HITACHI
Inspire the Next

Hitachi Volume Shredder

User Guide

Hitachi Virtual Storage Platform G1000 and G1500

Hitachi Virtual Storage Platform F1500

Hitachi Virtual Storage Platform G200, G400, G600, G800

Hitachi Data Systems

MK-92RD8025-07

October 2016

© 2014, 2016 Hitachi, Ltd. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including copying and recording, or stored in a database or retrieval system for commercial purposes without the express written permission of Hitachi, Ltd., or Hitachi Data Systems Corporation (collectively "Hitachi"). Licensee may make copies of the Materials provided that any such copy is: (i) created as an essential step in utilization of the Software as licensed and is used in no other manner; or (ii) used for archival purposes. Licensee may not make any other copies of the Materials. "Materials" mean text, data, photographs, graphics, audio, video and documents.

Hitachi reserves the right to make changes to this Material at any time without notice and assumes no responsibility for its use. The Materials contain the most current information available at the time of publication.

Some of the features described in the Materials might not be currently available. Refer to the most recent product announcement for information about feature and product availability, or contact Hitachi Data Systems Corporation at https://support.hds.com/en_us/contact-us.html.

Notice: Hitachi products and services can be ordered only under the terms and conditions of the applicable Hitachi agreements. The use of Hitachi products is governed by the terms of your agreements with Hitachi Data Systems Corporation.

By using this software, you agree that you are responsible for:

1. Acquiring the relevant consents as may be required under local privacy laws or otherwise from authorized employees and other individuals to access relevant data; and
2. Verifying that data continues to be held, retrieved, deleted, or otherwise processed in accordance with relevant laws.

Notice on Export Controls. The technical data and technology inherent in this Document may be subject to U.S. export control laws, including the U.S. Export Administration Act and its associated regulations, and may be subject to export or import regulations in other countries. Reader agrees to comply strictly with all such regulations and acknowledges that Reader has the responsibility to obtain licenses to export, re-export, or import the Document and any Compliant Products.

Hitachi is a registered trademark of Hitachi, Ltd., in the United States and other countries.

AIX, AS/400e, DB2, Domino, DS6000, DS8000, Enterprise Storage Server, eServer, FICON, FlashCopy, IBM, Lotus, MVS, OS/390, PowerPC, RS/6000, S/390, System z9, System z10, Tivoli, z/OS, z9, z10, z13, z/VM, and z/VSE are registered trademarks or trademarks of International Business Machines Corporation.

Active Directory, ActiveX, Bing, Excel, Hyper-V, Internet Explorer, the Internet Explorer logo, Microsoft, the Microsoft Corporate Logo, MS-DOS, Outlook, PowerPoint, SharePoint, Silverlight, SmartScreen, SQL Server, Visual Basic, Visual C++, Visual Studio, Windows, the Windows logo, Windows Azure, Windows PowerShell, Windows Server, the Windows start button, and Windows Vista are registered trademarks or trademarks of Microsoft Corporation. Microsoft product screen shots are reprinted with permission from Microsoft Corporation.

All other trademarks, service marks, and company names in this document or website are properties of their respective owners.

Contents

Preface 5

Intended audience 6
Product version 6
Changes in this revision 6
Referenced documents 7
Document conventions 7
Conventions for storage capacity values 8
Accessing product documentation 9
Getting help 9
Comments 9

1 Overview of Hitachi Volume Shredder 11

Data security practices and Volume Shredder 12
Supported volume types 12
Volume Shredder functions 12
Shredding times 14

2 Volume Shredder operations 17

Workflow for shredding 19
Blocking a volume 19
Blocking volumes in a parity group 20
Calculating the number of overwrite passes for flash drives 21
Example of shredding data on flash drives 22
Calculating the number of overwrite passes for FMDs 22
Example of shredding data on FMDs 23
Defining shredding conditions 24
Shredding a volume 25
Shredding volumes in parity groups 26
Viewing shredding status with the Tasks window 27
Viewing shredding status with the Logical Devices window 28
Stopping a shredding operation from HDvM - SN Tasks window 28
Stopping a shredding operation from HDvM - SN Interrupt Shredding Task window 29
Viewing shredding results with the Tasks window 30
Viewing shredding results in the compressed files 32

