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**StorageTek<sup>®</sup>**

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OS 2200 Client System Component  
(CSC)

**UNISYS OS 2200 CSC 5R1  
VSM Reference**

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February 2005

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# PREFACE

## PURPOSE

This is the *OS 2200 Client System Component (CSC) Unisys OS 2200 CSC 5R1 VSM Reference*. This manual addresses the installation and configuration of the **Virtual Storage Manager (VSM)**, StorageTek's solution for the inefficient use of tape media and transports, and for data sharing with multiple hosts.

## AUDIENCE

This manual is written for those who use the tape automation facilities of the StorageTek tape library. It assumes a general knowledge of how to use tape processing on the Unisys system. It builds on this basic knowledge to describe how to automate tape handling via CSC and the StorageTek tape library.

This manual also provides background information for those who install the tape library and those who install and administer CSC. The manner in which the tape library is installed affects how it is viewed by the tape library software. This connection information combined with the configuration parameters for the library server software affect the interaction between CSC and the tape library. The tape library information as well as the CSC configuration parameters dictates how a tape user would request automation services.

# HOW TO USE THIS DOCUMENT

## Chapter 1. Introduction

This chapter provides an introduction to the Virtual Storage Manager (VSM). A brief overview of the product is followed by a discussion of the VSM environment.

## Chapter 2. Implementing VSM with Unisys Clients

This chapter provides information about implementing the Virtual Storage Manager (VSM). It addresses the system, hardware configuration, and software configuration changes required to implement VSM.

## Chapter 3. Using VSM with Unisys Clients

This chapter provides guidelines for using VSM. It describes changes to client system runs that enables them to be used in the VSM virtual environment. The chapter also discusses user-assigned implementation options. A final section describes any additional considerations worth noting.

## Appendix A. Examples of CSC Configurations and Relationships

This appendix presents several examples of CSC configurations and relationships.

## Back Matter

The manual includes an index.

# COMMAND SYNTAX NOTATION

This manual uses the following conventions for representing command syntax notation and message displays:

|                         |   |
|-------------------------|---|
| UPPERCASE               | indicates a command or keyword  |
| <i>lowercase italic</i> | indicates a user- or system-supplied variable value. For example, in <i>XX=userid</i> , you enter the actual userid for <i>userid</i> . |
| abbreviation            | indicates a command that can be abbreviated to its minimum acceptable form. For example, ENABLE can be abbreviated to ENA.              |

|                    |  |
|--------------------|--|
| vertical bar       | separates operand alternatives. For example, A   B indicates that you must select either A or B.   |
| brackets []        | indicate an option that can be omitted. For example, [A   B   C] indicates that you can select A, B, C, or nothing.  |
| braces {}          | indicate an option that you <i>must</i> choose. For example, {A   B} indicates that you must choose either A or B.   |
| <u>underlining</u> | indicates the system default. If you do not enter a parameter or value, the system will supply the underscored value. For example, A   B   <u>C</u> indicates that if you do not choose an option, the system will default to C. |
| ellipses ...       | indicate that entries can be repeated as often as necessary.   |
| SMALLCAPS          | indicate a key, such as XMIT or F1.  |

## RELATED DOCUMENTATION

*OS 2200 Client System Component (CSC) Technical Bulletin*, Storage Technology Corporation (312537701)

*OS 2200 Client System Component (CSC) System Administrator's Guide*, Storage Technology Corporation (312537501)

*OS 2200 Client System Component (CSC) Operations Guide*, Storage Technology Corporation (312537201)

*OS 2200 Client System Component (CSC) Installation Guide*, Storage Technology Corporation (312537301)

*OS 2200 Client System Component User Interface (CSCUI) Programmer's Reference Manual*, Storage Technology Corporation (312537401)

*OS 2200 Client System Component (CSC) Client Direct Interconnect (CDI) Troubleshooting Guide*, Storage Technology Corporation (312537601)

*OS 2200 Client System Component (CSC) User Reference Manual*, Storage Technology Corporation (312537801)

*Virtual Tape Control System 5.1 Installation and Configuration Guide for MVS*, Storage Technology Corporation

*Virtual Tape Control System 5.1 Administrators Guide for MVS*, Storage Technology Corporation

*Nearline Control Solution 5.1 Installation Guide* (31386002)



# 1. INTRODUCTION

This chapter provides an introduction to the Virtual Storage Manager (VSM). A brief overview of the product is followed by a discussion of the VSM environment.

