



# Hitachi Universal Storage Platform V Hitachi Universal Storage Platform VM

## Multiplatform Backup User's Guide

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## Acronyms and Abbreviations



# Preface

This document describes and provides instructions for using the Multiplatform Backup feature of the Hitachi Universal Storage Platform V (USP V) and Hitachi Universal Storage Platform VM (USP VM) storage systems.

Please read this document carefully to understand how to use this product, and maintain a copy for reference purposes.

This preface includes the following information:

- [Intended Audience](#)
- [Product Version](#)
- [Document Revision Level](#)
- [Source Document\(s\) for this Revision](#)
- [Changes in this Revision](#)
- [Document Organization](#)
- [Referenced Documents](#)
- [Document Conventions](#)
- [Convention for Storage Capacity Values](#)
- [Getting Help](#)
- [Comments](#)

**Notice:** The use of Multiplatform Backup and all other Hitachi Data Systems products is governed by the terms of your agreement(s) with Hitachi Data Systems.

## Intended Audience

This document is intended for system administrators, Hitachi Data Systems representatives, and Authorized Service Providers who are involved in installing, configuring, and operating the Hitachi Universal Storage Platform V and/or VM storage systems.

This document assumes the following:

- The user has a background in data processing and understands RAID storage systems and their basic functions.
- The user is familiar with the Universal Storage Platform V and/or VM storage system and has read the *Universal Storage Platform V/VM User and Reference Guide*.
- The user is familiar with the Storage Navigator software for the Universal Storage Platform V/VM and has read the *Storage Navigator User's Guide*.
- The user is familiar with the backup/restore software on the mainframe host system(s).

## Product Version

This document revision applies to USP V/VM microcode 60-03-0x and higher.

## Document Revision Level

| Revision       | Date     | Description     |
|----------------|----------|-----------------|
| MK-98RD6713-00 | May 2008 | Initial release |

## Source Document(s) for this Revision

- MK-98RD6713-01c-RSD-V03

## Changes in this Revision

Not applicable to this revision.

## Document Organization

The following table provides an overview of the contents and organization of this document. Click the [chapter title](#) in the left column to go to that chapter. The first page of each chapter provides links to the sections in that chapter.

| Chapter  | Description   |
|--|---|
| <a href="#">Overview of Multiplatform Backup</a>           | This chapter provides an overview of the Multiplatform Backup function and describes its features and benefits. |
| <a href="#">About Multiplatform Backup Operations</a>      | This chapter describes how Multiplatform Backup provides mainframe-based backup/restore operations.             |
| <a href="#">Performing Multiplatform Backup Operations</a> | This chapter describes the preparations and procedures to execute Multiplatform Backup operations               |
| <a href="#">Acronyms and Abbreviations</a>                 | Defines the acronyms and abbreviations used in this document.   |

## Referenced Documents

Hitachi Universal Storage Platform V/VM:

- *User and Reference Guide*, MK-96RD635
- *Storage Navigator User's Guide*, MK-96RD621
- *Storage Navigator Messages*, MK-96RD613





## Document Conventions

The terms “Universal Storage Platform V” and “Universal Storage Platform VM” refer to all models of the Hitachi Universal Storage Platform V and VM storage systems, unless otherwise noted.

This document uses the following typographic conventions:

| Convention          | Description  |
|---------------------|--|
| <b>Bold</b>         | Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click <b>OK</b> .  |
| <i>Italic</i>       | Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy <i>source-file target-file</i><br><b>Note:</b> Angled brackets (< >) are also used to indicate variables. |
| screen/code         | Indicates text that is displayed on screen or entered by the user.<br>Example: # pairdisplay -g ora <b>db</b>  |
| < > angled brackets | Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: # pairdisplay -g <group><br><b>Note:</b> Italic font is also used to indicate variables.                       |
| [ ] square brackets | Indicates optional values. Example: [ a   b ] indicates that you can choose a, b, or nothing.  |
| { } braces          | Indicates required or expected values. Example: { a   b } indicates that you must choose either a or b.  |
| vertical bar        | Indicates that you have a choice between two or more options or arguments.<br>Examples:<br>[ a   b ] indicates that you can choose a, b, or nothing.<br>{ a   b } indicates that you must choose either a or b.      |
| underline           | Indicates the default value. Example: [ <u>a</u>   b ]   |