Understanding shredding results in compressed files.....32

A Volume Shredder GUI reference..... 35

Shred LDEVs wizard..... 36
Shred LDEVs window..... 36
Shred LDEVs wizard Confirm window..... 38
Edit Shredding Data Pattern window.....40
Interrupt Shredding Task window..... 41

Index.....43

Preface

This guide describes and provides instructions for Hitachi Volume Shredder secure erase software for the Hitachi Virtual Storage Platform G200, G400, G600, G800 and Hitachi Virtual Storage Platform G1000 and G1500, and Virtual Storage Platform F1500 storage systems.

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
- ☐ Changes in this revision
- ☐ Referenced documents
- ☐ Document conventions
- ☐ Conventions for storage capacity values
- ☐ Accessing product documentation
- ☐ Getting help
- ☐ Comments

Intended audience

This document is intended for system administrators, HDS representatives, and authorized service providers who install, configure, and operate the Hitachi Virtual Storage Platform G200, G400, G600, G800 or Hitachi Virtual Storage Platform G1000 and G1500, and Virtual Storage Platform F1500 storage system.

Readers of this document should be familiar with the following:

- Data processing and RAID storage systems and their basic functions.
- The Hitachi Virtual Storage Platform G200, G400, G600, G800, the Hitachi Virtual Storage Platform G1000 and G1500, and Virtual Storage Platform F1500 storage system and the *Hardware Guide for Hitachi Virtual Storage Platform G1000, G1500, and F1500*.
- The Hitachi Virtual Storage Platform G200, G400, G600, G800 system and the *Hardware Reference Guide* for your storage system model.
- The Hitachi Command Suite software or the Hitachi Device Manager - Storage Navigator software for the Hitachi Virtual Storage Platform G200, G400, G600, G800 and the Hitachi Virtual Storage Platform G1000 and G1500, and Virtual Storage Platform F1500 storage system, and the *Hitachi Command Suite User Guide* or the *System Administrator Guide*.
- The Hitachi Device Manager - Storage Navigator software and the *System Administrator Guide*.
- Data protection and security practices in enterprise storage environments, including data retention, archival, and shredding.

Hitachi Volume Shredder is not supported on Virtual Storage Platform F400, F600, F800 storage systems.

Product version

This document revision applies to:

- Hitachi Virtual Storage Platform G200, G400, G600, G800 firmware 83-04-0*x* or later
- Hitachi Virtual Storage Platform G1000 and G1500, and Virtual Storage Platform F1500 microcode 80-05-0*x* or later
- SVOS 7.0 or later

Changes in this revision

- Added unsupported volumes

Referenced documents

Hitachi Virtual Storage Platform G200, G400, G600, G800 and Hitachi Virtual Storage Platform G1000 and G1500, and Virtual Storage Platform F1500 documents:

- *Hitachi Virtual Storage Platform G200 Hardware Reference Guide*, MK-94HM8020
- *Hitachi Virtual Storage Platform G400, G600 Hardware Reference Guide*, MK-94HM8022
- *Hitachi Virtual Storage Platform G800 Hardware Reference Guide*, MK-94HM8026
- *Provisioning Guide*, MK-94HM8014
- *Hitachi Device Manager - Storage Navigator Messages*, MK-94HM8017
- *System Administrator Guide*, MK-92RD8016

Document conventions

This document uses the following typographic conventions:

Convention	Description
Bold	• Indicates text in a window, including window titles, menus, menu options, buttons, fields, and labels. Example: Click **OK**. • Indicates emphasized words in list items.
Italic	• Indicates a document title or emphasized words in text. • Indicates a variable, which is a placeholder for actual text provided by the user or for output by the system. Example: `pairdisplay -g group` (For exceptions to this convention for variables, see the entry for angle brackets.)
`Monospace`	Indicates text that is displayed on screen or entered by the user. Example: `pairdisplay -g oradb`
< > angle brackets	Indicates variables in the following scenarios: • Variables are not clearly separated from the surrounding text or from other variables. Example: `Status-<report-name><file-version>.csv` • Variables in headings.
[ ] 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. Examples: [a | b] indicates that you can choose a, b, or nothing.

