwidth</b>	12.1GB/second	13.3GB/second
<b>Integrated Front End Ports</b>	16 Fibre Channel ports (Integrated on the MIX Adapter)	Not applicable
<b>Maximum Front End Directors (Channel Adapters)</b>	1	3
<b>Maximum Fibre Channel Ports</b>	48 (16 integrated + one 32-port Fibre Channel FED)	48 (Three 16-port Fibre Channel FEDs)
<b>Maximum ESCON Ports</b>	16 (One 16-port ESCON FED)	24 (Three 8-port ESCON FEDs)
<b>Maximum FICON Ports</b>	16 (One 16-port FICON FED)	24 (Three 8-port FICON FEDs)
<b>Maximum iSCSI Ports</b>	8 (One 8-port iSCSI FED)	TBD
<b>Maximum NAS Ports</b>	8 (One 8-port NAS Blade FED)	Supports C-NAS

### The following features will be available at GA:

- 13.3 GB/sec Aggregate System Bandwidth
- 800,000 IOPS Maximum
- 69.22 TB (w/300 GB HDD) Internal raw capacity (72 TB is the rounded up mkt. number)
- 240 Disk drives
- 64 GB Data Cache Memory
- 16 GB Shared Memory (Control Cache Memory)
- 48 FC connections
- 24 FICON, 24 ESCON connections
- 8 Virtual Partitions (Virtual Storage Machines)
- 65,536 Logical devices (Open Systems and z/OS)
- 96 PB External Storage Support
- Dynamic Provisioning (Thin Provisioning)



## ST9900 Series Software Suite

Not all ST9985V features will be available at GA. The following will be available post GA(date TBD):

C-NAS, UR 4X4X4 and UR 6X6, iSCSI

**Performance** – Target of 800,000 IOPS vs. current ST9985 700,000 IOPS + performance improvements to local and remote replication, and external storage bandwidth.

**Scalability** – Up to 96 Petabytes (PBs) of virtualized storage + more ports, volumes, disk capacity, local and remote replication volume copies and additional scalability enhancements

**Dynamic Provisioning** software, known generically as thin provisioning, allows customers to allocate “virtual” disk capacity based on their anticipated future needs, but with less physical disk initially required. Additional physical disks can be purchased later and installed transparently without an application service interruption. The primary benefits of Dynamic Provisioning are Elimination of application service interruptions, reduced TCO (including lower power & cooling due to fewer disks) and simplified administration.

**NAS** – The current ST9990/ST9985 NAS blade will be replaced with a more scalable, higher performance NAS solution at a later time (TBD).

**Full 4Gb/second Fibre Channel front and back** (Channel adapters, disks, and back-end storage adapters. Unlike current ST9990 that has 4Gb/s front-end (adapters), but only 2Gb/s back-end (to disks).

**Tiered Storage-** New support for FICON-attached external storage available in late 2007. HDS will announce a statement of intent to deliver FICON attached external storage, but no delivery date will be announced.

**Statement of Intent to deliver additional features** – There are several other planned enhancements that might be announced in advance via a “statement of intent” to deliver. The following are potential items that may be disclosed via a statement of intent to deliver:

1. FICON attachment of external storage to enhance our mainframe solution portfolio
2. Increased number of ShadowImage pairs to reinforce the scalability message
3. Increased number of COW (Copy-On-Write) Snapshots
4. Increased number of HUR pairs
5. NAS
6. iSCSI

## Software

- All ST9985V software is leverageable from the ST 9990V and offered as suite bundles or as stand alone
- ST9900 Basic Operating System (BOS) Suite replaces Device & Resource Manager Suite
- - Includes Device Manager and Resource Manager Suite
- - Includes Virtual Partition Manager with support for up to 4
- partitions
- - Includes Server Priority Manager

- ST9900 BOS Virtual Suite (BOS V)
  - - Includes Universal Volume Manager
  - - Includes Virtual Partition Manager for more than 4 partitions
- ST9900 Disaster Recovery Suite to replace current TrueCopy
  - - Includes TrueCopy Sync + HUR for both Open and Z/OS
- ST9900 Disaster Recovery Extended Suite to replace current HUR Suite
  - - Include TrueCopy Sync + HUR with advanced function: 3DC for Open and z/OS and 4x4 for z/OS only
- ST9900 In-System Replication
  - - Includes ShadowImage for Open and z/OS and CoW for Open
- ST9900 Compatible FlashCopy version 2
- ST9900 Dynamic Provisioning
- ST9900 Continuous Data Protection
- ST9900 Compatible PAV
- ST9900 Business Continuity Manager
- ST9900 CrossOS File Exchange (RapidXchange HMDE)
- ST9900 HiCommand Tuning Manager
- ST9900 Tiered Storage Manager
- ST9900 HiCommand Replication Monitor
- ST9900 HiCommand Protection Manager
- ST9900 Dynamic Link Manager

## **Service / Warranty**

-WARRANTY LEVEL AND LENGTH:

Sun StorageTek 9985V System  
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The official Sun StorageTek 9985V warranty statements are maintained at Sun's external web site at [www.sun.com/service/support/warranty](http://www.sun.com/service/support/warranty)

Sun warranty on Sun StorageTek 9900 Series including ST9985V system currently includes an enhanced warranty with:

3 years coverage.

7 x 24 Same Day 4-hour\* on-site response.

7 x 24 Phone Support.

\*average response times.

All Sun StorageTek 9900 Series hardware components, disk groups, disk spares, port interface boards, disk frames, etc., receive the remaining warranty term of the ST9985V controller unit to which they are attached. The maximum warranty period of any given controller unit is 3 years.

If non-controller unit components are purchased from Sun and attached to an existing installed control unit, the warranty period of the controller unit is not affected. The warranty period of the non-controller unit new components assumes the remaining warranty period of the attached controller unit.

#### Installation

StorageTek 9985V product include Sun StorageTek(SM) 9900 Installation Service, (9900 Installation) a basic install offering, for new subsystem (minimum 1 control unit) purchases. This installation is provided during normal business hours.

#### Sun StorageTek 9900 Series Software

Standard software warranty covers 90 day defective media replacement only. To take advantage of ST9900 software free updates and upgrades, customers must purchase the appropriate Sun Software Service Plan. The recommended level of support for this product is Premium.

For more information regarding Sun Software Service Plans, please visit the following site:

<http://www.sun.com/service/support/software/index.html>

## FEATURE, FUNCTION, AND BENEFIT MATRIX

ST9985V will provide the industry's most extensive array of integrated features and functionality upon which to build enterprise storage solutions. The features and functions that customers have enjoyed on the ST9985 are enhanced and extended on ST9985V.

FEATURE	FUNCTION	BENEFIT
4th Generation cross-bar switch architecture	<ul style="list-style-type: none"> <li>* Up to 800,000 IOPS</li> <li>* 13.3 GB/s aggregate internal bandwidth</li> <li>* Up to 64GB Cache (128GB future)</li> <li>* 4Gbps Front-End and Backend FC loops</li> <li>* Faster internal processors</li> <li>* Performance scales with capacity</li> </ul>	Allows customers to achieve an optimum balance of performance, scalability, availability and enterprise-level functionality in a modular cost-effective package

Multi-platform connectivity	<ul style="list-style-type: none"> <li>* Heterogeneous multi protocol connectivity</li> <li>* 48 FC, 24 ESCON, 24 FICON channels and NAS (Q4CY07)</li> <li>* Better per port performance using faster processors</li> <li>* 4Gb/s FC ports</li> </ul>	* High performance Open Systems, Mainframe and NAS connectivity
Embedded Storage Virtualization	<ul style="list-style-type: none"> <li>* Multi-platform storage pooling</li> <li>* Up to 96 PB of external storage virtualization</li> <li>* Virtualization engine for heterogeneous storage</li> </ul>	Allows customers to consolidate, centrally manage and provide transparent data migration for up to 96 petabytes of external heterogeneous storage to simplify management and reduce cost
Up to 72TB internal and 96TB external storage support	<ul style="list-style-type: none"> <li>* Support for up to 240 internal HDDs</li> <li>* Support for 96 PB of external Storage</li> </ul>	* Virtualizes multiple tiers of internal and storage to enable simplified configurations and aggregated connectivity
Virtual Partitioning (Virtual Private Storage Machines)	* Virtual partitioning of cache, I/O ports and disk to create up to 8 Virtual Private Storage Machines	* Enhanced security and optimize application performance with highest levels of QoS
Universal Replicator	<ul style="list-style-type: none"> <li>* Any-to-any heterogeneous replication</li> <li>* Disk journaling for in path data protection</li> <li>* Pull technology for WAN performance and cost optimization</li> <li>* Multi-hop capability</li> <li>* Delta resync support for highest level of RPO and RTO</li> </ul>	<ul style="list-style-type: none"> <li>* Any to any replication, local or remote with optimized performance and data protection</li> <li>* Optimization of WAN performance and cost</li> <li>* Highest level of RPO (Recovery Point Objective) and RTO (Recovery Point Objective)</li> </ul>
Dynamic Provisioning	<ul style="list-style-type: none"> <li>* Provide Thin Provisioning capability and enable storage over allocation will less physical disk requirement</li> <li>* Enable non-disruptive capacity upgrades when needed</li> <li>* Spreads workloads across greater number of disks for optimizing application performance and eliminating hot spots</li> <li>* Simplifies storage provisioning administration</li> </ul>	<ul style="list-style-type: none"> <li>- Improve disk utilization</li> <li>- Eliminates application service interruptions during capacity upgrades</li> <li>- Improved physical disk utilization</li> <li>- Improved application performance because workloads are spread across a shared pool of physical disks</li> <li>- Lower power &amp; cooling requirements due to fewer disks</li> <li>- Simplifies storage provisioning and performance tuning administration</li> <li>- Greatly reduces operation cost due to over purchase and management of unused disk</li> </ul>
Mirrored Data Cache	Data cache boards are mirrored and battery backed up	Provides data protection in the event one of the data cache boards experiences a failure. Battery backup, good for 36 minutes, allows time for data to be destaged to disk in order to preserve data

Universal Storage Services	<p>Device Management</p> <ul style="list-style-type: none"> <li>* Thin Provisioning</li> <li>* Host Storage Domains</li> <li>* Logical Boot Device (LUN 0)</li> <li>* Logical Partitioning (Storage LPAR)</li> </ul> <p>Performance Management</p> <ul style="list-style-type: none"> <li>* Performance Monitor</li> <li>* Volume Migrator</li> <li>* Server Priority Manager</li> <li>* Tuning Manager</li> </ul> <p>Resource Management</p> <ul style="list-style-type: none"> <li>* HiCommand Device Manager</li> </ul> <p>Storage Area Management</p> <ul style="list-style-type: none"> <li>* ST9900 Storage Services Manager</li> </ul>	Reduce TCO by simplifying storage management and reducing application service interruptions
High availability with full components redundant and multipathing. (For example, a feature such as the Front End Director (FEC) actually consists of two printed circuit boards (PCB), with each feature in a separate hardware cluster)	Highly reliable, fully redundant multipathing active-active architecture	High Availability with 100% data availability guarantee. Service is maintained to customer in event of a component failure
Non-disruptive microcode upgrade	On a Front End Director (FED), microcode is stored on flash memory associated with one of 8 microprocessors (MP) on the the FED. MPs are arranged in partner pairs. To upgrade microcode, one of the MP partners is taken offline, while the other MP partner continues to process transactions. The flash memory associated with the offline MP is updated, and brought back online when the microcode update is completed	System remains in production during microcode update. Highly available system.
Channel Adapter Slots can accommodate either Front End Directors or Back End Directors	Flexibility to optimize for front end or back end performance	Configure system to fit the needs of the customer's application
13.3GB Bandwidth; 8 GB Data Bandwidth, 5.3GB Control data bandwidth	On the ST9985V, control bandwidth has been increased to support features which use shared memory	Better performance of applications
Increased external storage IOPs from 2000 on the ST9990 to 10,000 on the ST9985V	Greater data handling capability for external storage	Better performance, reduced latency, faster data provisioning and retrieval of externally attached storage

Flexible configuration	Can be configured as an enterprise storage solution or a diskless storage virtualization engine	* Flexibility for use as a mid-range enterprise storage solution or as a virtualization engine for external storage, migration and consolidation (or both)
Modular Packaging	* Standard 19-inch rack packaging for minimum footprint * Operating on standard wall outlet power	Fully integration enterprise storage solution and virtualization engine in a modular packaging with minimum environment and physical footprint

## Positioning Statements with Respect to the Sun's Disk Array Families

- The Sun StorageTek 9000 product family is the right choice for customers who demand the absolute highest levels of data availability and mainframe connectivity. With the introduction of the StorageTek 9985V, Sun's StorageTek 9900 family now consists of the ST9985, ST9985V, ST9990 and ST9990V addressing mid-range enterprise to the highest end of the data center market needs for both open systems and mainframe.
  - ST9985 - Mid-Enterprise and Remote DR
    - Affordable
  - ST9985V – Mid-Enterprise and Remote DR
    - Most affordable
    - Consolidation and utilization platform
  - ST9990 - Data Center
    - High availability, scalability and functionality
  - ST9990V - High-End Data Center
    - Highest performance, scalability and functionality
- The Sun StorageTek 6000 product family mostly consist of modular storage for open system environments delivers the most cost-effective combination of data availability, performance, scalability, and features.

The Sun StorageTek 3000 product family offers complete, ruggedized storage systems for workgroup environments. These systems deliver high performance, reliability, and scalability, as well as a small footprint. StorageTek 3000 products maximize performance and availability for workgroup applications and offer a flexible, cost-effective approach for growing storage demands.

## Market Value Proposition

The Sun StorageTek 9985V provides our customers with a fully integrated enterprise storage solution delivering market leading performance, availability, scalability, and manageability for meeting the most demanding data center needs with the added benefit of integrated storage virtualization and thin provisioning to reduce the Total Cost of Ownership. Embedded Virtualization enables massive storage consolidation and management simplicity for reducing cost, Thin Provisioning capability for optimizing storage utilization and capacity planning, Virtual Partitioning for assuring QOS and Tiered Storage Management for implementing Data Life Cycle Management. Universal Replicator provides enhance business continuity and disaster recovery protection across heterogeneous environments.

## **Target Markets:**

### **Customers Who:**

- Have the highest availability, connectivity and performance requirements and existing storage doesn't scale due to performance, capacity, and security limitations.
- Planning to consolidate multiple storage systems and need to maintain application isolation and Quality of Service
- Have difficulty managing storage complexity and cost from multiple heterogeneous storage systems. Have aging legacy disk systems
- Want to transparently migrate aging data to lower-cost storage technologies (DLM)
- Require remote replication to one or more recovery sites
- Need to share storage resources across multiple business groups with disparate application requirements
- Difficulty managing storage growth while keeping costs down due to low storage utilization, unplanned interruptions for capacity upgrades.

## **Customer Benefits**

The ST9900 Family, of which the ST9985V is the mid-enterprise offering, provides the following: "Provides our customers with end to end, best of breed, data center class solutions that deliver unbeatable availability, scalability and manageability - while delivering compelling value and Total Cost of Ownership.

When a customer buys a ST9985V array, they get simplified storage management and a lower TCO because the virtualization features simplify the connectivity of their network allowing them to save on environmental costs, licensing fees, and maintenance costs.

For customers who need to optimize their corporate assets, increase their productivity, and require their IT departments to meet Service Level Agreements, the ST9985V provides a critical piece in a complete end-to-end solution that simplifies storage management, and enables hyper-consolidation through enhanced virtualization features on an architecture that has proven itself reliable, resilient and unrivaled in performance - unlike point-product solutions based on an old architecture.

For enterprises facing rapid data growth and multiple, disparate applications, the Sun StorageTek 9985V system helps reduce costs and improve service levels through better management of new and existing storage resources.

**Simplified Management** — The Sun StorageTek 9985V system's application oriented storage-management utility abstracts storage complexity, enabling users to simplify management by pooling storage resources. With conventional provisioning, it is difficult to know how storage inventory is configured or how much is utilized at any given time, which can prove costly and time-consuming. With the Sun StorageTek 9985V System, however, the boundaries of physical storage devices are abstracted to a *virtual inventory* of enterprise-class storage classes and resources that are easily managed, enabling quick and precise provisioning based on application workloads. This can greatly reduce complexity and improve operational efficiencies that translate into cost savings.

**Extreme Scalability** — The Sun StorageTek 9985V system can also improve performance and service levels with an architecture that enables predictable, seamless scalability of performance and capacity to meet changing application needs, increasing agility and improving service levels. In contrast to typical modular storage arrays — which scale for capacity only, causing applications to compete for storage resources — the Sun StorageTek 9985V system's extreme scalability scales capacity, performance, connectivity, and data services as required by application or business needs.

**Extreme Availability** — All Sun StorageTek 9985V systems have been designed to ensure that the entire system has no single point of failure. Further, should a component in a StorageTek 9985V experience an outage, a redundant component takes over the tasks of a failing component until repaired. All of this is transparent from an application's perspective to the operation of the storage system. The result is Sun is one of the few companies in the industry to offer a 100% data availability guarantee to customers selecting a StorageTek 9985V storage solution for complete protection of their digital assets.

**Extreme Performance** — The Sun StorageTek 9985V is the industry leading storage platform in terms of performance. This system easily has twice the performance over any competitor's storage system. With the next generation non-blocking crossbar switch at the heart of all Sun StorageTek 9985V systems, the resulting throughput of the entire system provides outstanding performance to even the highest I/O intensive transactional applications. Additionally, the Sun StorageTek 9985V and 9990V are the only storage systems in the industry to offer the ability to partition resources to further ensure application quality of service objectives are maintained.

**Extreme Configurability** — Each Sun StorageTek 9985V system can be tailored to fit the most demanding customer environment. The front-end connectivity to servers is supported through Fibre Channel, Ethernet, ESCON, and FICON directors, permitting concurrent attachment to open system servers and mainframe systems. In fact, the Sun StorageTek 9985V supports up to 48 Fibre Channel connections. Back-end disk drive connectivity is provided through advanced back-end directors supporting 4Gpbs Fibre Channel Arbitrated Loops, all active-active, twice as many as the nearest competitor.

**Ensured Business Continuity** — Complimenting the Sun StorageTek 9985V system is a suite of business continuity software, ensuring that all essential data managed by a 9990 is fully protected. The Sun StorageTek 9985V provides two point-in-time local copy protection packages – Sun StorageTek 9985V ShadowImage In-System Replication and Sun StorageTek 9985V Copy-on-Write Snapshot. To support remote replication of data, the Sun StorageTek 9985V offers the StorageTek 9900 True Copy Remote Replication software that permits both synchronous and asynchronous data replication across Sun StorageTek 9985V systems.

**Centralized Data Services** — The Sun StorageTek 9985V system boosts application performance and creates operational efficiencies by delivering data services without diverting compute or storage resources from their intended purpose, which can help lower the total cost of ownership (TCO). Traditionally, data services delivery is either array-based or host-based. In the first case, data services are delivered via the data path, which can negatively affect application performance. In the second case, CPU cycles are consumed that could be dedicated to processing transactions. With the Sun StorageTek 9985V system, data services are system-wide and have dedicated compute resources existing outside of the data path and independent of the host, enabling virtually unparalleled application performance.

Offering simplified, application-oriented management, vast scalability in terms of performance and capacity, outstanding availability, tailored configurability, and robust business continuity, the Sun StorageTek 9985V system can help to:

- Reduce costs through consolidated management
- Reduce TCO by extending the life of storage resources
- Improve service levels through predictable application and data growth.

### **Supports Implementation of “Service Provider” Business Models**

By Complementing Dynamic System Domains (DSD) provided by Sun Servers and Solaris Containers, ST9990 Virtual Private Storage Machines (VPSM) support customer's initiative's to implement “Service Provider” Business Models. DSDs are a form of server partitioning. Solaris Containers are a form of software partitioning provided by the Solaris Operating System.



## Partner Business Proposition

The Sun StorageTek 9985V system enables channel sales partners to quickly and easily deploy enterprise storage resources with predictable business and application results.

**Easy, Predictable Deployment** —The Sun StorageTek 9985V system comes with a wide range of management support tools to allow partners the ability to setup and configure the system.

**No Hidden Costs** — The Sun StorageTek 9985V system includes a wide breadth of standard features of any system in its class. With Sun StorageTek Enterprise Storage Manager, Sun StorageTek 9985V Availability Suite, and Sun-server based load balancing, this system comes pre-tested with the complete set of functions required to host today's business-critical application environments.

**Predictable Scaling and Performance** — The Sun StorageTek 9985V system is one of the first products in its class that enables enterprises to dedicate and scale storage resources to meet changing application needs.

**Feature Support** —The Sun StorageTek 9985V provides for a complete set of connectivity and upgrade features to respond to changing customer environments. This provides partners the ability to manage customer expectations through deployment of non-disruptive upgrades to the system.

**Software Support** —The wide range of Sun StorageTek 9985V software allows partners to respond to customer requirements through acquisition of complimentary software solutions for storage resource management, business continuity, quality of service specification, and the like.

**Increase Business Annuity** — The Sun StorageTek 9985V system provides partners with a best-of-breed system for enterprise IT environments.

# Target Applications

The highly flexible architecture of the Sun StorageTek 9985V system provides a mix of optimal performance and availability for business-critical applications such as database, technical computing, and messaging.

## Databases — Online Transaction Processing (OLTP) and Decision Support Services (DSS)

Databases for online transaction processing (OLTP) are performance-hungry business applications characterized by very high amounts of small, random, non-sequential read and write transactions within concentrated periods.

The Sun StorageTek 9985V system provides high application performance through 4-gigabit per second, full-fabric Fibre Channel ports and 64 GB of data cache. With more than 69 TBs of internal capacity (with 300GB drives), the Sun StorageTek 9985V system is an unsurpassed enterprise storage solution for multiple high-performance applications.

## Messaging — Electronic Mail

Email applications combine the workload characteristic of OLTP and DSS databases. I/O is highly random and therefore unpredictable, and record sizes range from small text-only messages to large messages with file attachments. These environments require a storage system capable of performing both transaction-heavy and throughput-heavy I/O.

The Sun StorageTek 9985V system can be scaled to optimize I/O request operations, data movement, or a combination of both. I/O optimization does not sacrifice data protection, making this system an ideal storage solution for messaging applications.

## Mission-Critical Environments

As more and more data becomes mission critical and an increasing number of businesses need data access 24 hours per day, data availability is more important than ever.

In order to meet the high availability (HA) characteristics required in mission-critical environments, the Sun StorageTek 9985V system storage trays are designed to be fully redundant and available. Hot-swap, redundant RAID controllers, disk drives, cache, interconnect cards, data paths, mid-planes, power supplies, and cooling fans work in tandem to provide high levels of stability and data protection. In addition, the storage tray's RAID controller is equipped with enough embedded battery power to completely de-stage cache to disk in case of power failure for maximum data integrity. Eight minutes of battery power is available for destaging cache.

The Sun StorageTek 9985V system's *no single point of failure* architecture (through embedded dual fabrics and total redundancy) offers ease of deployment while maintaining a high level of data protection.

In addition, the Sun StorageTek 9985V system is even more suitable for mission-critical environments with its ease of management and multi-platform connectivity features.

## Storage Consolidation

The problem faced by many business executives in today's IT environment is their ability to manage exponential storage growth at reduced IT budgets. By consolidating storage needs onto a Sun StorageTek 9985V solution, customers can achieve higher levels of storage utilization, improve availability and scalability of storage environments, enhance management of storage infrastructures, and simplification of business continuity needs to protect critical data assets, all at effectively lower costs.

With the Sun StorageTek 9985V 's unique ability to manage other heterogeneous storage systems through aggregation of these resources under one “umbrella”(Sun refers to this as Multi-Vendor Storage Pooling), the Sun StorageTek 9985V takes storage consolidation to the next level.

## **Data Warehousing / Business Intelligence**

Over the past decade, data warehousing and business intelligence has emerged as a “must-have” solution for myriad of business challenges – from addressing the need for consistent information across the enterprise to enabling rapid response to business change. Today, companies considering data warehouse / business intelligence deployments face an evolving array of architectures, solutions and tools from which to choose.

The Sun StorageTek 9985V system is the ideal storage platform for implementing data warehousing and business intelligence solutions. A Sun StorageTek 9985V provides heterogeneous connectivity and offers extreme levels of availability, performance and security for the largest data warehouse / business intelligence environments. The Sun StorageTek 9985V system incorporates the highest levels of scalability, along with virtualization and blade architecture to add easily capacity as data demands of a warehouse increase. The Sun StorageTek 9985V series systems are ideal for data warehouse SAN solutions and as storage companions to Sun Fire 25K and Sun Fire 20K servers, underscoring the value of Sun's complete systems approach to meeting customer needs.

## **Data / Information Lifecycle Management**

One of the next big things in the storage industry is data lifecycle management (DLM) and information lifecycle management (ILM). Simply stated, data lifecycle management allows for the correct storage of data based on the data's information value. Information lifecycle management extends this concept through the grouping of data and storage into classes and migrating data based on established policies from one storage device to another. Data and information lifecycle management has become critical to companies for compliance and regulatory reasons.

A Sun StorageTek 9985V is an ideal storage system from a data / information lifecycle management perspective. With the Sun StorageTek 9985V 's future ability to support other heterogeneous systems through aggregation or pooling storage resources under a single 9985V system. Critical digital assets can be maintained on the Sun StorageTek 9985V and less critical digital assets can be migrated to lower-cost storage systems managed by the Sun StorageTek 9985V. Adding to this software support for hierarchical storage management, such as Sun's Storagetek SAM-FS and StorageTek QFS , and the ZFS File System products, the Sun StorageTek 9985V becomes the answer to an enterprise's information lifecycle management needs.

## **Business Continuity**

With outstanding reliability and availability characteristics, the Sun StorageTek 9985V is an enterprise's answer to providing complete data protection for their critical data assets. The Sun StorageTek 9985V system compliments its data availability through a suite of business continuity software, ensuring that all essential data managed by a Sun StorageTek 9985V is fully protected. The Sun StorageTek 9985V provides two point-in-time local copy protection packages – ST9900 In-System Replication Suite: ST9900 ShadowImage In-System Replication and ST9900 Copy-on-Write Snapshot. To support remote replication of data, the Sun StorageTek 9985V offers a StorageTek 9900 Disaster Recovery Suite Software that includes TrueCopy Sync and Universal Replicator that permits data replication across Sun StorageTek 9985V systems.

# Product Specifications

## Product Overview

Sun StorageTek 9985V is a comprehensive and fully integrated enterprise storage services platform that enables customers to achieve the highest levels of availability and performance in the industry with the lowest TCO. It is an evolution of the ST9990 with refinements to existing technology and additional new functionality, with higher system performance to further differentiate it from the competition. Building on the proven technical superiority and industry thought leadership established by the ST9990 with its unique embedded virtualization, 100% Data Availability Guarantee, Logical Partitioning, Universal Replicator, Dynamic Provisioning, and a proven massively scalable crossbar switch architecture; Sun StorageTek 9985V is an evolution of those capabilities with greater performance, scalability and new functionality. New integrated capabilities for thin provisioning, FICON attachment for external storage, and enhancements to its embedded virtualization will further demonstrate how Sun StorageTek 9985V is the most comprehensive and fully integrated enterprise storage platform on the market. When contrasted with IBM and EMC's piece-meal approach of separate switch-appliance based virtualization appliances and additional layers of software to manage, move and copy data, Sun StorageTek 9985V provides the industry's most fully integrated combination of enterprise-proven hardware and software technologies that unify and simplify the delivery of universal data and storage services across heterogeneous storage platforms. Key features and benefits:

- **Provides the Tiered Storage foundation that enables Data Lifecycle Management** - The ST9985V Universal Storage Platform is ideal for customers who wish to deploy a Data Lifecycle Management solution across multiple differentiated tiers of storage to reduce costs and improve efficiency by enabling them to match the value of their data to the type of storage it is kept on. The ST9985V enables the customer to manage a pool of heterogeneous tiered storage from a single console and move data non-disruptively between storage tiers as the value of the data or the usage model changes over time to maximize resource utilization and reduce costs. Customers can exploit all of ST9985V's benefits to build a tiered storage infrastructure internally or in combination with externally attached storage. New with ST9990V and ST9985V is the ability to attach external storage via FICON to enable a simpler and smoother migration path or tiered storage infrastructure for mainframe customers. With embedded virtualization and dynamic application data mobility solutions like HiCommand Tiered Storage Manager, customers can continually adjust their storage infrastructure to their changing business needs. HiCommand Tuning Manager and HiCommand Device Manager enable customers to continually monitor and forecast their storage infrastructure needs. ShadowImage In-System Replication and Universal Replication provide scalable data protection solutions that have proven to meet the most stringent business continuance and compliance requirements of the world's largest financial institutions.
- **Simplifies Storage Management** – Customers with multiple storage systems who wish to reduce their storage management complexity and cost can aggregate or consolidate all of their storage into a single storage pool with ST9985V's embedded virtualization, and exploit the benefits of common software for data movement, replication, partitioning, and storage management across the entire heterogeneous tiered storage pool. A rich portfolio of software solutions, coupled with the highest performing and most reliable storage platform in the industry provide the best platform for consolidating and simplifying storage management. Customers can manage their entire infrastructure from a single pane of glass, or they can choose to designate multiple storage administrators who can optionally manage only a particular set of storage resources that is accessible to them. ST9985V's unique embedded virtualization capabilities enable customers to use ST9990 storage management and data mobility software across an entire heterogeneous storage pool, thus dramatically simplifying the process while reducing software and maintenance costs. New integrated **Dynamic Provisioning** software greatly improves storage utilization and simplifies storage management to reduce TCO costs and eliminating many of the service interruptions that are normally required to install and format new disk capacity.
- **Provides investment protection** – ST9985V customers who seek a storage technology refresh but wish to protect the investment in their current storage systems that may or may not yet be fully

depreciated, can attach their legacy storage to ST9985V externally and exploit the unique virtualization, storage partitioning, universal replication, and other new software tools with their legacy storage. At a later date when it is more financially beneficial to retire the legacy storage, the customer can migrate the data to ST9985V or any other platform within ST9985V's external storage pool. New with ST9990V and ST9985V is the ability to externally attach storage via FICON ports thus enabling a much simpler migration and tiered storage management for z/OS mainframe customers.(future)

- **Massive Multi-Protocol Consolidation** – ST9985V provides customers an integrated platform for consolidating and centralizing their data while providing access to hundreds of or even thousands of servers with differing requirements for connectivity. ST9985V support for Fibre Channel, ESCON, FICON, and NAS and iSCSI not available at GA, but planned for later) coupled with logical partitioning, virtual storage ports and centralized management with HiCommand Software provides the most comprehensive and flexible platform for massive consolidation of storage systems with multi-protocol requirements, while also providing the software tools to monitor, manage and optimize the environment to ensure application quality of service. The fourth generation of the Universal Star Network switched network architecture provides the industry's highest performing and most scalable storage system with even more host connectivity than the previous generation to meet the needs of the largest consolidation projects.
- **Dynamic Provisioning Reduces Total Cost of Ownership while improving Data Availability** – Dynamic Provisioning, the new thin provisioning software feature available with ST9985V will allow customers to greatly improve their storage utilization and reduce their storage TCO by deferring a portion of their disk purchases to a later date when disk prices are usually lower. The reduction in physical disk requirement for provisioning also can provide a significant savings in power and cooling requirements. Today many customers purchase and allocate significantly more disk storage than they currently need, in anticipation of future growth and to avoid possible application service interruptions that may be needed to install additional disk drives. Dynamic Provisioning software allows customers to allocate “virtual” disk storage based on their anticipated future needs, but with less physical disk initially required. Additional physical disks can be purchased later and installed transparently without an application service interruption. This feature is not available for mainframes (z/OS), but Open Systems only.
- **Enhanced Business Continuance** – ST9985V provides heterogeneous data replication and copy services between any platform and at any distance, with higher performance, increased data protection and more efficient use of network bandwidth than previously available. The result is reduced costs, simplified management and improved data protection and disaster recovery capability. With ST9985V, Universal Replication (HUR) and ShadowImage (SI) software have improved performance and increased scalability. Both HUR and SI on ST9985V can support more volumes and more replication pairs than previously available. Performance has also been improved for both HUR and SI, and HUR has added new support for more consistency groups spread across up to 4 ST9985V systems that reside at each site within a 2 datacenter or a 3 datacenter configuration.
- **Increased ROI** – ST9985V, like its predecessor, the ST9985 will increase ROI by providing investment protection and longer life for legacy storage, improved storage and server utilization, improved application quality of service, lower software licenses/costs and simplified and centralized storage management.
- **Improved Service Level Management** – ST9985V ensures application-specific Quality of Service and security within private virtual storage machines. For customers who wish to charge end-users for differentiated levels of service, or charge for the amount of storage resources consumed, ST9985V's virtual private storage machines can also ensure that end-users are allocated only what they are charged for. Logical partitioning for mainframe-attached has been simplified by eliminating some of the restrictions on the ST9990 and ST9985.
- **Reduced Storage Costs for Mainframe Customers** – For mainframe customers ST9985V provides an opportunity to exploit SATA storage to improve data protection, or to more cost-effectively store larger amounts DFSMS Migration Level 1 data and offload costly DFSMS mainframe processing cycles, or deploy a long term and secure data archive solution for regulatory compliance. ST9985V's

virtual private storage machines are the perfect compliment to mainframe LPARs and together they provide workload isolation and optimum quality of service. This will be enhanced in the near future when FICON qualified to support external storage, along with Universal Volume Manager. This is not a statement that the ST 9990 V comes with internal SATA storage.

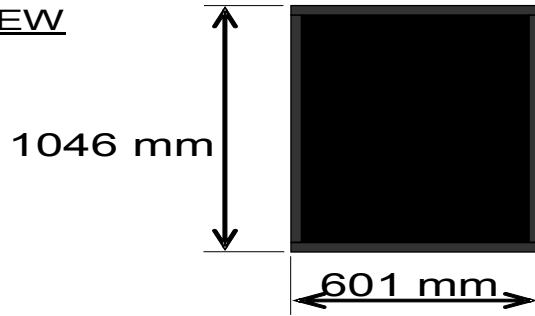
### **Key Application Areas and Opportunities:**

- Customers with multiple heterogeneous storage systems who **wish to reduce their storage management complexity and cost** by aggregating all of their storage as a common pool of ST9985V external storage and exploit the benefits of common software capabilities across the storage pool
- Customers seeking the performance or capacity of a “high-end” enterprise storage system with **very high reliability and availability characteristics** for mission-critical applications.
- Existing ST9990 customers **who wish to deploy an additional system at their Disaster Recovery site** can deploy either a ST9985V with only internal storage, or a ST9985V with externally attached lower cost or legacy storage for a more cost-effective disaster recovery solution
- Enterprise storage customers who seek a storage technology refresh but wish to **protect the investment in their current storage systems that are not yet fully depreciated**, can attach their legacy storage to ST9985V externally, and exploit the unique virtualization, storage partitioning, universal replication, and other common software tools with their older storage technology
- For customers who are replacing their existing storage systems that are nearing the end of life, ST9985V provides them with an easier and less disruptive data migration and transition to newer technology.
- Customers who wish to implement a storage chargeback system based on the amount of storage resources allocated to each application or dept. can utilize ST9985V’s virtual private storage machines to dedicate and charge for a fixed amount of storage for each application or department, with the flexibility to change that allocation as needed.
- Customers who wish to offer their end-users a service level agreement that includes the option for differentiated classes of storage to match the level of service they wish to pay for, can deploy ST9985V with internal storage and one or more differentiated types of external storage
- Customers who wish to deploy a data life cycle management solution across multiple differentiated tiers of storage can exploit HiCommand Tiered Storage Manager and other ST9900 Family copy software to non-disruptively move data between storage tiers as the value or usage model for that data changes over time. The result is optimum storage utilization and performance, and a lower overall TCO.
- Customers who wish to store a large amount of secure, online data due to regulatory compliance or other long term data retention requirements can externally attach Sun SATA storage archive capability, or other archive capable storage products from Sun’s extensive storage portfolio.
- Customers who wish to physically consolidate multiple storage systems into one ST9985V storage system, but wish to continue to maintain workload isolation that was previously afforded by separate and distinct storage systems, can do so with private virtual storage machines within a single ST9985V system.
- Mainframe LPAR customers who wish to extend their server workload isolation and QOS to include data isolation and QOS can configure and dedicate a ST9985V virtual private storage machine to each mainframe LPAR that requires it.
- Open Systems customers who wish to isolate storage resource-intensive applications like data replication and data back-up and Online Transaction Processing (OLTP) can dedicate one or more ST9985V virtual private storage machines to the resource-intensive applications to improve the quality of service of it, and the other storage applications.