This document uses the following icons to draw attention to information:

| Icon  | Meaning | Description   |
|---|---------|---|
|  | Note    | Calls attention to important and/or additional information.                                     |
|  | Tip     | Provides helpful information, guidelines, or suggestions for performing tasks more effectively. |
|  | Caution | Warns the user of adverse conditions and/or consequences (e.g., disruptive operations).         |
|  | WARNING | Warns the user of severe conditions and/or consequences (e.g., destructive operations).         |



## Convention for Storage Capacity Values

Physical storage capacity values (for example, disk drive capacity) are calculated based on the following values:

- 1 KB = 1,000 bytes
- 1 MB = 1,000<sup>2</sup> bytes
- 1 GB = 1,000<sup>3</sup> bytes
- 1 TB = 1,000<sup>4</sup> bytes
- 1 PB = 1,000<sup>5</sup> bytes

Logical storage capacity values (for example, logical device capacity) are calculated based on the following values:

- 1 KB = 1,024 bytes
- 1 MB = 1,024<sup>2</sup> bytes
- 1 GB = 1,024<sup>3</sup> bytes
- 1 TB = 1,024<sup>4</sup> bytes
- 1 PB = 1,024<sup>5</sup> bytes
- 1 block = 512 bytes

## Getting Help

If you need to call the Hitachi Data Systems Support Center, make sure to provide as much information about the problem as possible, including:

- The circumstances surrounding the error or failure.
- The content of any error messages displayed on the host system(s).
- The content of any error messages displayed by Storage Navigator.
- The Storage Navigator configuration information (use the FD Dump Tool).
- The service information messages (SIMs), including reference codes and severity levels, displayed by Storage Navigator.

The Hitachi Data Systems customer support staff is available 24 hours/day, seven days a week. If you need technical support, please call:

- United States: (800) 446-0744
- Outside the United States: (858) 547-4526

## Comments

Please send us your comments on this document. Make sure to include the document title, number, and revision. Please refer to specific section(s) and paragraph(s) whenever possible.

- **E-mail:** [doc.comments@hds.com](mailto:doc.comments@hds.com)
- **Fax:** 858-695-1186
- **Mail:**  
Technical Writing, M/S 35-10  
Hitachi Data Systems  
10277 Scripps Ranch Blvd.  
San Diego, CA 92131

***Thank you!*** (All comments become the property of Hitachi Data Systems.)

# Overview of Multiplatform Backup

The Multiplatform Backup feature enables you to perform standard mainframe backup and restore operations on the open-system data on the Universal Storage Platform V/VM (USP V/VM) storage system. Multiplatform Backup allows the mainframe host to “see” the OPEN-x logical units (LUs) on the USP V/VM storage system as 3390 volumes, making these devices available for use by mainframe-based backup utilities such as DFDSS, DFHSM, DFSMSdss™, DFSMSHsm™, FDR, and VSE FASTCOPY.

The Multiplatform Backup capability of the USP V/VM provides the following benefits for the user:

- Multiplatform Backup enables backup/restore of open-system data at host data transfer speeds through the front-end FICON and/or ESCON channels.
- By allowing the mainframe host to perform backup/restore operations on open-system data, Multiplatform Backup not only reduces the amount of time required to back up the data but also frees up valuable server resources for use by client-server applications.
- Multiplatform Backup allows the user to apply similar backup procedures and standards to both mainframe and open-system data, providing a centralized data management and disaster recovery environment for both mainframe and open-system data.
- Multiplatform Backup makes mainframe-based backup media (e.g., tape, disk, automated tape library) available for the open-system data.
- Once the open-system data is backed up on mainframe-based media, the user can apply other data management functions to these volumes, including backup generation management, primary/secondary duplication management, and automatic backup control.



**Note:** Multiplatform Backup enables full-volume backup/restore operations only and does not support partial-volume or file-level backup or restore operations. For information on file-level backup-restore for data on the USP V/VM storage system, contact your Hitachi Data Systems account team.