## OVERVIEW

The Virtual Storage Manager (VSM) is StorageTek's solution to inefficient use of tape media and transports and data sharing with multiple hosts. The VSM contains one or more Virtual Tape Subsystems (VTSS). Each VTSS consists of hardware and firmware that creates Virtual Tape Drives (VTDs). It also creates Virtual Tape Volumes (VTVs) on a RAID-6+ disk array. VSM also contains software that allows each VTSS to function as an ACS. This software is called Virtual Tape Control System (VTCS) and executes on the Nearline Control Solution (NCS) platform.

This guide presents a procedure for configuring, implementing, and using VSM with Unisys clients using CSC level 4R1 and above. The VSM information is based primarily on the *Virtual Tape Control System Installation, Configuration, and Administration Guide*. The VTCS guide also covers all aspects of using VSM in an MVS environment.

# THE VSM ENVIRONMENT

The VSM system consists of VTSS hardware and VTCS software are coupled with changes to the HSC and Library Station configurations creating a virtual ACS. Following are the hardware and software changes that are significant to the Unisys client system and CSC.

|                                   |  |
|-----------------------------------|--|
| <b>Transport configuration</b>    | To Exec, VTSS appears to be multiple CTS5136 subsystems with 4 cabinets containing 4 4780 drives attached through an ESCON (SBCON) channel interface.                              |
| <b>ACS configuration</b>          | To CSC, a VTSS appears to be an ACS with 16-256 transports depending on VSM model and SCMS IC. This ACS contains up to 97,000 tape volumes.  |
| <b>Scratch pool configuration</b> | A subpool is defined in HSC to include the virtual volumes in the VTSS. The Library Station configuration is updated to associate a scratch pool identifier with this HSC subpool. |
| <b>Establish defaults</b>         | The HSC and Library Station configurations are updated to specify default settings for VSM related parameters.   |
| <b>VTD</b>                        | Virtual Tape Drive   |
| <b>VTV</b>                        | Virtual Tape Volume  |
| <b>VTSS</b>                       | Virtual Tape Subsystem (This is the physical hardware.)  |
| <b>VTCS</b>                       | Virtual Tape Control Software (This software runs on the NCS Library Station server.)  |



## **2. IMPLEMENTING VSM WITH UNISYS CLIENTS**

This chapter provides information about implementing the Virtual Storage Manager (VSM). After a brief overview of VSM and a discussion of the VSM environment, this chapter addresses the system, hardware configuration, and software configuration changes required to implement VSM.

# UNISYS SYSTEM HARDWARE CONFIGURATION CHANGES

The Unisys hardware configuration maintained in the ODB will need to be updated using SCMS Site Data Facility to configure the Virtual Tape Drives (VTD's) and data path. The configuration of the number and type of virtual tape drives will depend on if your site has implemented IC-SCMS 9.7.1.0 and EXEC PLE 18017229.

The following items must be configured for each VTSS that a Unisys client has access to.

## *Without IC-SCMS 9.7.1.0 and EXEC PLE 18017229*

- At least 1 SBCON channel for each VTSS.
- 1 CTS5136 tape subsystems for each SBCON channel comprising of:
  - 1 5136-M30 Controller
  - 4 5136-M34LM Cabinets
  - 4 TP-4780-LM cartridge tape drives per Cabinet.

