Preliminary

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Hitachi Freedom Storage™
Thunder 9200™
IBM® AIX®Host Installation Guide

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The following source document was used to produce this Thunder 9200 host installation guide: *Hitachi Disk Array Subsystem Installation Manual (Fibre Channel),* revision 1.

Preface

The *Hitachi Freedom Storage™ Thunder 9200™ IBM® AIX® Host Installation Guide* describes and provides instructions for installing and configuring the devices on the Hitachi Thunder 9200™ disk array subsystem for operation with IBM® AIX® operating system. This configuration guide assumes that:

- the user has a background in data processing and understands direct-access storage device subsystems and their basic functions,
- the user is familiar with the Thunder 9200™ RAID subsystem,
- the user is familiar with the IBM® AIX® operating system and the IBM® RISC System/6000 (RS/6000)®, POWERstation®, POWERserver®, and/or SP® system,
- the user is familiar with the AIX® Journaled File System, system commands, and utilities.

Note: The term "9200" refers to the entire Hitachi Thunder 9200™ subsystem family, unless otherwise noted. Please refer to the *Hitachi Freedom Storage 9200™ User and Reference Guide (MK-90DF504)* for further information on the 9200 disk array subsystems.

For further information on IBM® AIX®, please consult the IBM® AIX® online help and/or user documentation, or contact IBM® technical support.

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Chapter 1 Overview of Thunder 9200™ IBM® AIX® Configuration

1.1 Configuration Requirements

This document describes the requirements and procedures for connecting the 9200 subsystem to an IBM® AIX® system and configuring the new 9200 devices for operation with the IBM® AIX® operating system. The Hitachi Data Systems representative performs the physical installation of the 9200 subsystem. The user prepares for 9200 subsystem installation and configures the new 9200 devices with assistance as needed from the Hitachi Data Systems representative.

Configuration of the 9200 SCSI disk devices for IBM® AIX® operations includes:

- Changing the device parameters (see section 3.1),
- Assigning the new devices to volume groups and setting the partition size (see section 3.3),
- Creating the Journaled File Systems (see section 3.4.1), and
- Mounting and verifying the file systems (see section 3.4.2).

Note on the term "SCSI disk": The 9200 logical devices are defined to the host as SCSI disk devices, even though the interface is fibre-channel.

1.2 Hitachi Thunder 9200™ RAID Subsystem

The Hitachi Thunder 9200 RAID subsystem supports concurrent attachment to multiple UNIX®-based and PC-server platforms. Please contact your Hitachi Data Systems account team for the latest information on platform support. The 9200 subsystem provides continuous data availability, high-speed response, scaleable connectivity, and expandable capacity for PC server storage. The 9200 subsystem can operate with multihost applications and host clusters, and is designed to handle very large databases as well as data warehousing and data mining applications that store and retrieve terabytes of data.

Chapter 2 Preparing for New Device Configuration

2.1 Configuration Requirements

The requirements for 9200 IBM® AIX® configuration are:

- Hitachi Thunder 9200™ subsystem, all-open or multiplatform configuration:

  Note: The availability of 9200 features and devices depends on the level of microcode installed on the 9200 subsystem.

- IBM® RS/6000®, POWERstation®, POWERserver®, or SP® series system.
- IBM® AIX® operating system, version 4.2 or 4.3. ***Important:*** Please contact IBM® to make sure the most current OS patches are installed on the IBM® system(s).

  Note: Hitachi Data Systems plans to support future releases of IBM® AIX®. For the latest information on AIX® version support, contact your Hitachi Data Systems account team.

- **Root** (superuser) login access to the IBM® system.
- Fibre-channel adapters. Make sure to install all utilities, tools, and drivers that come with the adapter(s).

2.2 Installing the 9200 Subsystem

The 9200 subsystem comes with all hardware and cabling required for installation.

Note: The Hitachi Data Systems representative must use the 9200 Maintenance Manual during all installation activities. Follow all precautions and procedures in the maintenance manual, and always check all specifications to ensure proper installation and configuration.