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# About Multiplatform Backup Operations

This chapter describes the Multiplatform Backup mainframe-based backup/restore operations.

- [Functionality Overview](#)
- [Data Format](#)
- [Internal Track Format](#)

# Functionality Overview

The Multiplatform Backup feature is provided by the microcode installed on the USP V/VM storage system. Multiplatform Backup allows you to initialize the OPEN-x LUs on the USP V/VM storage system as 3390 mainframe LVIs to make them available for mainframe-based backup/restore operations. Multiplatform Backup emulates the mainframe CKD format to allow the mainframe host to read the FBA-format data on the OPEN-x LUs. Multiplatform Backup also provides protection for the open-system data by rejecting all mainframe write commands, except those required to initialize the OPEN-x LU as a mainframe device and perform backup/restore operations.

Figure 2-1 shows a typical Multiplatform Backup system configuration.

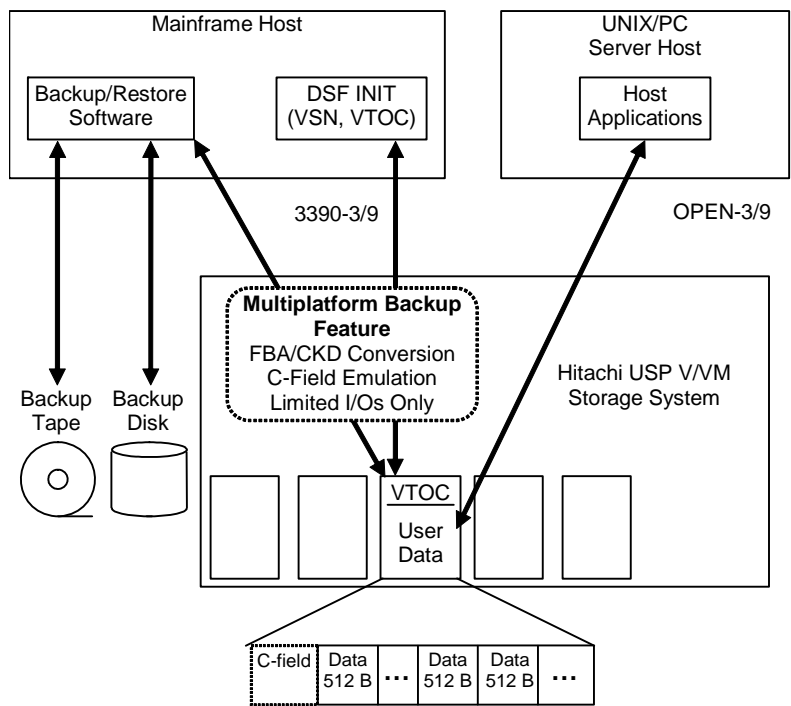
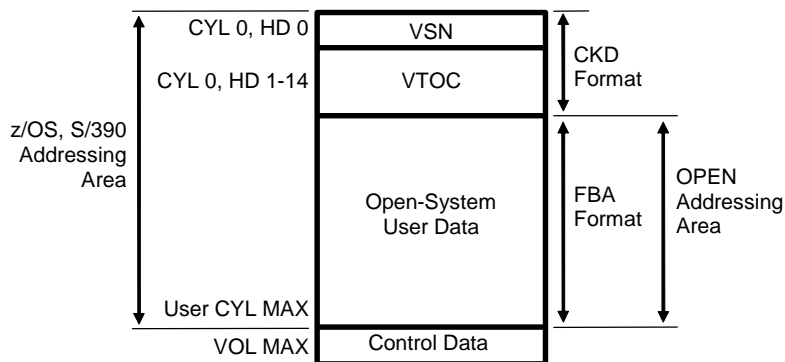