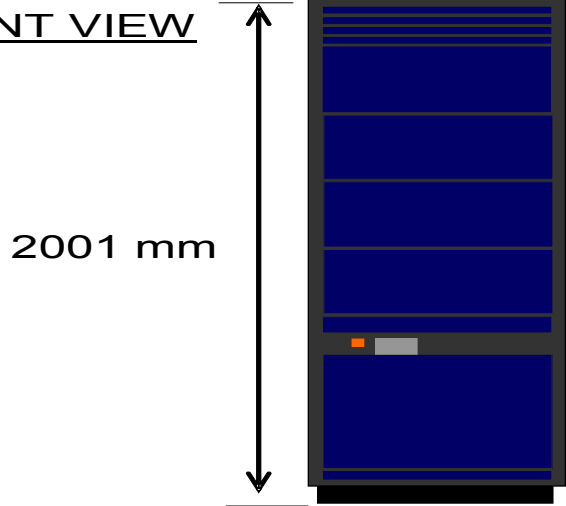
### **ST9985V Frame Types:**

Disk Controller (DKC) Frame  
Disk Unit (DKU) or Disk Array Frame

TOP VIEW



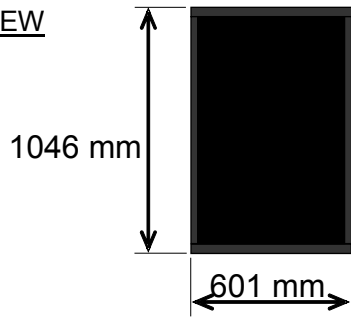
FRONT VIEW



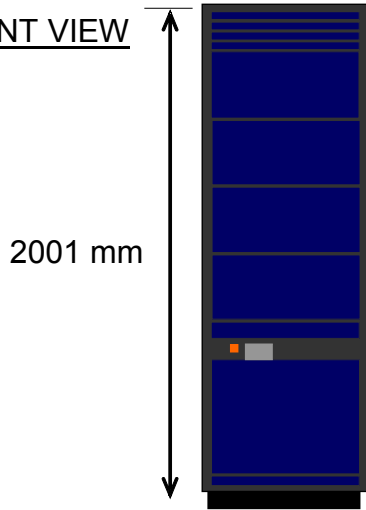
REAR VIEW



TOP VIEW



FRONT VIEW

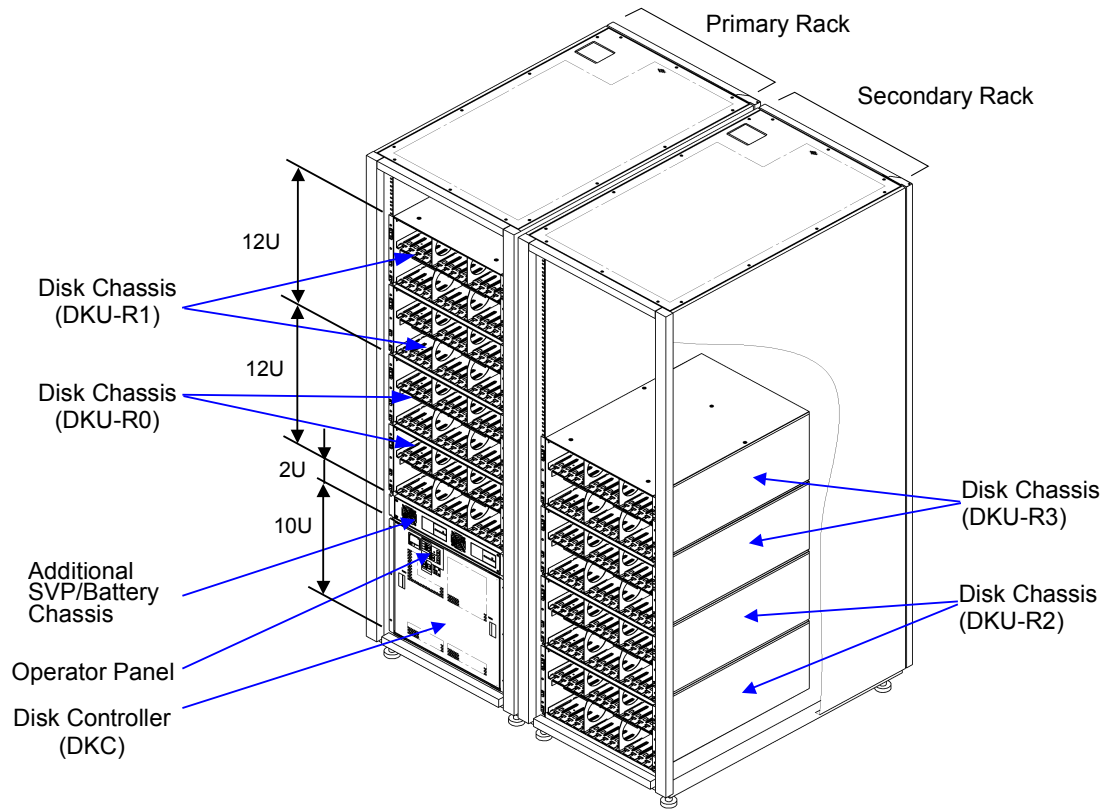


REAR VIEW



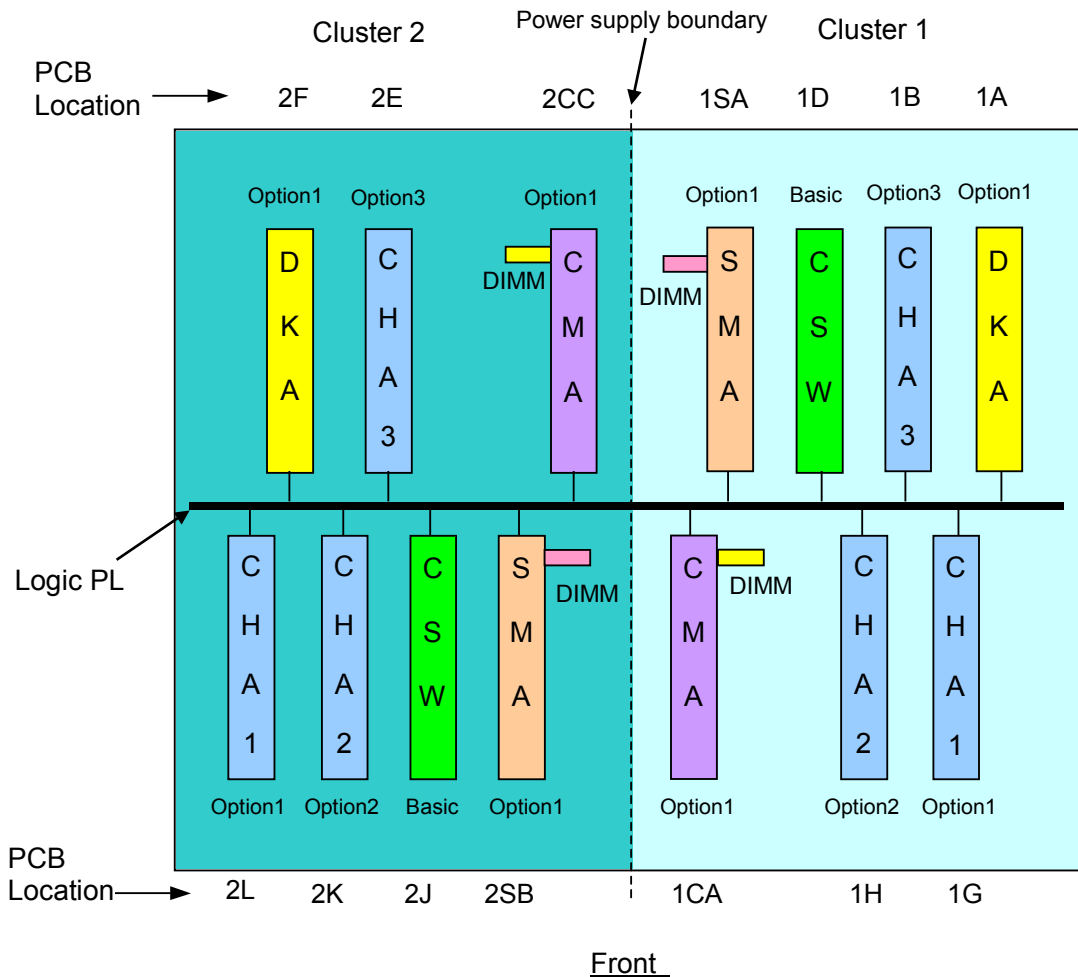


Here is another diagram of the primary and secondary rack for the ST 9985 V



### ST9985V Disk Controller Frame's New Logic Box Design:

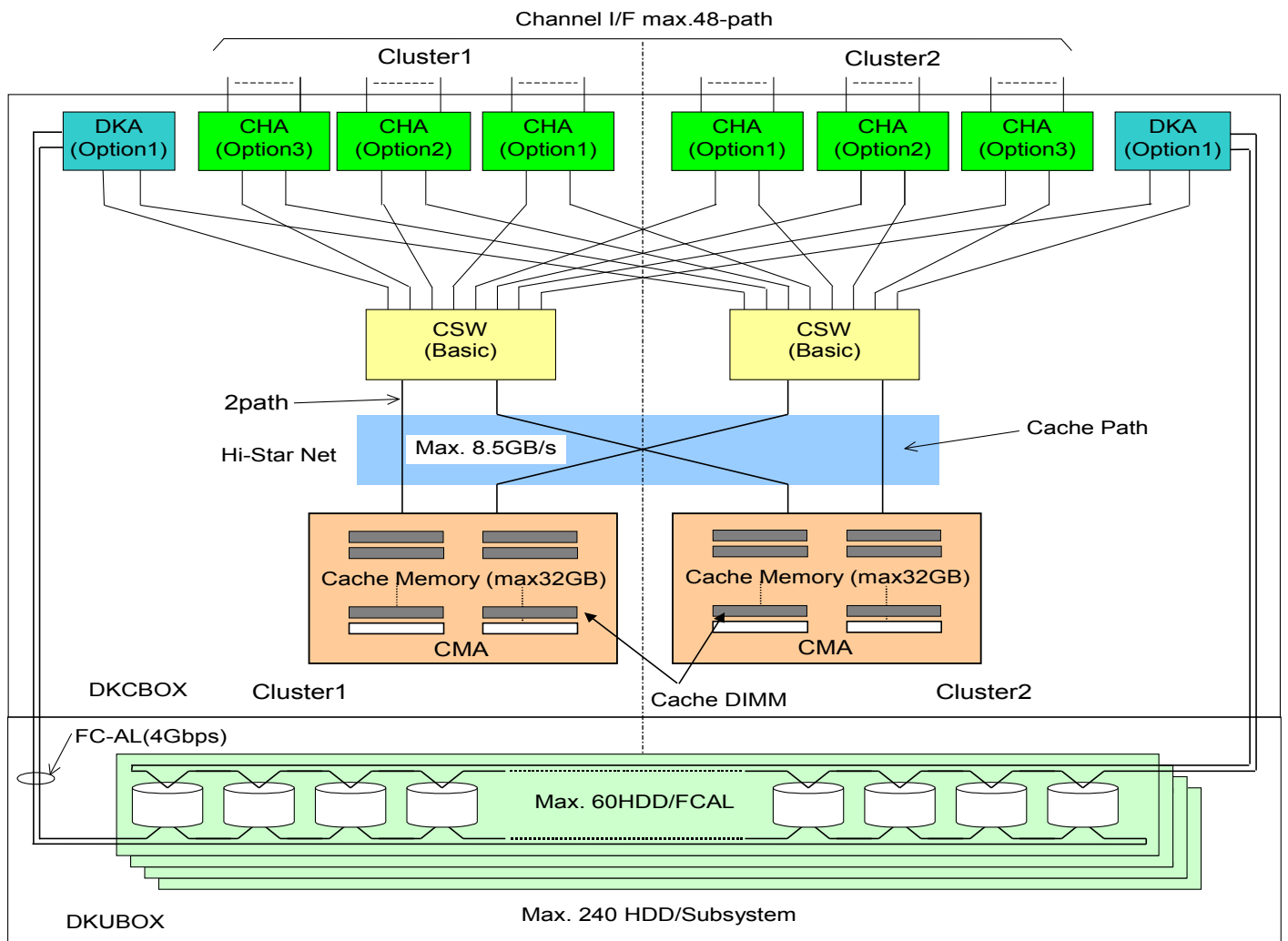
- The Logic Box is divided into CLuster1 a CLuster2 with a lower and upper layer.
- All PCBs are half size than on the Universal Storage Platform.



## Hardware Architecture

The ST9985V hardware is divided into the power supply section, controller section, and disk drive section in which disk drives are installed. The power supply section consists of the AC-boxes, AC-DC power supplies, and battery boxes. The controller section consists of the channel adapters (CHAs), disk adapters (DKAs), cache memory boards (CACHEs), shared memory boards (SMs), and disk units (DKUs). Each component is connected over the cache paths, SM paths, and/or disk paths. The batteries installed in the ST9985V are nickel metal hydride batteries.

**Note:** The shared memory for the ST9985V is now mounted on separate PCBs (was mounted on the cache boards for previous RAID subsystems). This new design eliminates the performance degradation (caused by write-through mode) previously experienced during shared memory replacement.



## Components of the Controller Frame

The ST9985V controller frame contains the control and operational components of the subsystem and one hard disk unit (HDU) box. The ST9985V controller is fully redundant and has no active single point of failure. All controller frame components can be repaired or replaced without interrupting access to user data. The key features and components of the controller frame are:

- Storage clusters
- Nonvolatile duplex shared memory
- Nonvolatile duplex cache memory
- Multiple data and control paths
- Redundant power supplies
- Front-end directors
- Channels
- Back-end directors

## Storage Clusters

Each controller frame consists of two redundant controller halves called storage clusters. Each storage cluster contains all physical and logical elements (for example, power supplies, channel adapters, disk adapters, cache, control storage) needed to sustain processing within the subsystem. Both storage clusters should be connected to each host using an alternate path scheme, so that if one storage cluster fails, the other storage cluster can continue processing for the entire subsystem.

The front-end and back-end directors are split between clusters to provide full backup. Each storage cluster also contains a separate, duplicate copy of cache and shared memory contents. In addition to the high-level redundancy that this type of storage clustering provides, many of the individual components within each storage cluster contain redundant circuits, paths, and/or processors to allow the storage cluster to remain operational even with multiple component failures. Each storage cluster is powered by its own set of power supplies, which can provide power for the entire storage subsystem in the unlikely event of power supply failure. Because of this redundancy, the ST9985V can sustain the loss of multiple power supplies and still continue operation.

**Note:** The redundancy and backup features of the ST9985V eliminate all active single points of failure, no matter how unlikely, to provide an additional level of reliability and data availability.

## Nonvolatile Shared Memory

The nonvolatile shared memory contains the cache directory and configuration information for the ST9985V. The path group arrays (for example, for dynamic path selection) also reside in the shared memory. The shared memory is duplexed, and each side of the duplex resides on the first two SM cards, which are in clusters 1 and 2. The shared memory has separate power supplies and is protected by separate seven-day battery backup.

For the ST9985V model, shared memory is now mounted on separate boards (previously on the cache boards). This new design eliminates the performance degradation (caused by write-through mode) that was previously experienced during shared memory replacement.

The ST9985V can be configured with up to 16 GB of shared memory. The size of the shared memory is determined by several factors, including total cache size, number of logical devices (LDEVs), and replication function(s) in use. The replication functions affecting shared memory include TrueCopy, ShadowImage, Universal Replicator, Copy-on-Write Snapshot, FlashCopy V2, Volume Migration, and Copy Manager for TPF. Any required increase beyond the base size is automatically shipped and configured during the upgrade process.

## Nonvolatile Cache Memory

The ST9985V can be configured with a maximum of 64 GB of data cache (increments of 4 or 8 GB).

The cache in the ST9985V is divided into two equal areas (called cache A and cache B) on separate cards. Cache A is in cluster 1, and cache B is in cluster 2. The ST9985V places all read and write data in cache. Write data is normally written to both cache A and B with one channel write operation, so that the data is always duplicated (duplexed) across logic and power boundaries. If one copy of write data is defective or lost, the other copy is immediately de-staged to disk. This “duplex cache” design ensures full data integrity in the unlikely event of a cache memory or power-related failure.

**Note:** Mainframe hosts can specify special attributes (for example, cache fast write (CFW) command) to write data (typically sort work data) without write duplexing. This data is not duplexed and is usually given a discard command at the end of the sort, so that the data will not be de-staged to the disk drives.

## Multiple Data and Control Paths

The ST9985V introduces the 4th generation of the revolutionary Hi-Star™ crossbar switch architecture which uses multiple point-to-point data and command paths to provide redundancy and improve performance. Each data and command path is independent. The individual paths between the channel or disk adapters and cache are steered by high-speed cache switch cards (CSWs). The ST9985V does not have any common buses, thus eliminating the performance degradation and contention that can occur in bus architecture. All data stored on the ST9985V is moved into and out of cache over the redundant high-speed paths.

## Redundant Power Supplies

Each storage cluster is powered by its own set of redundant power supplies, and each power supply is able to provide power for the entire system, if necessary. Because of this redundancy, the ST9985V can sustain the loss of multiple power supplies and still continue to operate. To make use of this capability, the ST9985V should be connected either to dual power sources or to different power panels, so if there is a failure on one of the power sources, the ST9985V can continue full operations using power from the alternate source.

## Channel Adapters and Front-End Directors

The channel adapter boards (CHAs) contain the front-end directors (microprocessors) that process the channel commands from the host(s) and manage host access to cache. In the mainframe environment, the front-end directors perform CKD-to-FBA and FBA-to-CKD conversion for the data in cache. Channel adapter boards are installed in pairs. The channel interfaces on each board can all transfer data at once, independently. Each channel adapter board pair is composed of one type of channel interface (for example, FICON or NAS). Fibre-channel adapters and FICON-channel adapters are available in both shortwave (multimode) and longwave (single-mode) versions. The ST9985V can be configured with multiple channel adapter pairs to support various interface configurations.

**Note:** Performance Monitor allows users to collect and view usage statistics for the front-end directors in the ST9985V.

## Host Channels

The ST9985V supports all-mainframe, all-open system, and multiplatform operations and offers the following types of host channel connections:

- **FICON.** The ST9985V supports up to 24 FICON ports capable of data transfer speeds of up to 400 MB/sec (4 Gbps). FICON features, available in shortwave (multimode) and longwave (single mode) versions, can have either 8 or 16 FICON host interfaces per pair of channel adapter boards. When configured with shortwave FICON channel adapters, the ST9985V can be located up to 500 meters (2750 feet) from the host(s). When configured with longwave FICON channel adapters, the ST9985V can be located up to ten kilometers from the host(s). If you need further FICON-related information, please contact your Sun Microsystems Systems representative.

**Note:** FICON data transmission rates vary according to configuration. Please note:

- S/390 Parallel Enterprise Servers - Generation 5 (G5) and Generation 6 (G6) only support FICON at 1 Gbps.
- z800 and z900 series hosts have the following possible configurations:

FICON channel will operate at 1 Gbps ONLY.

FICON EXPRESS channel transmission rates will vary according to microcode release. If microcode is 3G or later, the channel will auto-negotiate to set a 1-Gbps or 2-Gbps or 4Gbps transmission rate. If microcode is previous to 3G, the channel will operate at 1 Gbps ONLY.

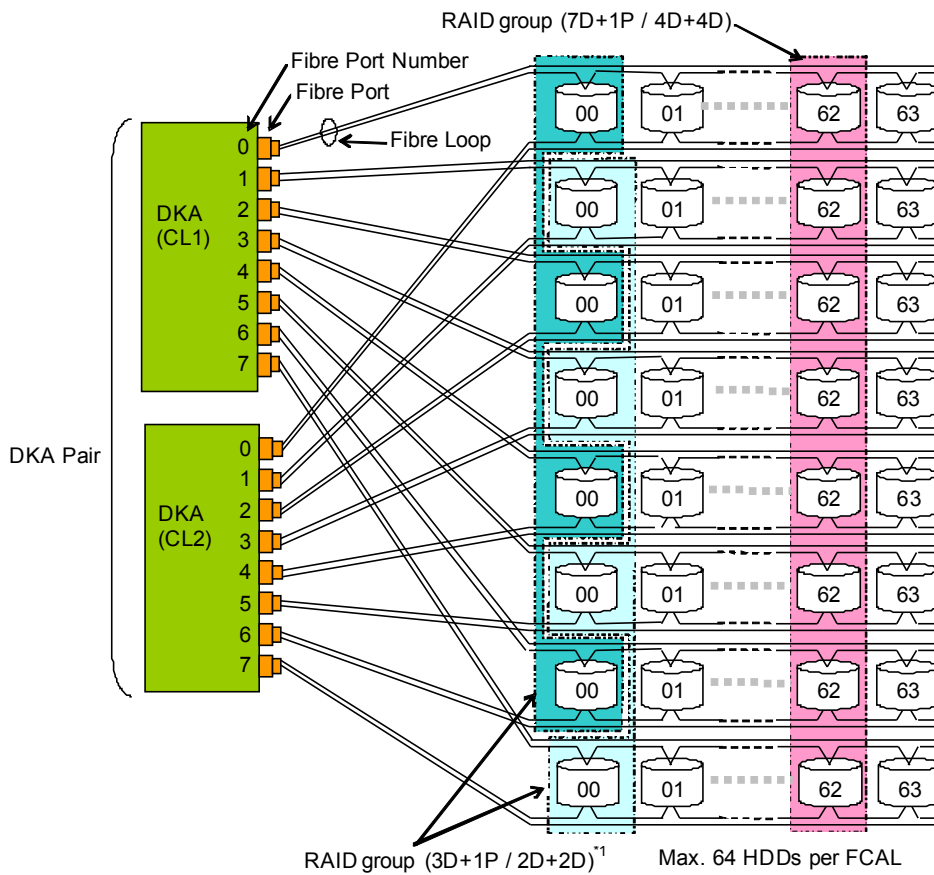
- Extended Serial Adapter (ExSA) (compatible with ESCON protocol). The ST9985V supports a maximum of ExSA serial channel interfaces. The ExSA channel interface cards provide data transfer speeds of up to 17 MB/sec and have 16 ports per pair of channel adapter boards. Each ExSA channel can be directly connected to a CHPID or a serial channel director. Shared serial channels can be used for dynamic path switching. The ST9985V also supports the ExSA Extended Distance Feature (XDF).
- Fibre-Channel. The ST9985V supports up to 48 fibre-channel ports. The fibre ports are capable of data transfer speeds of 400 MB/sec (4 Gbps). Fibre-channel features can have either 8 or 16 ports per pair of channel adapter boards. The ST9985V supports shortwave (multimode) and longwave (single-mode) versions of fibre-channel ports on the same adapter card. When configured with shortwave fibre-channel adapters, the ST9985V can be located up to 500 meters (2750 feet) from the open-system host(s). When configured with longwave fibre-channel adapters, the ST9985V can be located up to 10 kilometers from the open-system host(s).
- NAS. Support on the ST9985V is TBD.
- iSCSI. Support on the ST9985V is TBD, but with the ST9990 it supports a maximum of 48 iSCSI interfaces. The iSCSI channel interface boards provide data transfer speeds of up to 100 MB/sec. The ST9985V supports shortwave (multimode) iSCSI channel adapters and can be located up to 500 meters (2750 feet) from the host(s). In an iSCSI environment, the ST9985V provides user authentication between hosts and ports mutually by using CHAP (challenge handshake authentication protocol).(iSCSI is a future)

## Disk Adapters and Back-End Directors

The disk adapters (DKAs) contain the back-end directors (microprocessors) that control the transfer of data between the disk drives and cache. The disk adapters are installed in pairs for redundancy and performance. The diagram below illustrates a conceptual DKA pair domain. The ST9985V can be configured with up to 1 KA pair. All functions, paths, and disk drives controlled by one DKA pair are called an "array domain." An array domain can contain a variety of LVI and/or LU configurations.

The disk drives are connected to the DKA pairs by fibre cables using an arbitrated-loop (FC-AL) topology. Each DKA has eight independent fibre backend paths controlled by eight back-end directors (microprocessors). Each dual-ported fibre-channel disk drive is connected through its two ports to each DKA in a pair over separate physical paths for improved performance as well as redundancy.

The figure below lists DKA specifications. Each DKA pair can support a maximum of 256 HDDs (in two array frames), including dynamic spare drives (384 HDDs for the first DKA pair). Each DKA pair contains eight buffers (one per fibre path) that support data transfer to and from cache. Each dual-ported disk drive can transfer data over either port. Each of the two paths shared by the disk drive is connected to a separate DKA in the pair to provide alternate path capability. Each DKA pair is capable of 16 simultaneous data transfers to or from the HDDs.



\*1: A RAID group (3D+1P/2D+2D) consists of fibre port number 0, 2, 4, and 6, or 1, 3, 5 and 7.

Figure 2.1 Conceptual Array Domain for the ST9985V

### BED Specifications

Parameter	Specifications
Number of backend director features	USPV: 1-8 USPVM: 1
Backend paths per BED feature	8
Backend paths per storage system	USPV: 8-64 USPVM: 8
Backend array interface type	Fibre channel arbitrated loop (FCAL)
Backend interface transfer rate (burst rate)	400 MB/sec (4 Gbps)
Maximum concurrent backend operations per BED feature	8
Maximum concurrent backend operations per storage system	USPV: 64 USPVM: 8
Backend (data) bandwidth	USPV: 68 GB/sec USPVM: 8.5 GB/sec



## Service Processor (SVP)

The ST9985V includes a built-in custom PC called the service processor (SVP). The SVP is integrated into the controller frame and can only be used by authorized Sun or Hitachi Data Systems personnel. The SVP enables the Sun or Hitachi Data Systems representative to configure, maintain, and upgrade the ST9985V. The SVP also collects performance data for all key components of the ST9985V to enable diagnostic testing and analysis. In addition, the ST9985V Storage Navigator functionality is provided by the SVP. Connecting the SVP with a service center enables remote maintenance of the subsystem.

*Note:* The ST9985V can be equipped with an optional duplicate SVP for additional reliability.

*Important:* The SVP does not have access to any user data stored on the ST9985V.

## Security Issues

It is generally recommended that the SVP be administered on a private management network. By doing this, the SVP is protected from the public internet or open corporate networks, which have a high risk of transmitting viruses.

However, customers have raised several security issues. Most of these issues are general in nature.

## Recent Security Updates

There have been some recent security updates as documented in ECN DKC610I/615I. Key among them are support for Trend Micro OfficeScan Corporate Edition, Symantec Anti Virus Corporate Edition and McAfee Viruscan Enterprise have been supported for a few years now.

Communication between Storage Navigator and SVP can be encrypted using SSL (Secure Socket Layer). You need to install OpenSA (Apache supporting SSL) to encrypt the communication. Setup for encrypted communication will be performed only for customers who request encrypted communication.

Authentication is added for Fibre Channel similar like it used for iSCSI ports. The use of this additional security feature will require Host, HBA and/or Switches that support this function  
- Storage Navigator no longer runs a Java Applet in browser; instead it runs a Java application which is faster and more secure.

## Installation of Anti-virus software

The first security issue is associated with viruses infecting the SVP. This usually occurs when the SVP is placed on an open corporate network which has either a known or "unknown" connection to the internet. With respect to the term "unknown", this means that the customer may not know that a system on the supposedly private network is actually on the public internet, and may actually be infected and spreading viruses across a supposedly secure private network. In this scenario, installation of anti-virus software is a recommended, proactive measure which can mitigate the risk associated with this situation. Please note that this is a separate cost item, paid for by the customer.

Please refer to the following Sun Service Bulletin to secure the SVP with anti-virus software.

<http://sejsc.ebay/almain.html#SECURITY>

## Trade Offs Between Placement of the SVP on a Private Network in Context of Remote Administration.

It is generally recommended that the SVP be administered on a private management network. By doing this, the SVP is protected from the public internet which has a high risk of transmitting infection.

However, many customers have chosen to administer their systems remotely. If this occurs, then the security problem should be reframed as a general network security, administration, and integration issue. The issue may also be framed as a trade off between being secure on a private network versus opening up to an open corporate or even the public internet, which increases security risks.

Therefore utilizing remote administration across open corporate networks or the public internet surfaces a new set of challenges in context of general network security, administration, and integration issues instead of a narrowly focused SVP issue.

Please ensure that encryption is turned on with respect to avoidance of having password being transmitted in the clear. To address that issue, the Apache Server residing on the SVP should be -installed with SSL enabled.

Please refer to the following manual for guidelines

OpenSA Manual, see chapter 5

<http://subdude.central.sun.com/toi/hds/9990manual/21web.pdf>

Encrypted Communications User Guide MK94RD168-01

The ISO image of "Open SA CD" and also zip file is posted at

<http://ST9990/eng/ssl/>

These two files can also be found on sunsolve.sun.com under /coresdirectory.

There can be some challenges re-installing the Apache Web server with SSL enabled. Pls. contact ken.ow-wing@sun.com to direction to the appropriate resources which can assist you.

For those customer who strongly prefer to engage in remote administration, please check with Ken.Ow-Wing@Sun.com for the latest in terms improvement to security on this system.

## Disk Drives

The Primary rack can hold up to 120 disk drives. The second Expansion rack can contain up to 120 disk drive. With these two racks, the ST 9985 V can contain a total of 240 disk drives.

73GB / 15Krpm disk drive

146GB / 15Krpm disk drives

- 300 GB/ 15K disk drives

Please note that the 146 GB 10K and the 300 GB 10K are not supported on the ST 9985 V.

Please note that HDDs from prior generations of sytems are not usable in the ST 9985V and the ST 9990 V. HDDs in the ST 9985 V and ST 9990 V may not be used in prior generations of systems.

RAID Support

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“100 percent Data Availability on the ST9985V is NOT supported on RAID 5 with a (7D+1P) configuration. Note: As a general rule, ALL requests for 100 percent Data Availability is considered under an RPQ (Request Per Quote) basis and needs to be approved by the SUN ST9900 and HDS Product Management”.

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Recently ST9900 introduced concept of RAID concatenation. The benefit is to achieve the better performance in the backend. It allows striping the data across more disks. The disadvantage could be chances of more LDEV blockade if two or more HDDs are blocked (depends on RAID level used)

With "RAID5 concatenation" on V06 code and higher, you can stripe across either two or four RAID5 7+1 parity groups (i.e. up to 32 drives).

For both the ST 9985 V and ST 9990 V, the following RAID is supported:

- RAID1 (2D + 2M)
- RAID5 (3D + 1P)
- RAID6 (6D +2P)
- RAID5 (7D+1P)
- RAID1 (4D+4M)

There is a maximum of 40 Global Spares. However the configuration tool will not let you configure 40 spares; it will only allow you to configure 16 spares. So configure 16 spares and order and order extra data drives and convert them to spares by reconfiguring the system.

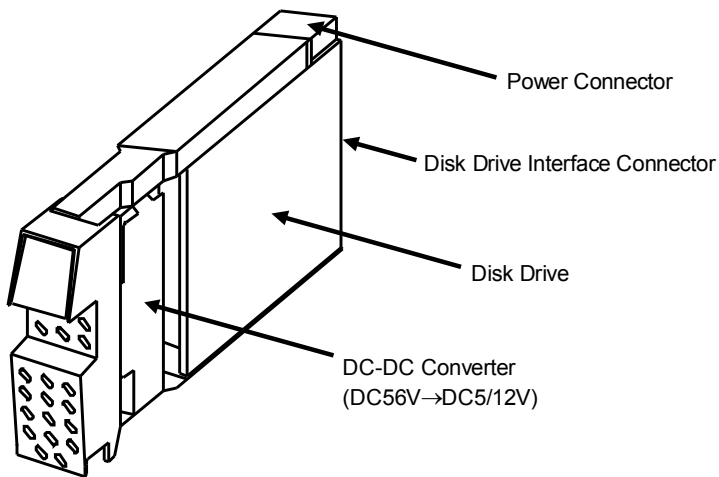
Table 2-1 Disk Drive Specifications

Parameter	72 GB (15 krpm) DKS2C-K72 FC	146 GB (15 krpm) DKS2D-K146FC
Formatted capacity (GB)	71.50	143.76
Revolution speed (rpm)	15,000	15,000
Platter diameter	2.5 inches	2.5 inches
Physical tracks per physical cylinder (user area) (number of heads)	8	8
Physical disk platters (user area) (numbers of disks)	4	4
Sector length (byte)	520 (512)	520 (512)
Seek time (ms) (read/write) MIN	0.4 / 0.6	0.4 / 0.6
MAX	6.7 / 7.1	6.7 / 7.1
AVE	3.8 / 4.2	3.8 / 4.1
Average latency time (ms)	2.01	2.01
Internal data transfer rate (MB/sec)	74.5 to 111.4	76.13 to 113.78
Max. interface data transfer rate (MB/sec)	200	200

Parameter	300 GB (15krpm) DKS2E=K300FC
Formatted capacity (GB)	288.20
Revolution speed (rpm)	15,000
Platter diameter	N/A

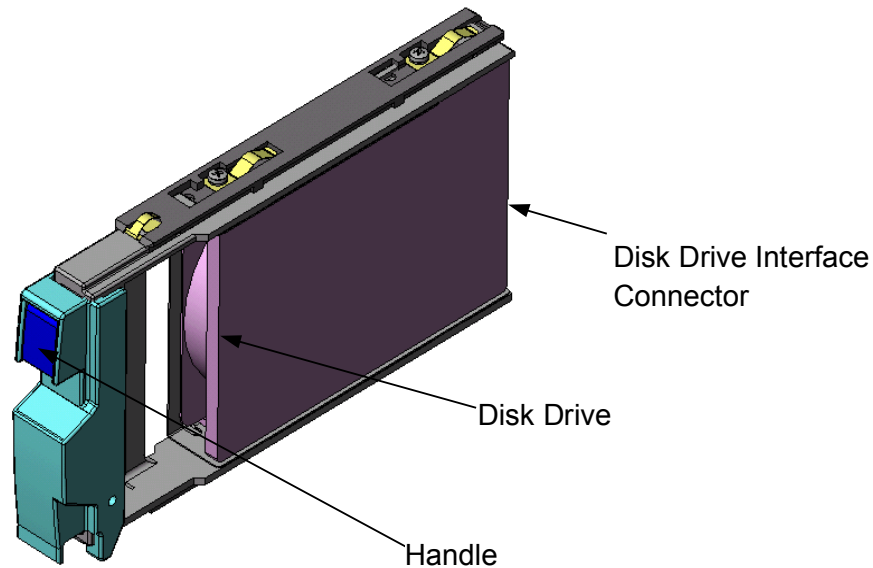
Physical tracks per physical cylinder (user area) (number of heads)	8
Physical disk platters (user area) (numbers of disks)	4
Sector length (byte)	520 (512)
Seek time (ms) (read/write)	0.2/0.4
MIN	
MAX	6.7/7.4
AVE	3.5/4.0
Average latency time (ms)	2.01
Internal data transfer rate (MB/sec)	120 to 202
Max. interface data transfer rate (MB/sec)	Max 400

Diagram of the Prior Generation ST 9985. The HDD and DC to DC converter are built in the same canister.



In the canister that is mounted with the HDD above, the DC-DC converter, which converts 56V DC to 5V and 12V DC used by the HDD, is installed.

However, in the new ST 9985 V, you can see that the DC to DC converter is not built into the canister.



All disk drives are over-engineered for extended life and the drive's firmware can be updated non-disruptively. All disk drives can be replaced with no disruption to the system.

With a maximum of 240 disk drives total, the total internal system raw capacity of a single StorageTek 9985V system is 69.2 TB (precise engineering measurement) or 72 TB in terms of a rounded up marketing measurement.

#### 300 GB Disk Drives and RAID 6

The introduction of 300 GB 10K and 15K disk drives has attracted a considerable amount of interest from the Sun field. Additional complexities associated with the 300 GB disk drives include the following:

RAID 6 (6+2) is a recommended option. When the ST 9990 was first released, RAID 6 was an was required. That requirement has since been relaxed, and RAID 6 now has the status of a recommended option.

#### Performance considerations associated with RAID 6

The amount of shared memory required will vary according to the capacity associated with the installed 300 GB disk drives. Please refer to the ST9985V maintenance manual, which is available only to authorized support personnel.

The reason why RAID 6 is a recommended option with 300 GB drives is to protect against double disk drive failures.

As larger disk drive capacities are achieved (such as with 300 GB), the total amounts of data which would need to be recovered increases. The recovery time increases commensurately with the amount of data being recovered. As the recovery time lengthens, some customers are concerned that if a second disk drive fails, their ability to recover their data would be lost.

RAID 6 is similar to RAID 5 as blocks of data and parity information are striped across an array of drives, except that in a RAID 6 implementation there are two sets of parity information striped across an array of drives. This duplication is solely to improve fault tolerance – RAID 6 can handle the failure of any two drives in the array while other single parity RAID levels can handle at most one fault. Performance-wise, RAID 6 is generally slightly worse than RAID 5 in terms of write operations due to the added overhead of more parity calculations, but may be slightly faster in random read operations due to the spreading of data over one more disk. The StorageTek 9900 will support RAID 6 sets as 8-drive stripe depth (6 data drives + 2 parity drives).

For these reasons additional information and focus is provided below.

The 300GB 15K RPM HDD (288.20GB unformatted, raw) achieved general availability May 3, 2005 for the ST9990. This drive is also used in the ST9990 V and ST9985V. This disk drive extends the maximum internal storage capacity of the ST9985V to 69.2 TB (un-formatted, raw).

Additional RAID levels and striping sizes are under consideration and further information will be provided when available.

The ST9985V supports RAID-1, RAID-5, and RAID-6 array groups.

**RAID-1.** illustrates a sample RAID-1 (2D+2D) layout. A RAID-1 (2D+2D) array group consists of two pair of disk drives in a mirrored configuration, regardless of disk drive capacity. A RAID-1 (4D+4D) group\* combines two RAID-1 (2D+2D) groups. Data is striped to two drives and mirrored to the other two drives. The stripe consists of two data chunks. The primary and secondary stripes are toggled back and forth across the physical disk drives for high performance. Each data chunk consists of either eight logical tracks (mainframe) or 768 logical blocks (open systems). A failure in a drive causes the corresponding mirrored drive to take over for the failed drive. Although the RAID-5 implementation is appropriate for many applications, the RAID-1 option on the ST9985V is ideal for workloads with low cache-hit ratios.

**\*Note for RAID-1(4D+4D):** It is recommended that both RAID-1 (2D+2D) groups within a RAID-1 (4D+4D) group be configured under the same DKA pair.

**RAID-5.** A RAID-5 array group consists of four (3D+1P) or eight (7D+1P) disk drives. The data is written across the four (or eight) disk drives in a stripe that has three (or seven) data chunks and one parity chunk. Each chunk contains either eight logical tracks (mainframe) or 768 logical blocks (open). The enhanced RAID-5+ implementation in the ST9985V minimizes the write penalty incurred by standard RAID-5 implementations by keeping write data in cache until an entire stripe can be built and then writing the entire data stripe to the disk drives. The 7D+1P RAID-5 increases usable capacity and improves performance.

illustrates RAID-5 data stripes mapped over four physical drives. Data and parity are striped across each of the disk drives in the array group (hence the term “parity group”). The logical devices (LDEVs) are evenly dispersed in the array group, so that the performance of each LDEV within the array group is the same. also shows the parity chunks that are the “Exclusive OR” (EOR) of the data chunks. The parity and data chunks rotate after each stripe. The total data in each stripe is either 24 logical tracks (eight tracks per chunk) for mainframe data, or 2304 blocks (768 blocks per chunk) for open-systems data. Each of these array groups can be configured as either 3390-*x* or OPEN-*x* logical devices. All LDEVs in the array group must be the same format (3390-*x* or OPEN-*x*). For open systems, each LDEV is mapped to a SCSI address, so that it has a TID and logical unit number (LUN).

**RAID-6.** A RAID-6 array group consists of eight (6D+2P) disk drives. The data is written across the eight disk drives in a stripe that has six data chunks and two parity chunks. Each chunk contains either eight logical tracks (mainframe) or 768 logical blocks (open).

In the case of RAID-6, data can be assured when up to two drives in an array group fail. Therefore, RAID-6 is the most reliable of the RAID levels.

#### Sequential Data Striping

The ST9985V’s enhanced RAID-5+ implementation attempts to keep write data in cache until parity can be generated without referencing old parity or data. This capability to write entire data stripes, which is usually achieved only in sequential processing environments, minimizes the write penalty incurred by standard RAID-5 implementations. The device data and parity tracks are mapped to specific physical disk drive locations within each array group. Therefore, each track of an LDEV occupies the same relative physical location within each array group in the subsystem.

#### LDEV Striping Across Array Groups

In addition to the conventional concatenation of RAID-1 array groups (4D+4D), the ST9985V supports LDEV striping across multiple RAID-5 array groups for improved LU performance in open-system environments. The advantages of LDEV striping are:

Improved performance, especially of an individual LU, due to an increase in the number of HDDs that constitute an array group.

Better workload distribution: in the case where the workload of one array group is higher than another array group, you can distribute the workload by combining the array groups, thereby reducing the total workload concentrated on each specific array group.

**Note:** The LDEV striping feature should only be used to resolve a performance problem (disk drive bottleneck) due to heavy I/O activity to an individual LDEV.

The supported LDEV striping configurations are:

LDEV striping across two RAID-5 (7D+1P) array groups (see ). The maximum number of LDEVs in this configuration is 1000.

LDEV striping across four RAID-5 (7D+1P) array groups (see ). The maximum number of LDEVs in this configuration is 2000.

All disk drives and device emulation types are supported for LDEV striping. LDEV striping can be used in combination with all ST9985V data management functions, with the following restriction in Volume Migration:

In Volume Migration operations (optimizing LDEV allocation), you cannot migrate an array group within a combined/striped group to another group. Volume Migration migrates all LDEVs in an array group to another array group.

## **RAID 28+4 - Vertical Striping**

Raid 28+4 or Raid 14+2 - vertical striping is also known as Raid 5 concatenation in which two or four RAID5 (7D+1) parity groups are concatenated. The data and parity is distributed and arranged in 16 or 32 drives. The V05 code has two parity group concatenation and V06 code has full four Raid5 (7+1) concatenation. The main advantage of this type of concatenation is that in case of major parity group bottleneck you can increase size of parity group and spread load by increasing twice or four times number of drives. More spindles better the performance. The only caveat you need to consider is in case of two drives blocked/failure as large numbers of Ldev are arranged in comparison to RAID5 (7+1) and formatting time.