Convention	Description
	{ a | b } indicates that you must choose either a or b.

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

Icon	Label	Description
	Note	Calls attention to important 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 (for example, disruptive operations, data loss, or a system crash).
	WARNING	Warns the user of a hazardous situation which, if not avoided, could result in death or serious injury.

Conventions for storage capacity values

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

Physical capacity unit	Value
1 kilobyte (KB)	1,000 (10^3) bytes
1 megabyte (MB)	1,000 KB or $1,000^2$ bytes
1 gigabyte (GB)	1,000 MB or $1,000^3$ bytes
1 terabyte (TB)	1,000 GB or $1,000^4$ bytes
1 petabyte (PB)	1,000 TB or $1,000^5$ bytes
1 exabyte (EB)	1,000 PB or $1,000^6$ bytes

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

Logical capacity unit	Value
1 block	512 bytes
1 cylinder	Mainframe: 870 KB Open-systems: • OPEN-V: 960 KB • Others: 720 KB
1 KB	1,024 (2^{10}) bytes
1 MB	1,024 KB or $1,024^2$ bytes

Logical capacity unit	Value
1 GB	1,024 MB or $1,024^3$ bytes
1 TB	1,024 GB or $1,024^4$ bytes
1 PB	1,024 TB or $1,024^5$ bytes
1 EB	1,024 PB or $1,024^6$ bytes

Accessing product documentation

Product user documentation is available on Hitachi Data Systems Support Connect: https://knowledge.hds.com/Documents. Check this site for the most current documentation, including important updates that may have been made after the release of the product.

Getting help

Hitachi Data Systems Support Connect is the destination for technical support of products and solutions sold by Hitachi Data Systems. To contact technical support, log on to Hitachi Data Systems Support Connect for contact information: https://support.hds.com/en_us/contact-us.html.

Hitachi Data Systems Community is a global online community for HDS customers, partners, independent software vendors, employees, and prospects. It is the destination to get answers, discover insights, and make connections. **Join the conversation today!** Go to community.hds.com, register, and complete your profile.

Comments

Please send us your comments on this document to doc.comments@hds.com. Include the document title and number, including the revision level (for example, -07), and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Data Systems Corporation.

Thank you!

1

Overview of Hitachi Volume Shredder

This chapter provides an overview of Volume Shredder operations.

- Data security practices and Volume Shredder
- Supported volume types
- Volume Shredder functions
- Shredding times

Data security practices and Volume Shredder

The Volume Shredder software enables you to securely erase data on volumes by overwriting existing data to prevent restoration of the erased data. For example, when the user of a volume changes, you may want to purge the data stored by the previous user before giving access to the new user. This method of erasing data by overwriting it with dummy data is referred to as *shredding*.

Because of the way data is written on the drives, overwriting data once or twice might not be enough to ensure that the data cannot be restored. The best practice is to overwrite data at least three times with dummy data. Volume Shredder allows you to specify the number of times the data is overwritten, enabling you to ensure compliance with applicable requirements (for example, DoD5220.22-M).

Supported volume types

You can use Volume Shredder to shred both open-systems and mainframe systems, including logical devices (LDEVs) and custom volumes (CVs) of all emulation types. External volumes and Dynamic Provisioning virtual volumes* can also be shredded.

*When a shredding operation is performed on an unused virtual volume for Dynamic Provisioning, no dummy data is written to the volume.