Figure 2-1 Typical Multiplatform Backup System Configuration

## Data Format

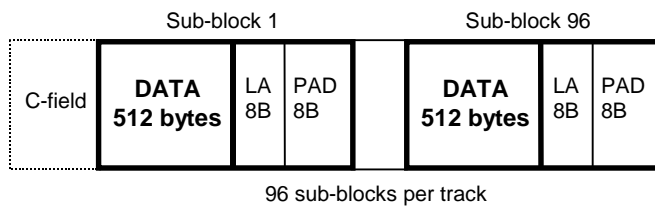
Figure 2-2 shows the data format of a Multiplatform Backup device. The area accessed only by the mainframe host, which includes the VSN and VTOC on cylinder 0, is in CKD format. Cylinder 0 must be used only for the VSN and VTOC to provide a fixed location for the open-system addressing area. The area accessed by the open-system host, which includes the user data on cylinder 1 through user cylinder max, remains in FBA format. Multiplatform Backup emulates the CKD format to allow the mainframe host to read the FBA-format data.



**Figure 2-2 Data Format of Multiplatform Backup Device**

## Internal Track Format

Figure 2-3 shows the internal track format of a Multiplatform Backup device. The USP V/VM storage system stores only the FBA data in cache, with no count-field (C-field). When the mainframe host issues a read command to a Multiplatform Backup device, the USP V/VM storage system generates the C-field and emulates the mainframe CKD format to transfer the data to the host. When the mainframe host issues a write command to a Multiplatform Backup device, the USP V/VM storage system discards the C-field and stores only the data field. All mainframe write commands issued to a Multiplatform Backup device must consist of a record with key length (KL) of 0 and data length (DL) of 16 KB. The USP V/VM will reject all other mainframe write commands as having an invalid track format.



**Figure 2-3 Internal Track Format of Multiplatform Backup Device**



# Performing Multiplatform Backup Operations

This chapter describes the preparations and procedures to execute Multiplatform Backup operations:

- [System Requirements](#)
- [Preparing for Backup/Restore Operations](#)
- [Performing Backup/Restore Operations](#)

# System Requirements

**Table 3-1 Multiplatform Backup Requirements**

| Item   | Requirements  |   |
|--|---|---|
| Mainframe operating system (z/OS®, OS/390®)    | MVS/ESA   | FICON/ESCON   |
| Open-System Platforms                          | Sun™ Solaris™: 2.6, 7, 8, 9, 10<br>HP-UX: 10.20, 11.0, 11.i, 11.20, 11.23<br>AIX: 4.3.3, 4.5L, 5.2, 5.3<br>Windows®: 2000, 2003 | <p><b>⚠Note:</b> The following platforms are supported at initial release: Linux (6.0), Netware (5.1), OpenVMS (7.2, 7.3), Tru64 (5.0A, 5.1, 5.1A). SGI IRIX and SEQUENT are not supported at initial release.</p> <p>This platform support information was current at the time of publication of this document. For the latest information on platform and version support, please contact your Hitachi Data Systems account team.</p> |
| Mainframe backup/restore utilities             | DFDSS, DFHSM, DFSMSdss, DFSMSshm  |   |
| USP V/VM storage system                        | Multiplatform Backup feature must be installed and enabled.   |   |
| Backup/restore method                          | Full-volume backup/restore only.<br>Partial-volume and file-level backup/restore are not supported.                             |   |
| Logical device types for open-system platforms | OPEN-3, OPEN-9  |   |
| Logical device types for mainframe systems     | 3390-3, 3390-9  |   |
| Volume serial number (VSN)                     | Use ICKDSF INIT.<br>Cylinder 0, head 0.   |   |
| Volume table of contents (VTOC)                | Use ICKDSF INIT.<br>Standard format (SMS index format not supported).<br>Cylinder 0, head 1 to 14.                              |   |
| Dataset allocation                             | Use IEFBR14.<br>Cylinder 1, head 0 to user cylinder max.<br>One dataset per OPEN-3 LU.<br>Three datasets per OPEN-9 LU.         |   |