### **RAID-Level Intermix**

RAID technology provides high availability capability for the disk drives of the ST9985V. The cache management algorithms enable the ST9985V to stage up to one full RAID stripe of data into cache ahead of the current access to allow subsequent access to be satisfied from cache at host channel transfer speeds.

The ST9985V supports RAID-1, RAID-5, RAID-6, and intermixed RAID-level configurations, including intermixed array groups within an array domain. illustrates an intermix of RAID levels. All types of array groups (RAID-5 3D+1P, 7D+1P; RAID-1 2D+2D, 4D+4D; RAID-6 6D+2P) can be intermixed under one DKA pair.

### **Hard Disk Drive Intermix**

All hard disk drives (HDDs) in one array group (parity group) must be of the same capacity and type. Different HDD types can be attached to the same DKA pair.

**Note:** For the latest information on available HDD types and intermix requirements, please contact your Sun Microsystems Systems account team.

### **Device Emulation Intermix**

This diagram illustrates an intermix of device emulation types. The ST9985V supports an intermix of all device emulations on the same DKA pair, with the restriction that the devices in each array group have the same type of track geometry or format.

The Virtual LVI/LUN (also called CVS) function enables different logical volume types to coexist. When Virtual LVI/LUN is not being used, an array group can be configured with only one device type (for example, 3390-3 or 3390-9, not 3390-3 and 3390-9). When Virtual LVI/LUN is being used, you can intermix 3390 device types, and you can intermix OPEN-*x* device types, but you cannot intermix 3390 and OPEN device types.

**Note:** For the latest information on supported LU types and intermix requirements, please contact your Sun Microsystems Data Systems account team.



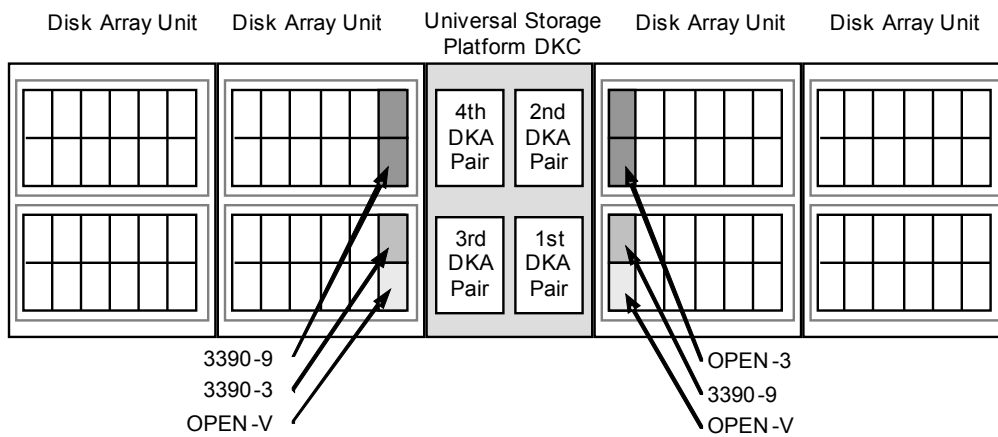


Figure 2.2 Sample Device Emulation Intermix

### Comparing RAID levels

The following are guidelines for comparing the characteristics of several RAID levels.

#### Space efficiency

RAID level	Space efficiency (User area/Physical capacity)	Note
RAID1 (2D+2D)	50.0%	Due to mirroring
RAID5 (3D+1P)	75.0%	Ratio between Data HDD and Parity HDD 6D+2P is the same as 3D+1P
RAID5 (7D+1P)	87.5%	
RAID6 (6D+2P)	75.0%	

#### Maximum performance

The following table shows the maximum performance (in the case of HDD bottleneck) for each RAID group (RAID1(2D+2D) is 100%). Note that we normally configure systems in customer environments so that HDD bottleneck would not occur. Therefore, the ratio is not always as shown in the table below.

RAID level	Random Read, Sequential Read	Sequential Write	Random Write
RAID1 (2D+2D)	100%	100%	100%
RAID5 (3D+1P)	100%	150%	50%
RAID5 (7D+1P)	200%	350%	100%
RAID6 (6D+2P)	200%	300%	66.7%
Note	Proportional to the number of HDDs	Proportional to that of data HDDs	(※)

※ Difference between performance in RAID6(6D+2P) and that in RAID5(7D+1P)

RAID6(6D+2P) needs to process 1.5 times<sup>(\*)</sup> more HDD I/Os than RAID5(7D+1P).

In other words, the Random Write performance in RAID6 (6D+2P) is lower than that in RAID5(7D+1P) by 33%.

\*: - The number of HDD I/Os in RAID5 Random Write: 4

(Old data/old parity reads, new data/new parity writes)

- The number of HDD I/Os in RAID6 Random Write: 6  
(Old data/old parity (P)/old parity (Q) reads, new data/new parity (P)/new parity (Q) writes)

#### Power Specifications

The ST9985V supports the following power specifications:

Single Phase 30 Amps in both ROW as well as inside of Japan

Here are the electrical connectors specifications:

Go here:

<http://pts-storage.west/products/T99x0/documentation.html>

Please refer to the following document:

*Universal Storage Platform VM Installation Planning Guide (MK-97RD6079)*

#### Circuit Breakers and Plugs

The PDU plugs are appropriate for the power sources at the installation sites:

For installations within the U.S., the plugs are NEMA L6-30P, which are rated as 30A and 250V and have two 16A circuit breakers with 20A trip values.

For installations outside the U.S., the plugs are IEC 309, which are rated as 32A and 250V and have two 16A circuit breakers with 20A trip values.

All power supplies are dual power supplies and are hot-swappable

Specific plug and receptacle configurations and part numbers are specified in the StorageTek 9985V installation guide.

For environmentals, please go to the following URL:

<http://pts-storage.west/products/T99x0/documentation.html>

[and look for the ST 9985 V User and Reference Guide MD-96RD635-02](#)

Go here:

<http://pts-storage.west/products/T99x0/documentation.html>

Please refer to the following document:

*Universal Storage Platform VM Installation Planning Guide (MK-97RD6079)*

## **Backup Mode (USP V and VM)**

When backup mode is chosen and a power failure occurs, storage system operations will continue normally for 200 milliseconds. If the power failure exceeds 200 ms, the storage system uses power from the batteries to back up the cache memory and shared memory for 36 hours or 48 hours, depending on the amount of cache memory.

# Software Solutions

All current Sun StorageTek 9900 software products are supported on the new StorageTek 9985V providing a complete suite of storage management, data/information lifecycle management, and business continuity solutions.

Complimenting the Sun StorageTek 9985V system is a set of specific software offerings providing storage resource management, performance tuning, and business continuity solutions.

## **StorageTek 9900 Basic Operating System (BOS) Suite**

- Includes Device Manager, Resource Manager Suite and Server Priority Manager
- Also includes Virtual Partition Manager with support for up to 4 partitions

This suite was created to deliver the storage return on investment, security, and quality of service to applications that your organization requires. And the Basic Operating System Virtualization software enables the ST9985V's embedded virtualization capabilities and allows customers to take advantage of storage management and data mobility capabilities within a single system or across an entire heterogeneous storage pool. Using Basic Operating System, one administrator can manage an entire storage infrastructure from a single pane of glass or you can choose to designate multiple storage administrators who can optionally manage only a particular set of storage resources that is made accessible to them.

## **StorageTek 9900 Resource Management Suite**

The Sun StorageTek software and hardware solutions are managed through the powerful StorageTek 9900 HiCommand Storage Area Management Suite. This management tool substantially lowers total cost of ownership by enabling storage hyper-consolidation and the intelligent remote management of critical information. The business value of centralized, global storage management is to increase business agility through heightened operational excellence and greatly reduced total cost of ownership.

## **StorageTek 9900 HiCommand Device Manager**

The StorageTek 9900 HiCommand Device Manager software provides a single platform for centrally managing, configuring, and monitoring Sun StorageTek 9900 series and any storage product that complies with the Storage Management Initiative Specification (SMI-S) standard set by the Storage Networking Industry Association. By significantly boosting the volume of storage that each administrator can manage, the single point-of-control design of Device Manager software can help raise storage management efficiency in these environments as well as reduce costs.

Easy-to-use Device Manager software views storage resources logically, while maintaining independent physical-management capabilities. By offering a continuously available view of actual storage usage and configuration, Device Manager software allows administrators to precisely control all managed storage systems. The result: Highly efficient use of administrative time and storage assets. When combined with StorageTek 9900 HiCommand Tuning Manager and StorageTek 9900 HiCommand Storage Services Manager modules, Device Manager software helps automate entire storage environments.

## **StorageTek 9900 Virtual Partition Manager**

The StorageTek 9985V Virtual Partition Manager enables the logical partitioning of ports, cache, and disk capacity (parity groups) on Sun StorageTek 9985V systems to create independently managed Virtual Private Storage Machines. These logical partitions allocate separate, independently managed, dedicated storage resources for specific users (servers, applications, etc.), and available only to those users.

Storage resources can be allocated based on business requirements and priorities and be re-assigned as needed. To the host, the partition appears as if it is its own storage system and can be managed as such. Administrators will have access to configure and manage resources within their assigned partitions. Overall system priorities, disk space and tiers of storage can be managed and used most efficiently based on business applications and requirements by allocating and adjusting resources to each partition.

### **StorageTek 9900 Server Priority Manager**

The StorageTek 9900 Server Priority Manager (formerly known as Priority Access) software allows users of open systems to designate prioritized ports (for example, for production servers) and non-prioritized ports (for example, for development servers), and set thresholds and upper limits for the I/O activity of these ports. Users can tune the performance of the development server without affecting the production server's performance. With Sun StorageTek 9900 Server Priority Manager software, users can define and optimize data access performance, helping to ensure that production servers have prioritized access to data over development servers.

### **StorageTek 9900 BOS Virtual Suite (BOS V)**

- Includes Universal Volume Manager and Virtual Partition Manager for more than 4 partitions

The BOS V is an upgrade to the BOS and adds Unique ability to virtualize externally attached storage subsystems to the ST9985V system creating a single heterogeneous pool of tiered storage. This enables simplified storage management, increases utilization, increases efficiency, improves service levels, simplifies data migration and helps meet compliance demands. The with the BOS V Virtual Partitions are expanded - up to 32 storage and 32 cache partitions.

### **Sun StorageTek 9990 Universal Volume Manager**

Simplified management is a key component of large-scale data storage consolidation. The Sun StorageTek 9990 Universal VolumeManager software allows you to manage multiple storage systems connected to the Sun StorageTek 9990 system under a single point of control. Using Universal VolumeManager, you can virtualize and manage up to 247 PB of mixed storage systems from Sun and other vendors as if they were all one system. External storage volumes form a shared storage pool that can be used by multiple servers and multiple applications.

### **StorageTek 9900 Disaster Recovery Suite(Bundle) (replaces TrueCopy)**

- Includes TrueCopy Sync and Universal Replicator for both Open and Z/OS.

Sun StorageTek 9900 TrueCopy Remote Replication provides data replication to other Sun StorageTek 9900 series subsystems over local or long distance connections. The added copies may be used to help enable disaster recovery, data mining, backup, testing, etc. Performs synchronous remote replication operations.

Sun StorageTek 9900 Disaster Recovery Extended Suite – Includes TrueCopy Sync and Universal Replicator with advanced function: 3DC for Open and z/OS and 4x4 for z/OS only.

### **StorageTek 9900 True Copy Remote Replication**

The StorageTek 9900 True Copy Remote Replication remote replication software automates the recovery process, enabling normal business operations to resume in a matter of minutes rather than hours or days. True Copy Remote Replication software provides a host independent data replication solution over any distance and rapidly copies data between the Sun StorageTek 9900 Series enterprise storage systems without affecting application performance. These copies can be used for production, rapid recovery following an outage, disaster

recovery, data warehousing/data mining, or migration applications. Both synchronous and asynchronous versions of True Copy Remote Replication software are available for open systems and mainframe environments. True Copy Remote Replication software can also be integrated with StorageTek 9900 ShadowImage™ in-system replication software to enable robust business continuity solutions.

## **StorageTek 9900 Universal Replicator**

The StorageTek 9900 Universal Replicator is intended for organizations that have enterprise-class heterogeneous data replication needs for business continuity or operational improvement requirements. All current copy products will work within a StorageTek 9900 series environment. When used in conjunction with the StorageTek 9985V system, the Universal Replicator becomes the first storage-based replication software component that provides server-free and application-transparent journal-based multi-target replication features for data from heterogeneous storage environments. And it does this in a way that accommodates both open and mainframe systems users and maximises the performance of the replication process.

Customers using Universal Replicator technology can optimise their ability to control recovery time objectives and recovery point objectives, while maximizing their investment in StorageTek 9900 True Copy Remote Replication software by leveraging their existing investment in the StorageTek 9900 Series storage systems. It provides an unmatched business continuity framework that enables local, remote, and multi-site data replication among 9985V systems including between and among hosted storage systems.

## **Sun StorageTek 9985V Dynamic Provisioning**

The Sun StorageTek 9985V Dynamic Provisioning software improves storage utilization, simplifies storage provisioning, and enables an easy, transparent way of adding additional storage when needed without disruptions to applications. Also known as thin provisioning, Dynamic Provisioning allows certain Open Systems customers the ability to overallocate storage to an application without it actually being physically installed until needed. This minimizes the cost associated with overallocating and underutilization of storage resources. It also helps simplify performance optimization by transparently spreading many hosts' individual IO patterns across many physical disks, thereby reducing performance management concerns and optimizing performance/throughput. Dynamic provisioning reduces costs, power and cooling, improves performance, simplifies management, and minimizes application service interruptions.

## **StorageTek 9900 HiCommand Tuning Manager**

The StorageTek 9900 HiCommand Tuning Manager software enables tuning of large storage infrastructures and helps manage storage growth. Beyond monitoring and reporting on capacity and performance, it employs predictive trending to forecast future storage requirements to help you satisfy service-level agreements. Besides deep integration with Sun storage systems, it accesses basic application-based utilization information from heterogeneous storage systems to:

- Predict and respond to capacity crises
- Consolidate existing storage resources and plan for new ones
- Identify performance bottlenecks.

## **StorageTek 9900 HiCommand Data Link Manager**

The capabilities of the StorageTek 9900 HiCommand Data Link Manager software (formerly known as StorageTek 9900 Dynamic Link Manager™ software)—including path fail-over and fail-back and automatic load balancing—can provide higher availability and accessibility to data than other solutions. If one path fails, the Data Link Manager path fail-over feature automatically switches the I/O to an alternate path, helping to ensure that an active route to your data is always available. Data Link Manager software also helps maintain outstanding system performance by balancing workloads across available paths. By removing the threat of I/O bottlenecks and protecting key data paths, Data Link Manager software can boost not only performance and reliability, but information-retrieval rates as well.

## **StorageTek 9900 HiCommand Storage Services Manager**

The StorageTek 9900 HiCommand Storage Services Manager is the main console for Sun's heterogeneous storage infrastructure management software. Storage Services Manager provides:

- auto-discovery of hosts, HBAs, SAN switches, and disk subsystems
- graphical topology mapping
- dependency and path management
- capacity and performance reports
- event management
- trending information
- policy-based automation
- role-based security.

Built-in Advisors and Automators simplify complex tasks such as

- replacing HBAs
- upgrading firmware
- understanding what users and data are impacted by planned or unplanned downtime
- identifying new capacity that can be utilized by individual application.

## **StorageTek 9900 Volume Migration**

The StorageTek 9900 Volume Migration software helps simplify the way users manage performance levels in the Sun StorageTek 9900 series. Sun StorageTek 9900 Volume Migration software automatically monitors, analyzes, tunes, and balances high volumes of information, then forecasts performance levels to system administrators. Performance level thresholds can be set and approved in either manual or automatic mode. Users can define and control the guidelines; StorageTek 9900 Volume Migration software does the work. This eliminates the requirement of physically managing performance levels, and liberates staff to work on other more productive, revenue-generating projects within the organization.

## **StorageTek 9900 Business Continuity Suite**

Sun Microsystems has an industry-unique commitment to the paradigm of continuous business. Continuous business refers to an enterprise's ability to minimize system downtime, whether it is planned or unplanned. This is distinct from business continuity, which refers to the ability to recover from unplanned downtime. Building on the Sun Microsystems reputation for bulletproof reliability, StorageTek 9900 Series storage systems offer complete redundancy and hot-replaceable components, delivering maximum uptime. To these

already-robust platforms, Sun Microsystems adds business continuity solutions to ensure quick recovery from unplanned downtime resulting from acts of nature, human errors, application errors, and malicious attacks.

## **StorageTek 9900 In-System Replication Suite**

The StorageTek 9900 In-System Replication includes both ShadowImage and Copy on Write. In-System Replication Suite along with the Sun StorageTek 9900 series, allows information to be protected and accessible 24x7. StorageTek 9900 ShadowImage In-System Replication software helps ensure continuous access to information. ShadowImage In-System Replication software replicates large volumes of information within the Sun StorageTek 9900 series without impacting service levels, timing out, or affecting performance levels. The information volumes can then be split away from the host application and used for system backups, testing, and data mining applications while your business continues to run at full capacity.

The high-speed, non-disruptive, copy-on-write technology of Sun's StorageTek 9900 Copy-on-Write Snapshot software rapidly creates up to 14 point-in-time copies of any data volume within a StorageTek 9900 series systems, without impacting host service or performance levels. Since Copy-on-Write Snapshot copies only store the changed data blocks in the Copy-on-Write Snapshot storage pool, the volume of storage capacity required for each Copy-on-Write Snapshot copy is substantially smaller than the source volume. As a result, a significant savings is realized when compared with full cloning methods. The Copy-on-Write Snapshot copies are fully read/write compatible with other hosts and can be used for rapid data restores, application testing and development, data mining/data warehousing, or non-disruptive backup or maintenance procedures.

## **Dynamic Provisioning Software**

### **Support**

Dynamic Provisioning only support Open Systems (Open – V emulation). Currently it only supports internal storage, but will be expanded to support external storage under UVM in phase 2 post GA (TBD)

### **Best Fit**

- Best Fit on larger systems where the usage aggregation of a storage pool across many spindles will demonstrate largest performance optimization.
  - Each user gets access to a larger number of spindles
- Best Fit for stable environments and large consistently growing files or volumes. It's best used for applications such as enterprise databases and archival applications where capacity growth rates are understood.
  - Oracle and other databases that can grow and automatically expand
- Deferred storage purchase benefits will be limited with applications or file systems that rapidly write in a sparse fashion over all their volume's allocation.
  - Some Open Systems applications and file systems do just that, so the benefits can be application-dependent.

## **File System Dependency – Benefits Quick Summary**



Benefit	Contents
(1) Simplify Volume Creation and Configuration	Quick volume creation w/o formatting or physical installation Freedom from volume expansion w/o physical configuration changes Freedom of drives additions w/o logical configuration changes
(2) Easier Performance Optimization	Automatic workload leveling across Pool.
(3) Optimize Capacity Usage	Allow huge logical volume size with minimum physical capacity usage. Dependent upon OS, filesystem, and/or DB platform.

OS	FS	Benefit (1)	Benefit (2)	Benefit (3)	Note
HP_UX	JFS	X	X	X	
Windows Server2003	NTFS	X	X	X	
Linux	XFS	X	X	X	Need to set specific parameter
	ext2	X	X	Partial	
	ext3	X	X	Partial	
Solaris	UFS	X	X		
	VxFS	X	X	X	
AIX	JFS	X	X		
	VxFS	X	X	X	

# Field Issues

## Cluster Support

Please refer to the following URL for Cluster Support of the ST9900 Family of Storage Systems.

<http://suncluster.eng/products/SC3.1/config/sc3ConfigurationGuide-6.htm#pgfId-780547>

## WWWW (What Works With What)

There are several WWWW documents associated with the ST9900 family of products.

Here is an explanation of the WWWW documents.

Token #344150 (WWWW)

This is the most important WWWW and it contains the following information:

- Supported combination of the following systems:  
Storage + Server + HBA + OS + Switch + Switch firmware.
- ST9990V, ST9985V, ST9990, ST9985, ST9980, ST9970, ST9960, ST9910
- Support for all of these hardware platforms are contained in token 344150
- Solaris 10
- AMD 64
- SAN X.X versions

Token # 385413(FAR or Feature Availability Report)

This is the second most used Support Matrix for the ST9900 Family.

- The most important items contained in this document include support statements for multipathing, clustering, booting, and volume management.
- A separate document under this token number is the TrueCopy Link Matrix. This is the document which states support for channel extenders in support of TrueCopy distance replication.

## Microcode

60-01-70-00/00

## RAID 10

ST9900 Data Systems promotes “RAID 1+”. In reality, striping is included with this, and therefore ST9990V and ST9985V RAID 1 is equivalent to RAID 10.

# Features and Capabilities of the Sun StorageTek 9985V

The method by which the StorageTek 9985V implements multi-vendor host platform storage pooling is through mapping an external LUN (ELUN) to a LUN within the StorageTek 9985V system. An external LUN (ELUN) requires no physical disk storage on the StorageTek 9985V.

## Multi-Vendor Host Platform Storage Pooling External LUN Mapping

An external heterogeneous storage system can be connected to a StorageTek 9985V system (1) through a direct connection, (2) through a switch, or, remotely, through extenders.

Currently, the following heterogeneous storage systems are supported by the StorageTek 9985V multi-vendor host platform storage pooling:

- Sun StorageTek 9900 series storage systems
- HDS Lightning 9985V series storage systems
- HDS Thunder 9500V series storage systems
- HP XP series storage system
- Sun StoreEdge T3B, and SE 6120.

Additional Sun and other vendor's storage systems will be added to this support matrix as they are qualified and support agreements reached.

## Virtual Private Storage Machines (VPSM)

Another unique feature of the StorageTek 9985V system is the ability to create Virtual Private Storage Machines within the system. Through the StorageTek 9985V Virtual Partition Manager, up to 8 separate Virtual Private Storage Machines can be defined, each with unique cache, channel, back-end resource aggregation specifications. This virtual partitioning feature of the StorageTek 9985V allows users to consolidate heterogeneous storage environments to provide known quality of service (QoS) metrics to applications and users.

VPSMs complement Dynamic System Domains (DSD) provided in Sun Servers. DSDs are a form of server partitioning. Together, VPSMs and DSD supports a customer's "Service Provider" business model initiatives.

Each Virtual Private Storage Machine within a StorageTek 9985V is dynamically allocated and statically used. This capability allows the assignment of resources between partitions if not required or used. Additionally, full separation and security is maintained between configured partitions.

The benefits of the StorageTek 9985V Virtual Private Storage Machines are:

- Better resource usage
- User and application aggregation with predictable QoS metrics
- Lower operational costs.

The virtual partitioning feature of a StorageTek 9985V is ideal for dedicating storage resources to critical applications, or in a storage provider model, allocating storage resources to specific clients with varying service level agreements. One example of the use of virtual partitioning would be the creation of separate storage partitions, each with different characteristics, supporting individual SunFire server domains. Figure 7 conceptually portrays the StorageTek 9985V virtual partitioning functionality.

## **StorageTek 9985V Virtual Partitioning**

Virtual partitions are configured via ST9900 Virtual Partition Manager, which is the software tool use to set up Storage Logical Partitions (SLPR) and a Cache Logical Partitions (CLPR). The Storage Logical Partition (SLPR) defines the assignment of one or more Cache Logical Partitions (CLPRs) and the assignment of one or more target physical ports for the Cache Logical Partitions (CLPRs) to use. Each Cache Logical Partition (CLPR) defines the assignment of a specific data cache allocation and the assignment of one or more parity groups assigned to that cache allocation.

The StorageTek 9900 Storage Navigator is used to maintain user access control for each Virtual Private Storage Machine. Storage Navigator provides administrator and user level authorities and maintains an access control directory to keep manage user authorities. This ensures that each defined Virtual Private Storage Machine within a StorageTek 9985V system is fully secure.

# Operating System Support

The following operating systems are supported at the initial release of the Sun StorageTek 9985V:

Note: These are listed as examples only. Do not configure you systems from this list. Go to SunWin token #344150 and 385413

## Open Systems

- HP HP-UX
- HP Tru64
- HP OpenVMS
- IBM AIX
- Microsoft Windows Server 2003
- Microsoft Windows 2002 Server
- Novell Netware
- RedHat Linux
- SGI IRIX
- Sun Solaris

## Mainframe Systems

- IBM OS/390
- IBM MVS/ESA
- IBM VMS/SA
- IBM VM/ESA
- IBM VSE/EDA
- IBM z/OS
- IBM z/OS.e
- IBM z/VM
- IBM RedHat for S/390 zSeries

## Security

### Monitoring and Diagnostics Software (StorageTek Hi-Track)

The main security features of this software are:

- 128-bit secure socket layer (SSL) encryption support for the user interface between the customer's management LAN and the Storage Service Processor

- Password protection in the user interface.

- The Expanded Antivirus software for SVP ECN has been released.

- Customer can install Symantec, McAfee or Trend Micro software packages

Communication between Storage Navigator and SVP can be encrypted using SSL (Secure Socket Layer). (need to install OpenSA (Apache supporting SSL) to encrypt the communication. Setup for encrypted communication will be performed only for customers who request encrypted communication).

Authentication is added for Fibre Channel similar to how it is used for iSCSI ports.

The use of this additional security feature will require Host, HBA and/or Switches that support this function.

## LUN Mapping

LUN mapping is the task of assigning a LUN number to a volume. This helps ensure that the storage administrator can tightly control access to particular volumes.

## Storage Domains

This feature lets the user carve the Sun StorageTek 9985V system into several storage domains (see Figure 2 below). Storage domains can be used to create multiple logical *arrays* and to assign volumes to these arrays. The domains serve as logical *buckets*, into which new servers and storage can be easily added via the Configuration Service software of the Sun StorageTek 9985V system.

This allows:

More efficient storage management — storage domains allow collapsing multiple departments or applications into a single storage management infrastructure.

More efficient utilization of storage capacity — all attached servers and departments receive storage from a unified storage pool, reducing the amount of capacity overhead required and eliminating the unused storage that typically sits wasted in a distributed environment.

## LUN Masking

LUN masking is the term used for assigning access permissions — read-only, read/write, or none — to a volume. LUN masking eases storage administration while allowing for a more secure environment. When a volume is masked from a host, that volume is not available to be configured from that host and thus cannot be assigned to multiple hosts accidentally.

WWNs (world-wide number) can either be assigned to a specific volume or a specific set of volumes, or multiple WWNs can be grouped and assigned to a specific volume or a specific set of volumes.

## Virtual Private Storage Machines

Each Virtual Private Storage Machine defined within a StorageTek 9985V is protected through an access control directory to maintain and manage administrator and user level authorities. This ensures that each defined Virtual Private Storage Machine within a StorageTek 9985V system is fully secure from outside access.

## Command Line Interface (CLI)

The CLI uses encryption and authentication.

## **Encrypted Communications**

Only encrypted services are provided on the Sun StorageTek 9985V system — that is, the monitoring and diagnostic software as well as the management software support only through https encrypted communications.

# Reliability, Availability, and Serviceability (RAS)

The ST9985V is not expected to fail in any way that would interrupt user access to data. The ST9985V can sustain multiple component failures and still continue to provide full access to all stored user data.

*Note:* While access to user data is never compromised, the failure of a key component can degrade performance.

The reliability, availability, and serviceability features of the ST9985V include:

**Highly Available.** The ST9985V provides highly available architecture for all critical components. The subsystem is protected against disk drive error and failure by enhanced RAID technologies and dynamic scrubbing and sparing. The ST9985V uses component and function redundancy to provide high availability for all other subsystem components (microprocessors, control storage, power supplies, etc.). The ST9985V has no active single point of component failure and is designed to provide continuous access to all user data.

**Separate power supply systems.** Each storage cluster is powered by a separate set of power supplies. Each set can provide power for the entire subsystem in the unlikely event of power supply failure. The power supplies of each set can be connected across power boundaries, so that each set can continue to provide power if a power outage occurs. The ST9985V can sustain the loss of multiple power supplies and still continue operation.

**New – battery backup and de-stage option for HDDs.** A new feature of the ST9985V provides separate battery backup for the hard disk drives (HDDs) with an optional setting to de-stage data from cache to the (internal) HDDs during a power outage.

*Note:* The de-stage option is not supported when external storage is connected and/or when Cache Residency Manager BIND mode is applied.

**Dynamic scrubbing and sparing for disk drives.** The ST9985V uses special diagnostic techniques and dynamic scrubbing to detect and correct disk errors. Dynamic sparing is invoked automatically if needed. The ST9985V can be configured with up to 40 spare disk drives (4 + 36 optional), and any spare disk can back up any other disk of the same speed (RPMs) and the same or less capacity, even if the failed disk and spare disk are in different array domains (attached to different back-end directors).

**Dynamic duplex cache.** The ST9985V cache is divided into two equal segments on separate power boundaries. The ST9985V places all write data in both cache segments with one internal write operation, so the data is always duplicated (duplexed) across power boundaries. If one copy of write data is defective or lost, the other copy is immediately de-staged to disk. This duplex design ensures full data integrity in the event of a cache or power failure.

**Remote copy features.** The ST9900 Universal Replicator, ST9900 TrueCopy, and Compatible Replication for IBM XRC data movement features enable users to set up and maintain duplicate copies of mainframe and open-system data over extended distances. In the event of a system failure or site disaster, the secondary copy of data can be invoked rapidly, allowing applications to be recovered with guaranteed data integrity.

**Hi-Track.** The Hi-Track maintenance support tool monitors the operation of the ST9985V at all times, collects hardware status and error data, and transmits this data to the ST9900 Data Systems Support Center. The Support Center analyzes the data and implements corrective action as needed. In the unlikely event of a component failure, Hi-Track contacts the ST9900 Data Systems Support Center immediately to report the failure without requiring any action on the part of the user. Hi-Track enables most problems to be identified and fixed prior to actual failure, and the advanced redundancy features enable the subsystem to remain operational even if one or more components fail.

*Note:* Hi-Track does not have access to any user data stored on the ST9985V.

**Non-disruptive service and upgrades.** All hardware upgrades can be performed non-disruptively during normal system operation. All hardware sub-assemblies can be removed, serviced, repaired, and/or replaced non-disruptively during normal system operation. Shared memory for the ST9985V is installed on separate PCBs, and the fibre-channel PCBs for the ST9985V are equipped with hot-swappable fibre SFP transceivers



(GBICs). All microcode upgrades can be performed during normal operations using the service processor (SVP) and the alternate path facilities of the host. Online microcode upgrades can be performed without interrupting open-system host operations.

**Error Reporting.** The ST9985V reports service information messages (SIMs) to notify users of errors and service requirements. SIMs can also report normal operational changes, such as remote copy pair status change. The SIMs are logged on the ST9985V SVP, reported directly to the mainframe and open-system hosts, and reported to ST9900 Data Systems over Hi-Track.

# System Administration

Please refer to the following web page for the latest User Guides and maintenance manuals:

<http://pts-storage.west/products/T99x0/documentation.html>

# What Works With What

Please refer to the following web page for the latest compatibility information. This information changes on a regular basis and it is strongly recommended that this web site be reviewed rather than depending on the information in this "Just the Facts" document which may rapidly become out of date.

- 1) Pls. proceed to <http://sejsc.ebay/>
- 2) Look to your left column on this web page.
- 3) Click on "ST9900 WWW"

Please refer to the documents described below,.

What Works With What (WWW) (Issued by ST9900 LTD and republished by Sun)

This document identifies the the supported combinations of:

Servers + Operating Systems + Switches + Switch Firmware .

If you seek a combination which is slightly different from a supported combination, please place a query to [hdsconfig.global@Sun.COM](mailto:hdsconfig.global@Sun.COM). For anybody wishing to keep up to date on the the latest purely product information regarding the SE 9900 Family of systems it is recommended that you subscribe to this alias.

Feature Availability Report (FAR) (Issued by ST9900 HDS and republished by Sun)

This document focuses primarily on software support, with specific usefulness centered around TrueCopy Link Matrix, Cluster Support, and Multipathing Support.

Q.

"How do I get a quote?"

A. In the Americas, please engage the Storage Center of Excellence (SCOE) by sending your request to [scoe@Sun.com](mailto:scoe@Sun.com) or by engaging your storage specialist.

# Compatible Software

The following software is compatible with the Sun StorageTek 9985V system.

## Sun Software

- StorageTek Enterprise Backup Software (EBS) 7.,1
- StorageTek QFS software 4.0, or later
- StorageTek SAM-FS software 4.0, or later
- Sun StorageTek Enterprise Storage Manager 2.1 software, or higher
- Sun StorageTek Enterprise Backup software (EBS) 7.1
- Solstice DiskSuite™ 4.2.1 software (in conjunction with Solaris 8 Operating System)
- Solaris Volume Manager software (embedded in Solaris 9 Operating System)
- Sun Cluster 3.0 software, update 3, and 3.1 base
- Sun StorageTek SAN Foundation 4.4 release (SF v.6.4)

## Third-Party Software

- VERITAS NetBackup (VxNBU) 5.0, or higher
- VERITAS Volume Manager with DMP (VxVM/DMP) 3.5 and 4.0 for Solaris OS
- VERITAS File System (VxFS) 3.5 and 4.0 for Solaris OS
- VERITAS Volume Replicator 3.5 for Solaris OS
- Legato NetWorker 7.1, or higher

# Ordering Information

Q.

"How do I get a quote?"

A. In the Americas, please engage the Storage Center of Excellence (SCOE) by sending your request to [scoe@Sun.com](mailto:scoe@Sun.com) or by engaging your storage specialist

**NEW PARTS NOW AVAILABLE FOR SALE:**

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Options and Spares

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Order Number	List Price	Discount	Category	SunSpectrum(SM)	Price*	Note
TV9DKC-F615I-146K1	\$3,255.00	M	\$6.0	1		
Description:						
Sun StorageTek(TM) 9985V 146G HDD Spare Canister consists of one 146G/15K HDD contained in a canister for installation as a spare into a ST9985V Disk Chassis (TV9DKC-F615i-B2). When installing the option as the spare disk, it is recommended to install one set of TV9DKC-F615I-146K1 per 16 HDDs. RoHS-5 compliant.						
TV9DKC-F615I-146KS	\$3,255.00	M	\$6.0	1		
Description:						
Sun StorageTek(TM) 9985V 146G HDD Canister consists of one 146G/15K HDD contained in a canister for ST9985V Disk Chassis (TV9DKC-F615i-B2). It is required to install as many sets of TV9DKC-F615I-146KS as HDDs required for the RAID configuration. RAID5 (3D+1P)/RAID1 (2D+2D) - 4 sets of the option. RAID5 (7D+1P)/RAID1 (4D+4D) - 8 sets of the option. RAID6 (6D+2P) - 8 sets of the option. RoHS-5 compliant.						
TV9DKC-F615I-16FS	\$38,995.00	M	N/A			
Description:						
Sun StorageTek(TM) 9985V Fibre Channel Adapter consists of sixteen 1/2/4Gbps Short Wave FC ports. Composed of two-channel adapter PCBs with eight FC ports each. Each port includes a SW transceiver. May be replaced with LW TV9DKC-F615I-1FL. Both short wavelength and long wavelength transceivers may be installed on the same channel adapter. A maximum of three adapters (48 ports) can be installed in the CHA exclusive use slot. RoHS-5 compliant.						
TV9DKC-F615I-1FL	\$895.00	M	N/A			
Description:						
Sun StorageTek(TM) 9985V 4Gb/s Fibre Long Wavelength SFP Transceiver. A port may be changed from short wavelength to long wavelength by replacing any short wavelength transceiver installed in the fibre 8-port or 16-port adapters with this long wavelength transceiver. RoHS-5 compliant.						
TV9DKC-F615I-1FS	\$295.00	M	N/A			
Description:						
Sun StorageTek(TM) 9985V 4Gb/s Short Wavelength Fibre SFP Transceiver. A port may be changed from long wavelength to short wavelength by replacing any long wavelength transceiver installed in the fibre 8-port or 16-port adapters with this short wavelength transceiver. RoHS-5 compliant.						
TV9DKC-F615I-300K1	\$5,195.00	M	\$6.0	1		
Description:						
Sun StorageTek(TM) 9985V 300G HDD Spare Canister consists of one 300G/15K HDD contained in a canister for installation as a spare into a ST9985V Disk Chassis (TV9DKC-F615i-B2). When installing the option as the spare disk, it is recommended to install one set of TV9DKC-F615I-300K1 per 16 HDDs. RoHS-5 compliant.						
TV9DKC-F615I-300KS	\$5,195.00	M	\$6.0	1		
Description:						
Sun StorageTek(TM) 9985V 300G HDD Canister consists of one 300G/15K HDD contained in a canister for ST9985V Disk Chassis (TV9DKC-F615i-B2). It is required to install as many sets of TV9DKC-F615I-300KS as HDDs						

required for the RAID configuration to be adopted. RAID5 (3D+1P)/RAID1 (2D+2D) - 4 sets of the option. RAID5 (7D+1P)/RAID1 (4D+4D) - 8 sets of the option. RAID6 (6D+2P) - 8 sets of the option. RoHS-5 compliant.

TV9DKC-F615I-72K1 \$1,995.00 M \$6.0 1

Description:

Sun StorageTek(TM) 9985V 72G HDD Spare Canister consists of one 72G/15K HDD contained in a canister for installation as a spare into a ST9985V Disk Chassis (TV9DKC-F615i-B2). When installing the option as the spare disk, it is recommended to install one set of TV9DKC-F615I-72K1 per 16 HDDs. RoHS-5 compliant.

TV9DKC-F615I-72KS \$1,995.00 M \$6.0 1

Description:

Sun StorageTek(TM) 9985V 72G HDD Canister consists of one 72G/15K HDD contained in a canister for ST9985V Disk Chassis (TV9DKC-F615i-B2). It is required to install as many sets of TV9DKC-F615I-72KS as HDDs required for the RAID configuration to be adopted. RAID5 (3D+1P)/RAID1 (2D+2D) - 4 sets of the option. RAID5 (7D+1P)/RAID1 (4D+4D) - 8 sets of the option. RAID6 (6D+2P) 8 sets of the option RoHS-5 compliant.

TV9DKC-F615I-8FS \$28,995.00 M N/A

Description:

Sun StorageTek(TM) 9985V Fibre Channel Adapter consists of eight 1/2/4Gbps Short Wave FC ports. This option is composed of two channel adapter PCBs with four FC ports each. Each port includes a SW transceiver. May be replaced with LW TV9DKC-F615I-1FL. Both SW and LW transceivers may be installed on the same channel adapter. A maximum of three adapters (24 ports) can be installed in the CHA exclusive use slot. RoHS-5 compliant.

TV9DKC-F615I-8MFL \$31,995.00 M N/A

Description:

Sun StorageTek(TM) 9985V FICON Channel Adapter consisting of eight 1/2/4Gbps mainframe Long Wavelength fibre channel ports. This option is composed of two-channel adapter PCBs with four fibre channel ports each. The LC type optical connectors are installed on the PCBs. A maximum of three adapters (24 ports) can be installed in the CHA exclusive use slot. RoHS-5 compliant.

TV9DKC-F615I-8MFS \$29,195.00 M N/A

Description:

Sun StorageTek(TM) 9985V FICON Channel Adapter consisting of eight 1/2/4Gbps mainframe Short Wavelength fibre channel ports. The option is composed of two-channel adapter PCBs with four fibre channel ports each. The LC type optical connectors are installed on the PCBs. A maximum of three adapters (24 ports) can be installed in the CHA exclusive use slot. RoHS-5 compliant.

TV9DKC-F615I-8S \$8,595.00 M N/A

Description:

Sun StorageTek(TM) 9985V ESCON Serial 8-port Adapter provides eight serial channel ports. The option is composed of two-channel adapter PCBs with four serial ports each. Three sets (24 ports) can be installed in the CHA exclusive use slot. RoHS-5 compliant.