## *With IC-SCMS 9.7.1.0 and EXEC PLE 18017229*

- At Least 1 SBCON channel for each VTSS.
- 1-16 CTS5136-VSM Subsystems (The upper limit is determined by the model of your VTSS).
  - Two Controllers per subsystem with addresses 00-1, 01-1, 02-1, 03-1  
*Note:* The second controller will receive a warning that it is not connected. Once the ODB is booted the second controller disappears.
  - 16 TP-4780-LM cartridge tape drives per subsystem with addresses 0-15.

## CSC CONFIGURATION CHANGES

There are four basic configuration changes to CSC that are required to implement VSM.

1. Add the VSM Virtual Tape Drives (VTDs) to the CSC CSC\$DRIVE element. The drive name must match the names configured in the ODB, and the address must specify the new ACS number.
2. Add a TRANSLATE POOL statement to the CSC CSC\$PARAM element for each VTSS scratch pool.
3. Ensure that the QUERYSCRATCH is set appropriately using the CSC ACSMAP utility using the “S” option as defined in the CSC System Administrator’s Guide. See the Changes to Client System Runs section below for a discussion of this.
4. Add an ACS NAME for every VTSS using the ACSMAP processor with the “L” option as defined in the CSC System Administrator’s Guide. The address of the ACS must match the VTCS configuration and should start with 126 for the first VTSS and decrease by 1 for each additional VTSS.

## SERVER SOFTWARE CHANGES / CONSIDERATIONS

The Library Station configuration parameter SPNUM associates a scratch pool identifier used by CSC with a named scratch pool defined in HSC. An HSC scratch pool must be defined and an SPNUM parameter added for volumes in the VTSS. CSC will request VTSS scratch volumes using this scratch pool identifier. The SPNUM statement also designates the default Management Class that CSC will use.

CSC requires that the NCS Library Station software is configured to use a Persistent Data File (PDF).

## STAR-1100 TAPE MANAGEMENT SYSTEM CHANGES

Virtual Volumes are defined and created using one or more ranges of volume identifiers. All VTVs must be entered into the STAR Tape Inventory File. They should all be associated with the VTSS scratch pool using the POOLID. The STAR-1100 ALSPARM element should be updated to include a new RANGE statement for the VSM volumes. The Range statement for the VSM volumes should have a ,VSM=YES appended to it.

### *Example ALSPARM Statements*

```
RANGE=V00000-V01000 , POOL=VIRTUAL          , VSM=YES  
RANGE=VT0000-VT1000 , VSM=YES
```

## DIFFERENCES BETWEEN VTSS AND REAL ACS

The CSC software contains code that adds a delay between the time a dismount is requested by OS 2200 and when it is sent to the server. This delay is to allow a physical drive time to complete the rewind and unload operation. .VTSS performs tape mounts and dismounts nearly instantaneously. The CSC software will view all drives as equals and insert a predetermined delay before dismounting a volume. CSC is not virtually aware, however it will compensate for VTSS instantaneous dismount time and eliminate the delay time as long as each VTSS ACS numbers are configured per StorageTek's recommendations starting at ACS number 126 and decreasing for each additional VTSS. CSC will assume drives that are configured with ACS number greater than 100 are VSM drives and will bypass all delays.

## **3. USING VSM WITH UNISYS CLIENTS**

This chapter provides guidelines for using VSM. It describes changes to client system runs that enables them to be used in the VSM virtual environment. The chapter also discusses user-assigned implementation options. A final section describes any additional considerations worth noting.

## CHANGES TO CLIENT SYSTEM RUNS

The changes listed in the previous chapter for the Unisys system, CSC, and the server software create an environment where VSM can be used. The client system software must be changed to make use of this virtual environment. Following are guidelines for using VSM.

- You must ensure that the equipment code for virtual tape assignments includes HICM tape drives that can be in an ACS
- For virtual scratch tape assignments, the scratch pool must match the CSC VTSS scratch pool. If this is different than the system or run default scratch pool, then a CTL-POOL specification must be added to the assignment statement.
- If QUERYSCRATCH is FALSE, then requesting a volume in the VTSS scratch pool is not sufficient to direct the assignments to virtual transport. Either an ACSNAME or an equipment code that directs the assignment to a transport in the desired VTSS must be used.
- If QUERYSCRATCH is TRUE, then requesting a scratch volume from the VTSS scratch pool will direct the assignment to the VTSS if and only if there are only virtual volumes in that pool and all of those volumes are in the desired VTSS.