| Item   | Requirements  |
|--|---|
| Mainframe access   | <p>No access during open-system server use. LUs should be OFFLINE to all mainframe hosts except during backup/restore operations.</p> <p>All control commands are accepted.</p> <p>All read commands are accepted.</p> <p>The following write commands are accepted:</p> <ul style="list-style-type: none"> <li>▪ VSN and VTOC creation by ICKDSF INIT (cylinder 0 only).</li> <li>▪ FORMAT WRITE with KL=0, DL=16 KB by specified backup/restore utilities.</li> </ul> <p>All other write commands are rejected from storage system: track overrun or invalid track format error.</p> <p><b>⚠Note:</b> Concurrent Copy, TrueCopy™ for z/OS, Universal Replicator for z/OS, Compatible FlashCopy®, Compatible FlashCopy V2, and Compatible XRC cannot be used on Multiplatform Backup volumes.</p> <p><b>⚠Note:</b> It is not recommended to use Cache Residency Manager on Multiplatform Backup volumes. If Cache Residency Manager is used, the storage system accesses the Multiplatform Backup volumes after destaging the data that remains in cache without being reflected to the disk when Multiplatform Backup volumes have been accessed from the mainframe. Therefore, the access processing time to the volume becomes long.</p> <p><b>⚠Note:</b> Please do not configure Multiplatform Backup volumes and mainframe volumes in the same CU. If Multiplatform Backup volumes coexist with mainframe volumes in the same CU, "EF-CHK=RDFEET?" may be displayed when the QDASD command (the example of describing the command: DS QD device #) that displays the state of the device on the console is executed from the mainframe to the volumes that is in the same CU.</p> |
| Open-system access   | No access during mainframe backup/restore operations. LUs should be unmounted from all open-system hosts during backup/restore.   |
| Program products that can be used on Multiplatform Backup volumes  | Open Volume Management<br>LUN Manager<br>LUN Expansion<br>Virtual Partition Manager<br>Cache Residency Manager  |
| Volumes that can be used as Multiplatform Backup volumes   | ShadowImage®  |
| Volumes that cannot be used as Multiplatform Backup volumes  | TrueCopy, TrueCopy Asynchronous<br>Universal Replicator<br>Universal Volume Manager<br>Dynamic Provisioning<br>Volume Migration   |
| Mainframe functions that cannot be used on Multiplatform Backup volumes                                    | Concurrent Copy<br>XRC<br>FlashCopy, FlashCopy V2<br>PPRC<br>Business Continuity Manager<br>PAV, Hyper PAV  |
| Backup/restore operations cannot be performed when these products are used on Multiplatform Backup volumes | Data Retention Utility  |

## Preparing for Backup/Restore Operations

Your Hitachi Data Systems representative must install and enable the Multiplatform Backup feature on the USP V/VM storage system before the open-system LUs can be accessed by the mainframe. Mainframe access to the open-system LUs will be rejected without the Multiplatform Backup feature installed and enabled. Once Multiplatform Backup has been installed and enabled, you can start preparing the open-system LUs on the USP V/VM storage system for Multiplatform Backup operations immediately.



**Note:** If the Multiplatform Backup feature is uninstalled or disabled, the mainframe host will not be able to perform backup/restore operations on the open-system LUs, even if they have been formatted as 3390 volumes, because of the FBA format of the open-system data.

### Volume (LU) Initialization

The first step in preparing the open-system LUs for mainframe backup/restore operations is to initialize the OPEN-x LUs as 3390 volumes. Use DSF INIT (not SMS) without the **Verify** option to generate the VSN and VTOC for the OPEN-x LU. Multiplatform Backup requires the standard VTOC format generated by DSF and is not compatible with the index VTOC format generated by SMS. Cylinder 0, head 0 must be used for the VSN, and cylinder 0, head 1 through 14 must be used for the VTOC. Figure 3-1 shows an example of DSF initialization for an OPEN-x LU.

```
//DISCINIT JOB MSGLEVEL=(1,1),MSGCLASS=Y,CLASS=Y,REGION=4096K
//QUICKID EXEC PGM=ICKDSF
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
  INIT UNIT(3410) VFY(*NONE*) VOLID(QA3410) VTOC(0000,1,14) NOINDEX
/*
//
```

**Figure 3-1** Example of DSF Initialization

### Dataset Allocation

The second and final step in preparing the OPEN-x LUs is to allocate the dataset(s). Use IEFBR14 to perform dataset allocation on the new VTOC. Each OPEN-3 LU must contain one dataset, and each OPEN-9 LU must contain three datasets so that the number of tracks does not exceed the maximum allowed per dataset. The specified extent of the dataset(s) must be cylinder 1, head 0 to user cylinder max, and the DAM file must be specified.