TV9DKC-F615I-B2 \$17,995.00 P N/A

Description:

Sun StorageTek(TM) 9985V Disk Chassis - Four assemblies that accommodate 15 HDDs each for a total of 60 HDDs. A max of four Disk Chassis may be controlled by a Control Frame with two of the Disk Chassis housed in the primary 19-inch Rack and an additional two housed in a secondary 19-inch Rack. Not included: Device I/F Cables TV9DKC-F615I-UC0, TV9DKC-F615I-UC1, TV9DKC-F615I-EXC0, Power Cord option. Disk Chassis R0 must include at least four HDDs. RoHS-5 compliant.

TV9DKC-F615I-C4G \$10,895.00 M N/A

Description:

Sun StorageTek(TM) 9985V 4GB Cache Memory Modules are used to expand the cache memory capacity by 4Gbytes. The option consists of four DIMM boards on which 512Mbit DRAMs are mounted. The maximum number of installable options is eight sets (Cache capacity: 32GB). The required number of the options is determined based on the disk capacity of the subsystem. RoHS-5 compliant.

TV9DKC-F615I-C8G \$35,095.00 M N/A

Description:

Sun StorageTek(TM) 9985V 8GB cache memory module expands the cache memory capacity by 8Gbytes. The option consists of four DIMM boards on which 1GB DRAMs are mounted. The maximum number of installable options is 8 sets (Cache capacity: 64GB). The required number of the options is determined based on the disk capacity of the subsystem.. RoHS-5 compliant.

TV9DKC-F615I-CX \$3,275.00 M N/A

Description:

Sun StorageTek(TM) 9985V shared memory adapter consists of two PCBs for installation of the shared memory modules. A maximum of 4 Shared Memory Modules (TV9DKC-F615I S4GQ x 4) for a total of 16GB can be installed in this option. RoHS-5 compliant

TV9DKC-F615I-DKA \$53,995.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disk Adapter controls the data transfer between the Cache Memory and HDDs. It consists of 2\*disk adapter printed circuit boards that control 4\*4Gbps fibre channel ports per PCB. This feature is required for all configurations including diskless.

TV9DKC-F615I-EXC0 \$2,095.00 M N/A

Description:

Sun StorageTek(TM) 9985V Device Interface Cable Kit. 1-cable unit assembly. This is a device interface cable required to connect Disk Chassis R1 in the primary 19-inch Rack to Disk Chassis R2 in the secondary 19-inch Rack. It is only required for configurations that have three or more Disk Chassis. RoHS-5 compliant

TV9DKC-F615I-LGAB \$5,125.00 M N/A

Description:

Sun StorageTek(TM) 9985V Additional Battery option can be installed in TV9DKC615I-5 and TV9 DKC-F615I-SBX. This option must be added based on: Add 1set of this option to TV9DKC615I-5 when either of the following two conditions is met: 1. Cache memory capacity is from 20GB to 64GB. 2. Shared memory capacity is 10GB or more. Add one set of this option to TV9DKC-F615I-SBX when cache memory capacity is 80GB or more (future cache memory support option). RoHS-5 compliant

TV9DKC-F615I-PHEC \$625.00 M N/A

Description:

Sun StorageTek(TM) 9985V Europe AC Power Cord Kit provides eight power cords for the 1-phase 10A connection between the Disk Chassis and PDU. One of these kits must be ordered for each TV9DKC615i-B2 Control Frame. RoHS-5 compliant.

TV9DKC-F615I-PHUC \$755.00 M N/A

Description:

Sun StorageTek(TM) 9985V USA AC Power Cord Kit provides eight power cords for the 1-phase 10A connection between the Disk Chassis and PDU. One kit must be ordered for each TV9DKC615i-B2 Disk Chassis. RoHS-5 compliant.

TV9DKC-F615I-PLEC \$515.00 M N/A

Description:

Sun StorageTek(TM) 9985V Europe AC Power Cord Kit provides four power cords for the 1-phase 10A connection between the DKC and PDU. One of these kits must be ordered for each TV9DKC615i-5 Control Frame. RoHS-5 compliant.

TV9DKC-F615I-PLUC \$515.00 M N/A

Description:

Sun StorageTek(TM) 9985V USA AC Power Cord Kit provides four power cords for the 1-phase 10A connection between the DKC and PDU. One kit must be ordered for each TV9DKC615i-5 Control Frame. RoHS-5 compliant.

TV9DKC-F615I-S4GQ \$29,595.00 M N/A

Description:

Sun StorageTek(TM) 9985V 4GB Shared Memory Modules are used to expand the shared memory capacity by 4Gbytes. The option consists of four DIMM boards on which 512Mbit DRAMs are mounted. The maximum number of installable options is four sets (Cache capacity: 16GB). The required number of the options is determined based on the disk capacity of the subsystem. RoHS-5 compliant.

TV9DKC-F615I-SBX \$12,695.00 M N/A

Description:

Sun StorageTek(TM) 9985V additional SVP/Battery Chassis is used to install a SVP High Reliability Support Kit (TV9DKC-F615I-SVP) for

implementations requiring the highest level of management availability and additional battery (TV9DKC-F615I-LGAB) when cache memory capacity exceeds 80MB. This Chassis must be installed immediately above the TV9DKC615I-5.

TV9DKC-F615I-SVP \$5,795.00 M N/A

Description:

Sun StorageTek(TM) 9985V optional SVP (Service Processor) for high availability implementations. This is installed in the TV9DKC-F615I-SBX. When failure occurs in the primary SVP, the active SVP is automatically switched to the secondary SVP and the SVP continues its operation. SVP does not have CD-ROM drive. RoHS-5 compliant.

TV9DKC-F615I-SX \$3,495.00 M N/A

Description:

Sun StorageTek(TM) 9985V Shared Memory Adapter; 2-printed circuit boards(PCBs) for mounting shared memory; Up to 2 sets of this option can be installed per a subsystem. Maximum of 16GB (S4GQ x 4 set) of Shared Memory can be installable with a set of this option; for the ST9985V integrated disk controller and array frame unit (DKC610I). RoHS-5 compliant

TV9DKC-F615I-UC0 \$2,095.00 M N/A

Description:

Sun StorageTek(TM) 9985V Device Interface Cable Kit. 1-cable unit assembly. This is a device interface cable required to connect the DKC to the Disk Chassis R0. RoHS-5 compliant

TV9DKC-F615I-UC1 \$2,095.00 M N/A

Description:

Sun StorageTek(TM) 9985V Device Interface Cable Kit. 1-cable unit assembly. This is a device interface cable to connect the Disk Chassis R0 to Disk Chassis R1 in the primary 19-inch Rack. If there are two Disk Chassis in the secondary 19-inch Rack, then an additional DKC-F615I-UC1R must be ordered to connect Disk Chassis R2 to Disk Chassis R3. RoHS-5 compliant

TV9DKC615I-5 \$42,995.00 M \$781.0 1

Description:

Sun StorageTek (TM) 9985V Disk Ctrl Frame with Logic/Pwr Box and SVP (no CE Laptop PC). Houses Memory, FE and BEDirectors, up to two Disk Chassis. Available in disk & diskless config. Supports RAID1/5/6. Not included: 19-inch Rack, DKA option, Cache Memory Adapter and Shared Memory Adapter, Cache Memory Module and Shared Memory Module, CHA option, Power Cord. Installation included. RoHS-5 compliant

TV9044-220033-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Tuning Manager v5.8 Media kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame.

TV9044-220033-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Tuning Manager v5.8 Trial License license key and documentation on CDROM. License certificate on paper. One per disk controller frame; capacity independent license is valid for 120 days.

TV9044-220034-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System (BOS) Media Kit includes HdvM, Resource Mgr, Server Priority Mgr and Virtual Partitioning Mgr 4 partitions media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame.

TV9044-220034-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System (BOS) Trial License includes HdvM, Resource Mgr, Server Priority Mgr and Virtual Partitioning Mgr 4 partitions trial license, license key and documentation on CDROM, license certificate on paper; one per disk controller frame; capacity independent license is valid for 120 days.

TV9044-220034-03 \$11,765.00 M N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System (BOS) Base License includes HdvM, Resource Mgr, Server Priority Mgr and Virtual Partitioning Mgr 4 partitions base license; one per disk controller



frame; capacity independent license; included with first license purchased for each disk controller frame.

TV9044-220035-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle Media Kit includes TC Sync, Universal Replicator 2DC and RAID Manager media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame.

TV9044-220035-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle Trial License for TC Sync, Universal Replicator 2DC and RAID Manager, trial license, license key and documentation on CDROM, license certificate on paper; one per disk controller frame; capacity independent license is valid for 120 days.

TV9044-220035-03 \$9,905.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) Base License for TC Sync, Universal Replicator 2DC and RAID Manager. Base License, one per disk controller frame, capacity independent license, included with first license purchased for each disk controller frame.

TV9044-220035-03A \$7,845.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band.

TV9044-220035-03B \$6,865.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 6-10TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band.

TV9044-220035-03C \$5,695.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band.

TV9044-220035-03D \$4,515.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 26-50TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band.

TV9044-220035-03E \$4,025.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 51-100TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band.

TV9044-220035-03F \$3,145.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 101-500TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band.

TV9044-220035-03G \$2,655.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 501+TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band.

TV9044-220036-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) Media Kit includes Universal Replicator 3DC and 4x4 media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame.

TV9044-220036-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) Trial License includes Universal Replicator 3DC and 4x4 trial license, license key and documentation on CDROM, license certificate on paper; one per disk controller frame; capacity independent license is valid for 120 days.

TV9044-220036-03 \$985.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) License Base includes Universal Replicator 3DC and 4x4 base license; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame.

TV9044-220036-03A \$795.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band.

TV9044-220036-03B \$695.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band.

TV9044-220036-03C \$495.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band.

TV9044-220036-03D \$405.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 26-50TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band.

TV9044-220036-03E \$405.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 51-100TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band.

TV9044-220036-03F \$305.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 101-500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band.

TV9044-220036-03G \$305.00 M N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, >500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band.

TV9044-220037-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) Media Kit includes ShadowImage and Copy-on-Write media kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame.

TV9044-220037-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) Trial License includes ShadowImage and Copy-on-Write trial license, license key and documentation on CDROM, license certificate on paper; one per disk controller frame; capacity independent license is valid for 120 days.

TV9044-220037-03 \$10,395.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) license base includes ShadowImage and Copy-on-Write base license, license key on CDROM, license certificate on paper; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame.

TV9044-220037-03A \$8,245.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220037-03B \$7,265.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220037-03C \$5,885.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220037-03D \$4,325.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220037-03E \$3,635.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220037-03F \$2,855.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220037-03G \$2,365.00 M N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220038-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System Virtualization (BOS-E) Media Kit includes UVM, Virtual Partitioning Mgr 5+ partitions media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame.

TV9044-220038-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System Virtualization (BOS-E) Media Kit includes UVM, Virtual Partitioning Mgr 5+ partitions media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame.

TV9044-220038-03 \$24,505.00 M N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System Virtualization (BOS-E) License Base includes UVM, Virtual Partitioning Mgr 5+ partitions base license. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame.

TV9044-220039-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Media Kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame.

TV9044-220039-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Trial License. License key and documentation on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license is valid for 120 days.

TV9044-220039-03 \$695.00 M N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame.

TV9044-220039-03A \$13,145.00 M N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning First 10TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool first 10TB increment per disk controller frame. Included with first license purchased for each disk controller frame.

TV9044-220039-03B \$13,145.00 M N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 10TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 10TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to a total of 110TBs.

TV9044-220039-03C \$23,035.00 M N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 20TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 20TB increment per disk controller frame. TB Qty ordered

in 10TB, 20TB, 50TB increments up to a total of 110TBs.

TV9044-220039-03D \$45,975.00 M N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 50TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 50TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs.

TV9044-220039-03E \$13,145.00 M N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning 60TB to Frame Upgrade License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool. Upgrade 60TB to Frame License. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs.

TV9044-220040-03 \$4,515.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame.

TV9044-220040-03A \$3,535.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220040-03B \$3,145.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220040-03C \$2,655.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220040-03D \$2,065.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220040-03E \$1,575.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220040-03F \$985.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 100-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220040-03G \$695.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220041-03 \$3,735.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal Base License. License key on CDROM. License certificate on paper. One per

disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame.

TV9044-220041-03A \$2,855.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220041-03B \$2,755.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220041-03C \$2,365.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220041-03D \$1,775.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220041-03E \$1,385.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220041-03F \$895.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220041-03G \$495.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220042-03A \$2,065.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 1-20TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment up to a total of 20TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220042-03B \$1,575.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 21-40TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 21-40TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220042-03C \$1,285.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB

increments in the 41-80TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 41-80TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220042-03D \$985.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 81-160TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 81-160TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220042-03E \$695.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 161-400TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 160-400TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220042-03F \$495.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 401-1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 401-1000TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220042-03G \$495.00 M N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the >1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment greater than 1000TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220043-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy Media Kit includes ShadowImage media kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame.

TV9044-220043-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License Base. Includes ShadowImage trial license. License key and documentation on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license is valid for 120 days.

TV9044-220043-03 \$17,255.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License Base. Includes ShadowImage base license. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame.

TV9044-220043-03A \$13,725.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220043-03B \$11,965.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220043-03C \$9,715.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB

increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220043-03D \$7,555.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220043-03E \$6,285.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220043-03F \$4,905.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220043-03G \$4,025.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220044-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV Media Kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame.

TV9044-220044-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV Trial License. License key and documentation on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license is valid for 120 days.

TV9044-220044-03 \$8,735.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame.

TV9044-220044-03A \$6,965.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220044-03B \$5,885.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220044-03C \$4,615.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220044-03D \$3,535.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable



capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220044-03E \$2,755.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220044-03F \$2,215.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220044-03G \$1,675.00 M N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band.

TV9044-220045-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Cross-OS File Exchange Trial License. License key and documentation on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license is valid for 120 days.

TV9044-220045-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9985V Cross-OS File Exchange Trial License. License key and documentation on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license is valid for 120 days.

TV9044-220045-03 \$41,365.00 M N/A

Description:

Sun StorageTek(TM) 9900 Cross-OS File Exchange Base License. License key. License certificate on paper. Capacity independent. Pricing per disk controller frame.

TV9044-220051-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 Business Continuity Manager v5.3 Media Kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame; includes BC Base and TC Extd CT Groups All 9900

TV9044-220051-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 Business Continuity Manager v5.3 trial license, license key and documentation on CDROM, license certificate on paper; one per disk controller frame; capacity independent license is valid for 120 days; includes BC Base and TC Extd CT Groups. For all 9900

TV9044-220052-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Replication Monitor v5.8, base kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame; For ST9900 systems

TV9044-220052-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Replication Monitor v5.8,,trial license, license key and documentation on CDROM, license certificate on paper; one per disk controller frame; capacity independent license is valid for 120 days;For ST9900 Systems

TV9044-220053-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Tiered Storage Manager 5.8, Media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame; For ST9900 systems

TV9044-220053-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Tiered Storage Manager 5.8,trial license, license key and documentation on CDROM, license certificate on paper; one per disk controller frame; capacity independent license is

valid for 120 days;For ST9900 systems  
 TV9044-220058-01 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Device Manager 5.8 base kit, no license, media kit and documentation on CDROM; for Solaris 8 & 9, Windows NT 4.0 SP6a or later & Windows 2000 SP2 & SP3 & SP4; included with first license purchased for each disk controller frame; (Prerequisite: Sun StorageTek 9900 Resource Manager and SANTinel software; for Sun StorageTek 9900 systems

TV9044-220059-02 \$1.00 M N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Device Manager 5.8, trial license; license key, media kit and documentation on CDROM, license certificate on paper; for Sun Solaris 8 & 9, Windows NT 4.0 SP6a or later & Windows 2000 SP2 & SP3 & SP4; one per disk controller frame; capacity independent license is valid for 120 days; (Prerequisite: Sun StorageTek 9900 Resource Manager software; for Sun StorageTek 9900 systems

TV97846543 \$8,995.00 M N/A

Description:

Sun StorageTek 19 inch US domestic rack houses the ST9985V unit which includes Logic, Power Supply Box, SVP(Service Processor),the initial Disk Chassis or HDD Box, and the Optional Disk Chassis. This 19" Global Rack provides 42U (1U = 1.75-inches)of usable space. Any portion not covered by the ST9985 subsystem bezel will be covered by a flat filler plate. US and the Americas electrical power requirements. RoHS-5 compliant

TV97846544 \$8,995.00 M N/A

Description:

Sun StorageTek 19 inch APAC and International Americas rack houses the ST9985V unit which includes Logic, Power Supply Box, SVP(Service Processor),the initial Disk Chassis or HDD Box, and the Optional Disk Chassis. This 19" Global Rack provides 42U (1U = 1.75-inches)of usable space. Any portion not covered by the ST9985 subsystem bezel will be covered by a flat filler plate. APAC and International Americas electrical power requirements. RoHS-5 compliant

TV97846545 \$8,995.00 M N/A

Description:

Sun StorageTek 19 inch EMEA rack houses the ST9985V unit which includes Logic, Power Supply Box, SVP(Service Processor),the initial Disk Chassis or HDD Box, and the Optional Disk Chassis. This 19" Global Rack provides 42U (1U = 1.75-inches)of usable space. Any portion not covered by the ST9985 subsystem bezel will be covered by a flat filler plate. EMEA electrical power requirements. RoHS-5 compliant

Warranty Part Numbers

Order Number	List Price	Discount	Category	SunSpectrum(SM)Price*	Note
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TV9-220035-03-1PR	\$1,980.00	S	N/A		
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Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) Base License for TC Sync, Universal Replicator 2DC and RAID Manager. Base License, one per disk controller frame, capacity independent license, included with first license purchased for each disk controller frame. Annual Premium Support

TV9-220035-03-1ST	\$1,680.00	S	N/A		
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Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) Base License for TC Sync, Universal Replicator 2DC and RAID Manager. Base License, one per disk controller frame, capacity independent license, included with first license purchased for each disk controller frame. Annual Standard Support

TV9-220035-03-3PR	\$5,400.00	S	N/A		
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Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) Base License for TC Sync, Universal Replicator 2DC and RAID Manager. Base License, one per disk controller frame, capacity independent license, included with first license purchased for each disk controller frame. 3 Year Premium Support

TV9-220035-03-3ST \$4,572.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) Base License for TC Sync, Universal Replicator 2DC and RAID Manager. Base License, one per disk controller frame, capacity independent license, included with first license purchased for each disk controller frame. 3 Year Standard Support

TV9-220035-03A-1PR \$1,572.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Premium Support

TV9-220035-03A-1ST \$1,332.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Standard Support

TV9-220035-03A-3PR \$4,284.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220035-03A-3ST \$3,636.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220035-03B-1PR \$1,368.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 6-10TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Premium Support

TV9-220035-03B-1ST \$1,164.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 6-10TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Standard Support

TV9-220035-03B-3PR \$3,744.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 6-10TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220035-03B-3ST \$3,168.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 6-10TB License Band, license key on CDROM, license certificate on paper; pricing based on

usable capacity for each 1TB increment up to a total of 10TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220035-03C-1PR \$1,140.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Premium Support

TV9-220035-03C-1ST \$972.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Standard Support

TV9-220035-03C-3PR \$3,096.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220035-03C-3ST \$2,664.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220035-03D-1PR \$900.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 26-50TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Premium Support

TV9-220035-03D-1ST \$768.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 26-50TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Standard Support

TV9-220035-03D-3PR \$2,448.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 26-50TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220035-03D-3ST \$2,088.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 26-50TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220035-03E-1PR \$804.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 51-100TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Premium Support

TV9-220035-03E-1ST \$684.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 51-100TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Standard Support

TV9-220035-03E-3PR \$2,196.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 51-100TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220035-03E-3ST \$1,872.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 51-100TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220035-03F-1PR \$624.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 101-500TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Premium Support

TV9-220035-03F-1ST \$540.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 101-500TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Standard Support

TV9-220035-03F-3PR \$1,692.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 101-500TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220035-03F-3ST \$1,476.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 101-500TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220035-03G-1PR \$528.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 501+TB License Tier, license key on CDROM, license certificate on paper; pricing based on

usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Premium Support  
 TV9-220035-03G-1ST \$456.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 501+TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. Annual Standard Support

TV9-220035-03G-3PR \$1,440.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 501+TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220035-03G-3ST \$1,260.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle (Suite) includes TC Sync, Universal Replicator 2DC and RAID Manager, 501+TB License Tier, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system); All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220035-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle Media Kit includes TC Sync, Universal Replicator 2DC and RAID Manager media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame. 3 Year Additional Media

TV9-220035-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Bundle Media Kit includes TC Sync, Universal Replicator 2DC and RAID Manager media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame. Additional Media

TV9-220036-03-1PR \$192.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) License Base includes Universal Replicator 3DC and 4x4 base license; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. Annual Premium Support

TV9-220036-03-1ST \$168.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) License Base includes Universal Replicator 3DC and 4x4 base license; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. Annual Standard Support

TV9-220036-03-3PR \$540.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) License Base includes Universal Replicator 3DC and 4x4 base license; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. 3 Year Premium Support

TV9-220036-03-3ST \$468.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) License Base includes Universal Replicator 3DC and 4x4 base license; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. 3 Year Standard Support

TV9-220036-03A-1PR \$156.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Premium Support

TV9-220036-03A-1ST \$132.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Standard Support

TV9-220036-03A-3PR \$432.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220036-03A-3ST \$360.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 1-5TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220036-03B-1PR \$144.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 6-10TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Premium Support

TV9-220036-03B-1ST \$120.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 6-10TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Standard Support

TV9-220036-03B-3PR \$396.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 6-10TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220036-03B-3ST \$324.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 6-10TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220036-03C-1PR \$96.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable

capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Premium Support  
TV9-220036-03C-1ST \$84.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Standard Support

TV9-220036-03C-3PR \$252.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220036-03C-3ST \$216.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 11-25TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220036-03D-1PR \$84.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 26-50TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Premium Support

TV9-220036-03D-1ST \$72.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 26-50TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Standard Support

TV9-220036-03D-3PR \$216.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 26-50TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220036-03D-3ST \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 26-50TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220036-03E-1PR \$84.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 51-100TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Premium Support

TV9-220036-03E-1ST \$72.00 S N/A



Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 51-100TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Standard Support

TV9-220036-03E-3PR \$216.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 51-100TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220036-03E-3ST \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 51-100TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220036-03F-1PR \$60.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 101-500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Premium Support

TV9-220036-03F-1ST \$48.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 101-500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Standard Support

TV9-220036-03F-3PR \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 101-500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220036-03F-3ST \$144.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, 101-500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220036-03G-1PR \$60.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, >500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Premium Support

TV9-220036-03G-1ST \$48.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, >500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable

capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. Annual Standard Support

TV9-220036-03G-3PR \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, >500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220036-03G-3ST \$144.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) includes Universal Replicator 3DC and 4x4, >500TB License Band, license key on CDROM, license certificate on paper; pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame (Primary and secondary volumes on a system). All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220036-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) Media Kit includes Universal Replicator 3DC and 4x4 media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame. 3 Year Additional Media

TV9-220036-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9985V Disaster Recovery Extended Bundle (Suite) Media Kit includes Universal Replicator 3DC and 4x4 media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame. Additional Media

TV9-220037-03-1PR \$2,076.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) license base includes ShadowImage and Copy-on-Write base license, license key on CDROM, license certificate on paper; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. Annual Premium Support

TV9-220037-03-1ST \$1,764.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) license base includes ShadowImage and Copy-on-Write base license, license key on CDROM, license certificate on paper; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. Annual Standard Support

TV9-220037-03-3PR \$5,652.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) license base includes ShadowImage and Copy-on-Write base license, license key on CDROM, license certificate on paper; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. 3 Year Premium Support

TV9-220037-03-3ST \$4,824.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) license base includes ShadowImage and Copy-on-Write base license, license key on CDROM, license certificate on paper; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. 3 Year Standard Support

TV9-220037-03A-1PR \$1,644.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220037-03A-1ST \$1,404.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220037-03A-3PR \$4,500.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220037-03A-3ST \$3,816.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220037-03B-1PR \$1,452.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220037-03B-1ST \$1,236.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220037-03B-3PR \$3,960.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220037-03B-3ST \$3,384.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220037-03C-1PR \$1,176.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220037-03C-1ST \$996.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220037-03C-3PR \$3,204.00 S N/A

Description:

Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220037-03C-3ST	\$2,736.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support			
TV9-220037-03D-1PR	\$864.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support			
TV9-220037-03D-1ST	\$732.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support			
TV9-220037-03D-3PR	\$2,376.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support			
TV9-220037-03D-3ST	\$2,016.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support			
TV9-220037-03E-1PR	\$732.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support			
TV9-220037-03E-1ST	\$612.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support			
TV9-220037-03E-3PR	\$2,016.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support			
TV9-220037-03E-3ST	\$1,656.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support			
TV9-220037-03F-1PR	\$576.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity			

for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220037-03F-1ST	\$480.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220037-03F-3PR	\$1,584.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220037-03F-3ST	\$1,296.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220037-03G-1PR	\$468.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220037-03G-1ST	\$408.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220037-03G-3ST	\$1,116.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220037-0GF-3PR	\$1,260.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) includes ShadowImage and Copy-on-Write, >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220037-3MED	\$180.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) Media Kit includes ShadowImage and Copy-on-Write media kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. 3 Year Additional Media

TV9-220037-MEDIA	\$60.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V In-System Replication Bundle (Suite) Media Kit includes ShadowImage and Copy-on-Write media kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. Additional Media

TV9-220034-03-1PR	\$2,352.00	S	N/A
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Description:

Sun StorageTek(TM) 9985V Basic Operating System (BOS) Base License includes HdvM, Resource Mgr, Server Priority Mgr and Virtual Partitioning Mgr 4 partitions base license; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. Annual Premium Support  
TV9-220034-03-1ST \$2,004.00 S N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System (BOS) Base License includes HdvM, Resource Mgr, Server Priority Mgr and Virtual Partitioning Mgr 4 partitions base license; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. Annual Standard Support  
TV9-220034-03-3PR \$6,408.00 S N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System (BOS) Base License includes HdvM, Resource Mgr, Server Priority Mgr and Virtual Partitioning Mgr 4 partitions base license; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. 3 Year Premium Support  
TV9-220034-03-3ST \$5,472.00 S N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System (BOS) Base License includes HdvM, Resource Mgr, Server Priority Mgr and Virtual Partitioning Mgr 4 partitions base license; one per disk controller frame; capacity independent license; included with first license purchased for each disk controller frame. 3 Year Standard Support  
TV9-220034-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System (BOS) Media Kit includes HdvM, Resource Mgr, Server Priority Mgr and Virtual Partitioning Mgr 4 partitions media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame. 3 Year Additional Media  
TV9-220034-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System (BOS) Media Kit includes HdvM, Resource Mgr, Server Priority Mgr and Virtual Partitioning Mgr 4 partitions media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame. Additional Media  
TV9-220038-03-1PR \$4,896.00 S N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System Virtualization (BOS-E) License Base includes UVM, Virtual Partitioning Mgr 5+ partitions base license. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Premium Support  
TV9-220038-03-1ST \$4,164.00 S N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System Virtualization (BOS-E) License Base includes UVM, Virtual Partitioning Mgr 5+ partitions base license. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Standard Support  
TV9-220038-03-3PR \$13,356.00 S N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System Virtualization (BOS-E) License Base includes UVM, Virtual Partitioning Mgr 5+ partitions base license. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Premium Support  
TV9-220038-03-3ST \$11,376.00 S N/A

Description:

Sun StorageTek(TM) 9985V Basic Operating System Virtualization (BOS-E) License Base includes UVM, Virtual Partitioning Mgr 5+ partitions base license. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3

Year Standard Support  
TV9-220038-3MED \$180.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Basic Operating System Virtualization (BOS-E) Media Kit includes UVM, Virtual Partitioning Mgr 5+ partitions media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame. 3 Year Additional Media

TV9-220038-MEDIA \$60.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Basic Operating System Virtualization (BOS-E) Media Kit includes UVM, Virtual Partitioning Mgr 5+ partitions media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame. Additional Media

TV9-220039-03-1PR \$144.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Dynamic Provisioning Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Premium Support

TV9-220039-03-1ST \$120.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Dynamic Provisioning Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Standard Support

TV9-220039-03-3PR \$396.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Dynamic Provisioning Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Premium Support

TV9-220039-03-3ST \$324.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Dynamic Provisioning Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Standard Support

TV9-220039-03A-1PR \$2,628.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Dynamic Provisioning First 10TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool first 10TB increment per disk controller frame. Included with first license purchased for each disk controller frame. Annual Premium Support

TV9-220039-03A-1ST \$2,232.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Dynamic Provisioning First 10TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool first 10TB increment per disk controller frame. Included with first license purchased for each disk controller frame. Annual Standard Support

TV9-220039-03A-3PR \$7,164.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Dynamic Provisioning First 10TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool first 10TB increment per disk controller frame. Included with first license purchased for each disk controller frame. 3 Year Premium Support

TV9-220039-03A-3ST \$6,084.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Dynamic Provisioning First 10TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool first 10TB increment per disk controller frame. Included with first license purchased for each disk controller frame. 3 Year Standard Support

TV9-220039-03B-1PR \$2,628.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 10TB License

Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 10TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to a total of 110TBs. Annual Premium Support

TV9-220039-03B-1ST \$2,232.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 10TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 10TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to a total of 110TBs. Annual Standard Support

TV9-220039-03B-3PR \$7,164.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 10TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 10TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to a total of 110TBs. 3 Year Premium Support

TV9-220039-03B-3ST \$6,084.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 10TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 10TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to a total of 110TBs. 3 Year Standard Support

TV9-220039-03C-1PR \$4,608.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 20TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 20TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to a total of 110TBs. Annual Premium Support

TV9-220039-03C-1ST \$3,912.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 20TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 20TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to a total of 110TBs. Annual Standard Support

TV9-220039-03C-3PR \$12,564.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 20TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 20TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to a total of 110TBs. 3 Year Premium Support

TV9-220039-03C-3ST \$10,692.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 20TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 20TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to a total of 110TBs. 3 Year Standard Support

TV9-220039-03D-1PR \$9,192.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 50TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 50TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs. Annual Premium



Support

TV9-220039-03D-1ST \$7,812.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 50TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 50TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs. Annual Standard Support

TV9-220039-03D-3PR \$25,092.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 50TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 50TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs. 3 Year Premium Support

TV9-220039-03D-3ST \$21,312.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Additional 50TB License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool additional 50TB increment per disk controller frame. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs. 3 Year Standard Support

TV9-220039-03E-1PR \$2,628.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning 60TB to Frame Upgrade License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool. Upgrade 60TB to Frame License. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs. Annual Premium Support

TV9-220039-03E-1ST \$2,232.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning 60TB to Frame Upgrade License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool. Upgrade 60TB to Frame License. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs. Annual Standard Support

TV9-220039-03E-3PR \$7,164.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning 60TB to Frame Upgrade License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool. Upgrade 60TB to Frame License. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs. 3 Year Premium Support

TV9-220039-03E-3ST \$6,084.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning 60TB to Frame Upgrade License Band. License key on CDROM. License certificate on paper. Pricing and license capacity based on total usable capacity of volumes in the HDP pool. Upgrade 60TB to Frame License. TB Qty ordered in 10TB, 20TB, 50TB increments up to total of 110TBs. 3 Year Standard Support

TV9-220039-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Media Kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. 3 Year Additional Media

TV9-220039-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9985V Dynamic Provisioning Media Kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. Additional Media

TV9-220040-03-1PR \$900.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license

purchased for each disk controller frame. Annual Premium Support  
TV9-220040-03-1ST \$768.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Standard Support

TV9-220040-03-3PR \$2,448.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Premium Support

TV9-220040-03-3ST \$2,088.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Standard Support

TV9-220040-03A-1PR \$708.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220040-03A-1ST \$600.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220040-03A-3PR \$1,944.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220040-03A-3ST \$1,656.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220040-03B-1PR \$624.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220040-03B-1ST \$540.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220040-03B-3PR \$1,692.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220040-03B-3ST	\$1,476.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support			
TV9-220040-03C-1PR	\$528.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support			
TV9-220040-03C-1ST	\$456.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support			
TV9-220040-03C-3PR	\$1,440.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support			
TV9-220040-03C-3ST	\$1,260.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support			
TV9-220040-03D-1PR	\$408.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support			
TV9-220040-03D-1ST	\$348.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support			
TV9-220040-03D-3PR	\$1,116.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support			
TV9-220040-03D-3ST	\$936.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support			
TV9-220040-03E-1PR	\$312.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 100TB per			

disk controller frame. All TB Qty ordered within destination band.  
Annual Premium Support  
TV9-220040-03E-1ST \$264.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 51-100TB License Band.  
License key on CDROM. License certificate on paper. Pricing based on  
internal raw capacity for each 1TB increment up to a total of 100TB per  
disk controller frame. All TB Qty ordered within destination band.  
Annual Standard Support  
TV9-220040-03E-3PR \$864.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 51-100TB License Band.  
License key on CDROM. License certificate on paper. Pricing based on  
internal raw capacity for each 1TB increment up to a total of 100TB per  
disk controller frame. All TB Qty ordered within destination band. 3  
Year Premium Support  
TV9-220040-03E-3ST \$720.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 51-100TB License Band.  
License key on CDROM. License certificate on paper. Pricing based on  
internal raw capacity for each 1TB increment up to a total of 100TB per  
disk controller frame. All TB Qty ordered within destination band. 3  
Year Standard Support  
TV9-220040-03F-1PR \$192.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 100-500TB License  
Band. License key on CDROM. License certificate on paper. Pricing based  
on internal raw capacity for each 1TB increment up to a total of 500TB  
per disk controller frame. All TB Qty ordered within destination band.  
Annual Premium Support  
TV9-220040-03F-1ST \$168.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 100-500TB License  
Band. License key on CDROM. License certificate on paper. Pricing based  
on internal raw capacity for each 1TB increment up to a total of 500TB  
per disk controller frame. All TB Qty ordered within destination band.  
Annual Standard Support  
TV9-220040-03F-3PR \$540.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 100-500TB License  
Band. License key on CDROM. License certificate on paper. Pricing based  
on internal raw capacity for each 1TB increment up to a total of 500TB  
per disk controller frame. All TB Qty ordered within destination band. 3  
Year Premium Support  
TV9-220040-03F-3ST \$468.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager 100-500TB License  
Band. License key on CDROM. License certificate on paper. Pricing based  
on internal raw capacity for each 1TB increment up to a total of 500TB  
per disk controller frame. All TB Qty ordered within destination band. 3  
Year Standard Support  
TV9-220040-03G-1PR \$144.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager >500TB License Band.  
License key on CDROM. License certificate on paper. Pricing based on  
internal raw capacity for each 1TB increment up to a total greater than  
500TB per disk controller frame. All TB Qty ordered within destination  
band. Annual Premium Support  
TV9-220040-03G-1ST \$120.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager >500TB License Band.  
License key on CDROM. License certificate on paper. Pricing based on  
internal raw capacity for each 1TB increment up to a total greater than  
500TB per disk controller frame. All TB Qty ordered within destination  
band. Annual Standard Support  
TV9-220040-03G-3PR \$396.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V HiCommand Tuning Manager >500TB License Band.