2.3 Prerequisites for New Device Configuration

Before setting up or installing the 9200 RAID subsystem, you should be familiar with the following activities:

- Setting logical units,
- Setting volume groups, and
- Setting file system sizes.

2.3.1 Setting Logical Units

The maximum number of logical units (LUs) that can be set on a single RAID subsystem is 64 for the Hitachi Freedom Storage™ Thunder 9200™. Contact your Hitachi Data Systems representative for information.

2.3.2 Setting Volume Groups

A volume group is a set of logical partitions. The number of logical partitions depends upon disk capacity as shown in Table 2.1. The AIX® system can register up to 255 disks per volume group.

Table 2.1 Volume Groups

Logical Partition	4MB	8MB	16MB	32MB	64MB	128MB	256MB
Volume Group Size	4GB	8GB	16GB	32GB	64GB	128GB	256GB

2.3.3 Setting File System Sizes

AIX® can create up to 255 file systems per volume group. Maximum capacity of the file system depends upon the version of the operating system. See Table 2.2 for maximum file sizes.

Table 2.2 File Limitations

OS Version	Maximum Size
AIX3.2.5	2GB
AIX4.1.2	64GB
AIX4.1.4	64GB
AIX4.2	128GB
AIX4.2.1	1024GB
AIX4.3	1024GB

Chapter 3 Configuring the New Devices

Configuration of the 9200 disk devices is performed by the user and requires root (superuser) access to the AIX® system.

Configuration of the 9200 SCSI disk devices for IBM® AIX® operations includes:

- Changing the device parameters (see section 3.1),
- Assigning the new devices to volume groups and setting the partition size (see section 3.3),
- Creating the Journaled File Systems (see section 3.4.1), and
- Mounting and verifying the file systems (see section 3.4.2).

3.1 Changing the Device Parameters

When the device files are created, the IBM® system sets the device parameters to the system default values.

AIX® uses the Logical Volume Manager (LVM) (accessed from within SMIT®) to manage data storage. You can use either SMIT® or the AIX® command line to perform this procedure. Make sure to set the parameters for the HMDE devices as well as the SCSI disk devices. Make sure to use the same settings and device parameters for all 9200 devices.

Instructions for SMIT®

To change the device parameters using SMIT®:

1. Enter **smit** on the command line to start SMIT®.
2. On the SMIT® System Management screen, select **Devices** to bring up the Fixed Disk screen.
3. Select **List All Defined Disks** to bring up the Command Status screen (see Figure 3.1).
4. Verify that the subsystem is recognized.

3.2 Recognizing the Subsystem

To verify that the subsystem is recognized:

1. At the AIX® command line prompt, enter **smit** to start SMIT®. This brings up the System Management screen. ***Note:*** If SMIT is not installed, please refer to the IBM® AIX® user guide for instructions on assigning new devices to volume groups using AIX® commands.
2. Select **Devices** to bring up the **Fixed Disk** screen.
3. Select **List All Defined Disks** to bring up the COMMAND STATUS screen (see Figure 3.1).
4. Press **F10** to exit the COMMAND STATUS screen.

```
                                COMMAND STATUS

Command:ok      stdout:yes      stderr:no

Before command completion additional instrustions may appear below

hdisk0    Available    30-68-00-8,0  16Bit SCSI Disk Drive
hdisk1    Available    20-58-01      other FC SCSI Disk Drive
hdisk2    Available    20-58-01      other FC SCSI Disk Drive
hdisk3    Available    20-58-01      other FC SCSI Disk Drive


F1=Help                  F2=Reflash               F3=Cancel
F8=Image                 F10=Exit                 Enter=Do
/=Find                   n=Find Next
```

Figure 3.1 Verifying the Subsystem

3.3 Assigning the New Devices to Volume Groups and Setting the Partition Size

To assign the disk devices to volume groups and set the partition size:

1. At the AIX® command line prompt, enter **smit** to start SMIT®. This brings up the System Management screen. ***Note:*** If SMIT® is not installed, please refer to the IBM® AIX® user guide for instructions on assigning new devices to volume groups using AIX® commands.
2. Select **System Storage Management (Physical & Logical Storage)** to bring up the System Storage Management screen.
3. Select **Logical Volume Manager** to bring up the Logical Volume Manager screen.
4. Select **Volume Groups** to bring up the Volume Group screen.
5. Select **Add a Volume Group** to bring up the Add a Volume Group screen.
6. The Add a Volume Group panel (see Figure 3.2) allows you to assign one or more devices (physical volumes) to a new volume group and set the physical partition size. To assign one or more devices to a volume group and set the partition size:
   a) Place the cursor in the **VOLUME GROUP name** entry field. Enter the name of the new volume group (e.g., DFvg00). A volume group can contain multiple hdisk devices, depending on the application.
   b) Place the cursor in the **Physical partition SIZE in megabytes** field, and press the **F4** key. When the size menu appears, select the correct partition size for the device(s).
   c) Place the cursor in the **PHYSICAL VOLUME names** entry field. Enter the device file name(s) for the desired device(s) (e.g., hdisk2), or press **F4** and select the device file name(s) from the list.
   d) Place the cursor in the **Activate volume group AUTOMATICALLY** entry field, and enter **yes** to activate the volume group automatically at system restart.
   Note: If you are using HACMP, enter **no**.

7. After selecting the volume group, partition size, and physical volume(s) on the Add a Volume Group screen, press the **Enter** key.
8. When the confirmation screen opens, respond **Yes** to assign the specified device(s) to the specified volume group with the specified partition size.
9. The Command Status screen now opens. To ensure that the devices have been assigned to a volume group, wait for **OK** to appear on the Command Status line. To continue creating volume groups, press **F3** until the Add a Volume Group screen appears.
10. Repeat steps (5) through (9) until all new disk devices are assigned to a volume group.

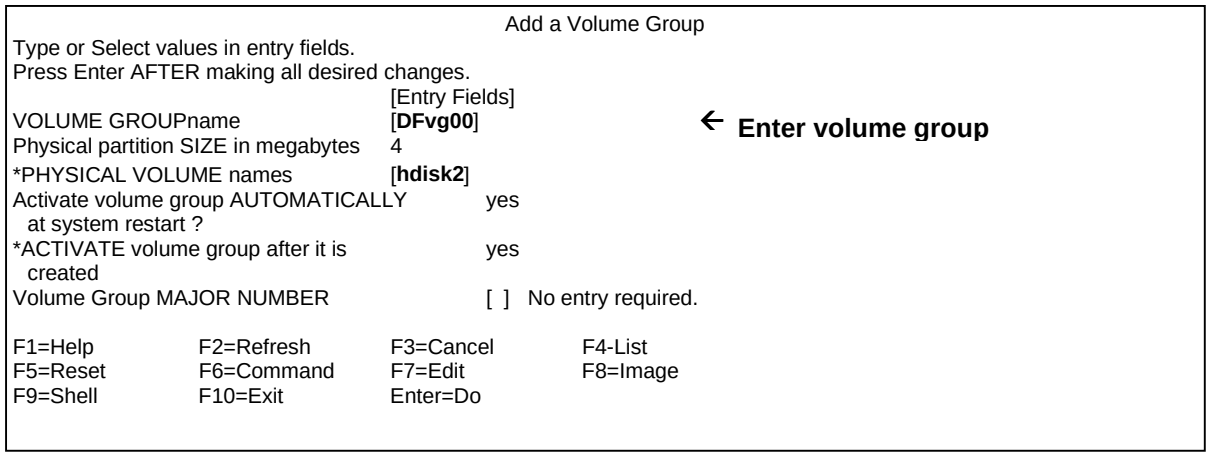

Figure 3.2 Assigning Devices to Volume Groups and Setting the Partition Size

3.4 Creating, Mounting, and Verifying the File Systems

After you have assigned the SCSI disk devices to volume groups and set the partition sizes, you can create the file systems.