Figure 3-2 shows an example of dataset allocation for an OPEN-3 LU, and Figure 3-3 shows an example of dataset allocation for an OPEN-9 LU. The amount of data and number of files on the OPEN-x LU is not related to the dataset allocation. The mainframe backup/restore utilities operate on the entire volume, whether it is full or not.

```
//OPEN3ALC JOB MSGLEVEL=(1,1),MSGCLASS=Y,CLASS=Y
//DUMMYDA EXEC PGM=IEFBR14
//SYSPRINT DD SYSOUT=*
//QA34D001 DD UNIT=DASD,
//          VOL=SER=QA34D0,
//          DSNNAME=DMYALC01,
//          SPACE=(CYL,3338),
//          DCB=DSORG=DA,
//          DISP=(NEW,KEEP,KEEP)
/*
//
```

**Figure 3-2 Example of VTOC Generation for an OPEN-3 LU**

```
//OPEN9ALC JOB MSGLEVEL=(1,1),MSGCLASS=Y,CLASS=Y
//DUMMYDA EXEC PGM=IEFBR14
//SYSPRINT DD SYSOUT=*
//QA34D001 DD UNIT=DASD,
//          VOL=SER=QA34D0,
//          DSNNAME=DMYALC01,
//          SPACE=(CYL,3338),
//          DCB=DSORG=DA,
//          DISP=(NEW,KEEP,KEEP)
//QA34D002 DD UNIT=DASD,
//          VOL=SER=QA34D0,
//          DSNNAME=DMYALC02,
//          SPACE=(CYL,3339),
//          DCB=DSORG=DA,
//          DISP=(NEW,KEEP,KEEP)
//QA34D003 DD UNIT=DASD,
//          VOL=SER=QA34D0,
//          DSNNAME=DMYALC03,
//          SPACE=(CYL,3339),
//          DCB=DSORG=DA,
//          DISP=(NEW,KEEP,KEEP)
/*
//
```

**Figure 3-3 Example of VTOC Generation for an OPEN-9 LU**

**Note:** DSORG=DA (RECFM is not required).

## Drive Letters on Windows Systems

The following operations are required when using Multiplatform Backup with Windows systems:

- **Before Backup:** Delete the drive letter of the LU to be backed up using the Disk Administrator, perform the backup operations, and then reassign the drive letter for the same LU using the Disk Administrator.
- **Before Restore:** Delete the drive letter of the LU to be restored using the Disk Administrator, perform the restore operations, and then reassign the drive letter for the same LU using the Disk Administrator.

## Performing Backup/Restore Operations

You can begin backup/restore operations on the Multiplatform Backup devices as soon as the VSN and VTOC have been generated and the datasets have been allocated. The user should follow these general guidelines for performing and managing Multiplatform Backup operations:

- Multiplatform Backup supports the full-volume dump/restore operations performed by DFSS, DFHSM, DFSMSdss, DFSMSHsm, FDR, and VSE FASTCOPY. Multiplatform Backup does not support partial-volume or file-level dump or restore. When an OPEN-x LU is restored from its backup copy, the entire volume is replaced. Due to this limitation, it is recommended that you back up the OPEN-x LUs more often than your mainframe volumes to minimize the loss of new data in case you need to restore an OPEN-x LU from its backup copy.
- When backing up and restoring database (DB) files, the user must be careful to include all of the volumes containing DB files, both data files and DB management files, in the backup and restore operations.
- Hitachi Data Systems recommends that the Multiplatform Backup devices remain OFFLINE to all mainframe hosts except during backup/restore operations to prevent simultaneous access by the mainframe and open-system hosts. If a Multiplatform Backup device is accessed by the mainframe at the same time as it is being used by an open-system host, the open-system access will result in an error. The mainframe host is not affected and can continue to access the volume.
- Hitachi Data Systems recommends that the Multiplatform Backup devices be UNMOUNTED from all open-system hosts during mainframe backup/restore operations. Do not access the Multiplatform Backup device from the open-system host during mainframe backup/restore operations. If simultaneous access does occur, the mainframe backup/restore operation will crash.
- For Windows systems, make sure that you have reassigned/deleted the drive letters as described in [Drive Letters on Windows Systems](#) before beginning backup/restore operations.