You cannot use Volume Shredder to shred the following types of volumes:

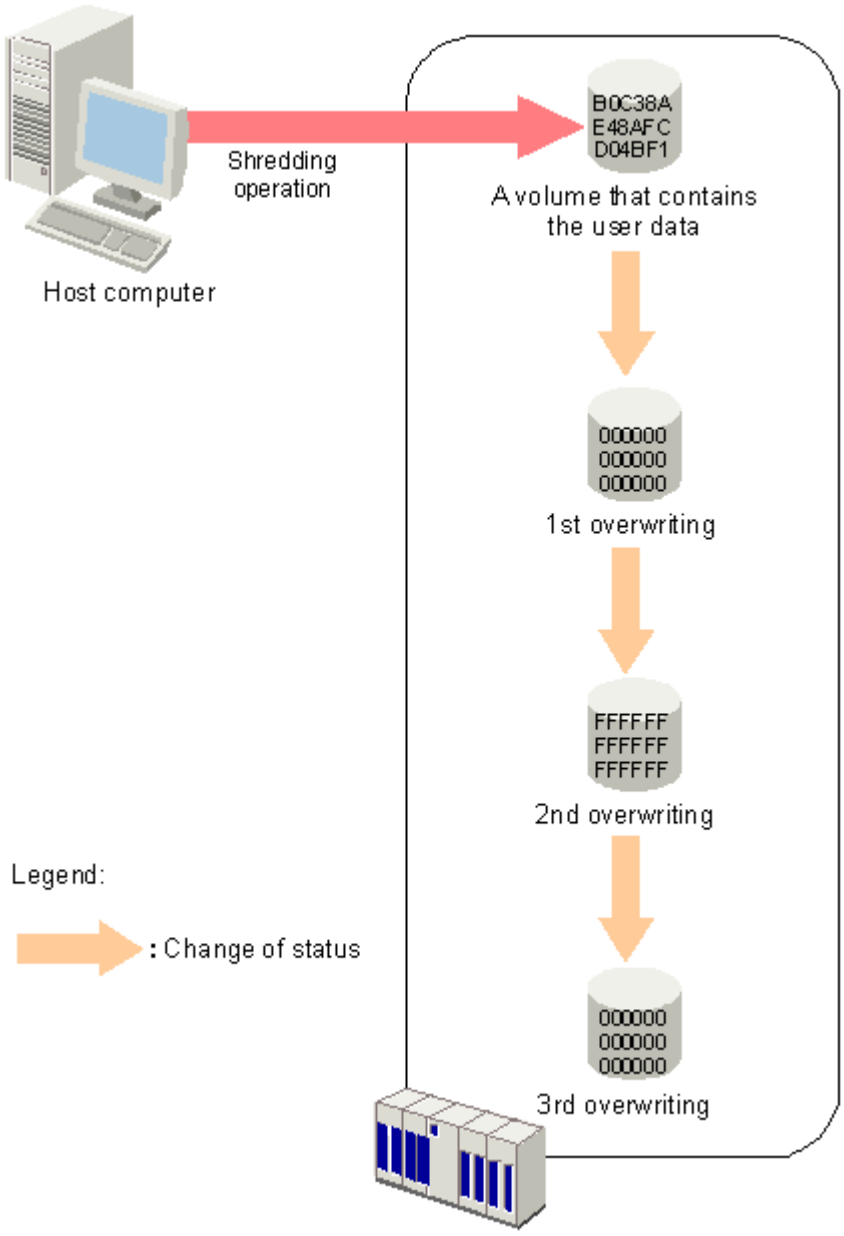
- Pool volumes
- Virtual volumes for Thin Image
- Journal volumes
- Volumes that are not write-enabled (access attribute is not read/write)
- TSE-VOL (VSP G1000 and G1500, and VSP F1500)
- Virtual volume with ALU attribute
- Volumes in which accelerated compression is enabled
- Virtual volumes in which the capacity saving function is enabled
- Deduplication system data volumes

Shredding volumes is not supported on the VSP Fx00 models.

Volume Shredder functions

The following figure shows user data that is being overwritten three times (default value for number of overwrites). Volume Shredder overwrites data using the following dummy data values:

- The first overwrite is 00.
- The second overwrite is FF.
- The third overwrite is 00.