3.4.1 Creating the File System

1. At the AIX® command line prompt, enter **smit** to start SMIT®. This brings up the System Management screen. ***Note:*** If SMIT® is not installed, please refer to the IBM® AIX® user guide for instructions on creating file systems using AIX® commands.
2. Select **System Storage Management (Physical & Logical Storage)** to bring up the System Storage screen.
3. Select **File Systems** to bring up the File Systems screen.
4. Select **Add/Change/Show/Delete File Systems** to bring up the Add/Change screen.
5. Select **Journaled File Systems** to bring up the Journaled File System screen.
6. Select **Add a Journaled File System** to bring up the Volume Group Name screen.
7. Move the cursor to the selected volume group, and press the **Enter** key.
8. Select the desired value, and then press the **Enter** key to bring up the Add a Journaled File System screen (see Figure 3.3).
9. Place the cursor in the **SIZE of file system** field, and enter the desired file system size.
10. Place the cursor in the **Mount Point** field, and enter the desired mount point name (e.g., //array1). Please record the mount point name and file system size. You will be asked to input this information again.
11. Place the cursor in the **Mount AUTOMATICALLY a system restart?** field. Enter **yes** to auto-mount the file systems. ***Note:*** If you are using HACMP, do not set the file systems to auto-mount.
12. Place the cursor in the **Number of bytes per inode** field, and enter the correct value for the selected device.
13. Make sure that the file system size, mount point name, auto-mount options, and number of bytes per inode are correct, and press the Enter key to create the Journaled File System.

The COMMAND STATUS screen now appears. To make sure that the Journaled File System has been created, wait for **OK** to appear on the Command Status line (see Figure 3.4).

14. Repeat steps (6) through (13) for each Journaled File System that you want to create. To continue creating Journaled File Systems press the **F3** key until you return to the Add a Journaled File System screen.
15. To exit SMIT®, press the **F10** key.