## Backup Operations

Before starting backup operations on any volume, make sure to reserve the volume to prevent access by another mainframe host during backup operations. Use DFDSS, DFHSM, DFSMSdss, DFSMSHsm, FDR, or VSE FASTCOPY to perform backup operations on the OPEN-x LUs. Figure 3-4 shows an example of disk-to-disk backup using DFDSS. Figure 3-5 shows an example of disk-to-tape backup using DFDSS. For additional information on using DFDSS, DFHSM, DFSMSdss, DFSMSHsm, FDR, or VSE FASTCOPY to perform backup operations, please refer to the user documentation for these software products.

For Windows systems, make sure that you have reassigned/deleted the drive letters as described in [Drive Letters on Windows Systems](#) before beginning backup/restore operations.

```
//DISCDUMP JOB MSGLEVEL=(1,1),MSGCLASS=Y,CLASS=Y,REGION=4096K,TIME=1440
//BACKUP EXEC PGM=ADDRSSU
//SCSIIN DD UNIT=3390,VOL=SER=QA3800,DISP=OLD
//DASDOUT DD UNIT=3390,VOL=SER=QA340F,DSNAME=DMYALC,
//          DISP=(NEW,KEEP,DELETE),SPACE=(CYL,(3338,9))
//SYSOUT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
DUMP FULL ALLDATA(*) ALLEXCP CANCELERROR COMPRESS OPTIMIZE(4) -
      INDDNAME(SCSIIN) OUTDDNAME(DASDOUT)
/*
//
```

**Figure 3-4** Example of Disk-to-Disk Backup Using DFDSS

```
//USER JOB '85042',MSGCLASS=X,REGION=2048K,
//      NOTIFY=USERNAME
//S1 EXEC PGM=ADDRSSU
//SYSPRINT DD SYSOUT=*
//DASD1 DD UNIT=3390,VOL=SER=SCSI51,DISP=SHR
//TAPE DD UNIT=3490,VOL=SER=(AB1130,AB0400),LABEL=(1,NL),
//      DSN=BACKUP.VSCSI51,DISP=(NEW,KEEP)
//      DISP=(OLD,KEEP,DELETE),VOL=SER=AAAAAA
//SYSIN DD *
DUMP FULL ALLDATA(*) ALLEXCP CANCELERROR COMPRESS OPTIMIZE(4) -
      INDDNAME(DASD1) OUTDDNAME(TAPE)
/*
```

**Figure 3-5** Example of Disk-to-Tape Backup Using DFDSS



## Restore Operations

Before starting restore operations on any volume, make sure to reserve the volume to prevent access during restore operations. Use DFDSS, DFHSM, DFSMSdss, DFSMSHsm, FDR, or VSE FASTCOPY to perform restore operations on OPEN-x LUs. Figure 3-6 shows an example of disk-to-disk restore using DFDSS. For additional information on using DFDSS, DFHSM, DFSMSdss, DFSMSHsm, FDR, or VSE FASTCOPY to perform restore operations, please refer to the user documentation for these software products.