License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220040-03G-3ST \$324.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tuning Manager >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220033-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Tuning Manager v5.8 Media kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. 3 Year Additional Media

TV9-220033-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Tuning Manager v5.8 Media kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. Additional Media

TV9-220041-03-1PR \$744.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Premium Support

TV9-220041-03-1ST \$636.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Standard Support

TV9-220041-03-3PR \$2,016.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Premium Support

TV9-220041-03-3ST \$1,728.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Standard Support

TV9-220041-03A-1PR \$576.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220041-03A-1ST \$480.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220041-03A-3PR \$1,584.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220041-03A-3ST \$1,296.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220041-03B-1PR \$552.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220041-03B-1ST \$468.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220041-03B-3PR \$1,512.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220041-03B-3ST \$1,260.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220041-03C-1PR \$468.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220041-03C-1ST \$408.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220041-03C-3PR \$1,260.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220041-03C-3ST \$1,116.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220041-03D-1PR \$360.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220041-03D-1ST	\$300.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support			
TV9-220041-03D-3PR	\$972.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support			
TV9-220041-03D-3ST	\$828.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support			
TV9-220041-03E-1PR	\$276.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support			
TV9-220041-03E-1ST	\$240.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support			
TV9-220041-03E-3PR	\$756.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support			
TV9-220041-03E-3ST	\$648.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support			
TV9-220041-03F-1PR	\$180.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support			
TV9-220041-03F-1ST	\$156.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support			
TV9-220041-03F-3PR	\$504.00	S	N/A
Description:			
Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up			

to a total of 500TB per disk controller frame. All TB Qty ordered within destination band.. 3 Year Premium Support

TV9-220041-03F-3ST \$432.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band.. 3 Year Standard Support

TV9-220041-03G-1PR \$96.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220041-03G-1ST \$84.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220041-03G-3PR \$252.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220041-03G-3ST \$216.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager Internal >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on internal raw capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220042-03A-1PR \$408.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 1-20TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment up to a total of 20TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220042-03A-1ST \$348.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 1-20TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment up to a total of 20TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220042-03A-3PR \$1,116.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 1-20TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment up to a total of 20TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220042-03A-3ST \$936.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 1-20TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment up to a total of 20TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220042-03B-1PR \$312.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB



increments in the 21-40TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 21-40TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220042-03B-1ST \$264.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 21-40TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 21-40TB per disk controller frame. All TB Qty ordered within destination band.. Annual Standard Support

TV9-220042-03B-3PR \$864.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 21-40TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 21-40TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220042-03B-3ST \$720.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 21-40TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 21-40TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220042-03C-1PR \$252.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 41-80TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 41-80TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220042-03C-1ST \$126.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 41-80TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 41-80TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220042-03C-3PR \$684.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 41-80TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 41-80TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220042-03C-3ST \$576.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 41-80TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 41-80TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220042-03D-1PR \$192.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 81-160TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 81-160TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220042-03D-1ST \$168.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 81-160TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 81-160TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220042-03D-3PR \$540.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 81-160TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 81-160TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220042-03D-3ST \$468.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 81-160TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 81-160TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220042-03E-1PR \$144.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 161-400TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 160-400TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220042-03E-1ST \$120.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 161-400TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 160-400TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220042-03E-3PR \$396.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 161-400TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 160-400TB per disk controller frame. All TB Qty ordered within destination band.. 3 Year Premium Support

TV9-220042-03E-3ST \$324.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 161-400TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 160-400TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220042-03F-1PR \$96.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 401-1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 401-1000TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220042-03F-1ST \$84.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 401-1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 401-1000TB per disk controller frame. All TB Qty ordered within destination band.. Annual Standard Support

TV9-220042-03F-3PR \$252.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 401-1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 401-1000TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220042-03F-3ST \$216.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the 401-1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment from 401-1000TB per disk controller frame. All TB Qty

ordered within destination band. 3 Year Standard Support

TV9-220042-03G-1PR \$96.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the >1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment greater than 1000TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220042-03G-1ST \$84.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the >1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment greater than 1000TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220042-03G-3PR \$252.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the >1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment greater than 1000TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220042-03G-3ST \$216.00 S N/A

Description:

Sun StorageTek(TM) 9985V HiCommand Tiered Storage Manager External 4TB increments in the >1000TB License Band. License key on CDROM. License certificate on paper. Pricing based on external usable capacity for each 4TB increment greater than 1000TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220053-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Tiered Storage Manager 5.8, Media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame; For ST9900 systems 3 Year Additional Media

TV9-220053-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Tiered Storage Manager 5.8, Media kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame; For ST9900 systems Additional Media

TV9-220043-03-1PR \$3,456.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License Base. Includes ShadowImage base license. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Premium Support

TV9-220043-03-1ST \$2,928.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License Base. Includes ShadowImage base license. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Standard Support

TV9-220043-03-3PR \$9,432.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License Base. Includes ShadowImage base license. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Premium Support

TV9-220043-03-3ST \$7,992.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License Base. Includes ShadowImage base license. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3

Year Standard Support  
TV9-220043-03A-1PR \$2,748.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220043-03A-1ST \$2,328.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220043-03A-3PR \$7,488.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220043-03A-3ST \$6,372.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220043-03B-1PR \$2,388.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220043-03B-1ST \$2,040.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220043-03B-3PR \$6,516.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220043-03B-3ST \$5,580.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220043-03C-1PR \$1,944.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220043-03C-1ST \$1,656.00 S N/A  
Description:  
Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 11-25TB License Band. License key on CDROM. License

certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220043-03C-3PR \$5,292.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220043-03C-3ST \$4,536.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220043-03D-1PR \$1,512.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220043-03D-1ST \$1,284.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220043-03D-3PR \$4,140.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220043-03D-3ST \$3,492.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220043-03E-1PR \$1,260.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220043-03E-1ST \$1,068.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220043-03E-3PR \$3,456.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220043-03E-3ST \$2,916.00 S N/A

Description:

Sun StorageTek(TM) 9985V CompatibleFlashCopy License. Includes ShadowImage 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220043-03F-1PR \$984.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220043-03F-1ST \$828.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220043-03F-3PR \$2,700.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band.. 3 Year Premium Support

TV9-220043-03F-3ST \$2,268.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220043-03G-1PR \$804.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220043-03G-1ST \$684.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220043-03G-3PR \$2,196.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220043-03G-3ST \$1,872.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy License. Includes ShadowImage >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220043-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy Media Kit includes ShadowImage media kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. 3 Year Additional Media

TV9-220043-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible FlashCopy Media Kit includes ShadowImage media kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. Additional Media

TV9-220044-03-1PR \$1,752.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Premium Support

TV9-220044-03-1ST \$1,488.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. Annual Standard Support

TV9-220044-03-3PR \$4,788.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Premium Support

TV9-220044-03-3ST \$4,068.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV Base License. License key on CDROM. License certificate on paper. One per disk controller frame. Capacity independent license. Included with first license purchased for each disk controller frame. 3 Year Standard Support

TV9-220044-03A-1PR \$1,392.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220044-03A-1ST \$1,188.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220044-03A-3PR \$3,816.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220044-03A-3ST \$3,240.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 1-5TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 5TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220044-03B-1PR \$1,176.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220044-03B-1ST \$996.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220044-03B-3PR \$3,204.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 6-10TB License Band. License key

on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220044-03B-3ST	\$2,736.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 6-10TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 10TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220044-03C-1PR	\$924.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220044-03C-1ST	\$780.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220044-03C-3PR	\$2,520.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220044-03C-3ST	\$2,124.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 11-25TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 25TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220044-03D-1PR	\$708.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220044-03D-1ST	\$600.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220044-03D-3PR	\$1,944.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220044-03D-3ST	\$1,656.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 26-50TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 50TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220044-03E-1PR	\$552.00	S	N/A
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Description:  
Sun StorageTek(TM) 9985V Compatible PAV 51-100TB License Band. License



key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220044-03E-1ST \$468.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220044-03E-3PR \$1,512.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220044-03E-3ST \$1,260.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 51-100TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 100TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220044-03F-1PR \$444.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220044-03F-1ST \$372.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220044-03F-3PR \$1,224.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220044-03F-3ST \$1,008.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV 101-500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total of 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220044-03G-1PR \$336.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Premium Support

TV9-220044-03G-1ST \$288.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. Annual Standard Support

TV9-220044-03G-3PR \$900.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Premium Support

TV9-220044-03G-3ST \$792.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV >500TB License Band. License key on CDROM. License certificate on paper. Pricing based on usable capacity for each 1TB increment up to a total greater than 500TB per disk controller frame. All TB Qty ordered within destination band. 3 Year Standard Support

TV9-220044-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV Media Kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. 3 Year Additional Media

TV9-220044-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9985V Compatible PAV Media Kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. Additional Media

TV9-220045-03-1PR \$8,268.00 S N/A

Description:

Sun StorageTek(TM) 9900 Cross-OS File Exchange Base License. License key. License certificate on paper. Capacity independent. Pricing per disk controller frame. Annual Premium Support

TV9-220045-03-1ST \$7,032.00 S N/A

Description:

Sun StorageTek(TM) 9900 Cross-OS File Exchange Base License. License key. License certificate on paper. Capacity independent. Pricing per disk controller frame. Annual Standard Support

TV9-220045-03-3PR \$22,572.00 S N/A

Description:

Sun StorageTek(TM) 9900 Cross-OS File Exchange Base License. License key. License certificate on paper. Capacity independent. Pricing per disk controller frame. 3 Year Premium Support

TV9-220045-03-3ST \$19,188.00 S N/A

Description:

Sun StorageTek(TM) 9900 Cross-OS File Exchange Base License. License key. License certificate on paper. Capacity independent. Pricing per disk controller frame. 3 Year Standard Support

TV9-220045-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9985V Cross-OS File Exchange Media Kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. 3 Year Additional Media

TV9-220045-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9985V Cross-OS File Exchange Media Kit. No license. Product documentation on CDROM. Included with first license purchased for each disk controller frame. Additional Media

TV9-220051-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9900 Business Continuity Manager v5.3 Media Kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame; includes BC Base and TC Extd CT Groups All 9900) 3 Year Additional Media

TV9-220051-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9900 Business Continuity Manager v5.3 Media Kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame; includes BC Base and TC Extd CT Groups All 9900) Additional Media

TV9-220052-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Replication Monitor v5.8, base kit, no

license, product documentation on CDROM; included with first license purchased for each disk controller frame; For ST9900 systems. 3 Year Additional Media

TV9-220052-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Replication Monitor v5.8, base kit, no license, product documentation on CDROM; included with first license purchased for each disk controller frame; For ST9900 systems. Additional Media

TV9-220058-3MED \$180.00 S N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Device Manager 5.8 base kit, no license, media kit and documentation on CDROM; for Solaris 8 & 9, Windows NT 4.0 SP6a or later & Windows 2000 SP2 & SP3 & SP4; included with first license purchased for each disk controller frame; (Prerequisite: Sun StorageTek 9900 Resource Manager and SAnTinel software; for Sun StorageTek 9900 systems. 3 Year Additional Media

TV9-220058-MEDIA \$60.00 S N/A

Description:

Sun StorageTek(TM) 9900 HiCommand Device Manager 5.8 base kit, no license, media kit and documentation on CDROM; for Solaris 8 & 9, Windows NT 4.0 SP6a or later & Windows 2000 SP2 & SP3 & SP4; included with first license purchased for each disk controller frame; (Prerequisite: Sun StorageTek 9900 Resource Manager and SAnTinel software; for Sun StorageTek 9900 systems. Additional Media

W9D-T13-1DSK-1P \$84.00 S N/A

Description:

Sun StorageTek 9985V System disk drive Upgrade to 1 Year of Platinum Support.

W9D-T13-1DSK-24-1G \$60.00 S N/A

Description:

Sun StorageTek 9985V System disk drive Upgrade to Gold Support + 7X24 On-Site Support for 1 Year

W9D-T13-1DSK-24-2G \$120.00 S N/A

Description:

Sun StorageTek 9985V System disk drive Upgrade to Gold Support + 7X24 On-Site Support for 2 Years

W9D-T13-1DSK-24-3G \$180.00 S N/A

Description:

Sun StorageTek 9985V System disk drive Upgrade to Gold Support + 7X24 On-Site Support for 3 Years

W9D-T13-1DSK-2P \$168.00 S N/A

Description:

Sun StorageTek 9985V System disk drive Upgrade to 2 Years of Platinum Support.

W9D-T13-1DSK-3P \$216.00 S N/A

Description:

Sun StorageTek 9985V System disk drive Upgrade to 3 Years of Platinum Support.

W9D-T13-985V-1P \$10,188.00 S N/A

Description:

Sun StorageTek 9985 System Upgrade to 1 Year of Platinum Support.

W9D-T13-985V-24-1G \$6,720.00 S N/A

Description:

Sun StorageTek 9985V System Upgrade to Gold Support + 7X24 On-Site Support for 1 Year.

W9D-T13-985V-24-2G \$12,912.00 S N/A

Description:

Sun StorageTek 9985V System Upgrade to Gold Support + 7X24 On-Site Support for 2 Years.

W9D-T13-985V-24-3G \$18,540.00 S N/A

Description:

Sun StorageTek 9985V System Upgrade to Gold Support + 7X24 On-Site Support for 3 Years

W9D-T13-985V-2P \$19,560.00 S N/A

Description:

Sun StorageTek 9985V System Upgrade to 2 Years of Platinum Support.

W9D-T13-985V-3P \$28,116.00 S N/A

Description:  
Sun StorageTek 9985V System Upgrade to 3 Years of Platinum Support.

Professional Services

Order Number	List Price	Discount	Category	SunSpectrum(SM)	Price*	Note
P-WW-PS-ED85VBOS-C	\$999,999.00	C				N/A
Description: FOR RESELL/CO-DELIVER, IDO PARTNER PURCHASE ONLY: Sun Professional Services High End Disk Integration Service for ST9985V Basic Operating System (BOS) Custom configuration, Includes Device Manager, Resource Manager, Server Priority Manager and Virtual Partition Manager support for up to 4 virtual Partitions. >120 Tbs, > 1024 LUNs, >80 dual host connections						
P-WW-PS-ED85VBOS-L	\$48,150.00	E				N/A
Description: FOR RESELL/CO-DELIVER, IDO PARTNER PURCHASE ONLY: Sun Professional Services High End Disk Integration Service for ST9985V Basic Operating System (BOS) configuration, Includes Device Manager, Resource Manager, Server Priority Manager and Virtual Partition Manager support for up to 4 virtual Partitions Large Configuration- Up to 120 TB of Disk, Up to 1024 LUNs included, Up to 80 dual host connections						
P-WW-PS-ED85VBOS-M	\$35,100.00	E				N/A
Description: FOR RESELL/CO-DELIVER, IDO PARTNER PURCHASE ONLY: Sun Professional Services High End Disk Integration Service for ST9985V Basic Operating System (BOS) configuration, Includes Device Manager, Resource Manager, Server Priority Manager and Virtual Partition Manager support for up to 4 virtual Partitions Medium Configuration- Up to 70 TB of Disk, Up to 512 LUNs included, Up to 64 dual host connections						
P-WW-PS-ED85VBOS-S	\$20,925.00	E				N/A
Description: FOR RESELL/CO-DELIVER, IDO PARTNER PURCHASE ONLY: Sun Professional Services High End Disk Integration Service for ST9985V Basic Operating System (BOS) configuration, Includes Device Manager, Resource Manager, Server Priority Manager and Virtual Partition Manager support for up to 4 virtual Partitions Small Configuration- Up to 35 TB of Disk, Up to 256 LUNs included, Up to 32 dual host connections						
P-WW-PS-ED85VDP-C	\$999,999.00	C				N/A
Description: Dynamic Provisioning (DP) for ST9985V can be included as an additional feature of the Base (BOS) configuration with additional Dynamic Provisioning Licensed TB's						
P-WW-PS-ED85VDR-C	\$999,999.00	C				N/A
Description: Disaster Recovery for ST9985V can be included as an addition to the Base (BOS) configuration, includes TrueCopy Sync support for the appropriate TC Licensed TB's service can be combined with TrueCopy Sync as an addition to the Base (BOS) configuration with additional Universal Replicator support for UR Licensed TB's						
P-WW-PS-ED85VDRX-C	\$999,999.00	C				N/A
Description: Disaster Recovery Extended for ST9985V can be included as an addition to the Base (BOS) configuration with additional support for Universal Replicator 3 Data Center solution for Open Systems and Universal Replicator 4X4 for Mainframe, Network Assessment services should be included as well.						
P-WW-PS-ED85VIS-C	\$999,999.00	C				N/A
Description: In-System Replication (IS) for ST9985V can be included as an addition to the Base (BOS) configuration with additional ShadowImage Replication support for SI Licensed TB's Open Systems Copy on Write (CoW) can be included as an addition to the Base (BOS) configuration with additional In-System Replication support for IS (CoW) Licensed TB's						
P-WW-PS-ED85BOSV-C	\$999,999.00	C				N/A

Description:

BOS Virtual for ST9985V can be included as an addition to the Base (BOS) configuration with additional Virtual Partition Manager support for more than 4 Virtual Partitions, service also includes support for Universal Volume Manager based on UVM Licensed TB's

WW-PS-ED85BOSV-C \$999,999.00 C N/A

Description:

BOS Virtual for ST9985V can be included as an addition to the Base (BOS) configuration with additional Virtual Partition Manager support for more than 4 Virtual Partitions, service also includes support for Universal Volume Manager based on UVM Licensed TB's

WW-PS-ED85VBOS-C \$999,999.00 C N/A

Description:

ST9985V Basic Operating System (BOS) Custom configuration Includes Device Manager, Resource Manager, Server Priority Manager and Virtual Partition Manager support for up to 4 virtual Partitions. >120 Tbs, > 1024 LUNs, >80 dual host connections

WW-PS-ED85VBOS-L \$107,000.00 E N/A

Description:

ST9985V Basic Operating System (BOS) configuration Includes Device Manager, Resource Manager, Server Priority Manager and Virtual Partition Manager support for up to 4 virtual Partitions. Large Configuration- Up to 120 TB of Disk, Up to 1024 LUNs included, Up to 80 dual host connections

WW-PS-ED85VBOS-M \$78,000.00 E N/A

Description:

ST9985V Basic Operating System (BOS) configuration Includes Device Manager, Resource Manager, Server Priority Manager and Virtual Partition Manager support for up to 4 virtual Partitions. Medium Configuration- Up to 70 TB of Disk, Up to 512 LUNs included, Up to 64 dual host connections

WW-PS-ED85VBOS-S \$46,500.00 E N/A

Description:

ST9985V Basic Operating System (BOS) configuration Includes Device Manager, Resource Manager, Server Priority Manager and Virtual Partition Manager support for up to 4 virtual Partitions. Small Configuration- Up to 35 TB of Disk, Up to 256 LUNs included, Up to 32 dual host connections.

WW-PS-ED85VDP-C \$999,999.00 C N/A

Description:

Dynamic Provisioning (DP) for ST9985V can be included as an additional feature of the Base (BOS) configuration with additional Dynamic Provisioning Licensed TB's

WW-PS-ED85VDR-C \$999,999.00 C N/A

Description:

Disaster Recovery for ST9985V can be included as an addition to the Base (BOS) configuration, includes TrueCopy Sync support for the appropriate TC Licensed TB's service can be combined with TrueCopy Sync as an addition to the Base (BOS) configuration with additional Universal Replicator support for UR Licensed TB's

WW-PS-ED85VDRX-C \$999,999.00 C N/A

Description:

Disaster Recovery Extended for ST9985V can be included as an addition to the Base (BOS) configuration with additional support for Universal Replicator 3 Data Center solution for Open Systems and Universal Replicator 4X4 for Mainframe, Network Assessment services should be included as well.

WW-PS-ED85VIS-C \$999,999.00 C N/A

Description:

In-System Replication (IS) for ST9985V can be included as an addition to the Base (BOS) configuration with additional ShadowImage Replication support for SI Licensed TB's Open Systems Copy on Write (CoW) can be included as an addition to the Base (BOS) configuration with additional In-System Replication support for IS (CoW) Licensed TB's

WW-PS-M85VBOS-C \$999,999.00 C N/A

Description:

ST9985V Basic Operating System (BOS) Mainframe Custom configuration Includes Device Manager, Resource Manager, and Virtual Partition Manager support for up to 4 virtual Partitions. >120 TB's, > 16 LPARs.

WW-PS-M85VBOS-L \$107,000.00 E N/A

Description:

ST9985V Basic Operating System (BOS) Mainframe configuration Includes Device Manager, Resource Manager, and Virtual Partition Manager support for up to 4 virtual Partitions. Large Configuration- Up to 120 TB of Disk, Up to 16 LPARs included.

WW-PS-M85VBOS-M \$78,000.00 E N/A

Description:

ST9985V Basic Operating System (BOS) configuration Includes Device Manager, Resource Manager, and Virtual Partition Manager support for up to 4 virtual Partitions. Medium Configuration- Up to 70 TB of Disk, Up to 8 LPARs included.

WW-PS-M85VBOS-S \$46,500.00 E N/A

Description:

ST9985V Basic Operating System (BOS) Mainframe configuration Includes Device Manager, Resource Manager, and Virtual Partition Manager support for up to 4 virtual Partitions. Small Configuration- Up to 35 TB of Disk, Up to 4 LPARs included.

P-WW-PS-M85VBOS-C \$999,999.00 C N/A

Description:

FOR RESELL/CO-DELIVER, IDO PARTNER PURCHASE ONLY: Sun Professional Services High End Disk Integration Service for ST9985V Basic Operating System (BOS) Mainframe Custom configuration Includes Device Manager, Resource Manager, and Virtual Partition Manager support for up to 4 virtual Partitions. >120 TB's, > 16 LPARs.

P-WW-PS-M85VBOS-L \$48,150.00 E N/A

Description:

FOR RESELL/CO-DELIVER, IDO PARTNER PURCHASE ONLY: Sun Professional Services High End Disk Integration Service for ST9985V Basic Operating System (BOS) Mainframe configuration Includes Device Manager, Resource Manager, and Virtual Partition Manager support for up to 4 virtual Partitions. Large Configuration- Up to 120 TB of Disk, Up to 16 LPARs included.

P-WW-PS-M85VBOS-M \$35,100.00 E N/A

Description:

FOR RESELL/CO-DELIVER, IDO PARTNER PURCHASE ONLY: Sun Professional Services High End Disk Integration Service for ST9985V Basic Operating System (BOS) configuration Includes Device Manager, Resource Manager, and Virtual Partition Manager support for up to 4 virtual Partitions. Medium Configuration- Up to 70 TB of Disk, Up to 8 LPARs included.

P-WW-PS-M85VBOS-S \$20,925.00 E N/A

Description:

FOR RESELL/CO-DELIVER, IDO PARTNER PURCHASE ONLY: Sun Professional Services High End Disk Integration Service for ST9985V Basic Operating System (BOS) Mainframe configuration Includes Device Manager, Resource Manager, and Virtual Partition Manager support for up to 4 virtual Partitions. Small Configuration- Up to 35 TB of Disk, Up to 4 LPARs included.

P-WW-PS-M85VDRX-C \$999,999.00 C N/A

Description:

Disaster Recovery Extended for ST9985V can be included as an addition to the Base (BOS) configuration with additional support for Universal Replicator 3 Data Center solution for Open Systems and Universal Replicator 4X4 for Mainframe, Network Assessment services should be included as well.

WW-PS-MED85BOSV-C \$999,999.00 C N/A

Description:

BOS Virtual for ST9985V can be included as an addition to the Base (BOS) configuration with additional Virtual Partition Manager support for more than 4 Virtual Partitions, service also includes support for Universal Volume Manager based on UVM Licensed TB's

WW-PS-MED85V-C \$999,999.00 C N/A

Description:

Custom Mainframe (MF) services for ST9985V can be included as an addition to the Base (BOS) configuration depending on the Licensed MF software components ordered.

WW-PS-MED85VDR-C \$999,999.00 C N/A

Description:

Disaster Recovery for ST9985V can be included as an addition to the Base

(BOS) configuration, includes TrueCopy Sync support for the appropriate TC Licensed TB's service can be combined with TrueCopy Sync as an addition to the Base (BOS) configuration with additional Universal Replicator support for UR Licensed TB's

WW-PS-MED85VDRX-C \$999,999.00 C N/A

Description:

Disaster Recovery Extended for ST9985V can be included as an addition to the Base (BOS) configuration with additional support for Universal Replicator 3 Data Center solution for Open Systems and Universal Replicator 4X4 for Mainframe, Network Assessment services should be included as well.

WW-PS-MED85VIS-C \$999,999.00 C N/A

Description:

In-System Replication (IS) for ST9985V can be included as an addition to the Base (BOS) configuration with additional ShadowImage Replication support for SI Licensed TB's Open Systems Copy on Write (CoW) can be included as an addition to the Base (BOS) configuration with additional In-System Replication support for IS (CoW) Licensed TB's

P-WW-PS-MED85V-C \$999,999.00 C N/A

Description:

Custom Mainframe (MF) services for ST9985V can be included as an addition to the Base (BOS) configuration depending on the Licensed MF software components ordered.

P-WW-PS-MED85VDR-C \$999,999.00 C N/A

Description:

Disaster Recovery for ST9985V can be included as an addition to the Base (BOS) configuration, includes TrueCopy Sync support for the appropriate TC Licensed TB's service can be combined with TrueCopy Sync as an addition to the Base (BOS) configuration with additional Universal Replicator support for UR Licensed TB's

P-WW-PS-MED85VIS-C \$999,999.00 C N/A

Description:

In-System Replication (IS) for ST9985V can be included as an addition to the Base (BOS) configuration with additional ShadowImage Replication support for SI Licensed TB's Open Systems Copy on Write (CoW) can be included as an addition to the Base (BOS) configuration with additional In-System Replication support for IS (CoW) Licensed TB's

P-WW-PS-M85BOSV-C \$999,999.00 C N/A

Description:

BOS Virtual for ST9985V can be included as an addition to the Base (BOS) configuration with additional Virtual Partition Manager support for more than 4 Virtual Partitions, service also includes support for Universal Volume Manager based on UVM Licensed TB's

Ordering Notes:

SunSpectrum Instant Upgrade 3year Platinum service recommended.

NOTE STO = High Storage SKU level platform attribute

+ Previously announced part.

\* Amounts shown in SunSpectrum(SM) Price column represent monthly service charges for the recommended level of hardware support.

All parts representing Documentation Only should show N/A under the service column. Such products never have a service price.

E. INTEGRATED STACK CONTENTS N/A

F. SUN UPGRADE ADVANTAGE PROGRAM (UAP) - NEW PARTS

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Q1FY2008-232I Oct 09, 2007

SUN HARDWARE PRODUCT INTRO: Announcing Sun StorageTek(TM) 9985V System

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

### SECTION III - PARTNER INFORMATION

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#### 12. PARTNER BUSINESS PROPOSITION

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The ST9985 is a product which complements our partners ability to sel into the Enterprise Data Center. Resellers and System Integrators now have a smaller scale version of the ST9990V that is compatible in hardware, firmware and software where the full scalability of the ST9990V is not required.

#### 13. AVAILABILITY TO ALL PARTNERS

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The ST9985V will be available through Sun distributors to resellers who have passed the standard Sun Partner Certification and Training Classes.

Partners are eligible to resell and deliver Sun services, subject to Sun Partner Advantage (SPA) criteria. Partner numbers are immediately available for partner sales.

#### 14. PARTNER CERTIFICATION AND TRAINING

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Please refer to the follow URL for information on appropriate partner training for the ST9985V

<http://partner.sun.com/US/training/programs/docs/strategic-datacenter-program.pdf>

#### 15. ORDERING PROCESS

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The ordering process remains the same with these new ST9900 series products.

#### 16. SUPPORT AND WARRANTY

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Leverage standard Sun Support and Warranty

SunSpectrum(SM) Service Plans:

SunSpectrum Service Plans are flexible and high-quality service offerings that allow customers to choose the level of service best suited to their needs, ranging from mission-critical support for maximum solution availability to simple backup assistance for self-support customers.

SunSpectrum Service Plans provide a simple pricing structure in



which a single fee covers support for an entire system, including related hardware and peripherals. Customers should check with their local Sun Services representatives for program and feature availability in their areas.

#### 17. CONFIGURATOR AVAILABILITY INFORMATION

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(Note: Not all customers worldwide will have availability to all Sun configurators)

Will the products in this intro appear in the following configurators and if so, on what date?

WebDesk? No, the ST9900 products are not in Webdesk, they are in Partner Express via the Comergernt configurator. The ST9985V System and Software models will be available with Comergernt at GA.

Partner WebDesk? No, the ST9900 products are not in Webdesk, they are in Partner Express via the Comergernt configurator. The ST9985V System and Software models will be available with Comergernt at GA.18. PARTNERS QUESTIONS AND ANSWERS

#### 18. PARTNERS QUESTIONS AND ANSWERS

Q. What level of certification is required of partners before they can sell ST9985Vs?

A. A partner should be qualified at the "Data Center" level before before committing to sell the ST9985V. Please refer to the following URL:

<http://partner.sun.com/US/training/programs/docs/strategic-datacenter-program.pdf>

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## Licensing Guidelines

This section covers licensing for a broad set of features associated with the ST9985V.

This part of the JTF is divided into two sections.

Section 1 provides an broad outline of how software is licensed across many different software features.

Section 2, places the changes and new information in context of the ST9985.

### Section 1. How products are licensed on the ST9985V.

Note 1: Presented Capacity is effectively the Total Usable Capacity.

= [External Usable = (Total Usable Capacity – Local Capacity Used for Production Usage)]

Note 2: Usable capacity = total of primary or secondary volumes, no matter if the volume is internal to the ST9985V or on an external device.

1. Features which are licensed based on ST9985V by Internal Capacity Only.

1.1. Basic Operating System (BOS) Suite - pricing based on Internal Raw capacity for each 1TB increments

1.2. HiCommand Tuning Manager – pricing based on internal raw capacity for each 1TB increments

1.3. HiCommand Replication Monitor– pricing based on internal raw capacity for each 1TB increments

2. Features which are licensed based on External Storage Capacity Only.

2.1. Basic Operating System Virtualization (BOS-V) - pricing based on total external usable capacity attached to the ST9985V system for each 4TB increments

3. Features which are licensed based on ST9985 Internal and External Capacities.

3.1. Use this guidance if this product is Raw Capacity based on a stand alone ST9985V.

a) If No External Storage, then the capacity to be licensed equals the amount of ST9985 Internal Raw Only.

b) If there is External Storage then the amount to be licensed equals ST9985V Internal Raw Capacity plus the Usable Presented Capacity from external devices.

c) The list of products in this category are:

HiCommand Tiered Storage Manager – Internal: pricing based on internal raw capacity for each 1TB increments; External : pricing based on external usable capacity for each 4TB increments

4. Features which are licensed based on Usable Capacity

a) These products are based on the total needed (usable) capacity. (i.e. the licensing is still based on total primary or secondary volumes, no matter if the volume is internal to the ST9985V or on the external device.)

b) The list of products in this category are:

Disaster Recovery Suite – pricing based on usable capacity for each 1TB increments

Disaster Recovery Suite Extended - pricing based on usable capacity for each 1TB increments

In-System Replication Suite - pricing based on usable capacity for each 1TB increments

Compatible FlashCopy version 2 - pricing based on usable capacity for each 1TB increments

Compatible PAV - pricing based on usable capacity for each 1TB increments

Dynamic Provisioning - pricing and License capacity based on total usable capacity of volumes in the HDP pool, TB Qty ordered in 10TB, 20TB, 50TB and 100TB increments.

Business Continuity Manager - pricing based on usable capacity for each 1TB increments

Business Continuity Manager Extended - pricing based on usable capacity for each 1TB increments

4. Features which are licensed based on P-VOLs

Protection Manager - pricing based on Total managed Primary Volumes (P-VOLs) and secondary volumes being protected by the Protection Manager Server for each 1TB increments up to 63TBs and in 4 increments up to unlimited capacity.

5. Features which are server based

Dynamic Link Manager(SDLM) pricing per individual server up to a unlimited number of servers

HiCommand Global Link Availability Manager(GLAM) - pricing based on 10 server Blocks

## Section 2. Licensing in context of ST9985V vs the ST9985

First, here is what is new and different from the ST9985:

The BOS, BOS V, Disaster Recovery and Disaster Recovery Extended Suites are all new to the ST9985V.

Here is what is different about licensing on the ST9985V:

All the ST9985V Software is licensed in new licensing bands. Here is how the licensing tiers/bands work:

Trial License

Media Kit (formerly Base Kit)

Base license (Base charge for Software)

1) 1-5TB Band

2) 6-10TB Band

3) 11-25TB Band

4) 26-50TB Band

5) 51-100TB Band

6) 101-500TB Band

7) 501-2000TB Band

Instead of ordering Software in Incremental tiers at 1TB increments up to 63TBs and 4TB increments up to unlimited capacity, you now order ST9985V software within bands in increments of 1TB up to unlimited capacity.

For example:

Customer wants 15TBs

Customer purchases the base license price plus the cost per TB within band 3 above (11TB-25TBs).

Upgrade example:

Customer wants to acquire an additional 15TBs

The next 15TBs places customer in band 4 pricing (26TB-50TB)

Customer acquires the next 15TB at the cost per TB within Band 4

This benefits the customer and gives them a price break when ordering more TB's up front. When ordering SW for the ST9985 you paid more for the first TB tiers and as you moved through the tiers the price per TB decreased. Now with these licensing bands your customer sees the price break per TB as they move up the bands, so they save more money the higher the band they fall into.

## II. Software Transfer Program (Technology Upgrades) between ST9985V and other ST9900 Family products such as the ST9990, ST9985, ST9980, ST9970, ST9960, ST9910.\*

There is currently \*NO\* Software Transfer Program to the ST9985V from other members of the ST9900 Family such as the ST9990, ST9985, ST9980, ST9970, ST9960, ST9910 at this time.

The Software Transfer Program is for technology upgrades, where an older generation subsystem is removed and replaced with a net new generation subsystem.

# Competitive Comparison

For competitive information, please visit the following URL:

<http://wikihome.sfbay.sun.com/Storage-Intelligence/Wiki.jsp?page=Disk#section-Disk-DatcenterDiskCompetition>

## Frequently Asked Questions

Q. How many models of the ST9985V are there? Are there separate "Pricing Reference Points" like there was on the ST9985?

A. There is only one model of the ST9985V

Unlike the ST9985, the ST9985V is available in one model only and there are no "Pricing Reference Points". This, along with the packaging and configuration enhancements offered, allows our customers to better tailor the system to their specific business needs. The ST9985V has more granular configuration options than its predecessor. For example, more Front End Directors and Back End Directors are available in smaller increments, allowing the customer to purchase only what they need. It also greatly improves serviceability since smaller increments of system resources are affected by any service action. Some of the other architecture enhancements include:

- Aggregate internal bandwidth increased from 12.31GB/sec to 13.3GB/sec
- Performance increased from 700K IOPS to 800K IOPS
- Replication IOPS increased 2X
- External Storage IOPS increased 6X
- Replication Products support more pairs, more volumes etc.
- The number of LDEVs per system increased to 64K for both Open systems and mainframes
- 4GB/sec end-to-end (Front End Directors, Disks, and Back End Directors)
- FICON External Storage attachment
- Fibre Channel Front End Directors in increments of either 8 or 16
- ESCON Front End Directors in increments of 8
- FICON directors available in increments of 8
- Number of FC ports is 48
- Number of FICON and ESCON ports has been increased from 16 to 24 for both

Q. How is the Service Processor (SVP) configured in the ST9985V?

A. The ST9985V does not come equipped with a laptop, which in the past has been referred to as a Service Processor or SVP. Instead, service personnel will be expected to provide their own PC type of device to interface to the ST9985V for maintenance purposes.

A ST9985V will come initially with a SVP blade embedded in a control frame. It has similar capabilities to the SVP used in the ST9985. A second SVP blade may be embedded for redundancy purposes. It is recommended that customers take advantage of SVP redundancy by purchasing a second SVP.

Q. What are Back End Directors and Front End Directors?

A. The same nomenclature used with the ST9985 with respect to Channel Host Adapters (CHA) and Array Control Processors (ACPs)/Disk Adapters (DKAs) is still used on the ST9985V. Redundant pairs of CHA are referred to as "Front End Directors" (FED) and Redundant Pairs of ACP/DKA are referred to as "Back End Directors" (BED). Note: For

clarification, the terms "ACP" and "DKA" are synonymous.

Q. What is "Control Cache"?

A. "Shared memory" is now known as "Control Cache".

Q. Will the 100% Data Availability Guarantee be available with the ST9985V?

A. Yes, the 100% Data Availability Guarantee will again be available for the ST9985V as it has been for the last 3 generations of ST9900 product.

Please note however: "100 percent Data Availability on the ST9985V is NOT supported on RAID 5 with a (7D+1P) configuration. Note: As a general rule, ALL requests for 100 percent Data Availability is considered under an RPQ (Request Per Quote) basis and needs to be approved by the SUN ST9900 and HDS Product Management".

Q. Can I attach the new disk array frames and disks for the ST9985V to my existing ST9990V, ST9990, ST9985, ST9960, ST9970, ST9980 control frame?

A. No. The new disk array frames are only supported on the ST9985V control frame. The new ST9985V is not backward compatible with ST9990V, ST9990, ST9985, ST9960, ST9970, ST9980. However, you can virtualize existing ST99XX Systems behind the ST9985V system.

Q. How are storage system trade-in values determined?

A. Sun works with customers on a case-by-case basis to understand a customer's current book value coupled with market values for older systems. Sun's upgrade sales reps then determine the appropriate value for the storage devices being traded for the ST9900. This amount can be used to purchase additional migration services or more storage capacity thereby extending the purchase budget.

Q. How can Sun help me with the migration and ongoing support of the ST9985V?

A. Sun Professional Services can assist the customer in optimizing storage investments and improving your operating efficiencies in the data center. Sun storage consultants can help the customer implement a comprehensive data migration plan that mitigates risk and ensures a smooth, prompt and uninterrupted transition to new storage equipment. Sun can also help implement TrueCopy and ShadowImage software for specific customer environments. Other relevant Storage Services include:

The following optional technical services are available:

- SAN Architecture and Implementation
- Data Migration and Replication
- Storage Assessment
- Capacity Planning
- Performance Tuning

The following optional business services are available:

- Storage Total Cost of Ownership (TCO)
- Enterprise Continuity

Q. Are the hard disk drives used in the ST9960, ST9910, ST9980, ST9970, ST9985, ST9990 and ST9990V the same as those used in the ST9985V?

A. No. Hard disk drives from those systems cannot be used in a ST9985V.

Q. What is the maximum of hard disk drives (HDDs) and Spares in a ST9985V?

A.	HDDs	Spares
	-----	-----
ST9985V	240	16

Q. How many Logical Devices(LUNS) does a ST9985V support?

A. 65,536 Logical Devices for both OPEN and z/OS.

Q. How many ports are dedicated to internal storage?

A. 16 ports are dedicated to internal storage.

Q. How many ports are available in the Sun StorageTek 9985V Fibre Channel 8-Port and Sun StorageTek 9985V Fibre Channel 16-Port Front End Directors?

A. The reason this question is asked is that the high availability architecture and nomenclature of this system can be confusing.

There are two front end directors available, one 8-port and one 16-port.

Sun StorageTek(TM) 9985V Fibre Channel Adapter consists of eight 1/2/4Gbps Short Wave FC1 ports. This option is composed of two channel adapter PCBs with four FC ports each. Each port includes a SW transceiver. Both SW and LW transceivers may be installed on the same channel adapter. A maximum of three adapters (24 ports) can be installed in the CHA exclusive use slot. RoHS-5 compliant.

Sun StorageTek(TM) 9985V Fibre Channel Adapter consists of sixteen 1/2/4Gbps Short Wave FC ports. Composed of two-channel adapter PCBs with eight FC ports each. Each port includes a SW transceiver. Both short wavelength and long wavelength transceivers may be installed on the same channel adapter. A maximum of three adapters (48 ports) can be installed in the CHA exclusive use slot. RoHS-5 compliant.

Q. Are there standard and high performance Back End Directors?

A. No. There is only one type of Back End Director, and it has one microprocessor per Fibre Channel Loop.

Q. How many hard disk drives can be contained in an ST9985V Disk Chassis?

A. 60 hard disk drives per disk chassis or 240 HDD maximum in two racks.

Q. What software is included within the ST9900 BOS and BOS V Suite Software? Does it replace these products?

- A. \* ST9900 Basic Operating System (BOS) Suite replaces Device & Resource Manager Suite
- Includes Device Manager and Resource Manager Suite
  - Includes Virtual Partition Manager with support for up to 4 partitions
  - Includes Server Priority Manager
- \* ST9900 BOS Virtual Suite (BOS V)
- Includes Universal Volume Manager
  - Includes Virtual Partition Manager for more than 4 partitions

Sun StorageTek 9900 Basic Operating System (BOS)- This suite was created to deliver the storage return on investment, security, and quality of service to applications that your organization requires. And the Basic Operating System Virtualization software enables the ST9985V's embedded virtualization capabilities and allows customers to take advantage of storage management and data mobility capabilities within a single system or across an entire heterogeneous storage pool. Using Basic Operating System, one administrator can manage an entire storage infrastructure from a single pane of glass or you can choose to designate multiple storage administrators who can optionally manage only a particular set of storage resources that is made accessible to

them.

Sun StorageTek 9900 BOS Virtual (BOS V) - The BOS V is an upgrade to the BOS and adds Unique ability to virtualize externally attached storage subsystems to the ST9985V system creating a single heterogeneous pool of tiered storage. This enables simplified storage management, increases utilization, increases efficiency, improves service levels, simplifies data migration and helps meet compliance demands. The with the BOS V Virtual Partitions are expanded - up to 8 storage and 8 cache partitions.

Q. Is installation included in the price of Sun StorageTek 9985V System?

A. ST9985V product purchase includes Sun StorageTek(SM) 9985V Installation Service, (9985V Installation) a basic install offering, for new system (minimum 1 controller unit) purchase. This installation is provided during normal business hours.\* The official service listing, including scope, tasks, deliverables and customer responsibilities for this and other service programs for Sun contracted customers, is maintained at:

<http://www.sun.com/service/servicelist/>

StorageTek 9985V product purchases sold for installation into existing ST9985V systems, i.e. incrementally-sold single drive canisters, also include installation, provided during normal business hours.\* Sun reserves the right to require customer to perform installation activities for certain optional components should it be determined that Sun's presence on-site is not necessary, e.g. for very basic product upgrade purchases such as power cords.

ST9985V Installation does not include the installation of optional third-party SAN components. Installation of optional third-party SAN components may involve additional charges.

ST9985V installation does not include any consulting engagement services. Customers are encouraged to utilize Sun Services consulting for SAN architecture and implementation engagements. Customers may also utilize Implementation Service for Sun StorageTek 9900 Series for implementation services that go beyond the basic installation provided by 9900 Installation.

\*If installation is performed outside of normal business hours, for customers in all geographies, the customer should be charged a separate line item charge for the following part: EIS-9900-E-AH . The extra charge for after-hours installations applies to initial controller base charge only, and must be ordered in conjunction with each 4 disk after hours installation service (EIS-9900-4DISKE-AH).

Q. What languages will the ST9900 series software products in this announcement support?

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

Q. What level of software warranty/support comes standard with the purchase of ST9900 Series software?

A. A Standard software warranty comes with the purchase of the ST9900 series software. This warranty covers 90 day defective media replacement only. To take advantage of ST9900 series software free updates and upgrades, customers must purchase the appropriate Sun S4 Maintenance contract. The recommended level of support for this product is Premium.