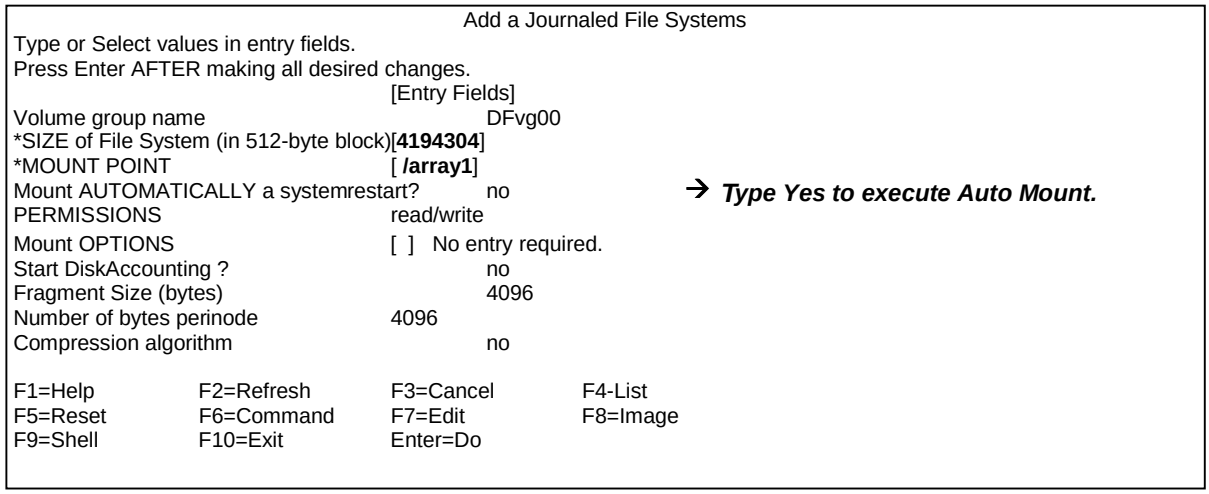

Figure 3.3 Adding a Journaled File System Using SMIT

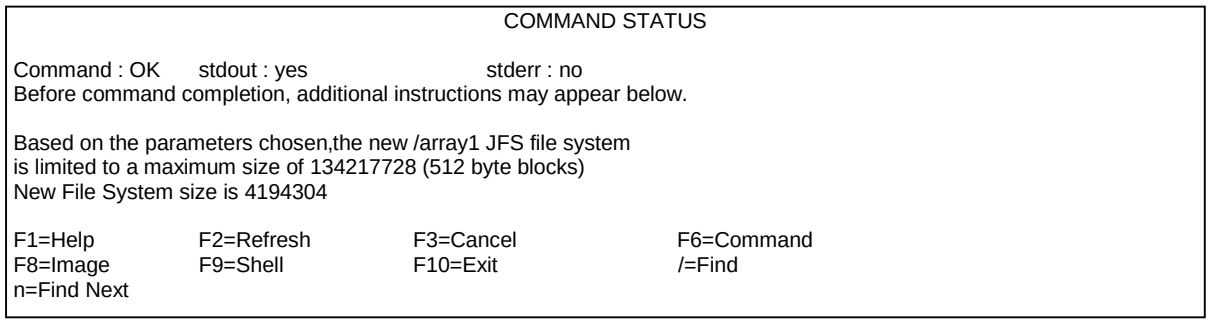

Figure 3.4 Verifying Creation of Journaled File System

3.4.2 Mounting and Verifying the File Systems

After you have created the Journaled File Systems, you can mount the file systems and verify that the file systems were created correctly and are functioning properly.

To mount and verify the file systems using SMIT®:

1. From the File Systems screen, select **Mount a File System** to access the **Mount a File System** screen.
2. Enter the appropriate data and press **Enter** when done. To select a file system, place your cursor in the FILE SYSTEM name field and press the **F4** key for a list.
3. To specify a mounting point, select the **DIRECTORY over which to mount** field, then press the **F4** key for a list. After selecting the mounting point, press **Enter**.
4. From the DIRECTORY over which to mount screen, place your cursor on the desired item and press **Enter.**
5. The COMMAND STATUS screen displays to confirm the mounting (see Figure 3.5).
6. Exit SMIT®.
7. From the command line, verify the size of the file systems you have created using the **df** command as shown in Figure 3.6. ***Note:*** The file system capacity is listed in 512-byte blocks by default. To list capacity in 1024-byte blocks, use the **df -k** command.

```
                                    COMMAND STATUS

Command : OK            stdout : no             stderr : no
-
```

Figure 3.5 Confirming the Mounting

```
#df-k ↵
File system                    1024bloks      Free   %Used    Iused    %Iused  Mounted on
                :
/dev/lv00              2048        1984      3%     16       0%       /array1
                :
```

Figure 3.6 Final File System Verification

Chapter 4 Troubleshooting

4.1 Troubleshooting

The Hitachi Freedom Storage™ Thunder 9200™ RAID subsystem provides continuous data availability. For troubleshooting information for the 9200 subsystem, please refer to the *Hitachi Freedom Storage™ Thunder 9200™ User and Reference Manual* (MK-90DF504).

4.2 Calling the 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 and the exact content of any error messages displayed on the host system(s). Please check the SVP service information messages (SIMs) using Web access, and note the reference codes and severity levels of the recent messages.

The worldwide Hitachi Data Systems Support Centers are:

- Hitachi Data Systems North America/Latin America
  San Diego, California, USA
  1-800-348-4357
- Hitachi Data Systems Europe
  Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific
  North Ryde, Australia
  011-61-2-9325-3300

Appendix A Acronyms and Abbreviations

ESCON®	Enterprise System Connection (IBM® trademark for optical channels)
GB	gigabyte(s)
HACMP	High Availability Cluster Multi-Processing
IBM®	International Business Machines Corporation
LUN	logical unit number
LVM	Logical Volume Manager
PC	personal computer system
RAID	redundant array of independent disks
RISC	reduced instruction set computer
SCSI	small computer system interface
SIM	service information message
SMIT®	System Management Interface Tool
SVP	service processor