For Windows systems, make sure that you have reassigned/deleted the drive letters as described in [Drive Letters on Windows Systems](#) before beginning backup/restore operations.

```
//DISCRSTR JOB MSGLEVEL=(1,1),MSGCLASS=Y,CLASS=Y,REGION=4096K,TIME=1440
//RESTORE EXEC PGM=ADRDSSU
//DASDIN DD UNIT=3390,VOL=SER=QA340F,DSNAME=DMYALC,
// DISP=(OLD,DELETE,DELETE)
//SCSIOUT DD UNIT=3390,VOL=SER=QA3800,DISP=OLD
//SYSOUT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
RESTORE FULL CANCELERROR -
        INDDNAME(DASDIN) OUTDDNAME(SCSIOUT)
/*
//
```

**Figure 3-6 Example of Disk-to-Disk Restore Using DFDSS**

The restore operation must access the same volume that was used in the backup operation. If the restore destination volume is different than the backup source volume, the open-system host will not recognize the volume after the restore operation. For example, HP-UX will return the following error messages:

*Example 1:*

```
# mount /dev/vg01/lvol1 /01
mount: /dev/vg01/lvol1:No such device or address
```

*Example 2:*

```
# fsck -m /dev/rdisk/c2t2d0
fsck:/etc/default/fs is used for determining the file system type
fsck:sanity check, /dev/rdisk/c2t2d0 is badly_damaged
```

If this error occurs, you must install the volume again from the open-system host (e.g., partition, label, create file system). For further information on installing LUs, please refer to the user documentation for the open-system OS.



# Troubleshooting

This chapter describes how to troubleshoot problems with the Storage Navigator:

- [General Troubleshooting](#)
- [Calling the Hitachi Data Systems Support Center](#)

## General Troubleshooting

**USP V/VM:** For general troubleshooting information on the Hitachi Universal Storage Platform V/VM storage system, see the *User and Reference Guide* (MK-96RD635).

**Storage Navigator:** For general troubleshooting information on Storage Navigator, see the *Storage Navigator User's Guide* (MK-96RD621). For a complete list of Storage Navigator error codes, see the *Storage Navigator Messages* (MK-96RD613).

**Mainframe backup software:** For troubleshooting information on the mainframe backup/restore software, refer to the user documentation for the software.

## Calling the Hitachi Data Systems Support Center

If you need to call the Hitachi Data Systems Support Center, make sure to provide as much information about the problem as possible, including:

- The circumstances surrounding the error or failure.
- The content of any error messages displayed on the host system(s).
- The content of any error messages displayed by Storage Navigator.
- The Storage Navigator configuration information (use the FD Dump Tool).
- The service information messages (SIMs), including reference codes and severity levels, displayed by Storage Navigator.

The Hitachi Data Systems customer support staff is available 24 hours/day, seven days a week. If you need technical support, please call:

- United States: (800) 446-0744
- Outside the United States: (858) 547-4526





# Acronyms and Abbreviations

|         |   |
|---------|---|
| C-field | count-field   |
| CC      | Concurrent Copy                                     |
| CKD     | count-key data                                      |
| CU      | control unit  |
| DAM     | direct-access method                                |
| DASD    | direct-access storage device                        |
| DB      | database  |
| DFDSS   | Data Facility Data Set Services                     |
| DFHSM   | Data Facility Hierarchical Storage Manager          |
| DFSMS   | Data Facility Storage Management Subsystem          |
| DL      | data length   |
| DSF     | Device Support Facilities                           |
| ESA     | Enterprise Systems Architecture                     |
| ESCON   | Enterprise System Connection                        |
| ExSA    | Extended Serial Adapter                             |
| FBA     | fixed-block architecture                            |
| FDR     | Fast Dump Restore                                   |
| GB      | gigabyte  |
| I/O     | input/output  |
| IEFBR14 | Information Engineering Facility branch register 14 |
| KB      | kilobyte  |
| KL      | key length  |
| LU      | logical unit  |
| LUN     | logical unit, logical unit number                   |
| LVI     | logical volume image                                |
| MB      | megabyte  |
| MVS     | Multiple Virtual Storage                            |
| OS      | operating system                                    |
| PAV     | Parallel Access Volume                              |
| PPRC    | Peer-to-Peer Remote Copy                            |

|        |                                       |
|--------|---------------------------------------|
| SIM    | service information message           |
| TB     | terabyte                              |
| USP V  | Hitachi Universal Storage Platform V  |
| USP VM | Hitachi Universal Storage Platform VM |
| VSN    | volume serial number                  |
| VTOC   | volume table of contents              |
| XRC    | Extended Remote Copy                  |





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**MK-98RD6713-00**