For more information regarding Sun Software support, please visit the following URL:  
<http://www.sun.com/service/support/software/index.html>

Q. Is Dynamic Provisioning an Optional Feature and does a customer have to implement it on the whole ST9985V system?

A. Yes, Dynamic Provisioning is an Optional Feature. Customer can configure it as needed. It supports:

- \* 1 to 8 Dynamic Pools per ST9985V
- \* 1 to 4096 Thin Provisioned LUNs (volumes) per pool
- \* 8GB to 2.0TB per Pool LDEV
- \* 8GB to 286TB maximum aggregate Pool size

Q. Will the ST9985V support the same external storage devices as the previous ST9985?

A. Yes, all external storage currently supported on the ST9985 will be supported at General Availability of the ST9985V.

Q. What new software was announced for ST9985V?

A. Sun StorageTek 9900 Dynamic Provisioning software for the ST9985V allows customers to allocate "virtual" disk storage based on their anticipated future needs, but with less physical disk initially required. Additional physical disks can be purchased later and installed transparently without an application service interruption. The primary benefits of Dynamic Provisioning are:

1. Elimination of application service interruptions that are normally required to install new disk capacity. Because the application only sees the amount of "virtual capacity" that is allocated to it, additional physical disk capacity can be installed when needed, without interruption.
2. Simplified administration by reducing the impact of volume creation and volume formatting associated with the installation of physical disk capacity
3. Improved performance and virtually automatic tuning and avoidance of performance "hot spots" because I/O activity is spread across a large number of disk devices in the Dynamic Provisioning software's shared pool of disks.
4. Reduced Total Cost of Ownership (TCO) by deferring some portion of storage acquisitions to a later date. Over an extended period of time the storage acquisition costs will be reduced by the use of Dynamic Provisioning and improved storage utilization.
5. Reduced Power and Cooling requirements due to fewer physical disks required.

The Sun StorageTek 9985V and 9990V are the first and only enterprise storage systems to support both virtualization and thin provisioning. ST9900 Dynamic Provisioning software is not unique in the industry, but at this moment in time neither EMC, nor IBM has delivered a thin provisioning solution. Network Appliance is the only major storage vendor with thin provisioning. 3parDATA and some smaller niche players also have a thin provisioning offering.

The other existing ST9900 software products that customers already know and trust have also been scaled beyond the limits of the prior generation ST9985 system. Many of the replication products now support more pairs per system, more consistency groups, and higher performance. This allows them to extend the value across the entire ST9900 product line and other vendors' products when virtualized and all centrally managed from a single pane of glass with ST9985V's embedded virtualization.

Q. Does ST9900 Dynamic Provisioning software for the ST9985V inter-operate with all other ST9900 software?



A. Like any other new software, features and enhancements will be delivered in a phased release over time. The initial release of Dynamic Provisioning software contains the basic function required to allow customers to begin using and testing it so that they can get familiar with its behavior and benefits. Not all of the replication products are supported in the first release and certain other product support will be added later, including support for externally attached storage. Please check with latest support updates.

Q. How is ST9900 Dynamic provisioning software for the ST9985V licensed to the customer?

A. ST9900 Dynamic Provisioning software for the ST9985V allows the customer to create "virtual volumes" that have a relationship to a shared pool of physical disks. The customer can purchase Dynamic Provisioning software based on the usable capacity of the physical disk pool (Aggregate usable dynamic pool capacity). The size of the virtual volumes has no direct effect on the license charge. In addition to a very modest "Base License Charge" that includes the first 10TB of pool capacity, Dynamic Provisioning software is sold in fixed blocks of capacity as follows:

- \* Base License Charge + first 10TB included
- \* 10TB additional
- \* 20TB additional
- \* 50TB additional
- \* 60TB to frame capacity

Example: Customer wants 30TBs of ST9900 Dynamic Provisioning Software capacity for initial testing and evaluation. Customer purchases the Base license with 10TB + they purchase an additional 20TB "block" for a total of 30TBs. Later they can add capacity in the fixed increments or "blocks" that are shown above, i.e. in 10TB, 20TB, 50TB etc. capacity upgrades.

Q. Why did we create new software suites (bundles) with the ST9985V and what are they?

A. NOTE: See ST9985V unique software part numbers.

The new software suites (bundles) were created to simplify the sales process, create new pricing structure that is easier to understand, reduce the installation and maintenance procedures for both our customers and sales personnel and increase customer satisfaction while providing them more value. The goal was to price the new software suites below the cost of the individual products if purchased separately. We also intend to reduce the number of license keys per software bundle to one license key to greatly simplify installation and maintenance. Initially there may be as many as two keys for some of the suites. The new software suites available on the ST9985V are:

- \* ST9900 Basic Operating System software (BOS) includes ST9900 Device Manager Software, all ST9900 Resource Manager Software components, ST9900 Server Priority Manager Software, and ST9900 Virtual Partition Manager Software with support for up to 4 storage partitions. The entire software package can be installed with one license key and it is priced lower than the sum of the individual products. Licensing is based on Internal Raw Capacity only.
- \* ST9900 Basic Operating System V software (BOS V) requires ST9900 Basic Operating System Software (BOS) as a pre-requisite and contains ST9900 Universal Volume Manager Software and ST9900 Virtual Partition Manager Software for more than 4 partitions. Basic Operating System V software is licensed by the attached external storage usable capacity only
- \* ST9900 Disaster Recovery Software (Only use this for replication solutions that involve a maximum of 2 datacenters). It includes

ST9900 Remote Replication Synchronous Software and ST9900 Universal Replicator Software for both Open Systems and Z/OS mainframes.

- \* ST9900 Disaster Recovery Extended Software - Customer must have ST9900 Disaster Recovery Software installed as a pre-requisite. It consists of ST9900 Universal Replicator with advanced function which includes the 3 Datacenter capabilities for both Open Systems and z/OS mainframes and the 4x4 function for z/OS mainframes only.
- \* ST9900 In-System Replication Software ? Consists of ST9900 In-System Replication software for Open Systems and z/OS Mainframes, and Copy-On-Write software for Open Systems only.
- \* ST9900 Compatible FlashCopy software ? Consists of ST9900 Compatible FlashCopy Version 2 software.

Q. Exactly what products are contained in the ST9900 Basic Operating System software bundle for the ST9985V?

A. By providing a powerful unified toolset for managing ST9900 storage environments, ST9900 Basic Operating System and ST9900 Basic Operating System V software unifies and simplifies storage tasks. The following products are contained in the ST9900 Basic Operating System software:

- \* ST9900 Device Manager for Windows, Solaris and Linux
- \* ST9900 Provisioning Manager for Windows, Solaris and Linux
- \* ST9900 Virtual LVI/LUN (VLL) software
- \* ST9900 LUN Management software
- \* ST9900 Cache Residency software for z/OS
- \* ST9900 Cache Residency software
- \* ST9900 Virtual Partition Manager software enabled for up to 4 partitions
- \* ST9900 Performance Monitor software
- \* ST9900 Volume Security software
- \* ST9900 Data Retention software for z/OS
- \* ST9900 Data Retention software
- \* ST9900 Volume Port Security software
- \* ST9900 Volume Shredder software
- \* ST9900 Storage Navigator software
- \* ST9900 SNMP API
- \* ST9900 JAVA API
- \* ST9900 Database Validator software
- \* ST9900 Server Priority Manager software

Q. How do I order the other ST9900 software products for use with the ST9985V that are not contained in the bundles?

A. All of the other existing ST9900 software can continue to be ordered as individual products with the following exceptions:

- \* ST9900 Compatible XRC software. Universal Replicator Software is our strategic product for asynchronous remote replication. We will continue to fully support existing XRC customers, but we want to encourage new customers to use Universal Replicator software
- \* ST9900 Volume Migration software. ST9900 Tiered Storage Manager software is our strategic product for data migration. We will continue to fully support existing Volume Migration software customers, but we want to encourage new customers to use ST9900 Tiered Storage Manager software
- \* ST9900 Remote Replication software. ST9900 Universal Replication Software is our strategic product for asynchronous remote replication. We will continue to fully support existing ST9900 Remote Replication Asynchronous software customers, but we want to encourage new customers to use ST9900 Universal Replication software.

Q. How does the ST9985V add value to the ST9900 Storage Management software story?

A. Sun Data Systems storage management software benefits are based upon one common management software interface. Rather than provide end-users with disparate interfaces for disparate platforms, essentially resulting in multiple islands of storage, Sun provides customers with the same software, the same management interfaces, and the same key tools to manage all of ST9900 storage systems from a single console. Through the standards-based ST9900 Storage Management Software portfolio, customers can manage a broad range of heterogeneous storage devices. The ST9985V builds on this by allowing storage to be attached, pooled/virtualized and managed.

Q. Will all current ST9900 software products work on the ST9985V?

A. Yes they will all work with the same functionality that existed on the ST9900.

Q. What is the maximum internal and external capacity of the ST9985V?

A. At its introduction the ST9985V supports a raw internal capacity of 62TB (based on 300GB drives). It's external (virtualized) capacity is 96PB.

Q. What hard disk drives are supported?

A. At introduction, internal storage supports 72GB/15K RPM, 146GB/15K RPM and 300GB/15K RPM disk drives.

Q. How much cache does the ST9985V have?

A. At introduction, the ST9985V supports 64GB of Data Cache and 16GB of Control Memory. Data Cache will expand to 128GB in CY2008 with even higher capacity planned in the future.

Q. What host connectivity is supported?

A. ESCON, FICON, and Fibre Channel connectivity is available at General Availability. NAS High and iSCSI support is not available at GA, but is planned for the future.

Q. Will the ST9985V replace the ST9985 immediately?

A. Both the ST9985V and current ST9985 will co-exist for a period of time. The ST9985 system will be orderable as a new manufactured product for 9-12 months beyond the introduction of the ST9985V. Furthermore, the ST9985 systems will continue to be supported for at least another 5 years.

Q. If the ST9985V supports 48 Fibre Channel ports, why does my customer need a SAN?

A. In relatively simple environments where the ST9985V is the primary or only storage device, the customer may not need a SAN and will be perfectly well served by attaching his servers directly to the ST9985V. However, most opportunities for ST9985V sales will probably involve relatively complex environments with multiple connections, other storage devices that are not attached to the ST9985V, shared SAN-attached tape libraries, FC to IP protocol conversion for long-haul data transmission, and third party software that must address a variety of devices. In those more complex environments a SAN is usually the best way to solve the customer's connectivity and management issues.

Q. Should a failure occur on a non-ST9900 disk attached to the ST9985V, how is the failure reported and who is responsible for repair?

A. The ST9985V will detect any error associated with the external device and will generate the appropriate message to the Host. The ST9985V will also generate a service call through HiTrack and, in case of

ST9900 devices, will be able to provide a comprehensive set of information related to the possible nature of the failure. For non-ST9900 devices, the ST9985V will be able to provide basic information but will not be able to report specific FRU (Field Replacement Unit) information. The externally attached device must have its own call-home facility enabled through which the maintenance provider will be able to collect the necessary service information. Sun does not assume responsibility for maintaining third party devices externally attached to a ST9985V.

The ST9985V appears as a Windows Host to the externally attached device, which is similar to the way many other devices are normally connected to both ST9900 and third party systems. Thus a ST9985V attachment should not have any impact on third party maintenance agreements.

Q. How is Dynamic Provisioning Software Licensed and Priced?

A. Dynamic Provisioning Software is based on the usable capacity Dynamic Provisioning Pool size. You do not need to license Data Provisioning (HDP) for the whole system amount, only the amount needed (Used Capacity).

Q. Is Dynamic Provisioning software supported on existing ST9990/85 products?

A. No, Dynamic Provisioning Software (and thin provisioning functionality) is only supported on the new ST9985V and ST9990V platforms.

Q. Does Dynamic Provisioning work with z/OS

A. No, Dynamic Provisioning is for Open Systems only supporting OPEN-V

Q. Where can I get even more information on the ST9985V?

A. For more and up to date information, please visit the following external product page:

[http://www.sun.com/storagetek/disk\\_systems/data\\_center/9985v](http://www.sun.com/storagetek/disk_systems/data_center/9985v)

Additional information is also available under the following Token #'s:

513698 ? Sun StorageTek 9985V Technical Presentation  
510459 ? Dynamic Provisioning Data Sheet  
513640 ? Sun StorageTek 9985V Data Sheet  
513696 ? Sun StorageTek 9985V Just The Facts  
513697 ? Sun StorageTek 9985V Customer Presentation  
385413 ? What works with what  
385413 ? Feature Availability Report

Q. Has there been any improvement in the single port performance (FED and BED Performance)?

A. Yes. While we have not released audited SPC1 figures at this time, unofficial tests suggest that there may be significant performance improvements. Please stay tuned on these performance numbers.

The key point is that the Front End Directors (FED) and Back End Directors (BED) have been re-designed to allow unused microprocessors (MP) to take workload from other microprocessors on the FED or BED. This is a significant contributor to improved overall throughput.

From an overall performance perspective, the ST 9985V is now end to end 4 Gbit. Both the FED, BED, and the HDDs all operate at 4 Gbit.

Q. What is really meant when the ST 9985 V is claimed to have a "Switched FC Backend"? What about those claims about improved diagnosability and reliability?

A. First of all, the ST 9985V does not have an embedded switch like a Brocade on the back end. The back end is still predominately based on Fibre-Channel Arbitrated Loop. However, there are some significant/subtle changes that those of your who are more technically inclined may be interested in. The technically inclined sales representative may also be interested in that this architecture in that it will support sales claims about \*improved reliability and diagnosability\* .

The key point is that new switching capability in the FSW allows only one HDD to be active on the loop at a particular point of time. This means that if there are any issues associated with sending/receiving data to that particular drive, those issues will be pretty clear that they are associated with that particular drive.

The paragraph above can be specifically linked to a benefit claim about improved diagnosability. The challenge associated with diagnosing HDDs on a FCAL is that there are some much noise (e.g. Many HDDs active) and it is difficult to know where the problem is. The new "Switched FCAL" (yes, quite an oxymoron) contains additional logic in the FSW switch to allow only one drive to be active at a time. This literally makes this a point to point architecture. To use a ST 9900V system metaphor, the FCAL Loop is data cache, and the FSW acts like Shared Memory in that it contains meta data about the other HDDs on the FCAL, and when the data packet comes around, the header in the packet will know to drop its payload/activate a particular HDD. And the key is that only that HDD will be active on the loop.

So with only one active HDD on the loop, diagnosability is improved. One can also make the argument that Reliability is improved. Since the "Switch FCAL" is more diagnosable, problems can be pin pointed and resolved more quickly, resulting in a more reliable back end architecture in the ST 9985V.

Q. Is E-Copy Serverless Backup still available?

A. E-Copy Serverless Backup has been withdrawn from sale and is no longer price listed and is no longer available for sale.

Q. At GA (General Availability) is there a NAS Blade available for the ST9985V ?

A. At GA, there is no NAS Blade available for the ST9985V. However, in November 2007, C-NAS will be available.

Q. Does Sun resell the HDS Blue ARC NAS Gateway?

A. Sun does not resell the HDS Blue ARC NAS Gateway.

Q. Is DB Validator still price listed?

A. No, DB Validator is withdrawn from market.

Q. How many spares can be placed in a ST9985V?

A. 16 can be ordered through PX Tool.

Q. How many microprocessors on a FED or BED?

A. There are 8 at 800 mhz. Please note that these are dedicated micro processors (MP) to specific tasks. Avoid getting in clock speed wars. In many cases, the competition will claim a single, shared MP has a much faster clock speed. But it is a shared device. Whereas the ST9985V has many non-shared MPs dedicated to specific tasks.

Q. What kind of power is available in various regions of the world?

A. ST 9985 V supports single phase 30 amp only.

Q. Does the ST9985V have any data encryption methodology?

A. There is no in-system methodology for encrypting data on disk. Please stay tuned for forthcoming information on qualified encryption appliances.

Q. Can different data cache densities be intermixed on the ST9985V?

A. Different densities of data cache cannot be intermixed. This has historically contradicted the maintenance manuals. HDS Santa Clara, the sales and marketing arm of Hitachi Ltd Japan, has created this policy to avoid the complexity and risk of this configuration scenario.

Q. What kind of mainframe emulations are supported? What about creation of mainframe emulations on internal or external storage?

A. The primary mainframe emulation used is 3390. 3390 emulation may be mapped to either internal or external storage. Use Cross OS File exchange to format open data on external storage. The support for any 3380-n device emulation is for the Unisys or Fujitsu MSP Operating Systems. No version of the IBM 3380-n emulation is supported on the USP/NSC product outside of this restriction. Emulations are not supported on a ST9985V when it is connected to an IBM Mainframe. Most hardware and software vendors have dropped support for 3380 because they are too small and use UCB (unit Control Blocks) which are a very limited resource in the z/OS operating system.

Q. The User Guide says that 3380 emulations are supported but you're saying that only the 3390 emulation is supported.

A. First, Sun does not support either Unisys or Fujitsu Mainframes. Support of these specific vendors of mainframes are special case situation which will be explained in another Q&A below.

The support has any 3380-n device emulation has historically been only for the Unisys or Fujitsu MSP Operating Systems with the SE 9960 and SE 9910. No version of the IBM 3380-n emulation is supported on the SE 9970 and SE 9980. However, effective August 9, 2007, IBM 3380 mod-3 Track Compatibility is available via special order (a form called a RPQ) is available for support with IBM mainframes and ST9990V, ST9990, ST9985V and ST9985.

Q. Can components such as FED/BED/Data Cache/Shared Memory from a ST9990V be placed in a ST9985V?

A. Components such as FED/BED/Data Cache/Shared Memory from a ST9990V cannot be placed in a ST9985V?

Q. Can a customer use the ST9985V as a ?diskless? virtualization engine for external heterogeneous storage?

A. Yes, the ST998V does support ?diskless? configurations for use as a virtualization engine for external heterogeneous storage similar to IBM SVC or EMC InVista

Q. Can the ST9985V be configured in any 19-inch rack?

A. No, the ST9985V supports only qualified 19-inch rack available under the ST99xx price list.

Q. Does Sun support HDS VTL solutions?

A. No, Sun has its own family of VTL solutions.

Q. When will Dynamic Provisioning support external storage?

A. Today Dynamic Provisioning provides thin provisioning capability for internal storage only, external storage support is planned for end of

CY2007. With external storage support Dynamic Provisioning with complement Sun's ST9900 virtualization strategy by providing both aggregation and thin provisioning for the whole virtual storage environment that includes both internal and external storage.

Q. Are there expected changes to the Services ordering numbers in near future?

A. Later this year Sun will implement a new ERP System, which will improve efficiency throughout our business. Contained in the ordering section of this announcement are Service parts numbers that will only be available for quoting between now and when new ERP system goes live. Please use these parts until further notice.

Q. How do I recognize the existing Sun Spectrum Instant Upgrade (SIU) part numbers?

A. These part numbers all start with the prefix W9D-.

Q. What other service offerings are impacted by this transition to new ERP system?

A. SunSpectrum Instant Upgrade Program, Sun Software Support Plans and some limited Managed Service part numbers will be impacted during the first phase of the deployment.

# Support Services

## Sun StorageTek Service Support Offerings

The Sun StorageTek Service<sup>SM</sup> program is an innovative and flexible service offering that allows customers to choose the level of service best suited to their needs, ranging from mission-critical support for maximum solution availability to backup assistance for self-support customers. The Sun StorageTek Service program provides a simple pricing structure in which a single fee covers support for an entire system, including related hardware and peripherals, the Solaris<sup>TM</sup> Operating Environment software, and telephone support for Sun<sup>TM</sup> software packages. The majority of Sun's customers today take advantage of the Sun StorageTek Service program, underscoring the value that it represents. Customers should check with their local Sun Enterprise Services representatives for program and feature availability in their areas.

Sun StorageTek Service program support contracts are available both during and after the warranty program. Customers may choose to uplift the service and support agreement to meet their business needs by purchasing a Sun StorageTek Service contract. For more information on the Sun StorageTek Service program offerings refer to the following URL:

<http://www.sun.com/service/storageplans/index.xml>

The Gold/Platinum levels of Sun StorageTek Service support contracts are outlined below.

## Sun StorageTek Service Program Support

<b>Program</b>	<b>Description</b>
<b>Mission-Critical Sun StorageTek Service Platinum<sup>SM</sup> Support</b>	Designed to support client-server, mission critical solutions by focusing on failure prevention, rapid recovery and year round technical services planning. Support is provided 24 x 7.
<b>Business-Critical Sun StorageTek Service Gold<sup>SM</sup> Support</b>	Includes a complete package of proactive and responsive services for customers who require maximum uptime for their strategic business-critical systems. Support is provided 24 x 7.

## Sun Software Standard Support (ST)

Extended local business hours coverage 12 hours a day, five days a week

Four (4) hour telephone response time for urgent\* issues during extended local business hours

Two (2) authorized contacts

Unlimited technical support incidents

You rate the priority of your support requests

Technical assistance from experienced support engineers

Web-based incident submission and tracking through Sun's Online Support Center

Software enhancement releases and patches

7x24 access to Sun's online technical knowledge database



#### Optional Services:

- Dedicated or Assigned Service Account Manager
- Dedicated Technical Support Engineer
- Additional authorized contacts

Specific features and service options may not be available in all regions. After hours support may not be available in your local language.

### **Sun Software Premium Support(PR)**

- 7x24 online and telephone technical support
- Live call transfer for urgent issues
- Three (3) authorized contacts per eight hour shift
- Unlimited technical support incidents
- You rate the severity of your support requests
- Technical assistance from experienced support engineers
- Web-based incident submission and tracking through Sun's Online Support Center
- Software enhancement releases and patches
- 7x24 access to Sun's online technical knowledge database
- Sun StorageTek Service InfoExpress newsletter
- Interoperability Support

#### Optional Services:

- Dedicated or Assigned Service Account Manager
- Dedicated Technical Support Engineer
- Additional authorized contacts

Specific features and service options may not be available in all regions. Coverage hours and response times may vary by country or location. After hours support may not be available in your local language.

### **Warranty Information**

This information applies to Sun StorageTek 9990V, 9990, 9985V, 9985, 9980 and 9970 systems. This does not include third-party switch, director or HBA products. These products, while related to the StorageTek 9900 Series products, have standalone product support information (warranty, W9D parts and pricing, installation policy, Sun StorageTek Service pricing, etc.) that are unique to each of these products.

The official Sun StorageTek 9985V warranty statements are maintained at Sun's external web site at

[www.sun.com/service/support/warranty](http://www.sun.com/service/support/warranty)

Sun warranty on Sun StorageTek 9900 Series including ST9985V system currently includes an enhanced warranty with:

- 3 years coverage
- 7 x 24 Same Day 4-hour\* on-site response
- 7 x 24 Phone Support.

\*average response times.

All Sun StorageTek 9900 Series hardware components, disk groups, disk spares, port interface boards, disk frames, etc., receive the remaining warranty term of the ST9990 controller unit to which they are attached. The maximum warranty period of any given controller unit is 3 years.

If non-controller unit components are purchased from Sun and attached to an existing installed control unit, the warranty period of the controller unit is not affected. The warranty period of the non-controller unit new components assumes the remaining warranty period of the attached controller unit.

## Installation Information

Summary of installation charges for initial install and add on upgrades  
StorageTek 9985V :

For customers outside of United States:

<b>Installation Charge</b>	<b>Normal Business Hour</b>	<b>After Hour</b>
<b>Base Charge</b>	No charge, included with product purchase	Extra charge required. Order EIS-9900-E-AH per event.
<b>4 Disk charge</b>	No charge, included with product purchase	Extra charge required Order EIS-9900-4DISKE-AH

For customers in United States:

<b>Installation Charge</b>	<b>Normal Business Hour</b>	<b>After Hour</b>
<b>Base Charge</b>	No charge, included with product purchase	Extra charge required. Order EIS-9900-E-AH per install event
<b>4 Disk charge</b>	No charge, included with product purchase	Extra charge required. Order EIS-9900-4DISKE-AH

StorageTek 9985V product includes Sun StorageTek (SM) 9900 Installation Service, (9900 Installation) a basic install offering, for new subsystem (minimum 1 control unit) purchases. This installation is provided during normal business hours.<sup>1</sup> 9900 Installation currently includes the high-level deliverables shown below. The official service listing, including scope, tasks, deliverables and customer responsibilities for this and other service programs for Sun contracted customers, is maintained at:

<http://www.sun.com/service/servicelist/>

StorageTek 9985V product purchases sold for installation into existing 9985V systems, i.e. incrementally-sold single drives, also include installation, provided during normal business hours.<sup>1</sup> Sun reserves the right to require customer to perform installation activities for certain optional components should it be determined that Sun's presence on-site is not necessary, i.e. for very basic product upgrade purchases such as power cords for which Sun's presence on-site is not required.

9900 Installation does not include the installation of optional third-party SAN components. Installation of optional third-party SAN components may involve additional charges.

9900 installation does not include any consulting engagement services. Customers are encouraged to utilize Sun Services consulting for SAN architecture and implementation engagements. Customers may also utilize Implementation Service for Sun StorageTek 9900 Series for implementation services that go beyond the basic installation provided by 9900 Installation.

Sun StorageTek 9900 Installation Service currently includes the following high-level deliverables. See service listing for official scope, tasks, deliverables and customer responsibilities.

### Site Audit

- Review customer physical environment
- Document environmental states

### Installation Planning

- Plan, confirm and schedule resources
- Plan and confirm delivery & install dates

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<sup>1</sup> If installation is performed outside of normal business hours, for customers in all geography's, the customer should be charged a separate line item charge for the following part: EIS-9900-E-AH for base controller and EIS-9900-4DISK charge per number of 4 drive groups.

Create installation related documentation

#### Installation Specification

Discuss customer-defined RAID, LUN, connectivity requirements

Review remote monitoring requirements, including customer analog line

#### Statement of Installation

Verify completion of pre-installation tasks

Verify supported configuration

Customer sign off to begin installation

#### Hardware and software installation

Unpack 9900 components.

Review packing list

Install and configure HBA's in Sun servers

Install Solaris patches, if applicable.

Connect controllers, disk frames and StorageTek 9985V components

Connect subsystem to host server(s)<sup>2</sup>

Power up and verify functionality (diagnostic level.)

Install remote console components into customer-supplied workstation

Connect service processor to customer phone line.

Install Sun StorageTek 9900 Remote Response components

Install and configure Resource Manager components per customer definition

Configure disk groups, LUNs, port mapping per customer definition

#### Installation Verification

Verify Sun server host connections to LUNs

Verify Sun StorageTek 9900 Remote Response with remote support center

#### System Turnover

Installation review and customer sign off

Provide system reference documentation

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<sup>2</sup> Connection of 9900 subsystem to host(s) through switches may involve additional charges and strong recommendation to customer to utilize Sun Professional Services engagement.

Basic installation does not include any consulting engagement services.

Customers are encouraged to utilize Sun Professional Services for SAN architecture and implementation engagements. Sun Support Services maybe utilized for the switch/Director installation (not architecture/implementation) on a time and material basis, depending on product complexity and local field office availability.

A GNSS TE (Global Network Storage Sales Technical Engineer) must recommend a SAN configuration and be approved by Storage Control Center via the QTF (Quote Tracking Form.). The configuration must be in accordance with the WWW (What Works With What) matrix is posted at <http://sejsc.ebay/> or -SunWIN Token # 385413

## Questions and Answers

Q. What is Sun Support Services policy on third-party servers connected to StorageTek 9900 Series products?

A. StorageTek 9900 Series products are designed for attachment to Sun Solaris and other open systems (HP-UX, IBM AIX), non-UNIX (i.e. Linux, Windows) and mainframe server platforms. The details of these supported configurations are provided in the WWW matrix.

Sun Support Services will diagnose and troubleshoot the 9900 up to the point of connection of 9900 to the host server if connected in these heterogeneous and multi-platform environments in accordance with the WWW matrix. Sun does not provide third-party host server break-fix warranty or contract support.

Q. What is Sun Support Services policy on StorageTek 9900 Series SAN support?

A. Sun currently sells Brocade and McData switch and director products as external SAN interconnect in support of StorageTek 9900 Series products. The design of such a SAN must be in conformance with Sun configuration rules. These rules are developed by NWS, working in conjunction with its partners. The current rules are listed in the WWW matrix mentioned above. SAN's not developed in accordance with these rules may result in switch-to-host, switch-to-storage or switch-to-switch connections which cannot be supported by Sun.

Sun highly recommends the use of Sun Professional Services or highly accredited channel partner with strong Sun storage expertise for the proper design and implementation of a Storage Area Network in order to properly translate customer requirements into a feasible and supportable SAN solution.

For all interconnect components not sold by Sun but listed in the WWW matrix, Sun will support the 9900 subsystem connection(s) in that particular SAN environment, provided proper configuration rules are followed. Sun will not provide warranty (break-fix) support for any interconnect component not sold by Sun.

Q. What are Sun Support Services capabilities across customers' heterogeneous operating system environments?

A. Sun Support Services' operating system expertise is tops in Sun Solaris. In addition, Sun's Customer Care Centers provide support expertise for customer product connections involving qualified Sun storage products attached to non-Solaris hosts. This currently includes Windows 2000, Windows NT, Linux, IBM-AIX and HP-UX and MainFrame Operating Systems. The nature of this support expertise includes single path interoperability, dual path fail-over involving the Sun StorageTek Traffic Manager software, and the limited ability to re-create customer interoperability involving non-Solaris equipment operating within the approved configurations. (The ability to re-create customer interoperability configurations varies depending on supported geography.)

Sun does not provide break-fix support for non-Sun servers or HBAs, but does provide support for Sun storage connections into those hosts when operating within the approved configurations.

Q. How does Sun Support Services provide a compelling reason to repeatedly choose Sun StorageTek for data center storage?

A. Sun Support Services provides true end-to-end support expertise across customers' storage environment, server environment and interconnect. This goes beyond what any storage-only vendor can provide. As an example, Sun has a highly trained and experienced group called Storage ACES which spans Sun Support Services, Sun Professional Services, sales and product engineering. This is a global Sun community which shares best practices in storage and storage networking, where storage does not equal storage alone. Some team members have spent their entire career in storage while others bring a wealth of expertise from server support perspective including boot disk, server/storage clustering, volume management and application support. All members are expected to have expertise that spans beyond pure storage.

Sun Support Services also provides a centralized means in each major geography to provide integrated pre-sales configuration verification, installation support, and post-sales engineering support for product

configurations via Sun Storage Technical Service Centers. These centers also provide a means to coordinate the receipt and problem resolution as part of Sun Remote Services for proactive, and preventive support.

Sun Support Services provides Sun StorageTek customers with exclusive access to the Sun StorageTek Joint Support Center. The StorageTek Joint Support Center provides co-dedicated Sun and Hitachi Data Systems server, storage and interconnect equipment as well as personnel to provide joint problem resolution for Sun StorageTek customers.

Sun Support Services provides Solution Centers, parts depots and field engineering offices worldwide. These Solution Centers are networked worldwide to form a tight knit of shared best practices and knowledge management to leverage Sun's experience and solutions across the world to local Sun customers.

Sun Support also provides expertise that spans to numerous third-parties via Sun Support's extensive network of vendor support agreements. This expertise is in the form of product and support knowledge across interconnect and interoperability of third-party products with Sun storage and servers. Sun StorageTek Service Gold and Platinum customers can also gain access to the VERITAS-Oracle-Sun Joint Esc1STtion Center (VOS JEC) and to Sun's Vendor Integration Program (SunVIP [SM].)

Q. How does Sun Support compare against the competition in data center storage system support?

A. Storage-only vendors do not have Sun's expertise of Sun field and in-house experts across Sun servers, non-Sun server attachments to Sun storage, Sun storage, non-Sun storage attachments to Sun servers, Fibre networking including SAN and server cluster interconnect, Ethernet management and Sun software including server applications and storage applications.

Only Sun StorageTek 9900 customers have access to the Sun StorageTek Joint Support Center, which provides co-dedicated Sun storage and server experts along with HDS storage experts to resolve complex issues across servers, storage and interconnect.

Only Sun StorageTek Service Gold and Platinum customers have access to SunVIP and VOS JEC (VERITAS Oracle Sun Joint Esc1STtion Center.)

## Internal Only Questions & Answers

Q. What documents should I use to understand interoperability between the ST9985V, servers, operating systems, switches, switch firmware, clustering, multipathing, and TrueCopy?

A. Please refer to the documents described below, as well as the URL where you can find them.

- \* What Works With What (WWWW) (Published by Sun)  
-SunWIN Token # 385413  
This document identifies the the supported combinations of Servers, Operating Systems, Switches, and Switch Firmware levels which are supported.
- \* Feature Availability Report (FAR) (Issued by Hitachi Ltd and republished by Sun)  
-SunWIN Token # 385413  
This document focuses primarily on software support, with specific usefulness centered around TrueCopy Link Matrix, Cluster Support, and Multipathing Support.
- \* SAN Support Document (Issued by Hitachi Ltd and republished by Sun)  
This document states exactly which ST9985V and Sun SAN products have joint Sun/Hitachi Support Statements. Joint Sun/Hitachi Support Statements are required before Sun support can be declared.

Please refer to the following web page for the latest compatibility information. This information changes on a regular basis and it is strongly recommended that this web site be reviewed rather than depending on the information in this SunIntro which may rapidly become out of date.

- 1) Go to <http://sejsc.ebay/>
- 2) Look to your left column on this web page.
- 3) Click on "WWWW"

Q. Can I still sell the ST9985?

A. Yes. Please continue to sell the ST9985. This system will continue to be sold for the foreseeable future.

Q. Where do I go to configure the ST9985V system and software?

A. Configure the ST9985V via the same landing page as the current PXtool: <https://channelone.hds.com/launch>.

Please check out the best practices guide available on the landing page for your convenience and to help with a smooth transition to the new tool.

Q. Can you place Tape on the External Storage Ports (also known as e-ports)

A. There are no approved plans to do this at this time. Please send a business justification for this to [Ken.Ow-Wing@Sun.com](mailto:Ken.Ow-Wing@Sun.com) if you believe this to be a requirement.

Q. What are the most relevant performance parameters that I should consider?

A. The target of 800K IOPS vs. current ST9985 700K IOPS + performance improvements to local and remote replication, and external storage bandwidth.

Full 4Gb/second Fibre Channel front and back (Channel adapters, disks,

and back-end storage adapters. Unlike current ST9985 that has 4Gb/s front-end (adapters), but only 2Gb/s back-end (to disks).

The maximum internal bandwidth was increased from 12GB/s on the ST9985 to 13.3 GB/s on the ST9985V

Q. This product update doesn't include consolidation allowances. Where do I obtain values for the storage systems that I want to consolidate onto the ST9985V?

A. The size and scope of consolidations vary from customer to customer and situation to situation.

Q. What is the i18n/l10n compliance of the ST9900 series software products in this announcement?

A. ST9990 software is available in English and Japanese. HiCommand and Sun Dynamic Link Manager (SDLM) are i18n compliant. The Sun StorageTek SDLM series software is available in English.

A waiver for Localization (l10n) has been granted for ST9900 Series software. Periodic reviews with Product Authorization Committee (PAC) are conducted to ensure compliance.

Q. Is the ST9985 upgradeable to the ST9985V?

A. The ST9985 is not directly upgradeable to a ST9985V. However, it can be virtualized by the ST9985V as a member external storage.

Q. How can I upgrade an ST9910/60/70/80 to a ST9985V?

A. The ST9910/60/70/80 are not directly upgradeable to a ST9985V. However, they can be virtualized behind the ST9985V system.

A complete swap upgrade is available using Sun's Upgrade Allowance Program. Sun Professional Services can perform data migration service to complement the upgrade.

Q. Does the ST9985V work with ST9910/60/70/80/85/90/90V?

A. The ST9985V will work with the ST9910/60/70/80/85/90/90V at multiple levels.

First, the ST9985V will work with ST9910/60/70/80/85/09/90V with TrueCopy for short and long distance replication.

Second, cross platform copy software is available for use with ST9910/60/70/80/85/09/90V. (Insystem-Replication Suite)

Third, is the ability for the ST9985V to virtualize multiple tiers of storage, both Sun, Hitachi Data Systems and other vendor storage systems.

Q. Can an you put FC-SATA HDDs in the ST9985V?

A. Higher capacity FC-SATA HDDs are planned for later availability. Please stay tuned to the hdsconfig.global.net alias and if intentions become firm plans, a communication will be sent to this alias.

We will accommodate array systems designed to be commensurate with the economics, availability, reliability, and performance requirements associated with the SATA-based array market space. The ST9985V design parameters are for the Low/Mid Data Center market space.

Q. What is the target market?

A. The target customers for the ST9985V are small to medium enterprise storage consumers that require solutions for storage aggregation, consolidation, simplification, tiered storage, data lifecycle



management, data protection and disaster recovery. Although the ST9985V can provide a platform for building solutions across virtually all vertical markets, the Financial Services, Telecom, Utilities, Transportation, Healthcare, Federal, State and Local Governments and Pharmaceutical industries provide especially good targets because of their storage growth and need for high performance, high availability storage solutions.

Q. What business value/benefit does the ST9985V bring to a customer?

- A. 1- Reduced costs through storage consolidation/aggregation and increased management efficiencies
- 2- Ensures QOS with Virtual Partitioning (Virtual Storage Machines) by removing the contention for valuable storage resources
- 3- Significantly improved service levels and lower costs associated with business continuity deployment and practices
- 4- ST9900 Dynamic Provisioning software reduces TCO, eliminates application service interruptions, simplifies storage administration and reduces power and cooling requirements
- 5- Higher return on investment by extending the life of current assets and enabling more efficient implementation new technologies

Q. What are the top problems addressed by the ST9985V?

- A. 1- Difficulty managing storage growth while keeping costs down due to low storage utilization, unplanned interruptions for capacity upgrades.
- 2- Existing storage doesn't scale due to performance, capacity, and security limitations.
- 3- Planning to consolidate multiple storage systems and need to maintain application isolation and Quality of Service
- 4- Difficulty meeting application availability targets due to service interruptions from adding additional storage capacity.
- 5- Inability to rapidly respond to changing user and application storage needs
- 6- Difficulty managing storage complexity and cost from multiple heterogeneous storage systems.
- 7- Inability to transparently migrate aging data to lower-cost storage technologies.

Q. How does storage consolidation differ between the ST9970/ST9980 Series and ST9985V systems?

A. With major improvements in scalability and performance, customers can consolidate much more capacity onto a ST9985V. Then, add aggregation to the equation with attachment of other storage devices and the ST9985V takes consolidation to the next level -- aggregation. A ST9985V presents all storage attached to it as if it were its own and makes data migration/movement a much easier process.

Q. How does the ST9985V provide a base for storage consolidation and investment protection?

A. For customers with investments in older, but still functional storage, the ST9985V's unique ability to attach and virtualize external storage delivers operational savings while enabling consolidation/aggregation, migration of critical data to higher performance storage, and repurposing and extending the useful life of existing systems to protect investments.

With ST9985V's external FICON support for mainframe customers (late CY2007) will enable them to take advantage of storage virtualization for their existing FICON environments. The ST9985V is able to provide the industry's only complete mainframe virtualization solution.

Q. How does the ST9985V support a tiered storage infrastructure?

A. For customers running multiple applications with varying requirements, the ST9985V's unique ability to host tiered storage and enable logical partitioning reduces investment and operational costs by providing tiered storage within a single, centrally managed system. ST9900 Tiered Storage manager software allows the customer to dynamically and non-disruptively move their application data to the right platform as the value or the processing characteristics of the data changes over time. It can do this with internal storage as well as that of externally virtualized heterogeneous storage systems.

Q. How do I order the ST9985V?

A. The ST9985V model including both hardware and software is available in Comergent at GA. A webinar training is available to provide application training for the Comergent tool as well as how to configurator the ST9985V within the new tool.

