

StorageTek Virtual Storage Manager System

Release Notes



Release 6
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Preface

This publication provides release guidelines and requirements for StorageTek Virtual Storage Manager (VSM) System Release 6. It also provides updates and enhancements to the original product documentation.

When applicable, use the procedures and information in this guide in place of the original documentation. Any applicable references to the original documentation are provided.

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Product Guidelines and Requirements

This section provides product guidelines and installation requirements for Virtual Storage Manager (VSM) System release 6.

- [Product Highlights](#)
- [Product Documentation](#)
- [VSM 6 Platform](#)
- [Configuration Options](#)
- [VSM 6 Ethernet \(IP\) Data Path Connectivity](#)
- [VSM 6 FICON Data Path Connectivity](#)

Product Highlights

This section highlights key VSM 6 features and functionality.

Oracle's StorageTek Virtual Storage Manager (VSM) solution is the collection of hardware and software products that comprise a disk-based virtual tape system to provide enterprise-class storage management capabilities for the IBM mainframe environment. VSM optimizes streaming workloads and backup and recovery functions, reduces management overhead, and maximizes tape capacity utilization to reduce data protection costs in a wide range of storage environments.

Additionally, VSM includes the VSM Extended Storage (ExS) feature that allows the VTSS to access and utilize storage external to the VTSS, including access to the Oracle Cloud.

The VSM solution includes the following subsystems:

- **VTSS hardware and software**
The VSM VTSS supports emulated tape connectivity to IBM MVS hosts over FICON interfaces, FICON attachment to Real Tape Drives (RTDs), IP attachment to other VTSSs and VLEs, and remote host connectivity using ECAM over IP and VSM VTSS-to-VTSS replication.

VSM stores virtual tape volumes (VTVs) on a disk buffer on the VTSS and can optionally migrate them to Virtual Library Extension (VLE), Real Tape Drives (RTDs), or both. VTVs can be a maximum of 32GB in size. When needed by the host, if the migrated VTVs are not VTSS-resident, they are then automatically recalled to the VTSS.
- **Enterprise Library Software (ELS)**
ELS is the consolidated suite of Oracle StorageTek mainframe software that enables and manages Oracle's StorageTek Automated Cartridge System (ACS) and VSM hardware. ELS includes the Host Software Component (HSC), Storage Management Component (SMC), HTTP Server, and the Virtual Tape Control Software (VTCS). VTCS controls virtual tape creation, deletion, replication,

migration, and recall of virtual tape images on the VTSS and also captures reporting information from the VTSS.

- Virtual Tape Library Extension (VLE) hardware and software
The VLE subsystem functions as a migrate and recall target for VTSS Virtual Tape Volumes (VTVs). VLEs are IP-attached to the VSM VTSS.
- Real Tape Drives (RTDs) connected to physical tape libraries
RTDs server as migrate and recall targets for VTSS Virtual Tape Volumes (VTVs). RTDs are FICON-attached to the VSM VTSS.

Product Documentation

This *Release Notes* publication provides supplemental updates to the original documentation for Virtual Storage Manager (VSM) System, release 6. The information in this publication supersedes the information found in the existing VSM publication set:

- *VSM Planning Guide*
- *VSM Security Guide*
- *VSM Licensing Information User Manual*

These publications are available for download via the [Oracle Help Center](#).

VSM 6 Platform

The VSM platform provides increased performance and greatly expanded storage capacity compared to previous VTSS versions, and it is can be scaled to meet a customer's current needs while providing a path for future growth.

The VSM VTSS is packaged as a standard rack mount system built on existing Oracle server, storage, and service platforms. The servers, disk shelves, and standard rack mount enclosure are delivered as a packaged system.

The Solaris 11 operating system is the foundation of the VSM 6 VTSS software environment, which also includes Solaris infrastructure components and VTSS function-specific software. The VSM 6 software environment is pre-installed and pre-configured for VTSS functionality so that limited site-level configuration is required to integrate the product into the customer's managed tape environment.

Configuration Options

VSM 6 may be installed in the following configurations, depending on whether optional upgrades have been applied:

- [Base Configuration](#)
- [Storage Capacity Upgrade](#)
- [FICON Upgrade](#)
- [ZIL SSD Upgrade](#)

Base Configuration

The base unit is a VSM 6 in its minimum configuration, including:

- A standard Sun Rack II cabinet, Model 1242
- Depending on country, two VLE50HZ-POWER-Z or two VLE60HZ-POWER-Z power Power Distribution Units (PDUs)
- Two Sun SPARC T4-2 servers in a specific configuration and factory preconfigured for VSM 6
- Two disk shelves, in a specific configuration depending on date of manufacture:
 - For VSM 6 units built starting in December 2013, the base unit has two Oracle Storage Drive Enclosure DE2-24C disk shelves. Each DE2-24C disk shelf has three 73GB or 200GB Flash SSDs and 21 4TB SAS HDD drives, representing 370TB approximate user capacity (configured, with 4:1 compression).
 - For VSM 6 units built before December 2013, the base unit has two Sun J4410 disk shelves, each with three 73GB Flash SSDs and 21 3TB SAS HDD drives, representing 270TB approximate user capacity (configured, with 4:1 compression).