## SUMMARY OF USER ASSIGNMENT IMPLEMENTATION OPTIONS FOR VSM

There are four user assignment implementation options for selecting VTSS drives and volumes.

1. Specific volume assignments can use an equipment code for HICM tape drives. CSC and OS 2200 will direct the assignment to the appropriate tape drive.
2. Scratch assignments using CTL-POOL. -- The CTL-POOL on the assign statement can be used to direct scratch requests to the VSM. This option requires that the CSC translate pool for the VSM points the pool number defined in HSC and is a different pool number than the other library pools and is not the CSC default pool number. This requires that Query\_Scratch is set to true.
3. Absolute Drive Assignment. The VTD's device names as defined in the ODB can be used in the user ECL. This is very inflexible but works for both specific and scratch volume assignments. This is not recommended for general use but it is an option for manually entered assignments.
4. ACS name. -- An ACS name can be used as the equipment code on the assign statement for either specific or scratch volumes. This will ensure that the allocated tape unit is in the designated ACS. For scratch assignments, the requested pool number must be the same as the VSM pool number. If this is different than the system default pool then a CTL-POOL parameter must be included on the assignment statement.

Options 1, 2, and 3 are the preferred methods for specifying VTSS. Option 4 is possible, but is less desirable. Future levels of the EXEC and CSC that support mixed media may or may not honor ACS name specifications.

All of the virtual drives and virtual volumes reside in separate ACSs which are maintained by the StorageTek NCS and VTCS software. The CSC product can only have a single default ACS number and single default pool for labeled and unlabeled volumes. Because of these configuration restrictions, a user who wants a virtual volume must either specify the ACS preference with the ACSNAM processor or use the configured ACS name as the assign mnemonic along with a CTL pool name for virtual scratch tapes within the virtual ACS.

In order to assign a virtual scratch tape a user run must assign the request in one of the two following manners:

### **Option 1 Setting run default ACS to virtual ACS**

```
@ACSNAM, R VTAPE  
@ASG, TF TAPE. , HICM, , , , VIRTUAL
```

### **Option 2 Specific ACS name on assignment.**

```
@ASG, TF TAPE. , VTAPE, , , , VIRTUAL
```

#### *Where:*

VTAPE is a defined ACSNAM equating to the Virtual ACS (126) using the ACSMAP processor.

VIRTUAL is a defined CTL-Pool name in the CSC\$PARAM element equating to the pool number defined in Library Station equating to the virtual tape pool.

With CSC level 5R1 and above, CSC can be configured with a default pool for an ACS. This means that the virtual pool can be defined for the VTAPE ACS, and does not need to be specified by the user.

## **ADDITIONAL CONSIDERATIONS**

1. Exec audit trails should not be configured to use virtual tape drives.
2. When using FAS with VSM, the FAS TAPE\_BLOCK\_SIZE parameter should not be set greater than 4.

# APPENDIX A. EXAMPLES OF CSC CONFIGURATIONS AND RELATIONSHIPS

This appendix presents several examples of CSC configurations and relationships.

## NOTE

---

*Some lines in the following examples are highlighted and referenced by number. Explanations of these lines follow the examples.*

## CONFIGURING ACS NAMES AND IDS

The following example shows a virtual tape subsystem defined as ACS number 126.

```
@ACSNAM, P
ACSNAM 2R1 SL76R2 04/17/03 14:20:14
CONFIGURED ACS NAMES AND ACS IDS
NAME           HEX           DECIMAL
ACS00          0X000         000
ACS01          0X001         001
❶ VTAPE       0X07E       126
SYS DEFAULT:ACS00          RUN DEFAULT:ACS00
ACSNAM DISPLAY FUNCTION COMPLETED!
END ACSNAM.
```

### *Explanation*

- ❶ This line defines the ACS name for this VSM as "VTAPE".