## Sun Educational Services

### 20. TRAINING PLAN

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Field Support SE's, Professional Services, Solution Center Engineers, Channel, Service Delivery Partners: The ST9985V System represents an evolution of the current ST9985 products. The ST9985V surpasses the performance, capacity, and scalability of the current product line, delivers thin provisioning, and extends the capabilities of the market-leading controller-based virtualization platform, while minimizing impact on current Data Center operations. The target audience needs to be able to install, configure and troubleshoot the new ST9985V storage array.

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## Field Enablement Sales Awareness

StorageWeeklyCallWebinar: "Sales and Technical Differences webinar" on ST9985 and

ST9985V, ST9990 and ST990V Avail 10/2/07.

[http://mysales.central.sun.com/public/storage/events\\_and\\_activities/storage\\_conference\\_calls/](http://mysales.central.sun.com/public/storage/events_and_activities/storage_conference_calls/)

Newsletter: Sun Storage Newsletter

ST9985V [http://mysales.central.sun.com/public/storage/events\\_and\\_activities/storage\\_conference\\_calls/#newsletter](http://mysales.central.sun.com/public/storage/events_and_activities/storage_conference_calls/#newsletter)

**Sun Learning Services (SLS)** <http://mylearning.central.sun.com/>

## **Sales, Pre-sales Technical, and Channel Training**

Course: WZO-1490 Sun Storage Tek 9985V Sales and Technical Differences – Avail 10/15/07

## **Customer**

Administration and Configuration (Customer class) HDS420 Increased to 3 day ILT. New course number tbd.

## **Services Support Training**

Course IESHDS451 Increased to 5 day SE training (Replaces IESHDS420). Available 11/30/07.

Course: WH1513 WBT: ST9985 to ST9985V Differences (for trained Support Engineers) Avail. 10/5/07.

## **Complete Service Training Path:**

Course: IESHDS424 5 day Installation and Maintenance Class

Course: IESHDS450 9990V differences 2 Day ILT. Avail now.

Course: WH1513 WBT: ST9985 to ST9985V Differences (for previously trained Support Engineers). Avail 10/5/07.

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Field Enablement Sales Awareness

Storage Weekly Call Webinar: ?Sales and Technical Differences  
webinar? on ST9985 and ST9985V, ST9990 and ST990V Avail 10/2/07.

[http://mysales.central.sun.com/public/storage/events\\_and\\_activities/storage\\_conference\\_calls/](http://mysales.central.sun.com/public/storage/events_and_activities/storage_conference_calls/)

Newsletter: Sun Storage Newsletter ST9985V

[http://mysales.central.sun.com/public/storage/events\\_and\\_activities/storage\\_conference\\_calls/#newsletter](http://mysales.central.sun.com/public/storage/events_and_activities/storage_conference_calls/#newsletter)

Sun Learning Services (SLS) <http://mylearning.central.sun.com/>

Sales, Pre-sales Technical, and Channel Training

(Course # tbd) Sun StorageTek 9900 Series Sales Fundamentals and  
Introducing the 9985V

(Course # tbd) ST9985 and ST9900 Technical Fundamentals and  
Introducing the 9985V

Web-based: Sun Storage University Sales and Technical USEFUL training  
Levels 1-4  
Customer

Administration and Configuration (Customer class) HDS-420 Increased to  
3 day ILT. New course number tbd.

Services Support Training

Course IESHDS-451 Increased to 5 day SE training (Replaces  
IESHDS-420. Available 11/30/07.

Course: WH-1513 WBT: ST9985 to ST9985V Differences (for trained  
Support Engineers) Avail. 9/30/07.

Complete Service Training Path:

Course: IESHDS-424 5 day Installation and Maintenance Class

Course: IESHDS-450 9990V differences 2 Day ILT. Avail now.

Course: WH-1513 WBT: ST9985 to ST9985V Differences (for previously  
trained Support Engineers). Avail 9/30/07.

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Sales and Pre-Sales Training

Audience - Sales

WZO-1506 StorageTek 9900 Series Sales Essentials ? 1 hour Web-based  
Available 6/22/07 Register at Sun LMS via myHR

Audience - Pre-Sales Technical

WZO-1507 StorageTek 9900 Series Technical  
Essentials - 3 hour Web-based Available 7/12/07 Register at Sun LMS  
via myHR

Additional Pre-Sales Technical Training

Device Manager Technical Webinar ? 1.5 hour webcast. Available 7/11/07.

Dynamic Provisioning Technical Webinar ? 1.5 hour webcast. Available 7/12/07.

Sun StorageTek 9900 Series Network Storage Controller Architecture and Administration ? 5 day classroom/lab Available 7/12/07. Register at [sun.com/training](http://sun.com/training)

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Sun Learning Services will send out regular email communications regarding training updates, changes to time lines, announcement information. The partner website will be updated in the "What's New" section to include information about registering for partner-ready webinars, seminars, and conference calls. "Selling@Sales" will be used as well as other field aliases to communicate and promote registration information for web-based training.

To access the Sun Learning Management System for web-based training courses:

1. Login to Sun LMS via myHR with your Sun ID & LDAP password
2. Select "Learning" from the Key Links
3. Search for course title ("Installing Asset Management") or code ("WZO-1522") (using starts with, exact, contains)
4. Click course title link
5. Click enroll in course
6. Click launch course

If you experience any problems accessing the Sun LMS using the above instructions, try to Login via the Contractor login to Sun LMS with your Sun ID & LDAP password.

To access the Sun Product Training from the Partner Portal:

<http://pwtraining.eu.sun.com/> (EMEA)

<http://pwtraining.sun.com/> (AMER)

<http://pwtraining.pr.sun.com/> (APAC)

## Sun Professional Services

### Sun StorageTek 99985V Implementation Service

BOS Virtual Service- Service is a combination of both the Virtual Partition Manager (VPM) and Universal Volume Manager (UVM) Software components. The service is appropriate for both Open Systems and Mainframe environments. Depending on the customer requirements the service may include:

- 1) additional VPM support for up to 8 Virtual Partitions (VPM Medium configuration PN)
- 2) #1 above and additional support for UVM components (UVM Small, Medium, Large, XL PN's)
- 3) or just UVM components (UVM Small, Medium, Large, XL PN's) with no additional VPM support

Disaster Recovery Service- Service is a combination of Sync TrueCopy (TC Sync) and Universal Replicator (UR) Software components. The service is appropriate for both Open Systems and Mainframe environments. Again depending on the customer's requirements the service may include:

- 1) TrueCopy Sync services for Small, Medium, and Large configurations (TCS SM, MED, LG configuration PN's)
- 2) Universal Replicator services for Small, Medium, Large, and XL configurations (UR SM, MED, LG, XLG PN's)

- 3) or a combination of any of the above components from #1 and #2 above, for example a Medium TCS component with and XLG UR component depending on the customer's requirements.

Disaster Recovery Extended Service- Service is a Custom engagement and is built on a combination of Sync TrueCopy (TC Sync) and Universal Replicator (UR) Software Advanced Features components. The service is custom scoped and priced depending on the customer's requirements. The service supporting "3 Data Center" for Open Systems and "4x4x4" and "6x6x6" for z/OS environments. Again depending on the customer's requirements the service may include:

- 1) components of the TrueCopy Sync services for Small, Medium, and Large configurations (TCS SM, MED, LG configuration PN's)
- 2) and the advanced Features of Universal Replicator software services for Small, Medium, Large, and XL configurations (UR SM, MED, LG, XLG PN's)

In-System Replication Service- Service is composed of ShadowImage (SI) for both Open Systems and Mainframe as well as Copy on Write (CoW) for Open Systems environments. Depending on the customer requirements the service can include:

- 1) the service may include ShadowImage (SI) Small, Medium, Large configurations (SI SM, MED, LG PN's) for Open Systems or Mainframe environments
- 2) and, or Copy on Write (CoW) Small, Medium, Large configurations (CoW SM, MED, LG PN's) for Open Systems environments

Dynamic Provisioning Service- Service is composed of Custom Assessment Services to help customers determine the potential ROI from an investment in Dynamic Provisioning, and a Custom Optimization service which is based of the output of the Assessment Service. This service is for Open Systems environments only and is not applicable to Mainframe environments. The services are custom services and scoped and priced on the size of the customer's environment and the level of effort required to complete the services. It is a two (2) step process to engage Professional Services:

- 1) Assessment Service is purchased and completed and an executive report is generated covering the possible ROI the customer's will see in their environment if the plan is followed and all the steps implemented as outlined.
- 2) The Optimization Service is the follow on to the Assessment Service and takes the components selected by the customer and then integrates the Dynamic Provisioning Software features into the customer environment.

The Storage and Data Management Practice supports the release of J4 (SE 9985V).

For the ST9985V, Sun Support Services will deliver Professional Services relating to the installation, and implementation of a complete data management solution. Professional Services will be responsible for the pre-sales assessment, architecture and design of these solutions. Implementation services are price listed for the ST9900 product line and will be available for the ST9985V.

Sun Services delivers a number of new services built around the software capabilities of the ST9985V. Implementations are available for the Base Operating System, Disaster Recovery, Disaster Recovery Extended, In-Service Replication, Dynamic Provisioning and Mainframe Software, for both Open Systems and mainframe environments.

## Installation

### Planning for Installation and Operation

Go here:

<http://pts-storage.west/products/T99x0/documentation.html>

Please refer to the following document:

*Universal Storage Platform VM Installation Planning Guide (MK-97RD6079)*

## Installation Requirements

This chapter provides the installation requirements for the Universal Storage Platform VM storage system.

1. [Safety Requirements](#)
2. [Delivery Requirements](#)
3. [Storage Requirements](#)
4. [Facilities Requirements](#)
5. [Physical Specifications and Requirements](#)
6. [Power Specifications and Requirements](#)
7. [Environmental Specifications and Requirements](#)
8. [Operational Requirements](#)



**Note:** The general information in this chapter is provided to assist in installation planning and may not be complete. The installation and maintenance documents used by Hitachi Data Systems personnel (e.g., Maintenance Manual) contain complete specifications. The exact electrical power interfaces and requirements for each site must be determined and verified to meet the applicable local regulations.

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## Safety Requirements

The safety requirements for Universal Storage Platform VM installation are:

- **Safety regulations:** The data center must comply with all applicable safety regulations, standards, and requirements.
- **Fire protection:** The data center must have an operational fire protection system.
- **Hazards:** The data center must be free of hazards (e.g., cables on the floor that obstruct access).

Observe the following general safety requirements:

- **Cabling:**
  - Do not obstruct walkways when routing cables.
  - Do not place heavy materials on cables.
  - Do not place cables near any possible source of heat.
- **Warning labels:** Obey all warning labels. When warning labels become dirty or start peeling off, replace them.
- **Authorized personnel:** Allow only qualified and authorized personnel (e.g., certified electrician) to perform tasks that may be hazardous to persons and/or equipment.



## Delivery Requirements

The customer site must accommodate the delivery and movement of the equipment to the installation location in the data center.

The delivery requirements for Universal Storage Platform VM installation are:

- **Dimensions:** The loading bay, hallways, doors, elevators, and stairs must be large enough to allow the delivered equipment to be moved to the installation location.

The shipping crate dimensions are:

Height: 84 inches (2.134 meters) (overall height including palette)

Width: 42 inches (1066.8 mm)

Depth: 55 inches (1397 mm)

See Service Clearance, Floor Cutout, and Floor Load Rating for the dimensions of the USP VM product (uncrated and unpacked).

See Dimensions and Weight for the dimensions of the USP VM components.

- **Weight:** The floors, elevators, stairs, and ramps must be able to support the weight of the delivered equipment as it is moved to the installation location. Spreader plates may be required to distribute the load and/or protect the floor as the equipment is moved to the installation location.

The weight of the delivered equipment depends on the storage system configuration. The weight for a maximally configured storage system could reach 1600 or 1700 pounds (726 to 771 kilograms).

See Dimensions and Weight for the weight specifications for the Universal Storage Platform VM components.

## Storage Requirements

If the delivered equipment needs to be stored after delivery and prior to installation, the storage location must meet the environmental requirements for the Universal Storage Platform VM (see Table 2-2).

Table 2-2 Environmental Specifications for Storage

Parameter	Shipping&Storage*	
	Low	High
Temperature°F(°C)	5 (-25)	140(60)
RelativeHumidity(%) <sup>4</sup>	5 – 95	
Max.WetBulb°F(°C)	84(29)	
TemperatureDeviation°F/hour(°C/hour)	36(20)	

\* For storage, the equipment should be packed with factory packing.

## Facilities Requirements

The customer site must meet the following facilities requirements:

- **General:** The data center must be fully operational (e.g., power, air conditioning, cabling, fire protection system).
- **Floor:** The data center must have a tiled raised floor.
- **ESD:** The data center must provide adequate protection from electrostatic discharge (ESD).
- **Electrical interference:** The data center must provide adequate protection from electrical/radio frequency interference.
- **Dust, pollution, and particulate contamination:** The data center must provide adequate protection from dust, pollution, and particulate contamination.
- **Acoustics:** The data center must provide adequate acoustic insulation for operation of the Universal Storage Platform VM.
- **Customer-supplied hardware:** The customer-supplied hardware (e.g., connectors, receptacles) must be available and ready for installation of the Universal Storage Platform VM.

## Physical Specifications and Requirements

Figure 2-1 shows a physical overview of the Universal Storage Platform VM. The physical specifications and requirements for the USP VM include:

- [Dimensions and Weight](#)
- [Service Clearance, Floor Cutout, and Floor Load Rating](#)

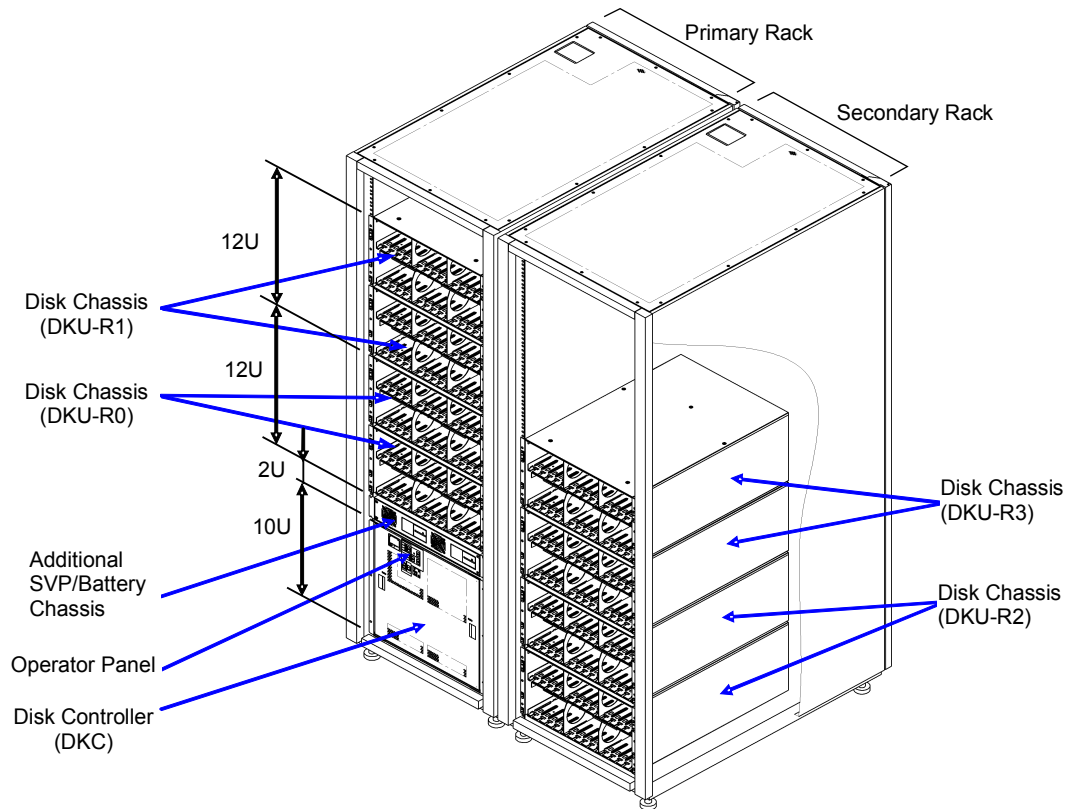


Figure 2-1 Physical Overview of the Universal Storage Platform VM

## Dimensions and Weight

Figure 2-2 shows the dimensions of the single-rack configuration. Figure 2-3 shows the dimensions of the twin-rack configuration. Table 2-3 lists the dimension and weight specifications for the Universal Storage Platform VM components.

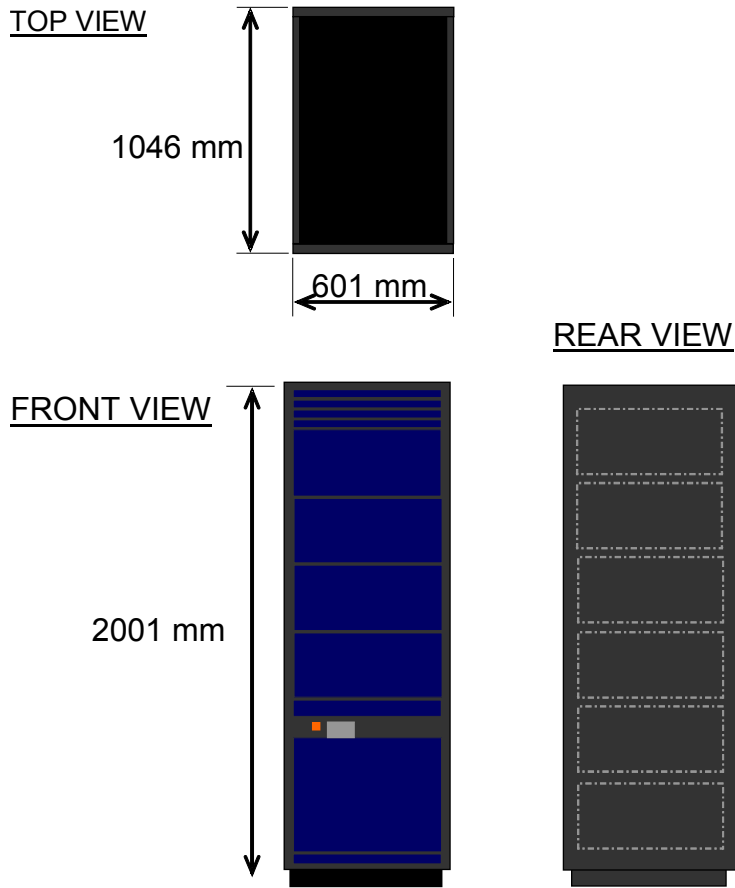


Figure 2-2 Physical Dimensions: Single-Rack Configuration

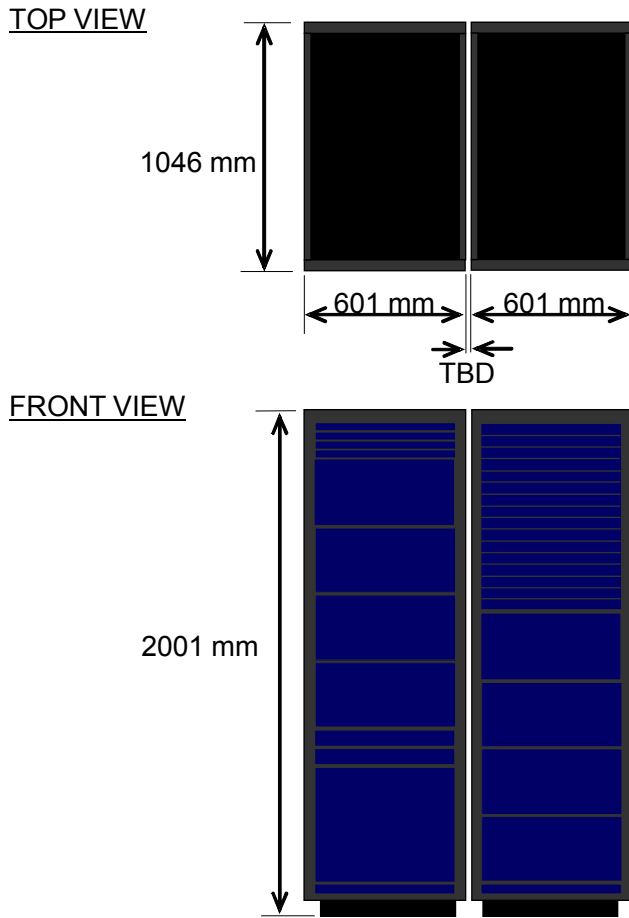


Figure 2-3 Physical Dimensions: Twin-Rack Configuration

Table 2-3 Component Specifications: Weight and Dimension

ModelNumber	Weight(kg)	Dimension(mm)		
		Width	Depth	Height
DKC615I5	70	445	800	438
DKCF615IB2	80.5	445	647	522
DKCF615ISBX	13	445	800	84
DKCF615ILGAB	11	—	—	—
DKCF615IPLUC	2.0	—	—	—
DKCF615IPHUC	4.0	—	—	—
DKCF615IPLC	1.5	—	—	—
DKCF615IPHEC	2.5	—	—	—
DKCF615IUC0	3.2	—	—	—
DKCF615IUC1	2.1	—	—	—
DKCF615IEXC0	6.2	—	—	—
DKCF615ISX	1.2	—	—	—
DKCF615IS4GQ	0.08	—	—	—
DKCF615IDKA	2.6	—	—	—
DKCF615ICX	2.2	—	—	—
DKCF615IC4G	0.08	—	—	—
DKCF615IC8G	0.08	—	—	—
DKCF615I8S	2.7	—	—	—
DKCF615I8MFS	3.0	—	—	—
DKCF615I8MFL	3.0	—	—	—
DKCF615I8FS	2.8	—	—	—
DKCF615I16FS	3.0	—	—	—
DKCF615I1FL	0.02	—	—	—
DKCF615I1FS	0.02	—	—	—
DKCF615ISVP	4.1	—	—	—
DKCF615IMDM	0.07	—	—	—
DKCF615I72KS	0.9	—	—	—
DKCF615I146KS	0.9	—	—	—
DKCF605I300KS	0.9	—	—	—

## Service Clearance, Floor Cutout, and Floor Load Rating

This section specifies the service clearance requirements (a + b) for the Universal Storage Platform VM storage system, based on the floor load rating and the clearance (c), and the required floor cutouts for cabling.

- Figure 2-4 shows the service clearance and floor cutout requirements for the single-rack configuration. Table 2-4 shows the floor load rating and clearance requirements for this configuration.
- Figure 2-5 shows the service clearance and floor cutout requirements for the twin-rack configuration. Table 2-5 shows the floor load rating and clearance requirements for this configuration.



### Notes:

- (a) For safe and efficient maintenance operations, clearance (c) should be made as large as possible.
- (b) Actual clearances for installation should be determined after consulting with the site/facilities manager, as the clearances could vary depending on the building conditions.

Table 2-4 Floor Load Rating and Clearances: Single Rack

Floor Load Rating kg/m <sup>2</sup> (lb/ft <sup>2</sup> )	Required Clearance(a+b)m				
	Clearance(c)m				
	C=0	C=0.2	C=0.4	C=0.6	C=1.0
500(102.4)	0.2	0.2	0.2	0.2	0.2
450(92.2)	0.2	0.2	0.2	0.2	0.2
400(81.9)	0.2	0.2	0.2	0.2	0.2
350(71.7)	0.3	0.2	0.2	0.2	0.2
300(61.4)	0.6	0.4	0.3	0.2	0.2

Table 2-5 Floor Load Rating and Clearances: Two Racks

Floor Load Rating kg/m <sup>2</sup> (lb/ft <sup>2</sup> )	Required Clearance(a+b)m				
	Clearance(c)m				
	C=0	C=0.2	C=0.4	C=0.6	C=1.0
500(102.4)	0.2	0.2	0.2	0.2	0.2
450(92.2)	0.2	0.2	0.2	0.2	0.2
400(81.9)	0.2	0.2	0.2	0.2	0.2
350(71.7)	0.4	0.3	0.2	0.2	0.2
300(61.4)	0.8	0.6	0.5	0.4	0.2



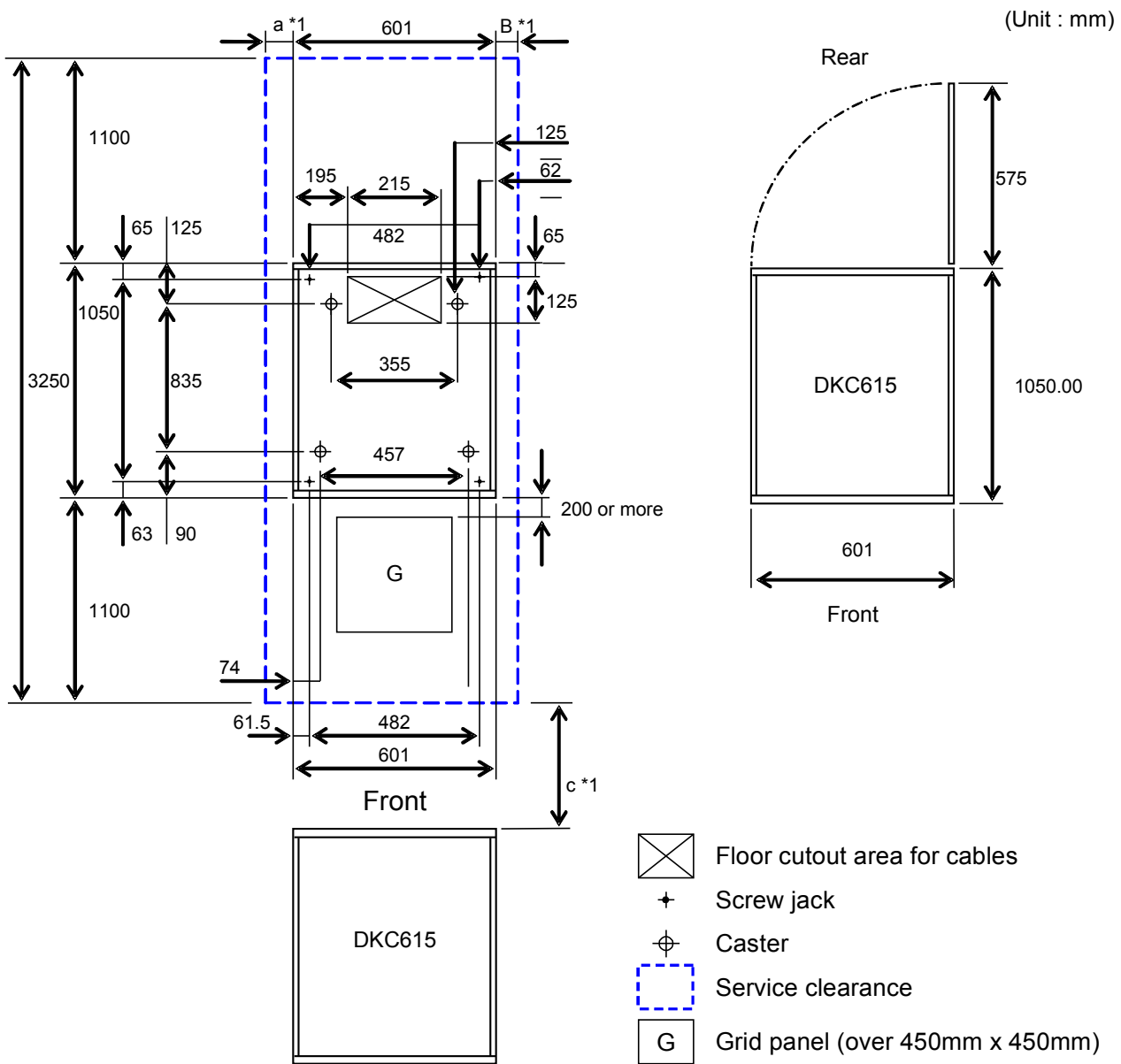


Figure 2-4 Service Clearance and Floor Cutouts: Single Rack

**Notes:**

Clearance  $(a+b)$  depends on the floor load rating and clearance  $(c)$ . See Table 2-4 for floor load rating and clearance requirements.

Leave clearance of 100 mm on both sides of the storage system when the stabilizer plate(s) are to be attached after the storage system is installed. When storage systems of the same type are to be installed adjacent to each other, the minimum clearance between the storage systems is 100 mm.

Dimensions in parentheses show allowable range of the floor cutout dimensions. Position the floor cutout in the center of the storage system. The position may be off-center if the cutout allows smooth entrance of an external cable. Check the relation between the positions of the cutout and the opening on the bottom plate of the storage rack, and verify that it is within the allowable range.

This dimension varies depending on the floor cutout dimensions.

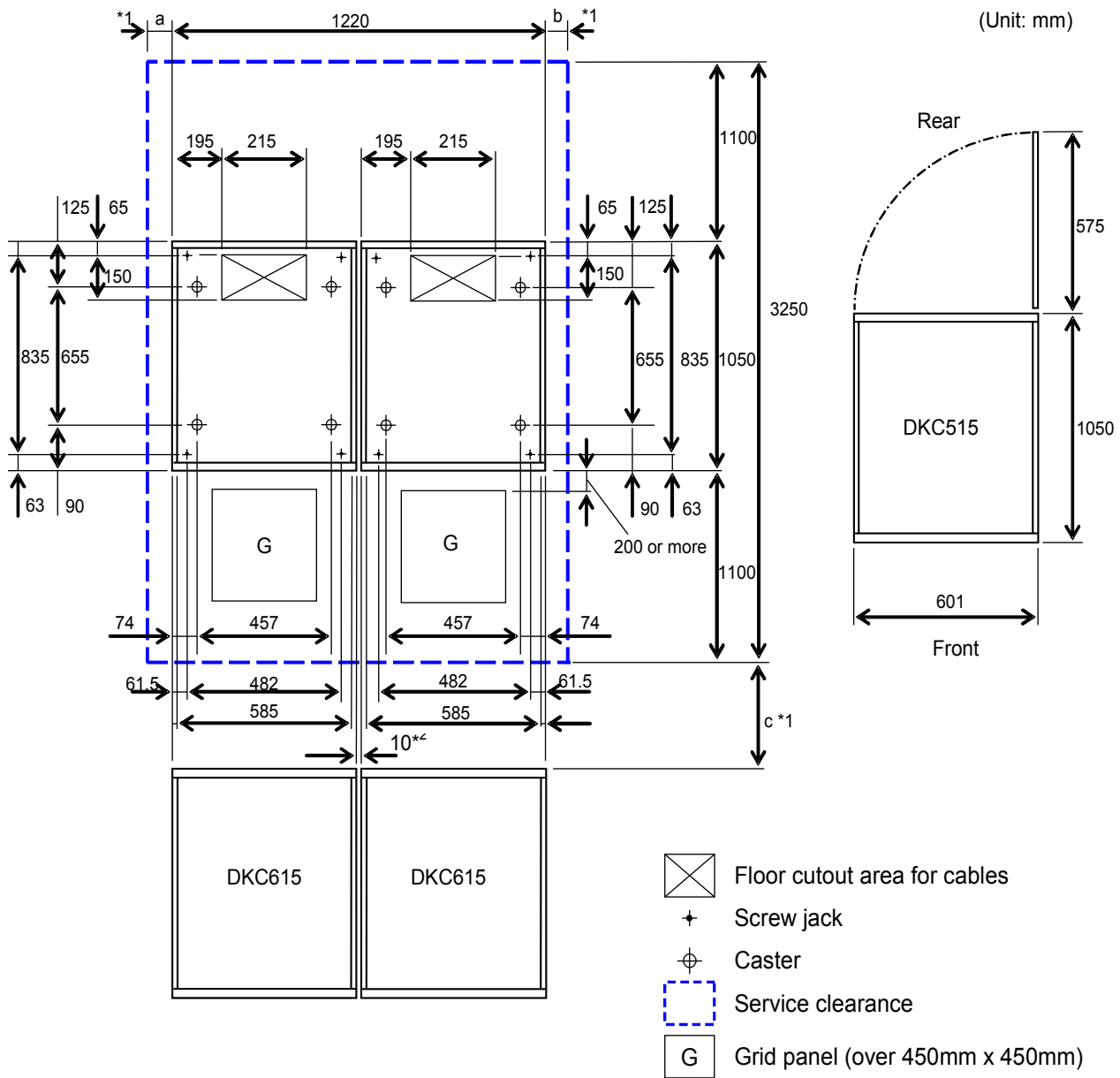


Figure 2-5 Service Clearance and Floor Cutouts: Two Racks

**Notes:**

1. Clearance(a+b) depends on the floor load rating and clearance(c). See Table 2-5 for floor load rating and clearance requirements.

Allow clearance of 100 mm on both sides of the storage system when the stabilizer plate(s) are to be attached after the storage system is installed. The stabilizer plates have dimensions (H x W x D) of 74 mm x 500 mm x 220 mm or 2.9 inches x 19.6 inches x 8.6 inches.

When storage systems of the same type are to be installed adjacent to each other, the minimum clearance between the storage systems is 100 mm.

When installing a second rack, be sure to leave a 10-mm space.

## Power Specifications and Requirements

This section describes the power specifications and requirements for the Universal Storage Platform VM storage system:

- [Power Specifications and Power Supplies](#)
- [Breaker Configurations](#)
- [Power Connection](#)
- [Input Voltage and Input Frequency](#)
- [Circuit Breakers and Plugs](#)

### Power Specifications and Power Supplies

Table 2-6 lists the power specifications for the Universal Storage Platform VM, including inrush current, leakage current, input current, and steady current. Figure 2-6 shows the locations of the power supplies.

*Table 2-6 Current Specifications*

PowerSupplyLocation	Input Power	InrushCurrent			Leakage Current	Input Current <sup>1</sup>	Steady Current <sup>2</sup>
		1st (0-p)	2nd (0-p)	1st(0-p)Time (-25%)			
DKCPS11,12	1-phase	10.5A	7.0A	0.2ms	0.29mA	5.6A	2.8A
DKCPS21,22	1-phase	10.5A	7.0A	0.2ms	0.29mA	5.6A	2.8A
DKUPSx01,11,21,31	1-phase	12.5A	5.0A	0.2ms	0.2mA	2.4A	1.2A
DKUPSx00,10,20,30	1-phase	12.5A	5.0A	0.2ms	0.2mA	2.4A	1.2A

**Notes:**

2. This is the maximum current when there is only one AC input power line (non-redundant configuration).

This is the maximum current when there are two AC input power lines (redundant configuration).

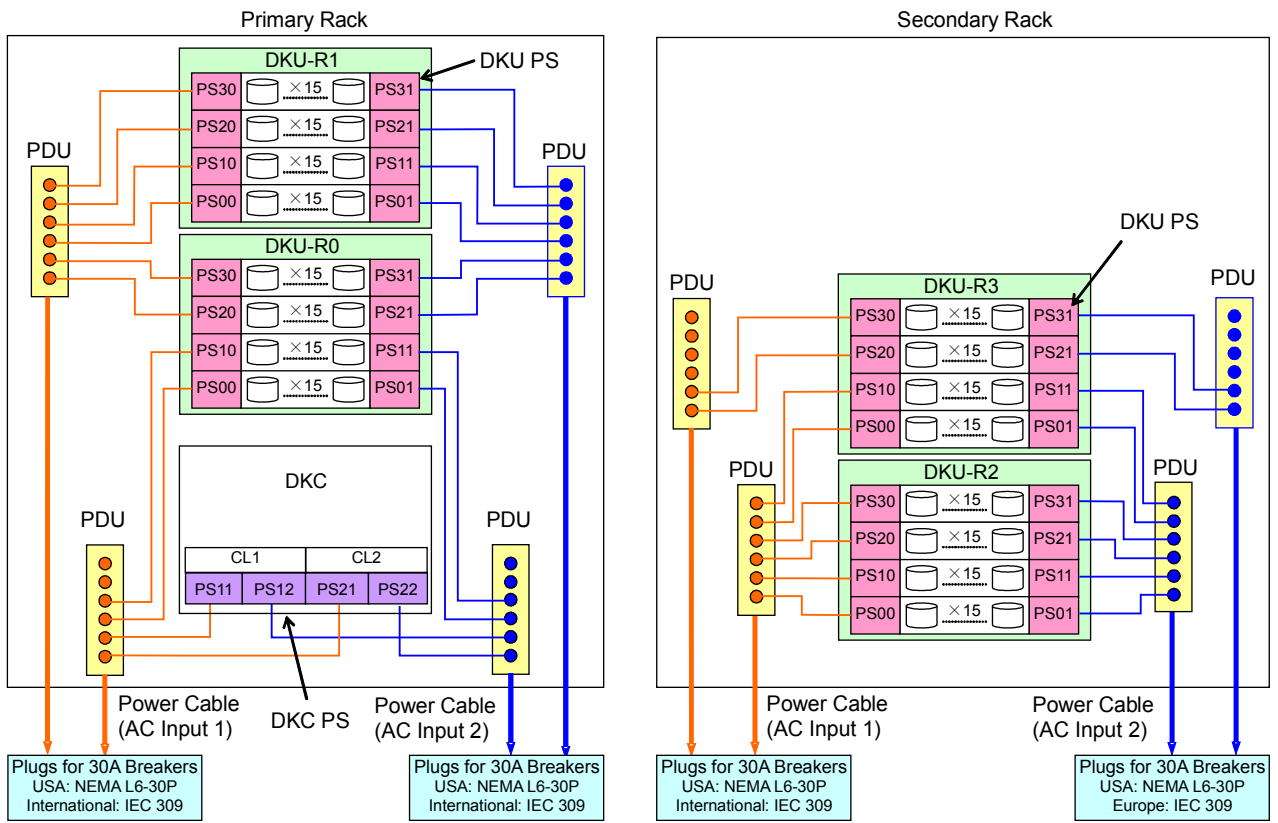


Figure 2-6 Power Supply Locations

## Breaker Configurations

For both racks, AC power is supplied to each power distribution unit (PDU) from the breaker. Figure 2-7 and Figure 2-8 show the breaker configurations for the primary and secondary racks, respectively.