Storage Capacity Upgrade

Storage capacity upgrades are either base capacity upgrades that are factory-built when the base unit is assembled, or field capacity upgrades that are installed in the field.

A storage capacity upgrade kit is packaged as two disk shelves. Up to three upgrade kits can be installed in a VSM 6 base unit, for a total of four, six, or eight disk shelves in the unit.

Note:

The capacity upgrade must use the same disk shelf product that is used in the base configuration. You cannot mix Oracle DE2-24C and Sun J4410 disk shelves in a VSM 6.

Capacity Upgrade for VSM6 with Oracle DE2-24C Disk Shelves

For a VSM 6 with Oracle DE2-24C disk shelves, a capacity upgrade kit has two Oracle DE2-24C disk shelves, each containing 24 4TB SAS HDD drives, representing 400TB approximate user capacity (configured, with 4:1 compression).

Total approximate user capacity (configured, with 4:1 compression) for a base unit with one, two, or three capacity upgrade kits installed is as follows:

- VSM 6 with four Oracle DE2-24C disk shelves: 800TB
- VSM 6 with six Oracle DE2-24C disk shelves: 1200TB
- VSM 6 with eight Oracle DE2-24C disk shelves: 1600TB

Capacity Upgrade with Older J4410 Disk Shelves

For a VSM 6 with older J4410 disk shelves, a capacity upgrade kit has two J4410 disk shelves, each containing 24 3TB SAS HDD drives, representing 300TB approximate user capacity (configured, with 4:1 compression).

Total approximate user capacity (configured, with 4:1 compression) for a base unit with one, two, or three capacity upgrade kits installed is as follows:

- VSM 6 with four J4410 disk shelves: 600TB
- VSM 6 with six J4410 disk shelves: 900TB
- VSM 6 with eight J4410 disk shelves: 1200TB

FICON Upgrade

The FICON upgrade option may include up to eight Long Wave SFPs that replace some or all of the Short Wave SFPs in the VSM 6 VTSS's FICON HBAs. There are eight SFPs total in a VSM 6 VTSS. They can be all Long Wave, all Short Wave, or mixed to balance Long and Short Wave SFPs between servers.

ZIL SSD Upgrade

The ZIL SSD upgrade adds two 200GB SSDs to the VSM 6 storage pool. These SSDs are dedicated to the ZFS intent log (ZIL) to improve synchronous write performance by speeding up specific synchronizing events. This upgrade is only available for VSM 6 configurations with four or more disk shelves installed.

The ZIL performance upgrade for VSM 6 systems with 4TB disks is for VSM 6 units with approximate production dates of December 2013 to present. The Oracle service person can confirm the VSM 6 configuration.

The ZIL performance upgrade for VSM 6 with 3TB disks is for VSM 6 units with approximate production dates of November 2012 through November 2013. The Oracle service person can confirm the VSM 6 configuration.

This upgrade is recommended for certain VSM 6 configurations with Host workloads involving small (1MB to 2MB) VTVs and a high number of simultaneous VTV mount operations. For these workloads, adding SSDs to the VSM 6 storage pool significantly improves performance.

VSM 6 Ethernet (IP) Data Path Connectivity

VSM 6 supports direct and multi-port director switch attachment between VSM 6 and VLE appliances, and CLINKs to other VSM 6 or VSM 5 VTSSs.

VLE traffic and CLINK traffic are not segregated by the VSM 6. Any RoIP port with connectivity will be used for either

To define these connections, you need to define the RoIP ports that VSM 6 uses to replicate out and the ippaths to the targets. Refer to the *VSM Planning Guide* for information about Ethernet (IP) port assignments, node configuration details, and examples.

VSM 6 FICON Data Path Connectivity

FICON ports connect the two VSM 6 nodes to the ELS host software and VTCS interface software on the MVS host systems, and to Real Tape Drives (RTDs) in the tapeplex. Attachment may be direct or through a switch.

There are four FICON ports per VSM 6 node, a total of eight for the VTSS. Each port supports IBM Control Unit (CU) and IBM Channel Mode (CH) images concurrently, so that when connected through a switch each port may attach to both hosts and RTDs. Sharing a HOST port with an RTD connection does not reduce logical pathing.