## CONFIGURING ACSMAP

The following example shows how to determine the QUERYSCRATCH value.

```
@ACSMAP, S
ACSMAP 2R2 SL76R2 04/17/03 14:38:00
  QUERYSCRATCH EQUAL FALSE
  BYPASSLSM    EQUAL FALSE
  LOADMSG      EQUAL FALSE
  NONACS       EQUAL TRUE
  SCRPREF      EQUAL TRUE
  SERVMSG      EQUAL TRUE
END ACSMAP.
```

## CONFIGURING CSC POOL NAMES

The following example shows the updates required to define the virtual tape pool to CSC.

### **SYS\$LIB\$\*CSC-PARM.CSC\$PARAM**

```
CDIBDI=0400410,0141000
CSCUIBDI=0400302,0400303
ERIndex=00275
Default_labeled_pool=5
Default_unlabeled_pool=6
```

❷ **Translate\_pool Virtual,labeled into 7**

❸ **Translate\_pool Virtual,unlabeled into 8**

```
Sec_level_1 = TERM, BRKPT, DEBUG, ABORT, MOUNT, DISMOUNT, CYCLE
```

```
Interface CMSA uses CMSA,CSC,CSC
```

```
Interface CDI uses CDI
```

```
Path ALPHA uses CDI connects 209,25,5,20 to 209,25,5,218
```

```
Path CMSHLC uses CMSA connects 209,25,5,1 to 209,25,5,218 status,down
```

```
Path CMSDCP uses CMSA connects 209,25,5,10 to 209,25,5,218 status,down
```

```
Path CMSEXT uses CMSA connects 209,25,6,24 to 209,25,5,218
```

### *Explanation*

❷ & ❸ These lines define the CTL-POOL name for virtual tapes as "virtual". The pool numbers should match the Library Station configuration.

## CONFIGURING CSC VIRTUAL DRIVES

The following example shows the CSC\$DRIVE updates required to define the virtual tape drives to CSC.

### **SYS\$LIB\$\*CSC4-PARM.CSC\$DRIVE**

```
Drive ATAP0=0,0,9,0
Drive ATAP1=0,0,9,1
Drive ATAP2=0,0,9,2
Drive ATAP3=0,0,9,3
Drive ATAP4=0,0,10,0
Drive ATAP5=0,0,10,1
Drive ATAP6=0,0,10,2
Drive ATAP7=0,0,10,3
Drive ATAP8=0,0,2,0
Drive ATAP9=0,0,2,1
Drive ATAP10=0,0,2,2
Drive ATAP11=0,0,2,3
Drive ATAP12=0,0,3,0
Drive ATAP13=0,0,3,1
Drive ATAP14=0,0,3,2
```

- ④ **Drive VTAP0=126,0,1,0**
- ④ **Drive VTAP1=126,0,1,1**
- ④ **Drive VTAP2=126,0,1,2**
- ④ **Drive VTAP3=126,0,1,3**
- ④ **Drive VTAP4=126,0,2,0**
- ④ **Drive VTAP5=126,0,2,1**
- ④ **Drive VTAP6=126,0,2,2**
- ④ **Drive VTAP7=126,0,2,3**
- ④ **Drive VTAP8=126,0,3,0**
- ④ **Drive VTAP9=126,0,3,1**
- ④ **Drive VTAP10=126,0,3,2**
- ④ **Drive VTAP11=126,0,3,3**
- ④ **Drive VTAP12=126,0,4,0**
- ④ **Drive VTAP13=126,0,4,1**
- ④ **Drive VTAP14=126,0,4,2**
- ④ **Drive VTAP15=126,0,4,3**

### *Explanation*

④ These lines configure the virtual drives VTAP0 through VTAP15. The device names VTAP0, VTAP1, ... must match the ODB configuration. The address must start with the ACS number of the VTSS. This usually starts with 126 for the first VSM. For each additional VSM subsystem, the ACS would be decremented by one. The second VSM would be 125.

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