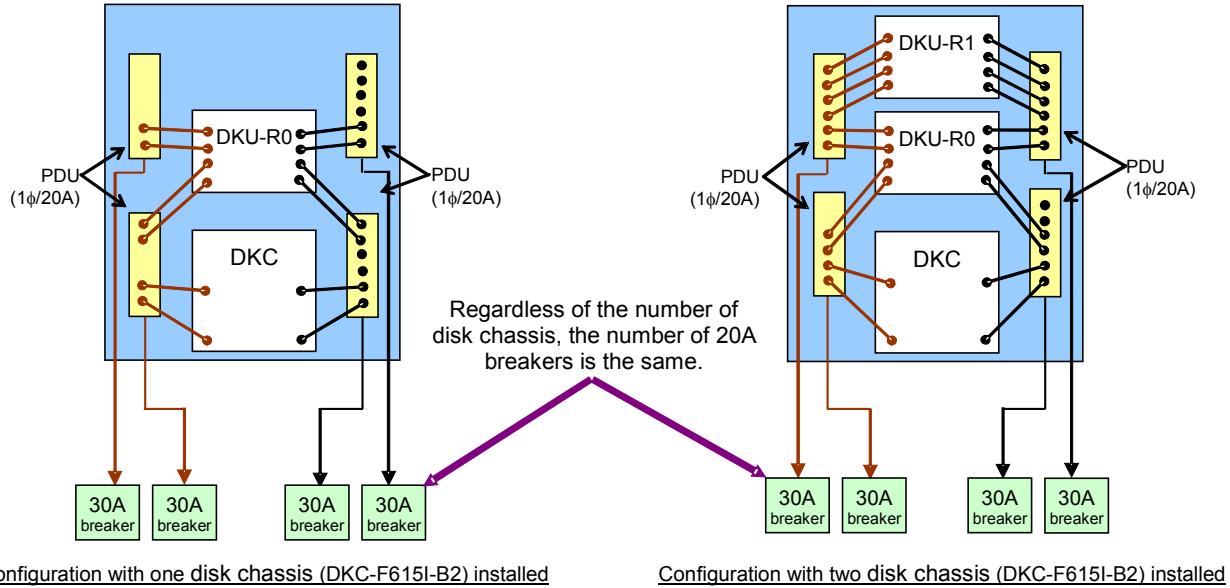


Figure 2-7 Breaker Configurations for the Primary Rack

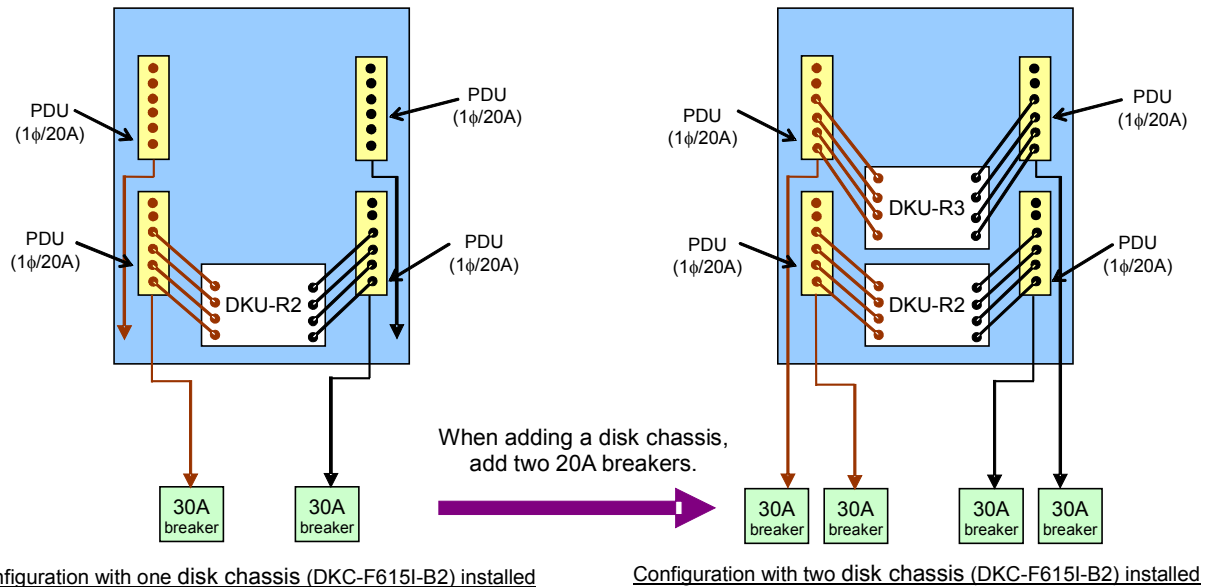


Figure 2-8 Breaker Configurations for the Secondary Rack

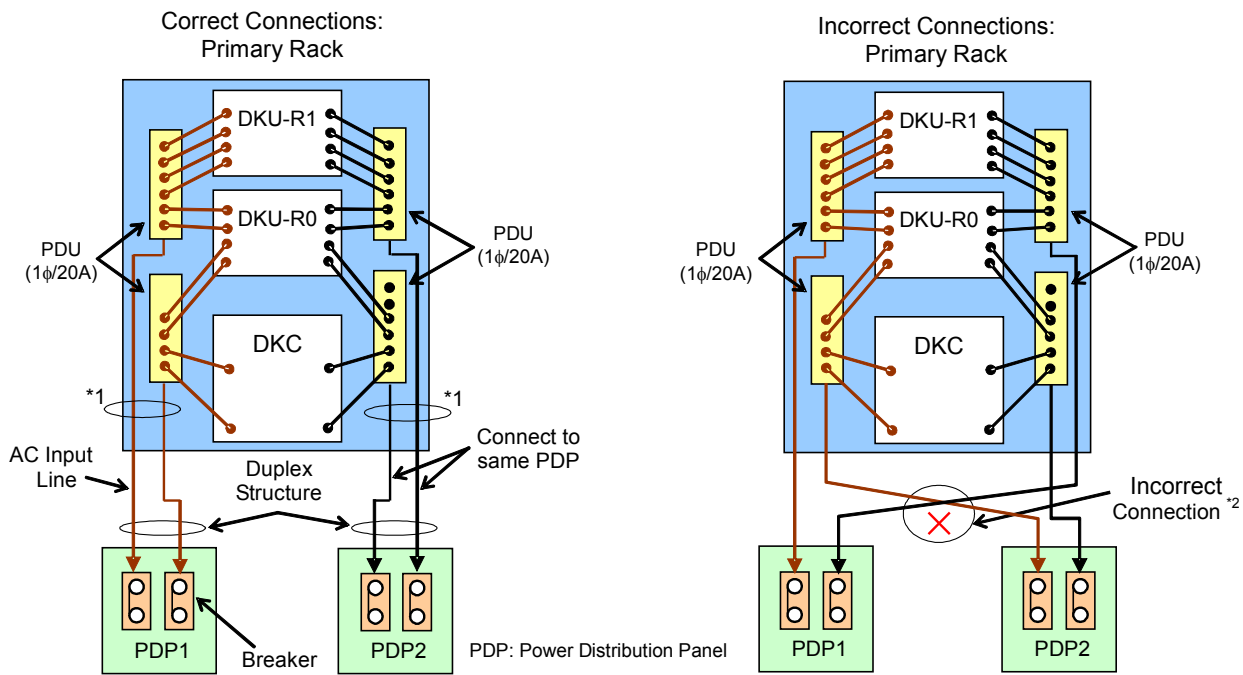
## Power Connection

The AC power input for the Universal Storage Platform VM has a duplex PDU structure. This duplex structure enables the entire rack to remain powered on in the event that power is removed from one of the two power distribution panels (PDPs).

- **Direct connection to power.** Figure 2-9 shows the power connections when the AC input lines are connected directly to the power facility.
- **Power connection through UPS.** Figure 2-10 shows the power connections when half of the AC input lines are connected to an uninterruptible power supply (UPS), and the other half of the AC input lines are connected directly to the power facility.



**Caution:** When installing the USP VM, be sure to connect the AC cables between the PDUs and PDPs correctly. If these cables are connected incorrectly, a system failure will occur when one of the AC inputs is interrupted. Figure 2-9 illustrates the correct connections (drawing on the left) and the incorrect connections (drawing on the right).



\*1: When connected correctly, two of the four PDUs can supply power to the entire rack.

\*2: If connected incorrectly, the two PDUs cannot supply power to the entire rack, which causes a system failure.

Figure 2-9 *Direct Power Connection*

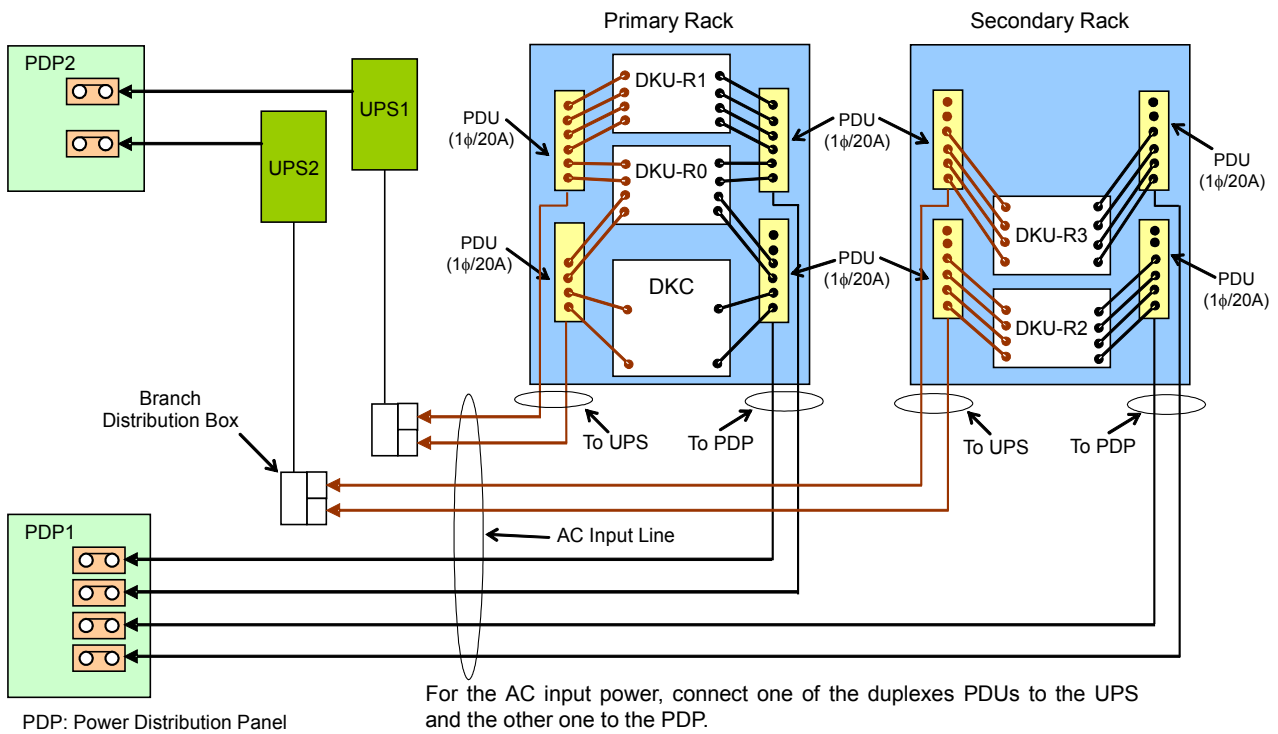


Figure 2-10 Power Connection through UPS

## Input Voltage and Input Frequency

Table 2-7 lists the input voltage and input frequency requirements for the Universal Storage Platform VM.

*Table 2-7 Input Voltage and Input Frequency Requirements*

Frequency	Input Voltages(AC)	Conditions	Tolerance(%)
60Hz±2Hz	200V,208V or 230V	1 Phase 2 Wire+ Ground	+6% or -8%
50Hz±3Hz	200V,220V,230V or 240V	1 Phase 2 Wire+ Ground	+6% or -8%

## Circuit Breakers and Plugs

The PDU plugs are appropriate for the power sources at the installation sites:

- For installations within the U.S., the plugs are NEMA L6-30P, which are rated as 30A and 250V and have two 16A circuit breakers with 20A trip values.
- For installations outside the U.S., the plugs are IEC 309, which are rated as 32A and 250V and have two 16A circuit breakers with 20A trip values.



## Environmental Specifications and Requirements

The environmental specifications and requirements for the Universal Storage Platform VM include:

- [Temperature, Humidity, and Altitude](#)
- [Heat Output, Power Consumption, and Air Flow](#)
- [Loudness](#)
- [Vibration and Shock](#)

### Temperature, Humidity, and Altitude

Table 2-2 specifies the temperature, humidity, and altitude requirements for the Universal Storage Platform VM. The recommended operational room temperature is 21–24°C (70–75°F).

Table 2-8 Environmental Specifications

Parameter	Operating <sup>§1</sup>		NonOperating <sup>§2</sup>		Shipping&Storage <sup>§3</sup>	
	Low	High	Low	High	Low	High
Temperature°F(°C)	60(16)	90(32)	14(-10)	109(43)	5(-25)	140(60)
RelativeHumidity(%) <sup>§4</sup>	20 - 80		8 - 90		5 - 95	
Max.WetBulb°F(°C)	79(26)		81(27)		84(29)	
TemperatureDeviation °F/hour(°C/hour)	18(10)		18(10)		36(20)	
Altitude	-60 mto 3,000m				—	

**Notes:**

3. Therequirementsforoperatingconditionsshouldbe satisfiedbeforethestorage systemis poweredon. Maximum temperatureof 90°F(32°C)shouldbe strictlysatisfiedat airinletportion.

Nonoperatingconditionincludesbothpackingandunpackingconditionsunlessotherwise specified.

Forshipping/storage,theproductshouldbe packedwithfactorypacking.

Nocondensationinor aroundthedriveshouldbe observedunderanyconditions.

## Heat Output, Power Consumption, and Air Flow

Table 2-9 lists the power consumption and heat output specifications and the air flow requirements for the Universal Storage Platform VM. These data generally apply to both 60-Hz and 50-Hz storage systems. The Universal Storage Platform VM requires less power and puts out less heat than the Hitachi TagmaStore® Network Storage Controller, so the air flow requirements are decreased.

Table 2-9 Component Specifications: Heat Output, Power Consumption, and Air Flow

ModelNumber	HeatOutput(kW)	PowerConsumption(kVA)	AirFlow(m <sup>3</sup> /min)
DKC615I5	0.0291	0.30	4.3
DKCF615IB2	0.233	0.24	5.0
DKCF615ISBX	0.012	0.013	1.3
DKCF615ILGAB	—	0.015	—
DKCF615IPLUC	—	—	—
DKCF615IPHUC	—	—	—
DKCF615IPLC	—	—	—
DKCF615IPHEC	—	—	—
DKCF615IUC0	—	—	—
DKCF615IUC1	—	—	—
DKCF615IEXC0	—	—	—
DKCF615ISX	0.005	0.005	—
DKCF615IS4GQ	0.013	0.013	—
DKCF615IDKA	0.097	0.100	—
DKCF615ICX	0.005	0.005	—
DKCF615IC4G	0.015	0.015	—
DKCF615IC8G	0.019	0.020	—
DKCF615I8S	0.146	0.150	—
DKCF615I8MFS	0.146	0.150	—
DKCF615I8MFL	0.146	0.150	—
DKCF615I8FS	0.130	0.135	—
DKCF615I16FS	0.146	0.150	—
DKCF615I1FL	—	—	—
DKCF615I1FS	—	—	—
DKCF615ISVP	0.073	0.075	—
DKCF615IMDM	0.006	0.006	—
DKCF615I72KS	0.020	0.021	—
DKCF615I146KS	0.020	0.021	—
DKCF615I300KS	0.020	0.021	—

## Loudness

The acoustic emission values [loudness in dB(A)] for the Universal Storage Platform VM storage system are:

Front/rear = 65 dB(A)  
Both sides = 65 dB(A)

## Vibration and Shock

Table 2-10 lists the vibration and shock tolerance data for the Universal Storage Platform VM. The USP VM can be subjected to vibration and shock up to these limits and still perform normally. The user should consider these requirements if installing the storage system near large generators located on the floor above or below the storage system. Generators or any other source of vibration, if not insulated or shock-mounted, can cause excessive vibration that may affect the storage system.

Table 2-10 Vibration and Shock Tolerances

Parameter	Condition Operating	NonOperating	Shipping or Storage
Vibration	5-10 Hz: 0.25 mm 10-300 Hz: 0.49 m/s <sup>2</sup>	5-10 Hz: 2.5 mm 10-70 Hz: 4.9 m/s <sup>2</sup> 70-99 Hz: 0.05 mm 99-300 Hz: 9.8 m/s <sup>2</sup>	Sine Vibration: <sup>*2</sup> 4.9 m/s <sup>2</sup> , 5 min.  At the resonant frequency with the highest displacement found between 3 and 100 Hz.  Random Vibration: <sup>*3</sup> 0.147 m <sup>2</sup> /s <sup>3</sup> , 30 min., 5-100 Hz
Shock	--	78.4 m/s <sup>2</sup> , 15 ms	Horizontal: Incline Impact 4 ft/s (1.22 m/s) <sup>*4</sup>  Vertical: Rotational Edge 0.5 ft (0.15 m) <sup>*5</sup>

**Notes:**

4. The vibration specifications apply to all three axes.

See ASTM D9999-1, Standard Methods for Vibration Testing of Shipping Containers

See ASTM D4728-01 Test Method for Random Vibration Testing of Shipping Containers

See ASTM D5277-92, Standard Test Methods for Performing Programmed Horizontal Impacts Using an Inclined Impact Tester.

See ASTM D6055-96, Standard Test Methods for Mechanical Handling of Unitized Loads and Large Shipping Cases and Crates.

## Operational Requirements

The operational requirements for the Universal Storage Platform VM include:

- **LAN connection (or RJ-11 analog phone line) for Hi-Track®**

The Hi-Track maintenance support tool monitors the operation of the Universal Storage Platform VM, collects hardware status and error data, and transmits this data via LAN (or modem) to the Hitachi Data Systems Support Center. In the event of a component failure, Hi-Track reports the failure to the Support Center, with no action required on the part of the user. Hi-Track enables most problems to be identified and fixed prior to actual failure, and the advanced redundancy features enable the storage system to remain operational even if one or more components fail.

- **LAN for Storage Navigator**

Hitachi Storage Navigator communicates directly with the Universal Storage Platform VM via LAN to obtain system configuration and status information and send user-requested commands to the storage system. Storage Navigator serves as the integrated interface for all Resource Manager components.

- **Cable length for front-end directors**

Table 2-11 lists the cable length requirements for the front-end directors (FEDs) in the Universal Storage Platform VM.

- **External storage**

If you plan to attach external storage to the Universal Storage Platform VM, be sure to include the appropriate power and space requirements in your planning.

Table 2-11 FED Cable Length Requirements

Cable	Maximum Cable Length (Data Transfer Rate)
ESCON	3 km
FICON Short Wave	
50/125µm multimode	500m (100MB/s), 300m (200MB/s), 150m (400MB/s)
62.5/125µm multimode	300m (100MB/s), 150m (200MB/s), 75m (400MB/s)
FICON Long Wave	10 km
Fibre Channel Short Wave	
50/125µm multimode	500m (100MB/s), 300m (200MB/s), 150m (400MB/s)
62.5/125µm multimode	300m (100MB/s), 150m (200MB/s), 75m (400MB/s)
Fibre Channel Long Wave	10 km

# Units and Unit Conversions

Table A-1 provides conversions for metric and standard (U.S.) units of measure associated with the Hitachi Universal Storage Platform VM storage system. For information on physical and logical storage capacity values on the USP VM storage system, see [Convention for Storage Capacity Values](#).

Table A-1 Conversions for Metric and Standard (U.S.) Units of Measure

From	Multiply By:	To Get:
British thermal units (BTU)	0.251996	Kilocalories (kcal)
British thermal units (BTU)	0.00293018	Kilowatts (kW)
Inches (in)	2.54000508	Centimeters (cm)
Feet (ft)	0.3048006096	Meters (m)
Square feet (ft <sup>2</sup> )	0.09290341	Square meters (m <sup>2</sup> )
Cubic feet per minute (ft <sup>3</sup> /min)	0.028317016	Cubic meters per minute (m <sup>3</sup> /min)
Pound (lb)	0.4535924277	Kilogram (kg)
Kilocalories (kcal)	3.96832	British thermal units (BTU)
Kilocalories (kcal)	$1.16279 \times 10^3$	Kilowatts (kW)
Kilowatts (kW)	3412.08	British thermal units (BTU)
Kilowatts (kW)	859.828	Kilocalories (kcal)
Millimeters (mm)	0.03937	Inches (in)
Centimeters (cm)	0.3937	Inches (in)
Meters (m)	39.369996	Inches (in)
Meters (m)	3.280833	Feet (ft)
Square meters (m <sup>2</sup> )	10.76387	Square feet (ft <sup>2</sup> )
Cubic meters per minute (m <sup>3</sup> /min)	35.314445	Cubic feet per minute (ft <sup>3</sup> /min)
Kilograms (kg)	2.2046	Pounds (lb)
Ton (refrigerated)	12,000	BTUs per hour (BTU/hr)
Degrees Fahrenheit (°F)	First subtract 32, then multiply: °C = (°F - 32) × 0.555556	Degrees Celsius (°C)
Degrees Celsius (°C)	First multiply, then add 32: °F = (°C × 1.8) + 32	Degrees Fahrenheit (°F)
Degrees Fahrenheit per hour (°F/hour)	0.555555	Degrees Celsius per hour (°C/hour)
Degrees Celsius per hour (°C/hour)	1.8	Degrees Fahrenheit per hour (°F/hour)



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# Glossary

<b>Term</b>	<b>Definition</b>
<b>Array</b>	Storage system consisting of trays and controller units. Storage system consisting of a minimum of one controller unit. Also includes one or more slots to house disks drives.
<b>Array hot-spare</b>	Disk that serves as a hot-spare within an array. A reserve disk that can be made available to all virtual disks within an array.
<b>Asymmetric volume access</b>	A storage access method that provides multiple data paths to the same volume, but allows only a subset of data paths at a time to be active.
<b>Auto-sensing</b>	Automatically determining the type of device connected (N-port, NL-port, F-port, FL-port, or Fabric) and adapting the port speed and interface protocol to match.
<b>Back-End Director Block or block size</b>	A pair of array control processors (ACPs). Amount of data sent or received by the host per I/O operation. Atomic read/write operation to/from a disk. Size of data unit that is striped across disks.
<b>Cache</b>	DRAM-based staging area used to provide higher performance to applications for reads and writes. During reads, the controller unit tries to keep the latest and most often accessed data in cache and also tries to pre-stage cache with future data during sequential accesses. For writes, cache is used to provide delayed writes to the disks. This delays the parity calculations and disk writes during RAID 5 operations. More optimization and advanced staging algorithms thus provide better performance.
<b>Cache hit</b>	Read or write request for data that is already in cache. Therefore, a request can be serviced without needing to go to disk.
<b>Chunk</b>	A quantity of information that is handled as a unit by the host and disk device.
<b>Clean data</b>	Any read data or write data that has been committed to disk. In other words, a copy of data that is safely on disk.
<b>Concatenation</b>	Sequentially mapping blocks on disks to a logical device. Two or more extents can be concatenated and accessed as a single logical device. Add extents to an existing volume.
<b>Control path</b>	The communications path used for system management information. Generally provided as an out-of-band connection over Ethernet.
<b>Controller pair</b>	Pair of controller units servicing a particular tray or group of trays.
<b>Controller tray</b>	A tray with one or more installed controller units.
<b>Controller unit</b>	The intelligence card that manages RAID functions and fail-over characteristics for an array or tray, or group of trays.
<b>Copy-On-Write (COW)</b>	The process that Sun StorageTek 9900 Copy-on-Write software uses to preserve point-in-time data when new data is written to disk. With each write, the system preserves the old data in snapshot reserve space, so that it can re-create the volume as it existed at the time of the snapshot.
<b>CRC error checking</b>	Checking for frames that have been corrupted (some of the 1 bits changed to 0 bits, and vice versa), due to noise or collision.
<b>DAS</b>	Direct attach storage. Storage directly attached to servers or hosts (as opposed to SAN storage where storage is attached to a network of storage devices).
<b>Data path</b>	The path traveled by data packet — between the host processor and the disk.
<b>Dedicated hot-spare</b>	Disk that serves as a hot-spare to one, and only one, virtual disk in an array or tray.
<b>Dirty data</b>	Write data that is in cache and has been acknowledged to the application host, but which has not yet been committed to disk.
<b>Disk</b>	Physical entity that stores data (as compared to a virtual disk, which is a logical grouping of disks or storage extents).

<b>Term</b>	<b>Definition</b>
<b>Disk Slot</b>	Slots on trays that house physical disks.
<b>DMP</b>	VERITAS dynamic multi-pathing.
<b>Drive depopulation</b>	Drive depopulation allows additional spindles to be added to drive trays that are not fully populated with 14 drives.
<b>Duplexed cache</b>	Cache mirroring with duplicate data paths to and from the cache. See <i>mirrored cache</i> .
<b>ECC</b>	Error correction code. Extra bits added to words, or double words, that correct all single-bit errors, and detect all double-bit errors. A superior technology to parity, which detects, but does not correct, single-bit errors, and cannot detect double-bit errors.
<b>E-Port</b>	An expansion port connecting two fabric switches.
<b>ESCON</b>	Enterprise System Connection. An IBM protocol used to link mainframes with peripherals and other mainframes at 10 to 17 Mbps over fiber optic cable.
<b>Event</b>	A change in the state of a managed object.
<b>Expansion cabinet</b>	An additional cabinet to expand the capacity of a storage system.
<b>Expansion tray</b>	A tray without an installed controller, used to expand the capacity of an array and/or storage system. Must be attached to a controller tray to function.
<b>Extent</b>	A set of contiguous blocks on a disk or disks with consecutive logical addresses. Extents can be smaller or larger than physical disks. On the Solaris OS, the format utility can subdivide a disk into several extents called slices (Windows and Linux have a similar concept called partitions). RAID arrays allow users to combine several disks together into a larger virtual disk. Although the underlying disks are separate extents, the resulting virtual disk is addressed from zero up to its new size — so this virtual disk is also an extent.
<b>Fabric</b>	A group of interconnections between ports that includes a fabric element. A collection of switches and the connections between them.
<b>Fail-over</b>	See <i>Path Fail-over and Recovery</i>
<b>FC-AL</b>	Fibre Channel arbitrated loop, a loop topology used with Fibre Channel.
<b>Fiber</b>	A wire or optical strand. Spelled <i>fibres</i> in the context of Fibre Channel.
<b>Fibre Channel</b>	A set of standards for a serial I/O bus capable of transferring data between two ports up to 100 MB per second. Fibre Channel supports point-to-point, arbitrated loop, and switched topologies. Fibre Channel can be implemented with either optical fiber (note spelling) or copper.
<b>Fiber-optic cable</b>	Jacketed cable made from thin strands of glass, through which pulses of light transmit data. Used for high-speed transmission over medium to long distances.
<b>FICON</b>	Short for <i>Fiber Connection</i> , or <i>Fiber Connectivity</i> , IBM's fiber optic channel technology that extends the capabilities of its previous fiber optic channel standard, ESCON. Unlike ESCON, FICON supports full duplex data transfers and enables greater throughput rates over longer distances. FICON uses a mapping layer that is based on technology developed for Fibre Channel and multiplexing technology, which allows small data transfers to be transmitted at the same time as larger ones.
<b>Floating hot-spare</b>	A drive that remains an active data drive after a RAID controller replaces a failed drive with it. A replacement drive now becomes the new hot-spare drive.
<b>Front-end Director</b>	A pair of channel host adapters (CHAs).
<b>FRU</b>	Field replaceable unit. A component that can be removed and replaced during service in the field.
<b>F_Port</b>	On a Fibre Channel switch, a port that supports an N_port.
<b>GBIC</b>	Gigabit interface converter. A standard form factor that provides a hot-plug connection into a Fibre Channel device.
<b>G_Port</b>	On a Fibre Channel switch, a port that supports either F_Port or E_Port functionality.
<b>HBA</b>	Host bus adapter.

<b>Term</b>	<b>Definition</b>
<b>Host ports</b>	DSP ports attached to hosts or host-facing SAN ports. Any DSP port is capable of being either a host port or a storage port.
<b>Hot-spare</b>	Disk used by a controller unit to replace a failed disk.
<b>Hot-swappable</b>	A hot-swappable component can be installed or removed by simply pulling the component out and putting the new one in. The system either automatically recognizes the component change and configures itself as necessary or requires user interaction to configure the system. However, in neither case is a reboot required. All hot-swappable components are hot-pluggable, but not all hot-pluggable components are hot-swappable.
<b>In-band</b>	Using the data path between a host(s) and a storage device to transport system management traffic.
<b>Initiator</b>	On a Fibre Channel network, typically a server or workstation that requests transactions of disk or tape targets. Servers can have one or more initiators.
<b>I/O</b>	Input/output.
<b>I/O rate</b>	A measure of a device's capacity to transfer data to and from another device within a given time period, typically as I/O operations per second.
<b>IOPS</b>	Input/output operations per second. A measure of I/O performance, this is commonly used to quote random I/O performance.
<b>IP</b>	Internet protocol. A set of protocols developed by the United States Department of Defense to communicate between dissimilar computers across networks.
<b>iSCSI</b>	A protocol being ratified by the IETF for the transmission of SCSI commands and data blocks over TCP/IP networks .
<b>LED</b>	Light emitting diode.
<b>LUN</b>	Logical Unit as defined by SNIA. Defines a volume as it is mapped to particular host(s) or initiator(s). Distinguished from a volume in a sense that the same volume can represent a different LUN to different host(s) or initiator(s).
<b>LUN mapping</b>	Assigning volume permissions (read-only, read/write, or none) to a host or initiator.
<b>LUN masking</b>	A technique that prevents all but certain initiators from gaining access to a volume.
<b>Management path</b>	The out-of-band path that connects components of the system to the storage service processor.
<b>Mirror</b>	The process of performing write operations to multiple physical media as part of each host-acknowledged write operation in order to maintain data availability.
<b>Mirrored cache</b>	Provides data integrity by keeping multiple copies of identical volume data. Redundant copies of data residing in cache — the (write) data residing in cache that has not yet been written to the hard disks is duplicated for fail-over operation.
<b>Mirroring (RAID)</b>	Redundant storage of data, achieved by duplicating files (so there is always a primary file and a copy of the primary file) onto separate disks.
<b>Multi-pathing</b>	Providing two or more physical paths to a given target or device.
<b>NAS</b>	Network Attached Storage. Network Attached Storage is a term for a conventional or proprietary server that provides file storage over a network using file access network protocols like NFS or CIFS.
<b>Network terminal concentrator (NTC)</b>	A modem connection point for the Sun StorageTek Remote Response service. Helps facilitate a point-to-point connection from a remote support center.
<b>Non-disruptive</b>	Does not prevent system or data access at any time during operation. Data path access is not sacrificed, and the host does not see any I/O failure (unless dual points of failure). May no longer a be an HA environment. Availability of management services not included.
<b>Non-floating hot-spare</b>	A drive that reverts back to hot-spare status after a failed drive has been replaced and the mirror re-silvered or the stripe rebuilt.
<b>N_Port</b>	A Fibre Channel port in a point-to-point or fabric topology.

<b>Term</b>	<b>Definition</b>
<b>NL_Port</b>	A port attached to a node for use in all three topologies (point-to-point, arbitrated loop, or fabric).
<b>NTC</b>	Network terminal concentrator — see above.
<b>NVRAM cache</b>	A non-volatile (battery-backed) random access memory area used as an intermediate store for data between a host computer system and disk drives to achieve faster writes and, in some cases, faster reads.
<b>OLTP</b>	On-line transaction processing.
<b>Optical fiber</b>	Any filament of fiber, made of dielectric material, that guides light.
<b>Out-of-band</b>	Using a path other than the data path to transport system management information. Connecting to a management port using an IP network, for example.
<b>Partner group (or partner pair)</b>	Two controller units providing redundant data and management paths and mirrored cache duplexing (which provide controller fail-over and path fail-over capability).
<b>Path failure</b>	The loss of a data or management path.
<b>Path fail-over and recovery</b>	The process of automatically moving traffic to a different path when a path either fails, or is re-instated.
<b>Point-in-time copy</b>	A frozen copy of a volume's data, as created when taking a snapshot.
<b>Port</b>	An access point on a device for attaching a link.
<b>Primary volume</b>	Used in the context of snapshots, the primary volume is the live data set from which the snapshot copy is made.
<b>Profile</b>	A set of attributes applied to a set of storage in a storage pool designed to help optimize that pool for a particular access pattern and/or level of data protection. Profiles are associated with storage pools to define the attributes of the pool.
<b>Protocol</b>	A convention for data transmission that defines timing, control, format, and data representation.
<b>RAID</b>	Redundant array of independent disks. A set of disk drives that appear to be a single logical disk drive to an application such as a database or file system. Different RAID levels provide different capacity, performance, availability, and cost characteristics.
<b>RAID group</b>	A set of disks running a RAID algorithm.
<b>RAID 0</b>	RAID level 0, or striping without parity or mirroring protection. Data is distributed evenly at the block level among disks for performance. No redundancy is provided, and the loss of a single disk causes the loss of data on all disks. Use this level for high-speed streaming of large file reads (for example, video) of non-critical data that is easily available elsewhere within the organization.
<b>RAID 1+</b>	RAID level 1 (1+0), or mirroring with striping. Data is stored at the file level. Files reside on separate disks, and two copies of the data are kept. Each data block in a RAID 1(1+0) volume is mirrored on two drives, and the blocks are striped across all the drives in a storage pool. If one of the mirrored pair fails, the data from the other drive is used.
<b>RAID 5</b>	RAID level 5, or striping with distributed parity. Both data and parity information are striped across the drives. Because of parity, if a single drive fails, data can be recovered from the remaining drives. Two drive failures cause all data to be lost. In other words, both data and parity are distributed evenly across all the disks in the array at the block level. No single disk can compromise the integrity of the data.
<b>RAID 6</b>	RAID level 6, or striping with two sets of distributed parity for improved reliability and availability.

Term	Definition
<b>RAS</b>	Reliability, availability, and serviceability. Reliability is a measure of the likelihood that problems will occur. A highly reliable system has few problems. Once a problem occurs, availability is the measure of how the system protects the user from being adversely affected by the problem. Serviceability is a measure of how easy it is to repair the problem.
<b>Read-ahead</b>	Sequential data read from disk into cache without having actually been requested by the application host, in anticipation that it will be requested by the host. When the request occurs, it can be serviced as a low latency cache hit, thus improving host application performance.
<b>Reconstruction</b>	The process of rebuilding lost data on a replacement disk after a disk failure.
<b>Redundancy</b>	Duplication for the purpose of achieving fault tolerance. Refers to duplication or addition of components, data, and functions within the array.
<b>Rolling snapshot pattern</b>	The creation of a series of snapshots in which the oldest snapshot is replaced each time a new snapshot is taken. For example, a weekly rolling snapshot pattern would cause this Tuesday's snapshot to replace last Tuesday's snapshot, this Wednesday's snapshot to replace last Wednesday's snapshot, etc.
<b>SAN</b>	Storage area network. SAN architecture uses high-performance, high-capacity Fibre Channel switches to connect storage islands to servers. This approach provides physical connectivity, facilitating information sharing, or simplifying management across servers.
<b>SCSI</b>	Small computer systems interface. An ANSI standard for controlling peripheral devices by one or more host computers.
<b>Serial transmission</b>	Data communication mode where bits are sent in sequence in a single fiber.
<b>SFC</b>	See <i>Switch Fabric Cards</i> .
<b>SFP</b>	Small form pluggable.
<b>SIO</b>	See <i>Storage I/O Cards</i> .
<b>Snapshot</b>	A point-in-time copy of volume data, created using copy-on-write technology.
<b>Snapshot reserve space</b>	Disk space reserved for Copy-on-Write data.
<b>Snapshot rollback</b>	The process of applying saved changes from a snapshot copy to a primary volume. The most common application of this feature is to roll the primary volume back to the state it was in at the time the snapshot was taken.
<b>(Snapshot) update</b>	Modify an existing snapshot to contain data currently in the primary volume. This feature is typically used when updating the oldest snapshot to be the newest in a rolling snapshot pattern. Note (for developers): The DSP refers to this operation as a snapshot "reset".
<b>SNMP</b>	Simple network management protocol. A simple protocol designed to allow networked entities (for example, hosts, routers) to exchange monitoring information.
<b>SRC</b>	See <i>Storage Resource Card</i> .
<b>SVP</b>	See <i>Storage Service Processor</i> .
<b>Storage domain</b>	A logical domain with its own storage, and its own management environment.
<b>Storage extent</b>	See <i>Extent</i> .
<b>Storage pool</b>	A collection of disks, virtual disks or storage extents, generally with common configuration, availability, and performance characteristics, that can be carved into volumes.
<b>Storage profile</b>	See <i>Profile</i> .
<b>Storage Resource Cards (SRC)</b>	Processing cards in the DSP, which mate with SIO cards.
<b>Storage Service Processor (SVP)</b>	The management device integrated into storage systems that provide unified management access to system components and remote management functionality.

<b>Term</b>	<b>Definition</b>
<b>Striping</b>	Laying data out over a series of disks or virtual disks, allows multiple disk controllers to simultaneously access data, thus improving performance.
<b>Stripe size</b>	Total amount of data in a disk stripe, that is, the block size multiplied by number of data disks in the stripe.
<b>Stripe width</b>	Total number of disks in a disk stripe.
<b>Sun StorageTek Storage Pool Manager software</b>	Uses virtualization capabilities of the Sun StorageTek 9990V system to simplify storage management, using storage pools and application-oriented storage profiles.
<b>Switch</b>	The name of an implementation of the fabric topology. A fabric element that implements a fabric. The fabric element that allows each port of a switch to be connected to any other port on that switch. A collection of switches implement a fabric and provide the network through which any device can communicate with any other device.
<b>Symmetric volume access</b>	A storage access method that provides multiple live data paths to the same volume.
<b>Syslog</b>	The internal log file maintained by Sun StorageTek 9990V arrays to track events and alerts as well as informational and notice messages. This log file can be sent periodically to a host server for evaluation using the <code>syslogd(1M)</code> function.
<b>System management</b>	The set of features and functions that allow the user to control a storage system.
<b>Target</b>	The recipient of initiator commands. For example, volumes are presented to initiators as targets.
<b>Telemetry stream</b>	Stream of data generated by monitoring agents.
<b>Throughput</b>	A measure of sequential I/O performance, quoted as gigabytes per second (GB/sec.). See <i>IOPS and I/O rate</i> .
<b>Topology</b>	The components used to connect two or more ports together. Also, a specific way of connecting those components, as in point-to-point, fabric, or arbitrated loop.
<b>Transfer rate</b>	The rate at which data is transferred, usually measured in megabytes per second (MB/sec.).
<b>Tray</b>	An enclosure containing disks.
<b>Tray depopulation</b>	Trays delivered without the full compliment of disks installed. Allows additional disks to be added to trays that are not fully populated.
<b>Virtual disk</b>	Any abstraction or collection of disks that appears as a single disk to the device mounting it.
<b>Volume</b>	A logical disk carved from a storage pool. A virtual disk comprised of raw storage extents into which a file system, a DBMS, or an application can place data. Can be a single physical disk or a virtual disk mapped from one or more underlying extents.
<b>Warm boot device</b>	Bootable on all supported HBAs with storage booted before server booting.
<b>Zone or zoning</b>	Provided by fabric switches, a function that allows segmentation of node by physical port, name, or address.

# Collateral

## Documents available on SunWin

## SunWIN Token #

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ST9985V Data Sheet	513640
ST9985V Just the Facts	513696
ST9985V Customer Presentation	513697
ST9985V Technical Presentation	513698

## User Guides Available on the PTS Website

<http://pts-storage.west/products/T99x0/documentation.html>

While there are many user guides, the following is one of the most important. It provides a broad overview of the product rather than being a "point releases" about an individual feature.

Sun StorageTek 9985V User Guide

## WEB INFORMATION:

### Internal

<http://onestop/storage/9900/index.shtml?menu>

<http://mysalesstg.central/public/storage/products/highend/>

[http://www.sun.com/storagetek/disk\\_systems/data\\_center/9985v](http://www.sun.com/storagetek/disk_systems/data_center/9985v)

<http://webhome.ebay/networkstorage/products/9900/index.html>

<http://pts-storage.west/products/T99x0/documentation.html>

<http://sejsc.ebay/> (easy place to go to the WWWs)

<http://webhome.ebay/networkstorage/products/datacenter/>

<http://webhome.ebay/networkstorage/solutions/consolidation.html>

<http://webhome.ebay/networkstorage/products/software>

<http://systems.corp/programs/datacenter/consolidation/>

<http://suncluster.eng/>

<https://channelone.hds.com/indexmain.cfm>

<http://sejsc.ebay/>

### Partner:

<http://partner.sun.com/products/storage/9985.html>

<http://partner.sun.com/products/storage/highend.html>

<http://pts-storage.west/products/T99x0/documentation.html>

### External

<http://www.sun.com/storage/highend/9985/index.xml>

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

<http://reseller.sun.com/products/storage/9960.html>

<http://reseller.sun.com/products/storage/9910.html>

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

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