Functionality

- The link between the VSM 6 and VTCS is the RTD NAME.
- The link between VTCS and the RTD is the FICON cable to the relevant DEVNO in the relevant drive bay
- VSM 6 CLI commands define the connections to the VSM 6.
- VTCS commands define the connections to the VTCS configuration.
- VTCS uses the RTD name defined on the FICONPATH command used in the VSM 6 CLI.
- Multiple FICONPATHs can route to the SAME RTD.
- Physical RTDs are defined to VTCS as FICON devices with CHANIF ids.
- The CHANIF id is not used to reference the device but must be present to meet VTCS syntax rules. Each CHANIF id must be unique and with valid syntax for each VSM 6 defined in VTCS.
- VTCS allows 32 unique CHANIF ids. Each VSM 6 can have a maximum of 32 physical RTDs defined.

Refer to the *VSM Planning Guide* for more information about FICON port assignment details and connectivity examples.

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Documentation Updates

This section provides supplemental updates to the original documentation for Virtual Storage Manager (VSM) System release 6. This information supersedes the information found in the existing VSM publication set.

Topics include:

- [Enhanced Replication \(RLINKS\) Feature](#)
- [Extended Storage \(ExS\) Encryption Feature](#)

Enhanced Replication (RLINKS) Feature

VSM 6 supports an Enhanced Replication feature that extends the replication capabilities of the VSM 6 product. With Enhanced Replication, synchronous replication begins replicating data to the target VTSS upon first host write to the VTV and provides host acknowledgment to the rewind unload operation once all data has been successfully replicated to the target VTSS.

A new replication facility, RLINKs, is used for Enhanced Replication. An RLINK is composed of all IP paths defined to the target VTSS. There is only one RLINK between the primary and target VTSS. With RLINKs, the number of replications is limited only to the number of virtual tape devices (VTDs) supported within the VTSS.

 **Note:**

RLINK functionality cannot be used concurrently with synchronous CLINK replication.

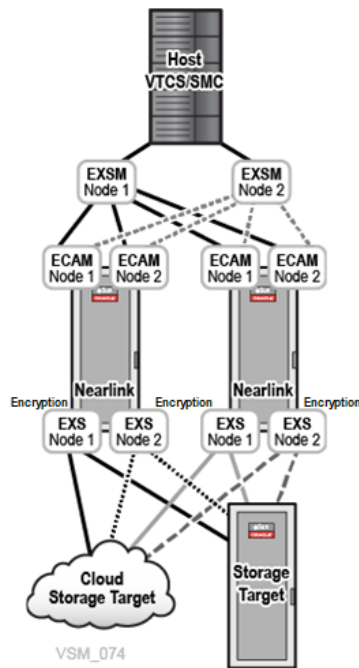
The Enhanced Replication feature is initially available for use between two VSM 6 VTSSs, where each VTSS can be both a primary and a target for bi-directional synchronous VTV-level replication. Subsequent releases provide support for three-target synchronous replication and file-level synchronous replication.

Extended Storage (ExS) Encryption Feature

VSM Extended Storage (ExS) Encryption is an enhancement to VSM Extended Storage that allows the VTSS to encrypt the data before sending the data out to the extended storage. This allows the customer to manage their own keys using Oracle Key Manager (OKM) or EXS VSM Key Manager (VSM Key Store).

ExS Encryption is included in the base VSM6 or VSM7 code and is configured by Oracle Services personnel as part of the VSM configuration. ExS encryption is a separate feature from VTSS encryption, which encrypts data residing in the VTSS disk buffer.

Figure 2-1 VSM ExS Configuration with Encryption



As shown in the figure above, ExS Encryption occurs between the Nearlink and the Extended Storage (ExS) nodes, before the ExS nodes send data to physical and cloud storage targets across the IP network.

Encryption keys are handled differently depending on the type of Key Store used:

- When using VSM Key Store, encryption keys are created and stored on each VTSS in the EXS complex. Multiple VMVCs will share the same encryption key. The encryption key used to migrate new data to a VMVC can be changed over time by creating a new key. Deletion of a VSM key is not supported.
- When using OKM, keys are automatically generated, stored and managed external to the VTSS and the EXS storage. Each VMVC will have its own encryption key.

The VSM ExS Encryption feature introduces two new constructs, **keystore** and **key**.

- The keystore identifies the Key manager type (OKM or VSM) to use for encryption. Specifies a name for the Key Store that is shared on all systems in the EXS complex. For keystores of type VSM, the keystore construct also specifies the label name of the key to use for subsequent migrations (the current key).
- The key construct is only applicable to a VSM keystore. It associates an encryption key with a named VSM keystore, specifies a label name associated with the encryption key, and specifies the encryption key value.

If you wish to utilize the VSM Extended Storage (ExS) Encryption feature in your VSM configuration, contact Oracle Services.