You can configure Volume Shredder to overwrite data from three to eight times, and each time the system overwrites the data you can configure the dummy data to be any hexadecimal number from 0 to FFFF.

After the system finishes overwriting data, you can view the results in the user interface or, if configured, you can open the compressed results files.

We recommend that you execute the shredding function at times of day when the host I/O load is lowest. If the number of LDEVs to be shredded is large, shredding operations might affect host I/O operations.

Use the following formula to determine the standard required time for a shredding operation.

```
(time required for shredding) = (time required for one dummy
data write (standard required time)) x (number of times dummy
data is written (n))
```

Shredding times

The following tables show the standard required times for shredding without host I/O, listed by drive type. The same standard times also apply to shredding encrypted drives. The standard required time in each table assumes the use of OPEN-V volumes.

Since each volume is overwritten three times with dummy data by default, Volume Shredder requires three times the time listed in the table below. If you want to change the default settings, use the formula shown above to calculate the time required.

For DKxxx-JxxxSS/KxxxSS/HxxxSS disk drives

Rotation per minute	RAID level		Standard required time*
15 Krpm	RAID 1	2D+2D	85 minutes
	RAID 5	3D+1P	65 minutes
		7D+1P	30 minutes
	RAID 6	6D+2P	35 minutes
		14D+2P	20 minutes
10 Krpm	RAID 1	2D+2D	110 minutes
	RAID 5	3D+1P	70 minutes
		7D+1P	35 minutes
	RAID 6	6D+2P	35 minutes
		14D+2P	20 minutes
7.2Krpm	RAID 1	2D+2D	185 minutes
	RAID 5	3D+1P	120 minutes
		7D+1P	50 minutes
	RAID 6	6D+2P	65 minutes
		14D+2P	25 minutes
*Data drive capacity is assumed to be 1 TB.			

For flash drives (SSDs)

Number of parity groups	RAID level		Standard required time*
From 1 to 4	RAID 1	2D+2D	30 minutes
	RAID 5	3D+1P	20 minutes
		7D+1P	15 minutes
	RAID 6	6D+2P	15 minutes
		14D+2P	10 minutes
*Flash drive capacity is assumed to be 1 TB.			

For FMDs

Number of parity groups	RAID level		Standard required time*
From 1 to 4	RAID 1	2D+2D	20 minutes
	RAID 5	3D+1P	10 minutes
		7D+1P	10 minutes
	RAID 6	6D+2P	10 minutes
		14D+2P	5 minutes
*FMD capacity is assumed to be 1 TB.			

When host I/Os are performed, the required shredding time is at least six times that of when no host I/Os are performed. If a DKxxx-HxxxSS data drive is used for creating a parity group on an encrypted data drive, the time required for shredding that parity group is the maximum time listed.

If the volumes to be shredded belong to drives of mixed types or mixed configurations, the longest required times associated with the drive type or drive configuration apply to all volumes. Thus, mixed types and configurations take more time for the volumes to become available for use than when the drive type and drive configuration are the same. When you add drives or change drive configurations, you should arrange the drives into those with the same standard required times, and then add drives starting with those volume types requiring the least shredding time.

When the emulation type for mainframe is selected for the LDEV, Fibre channel connectivity for mainframe is required. When the emulation type for open systems is selected, a channel for open systems is required.

2

Volume Shredder operations

This chapter describes and provides instructions for performing Hitachi Volume Shredder operations:

- Workflow for shredding
- Blocking a volume
- Blocking volumes in a parity group
- Calculating the number of overwrite passes for flash drives
- Example of shredding data on flash drives
- Calculating the number of overwrite passes for FMDs
- Example of shredding data on FMDs
- Defining shredding conditions
- Shredding a volume
- Shredding volumes in parity groups
- Viewing shredding status with the Tasks window
- Viewing shredding status with the Logical Devices window
- Stopping a shredding operation from HDvM - SN Tasks window
- Stopping a shredding operation from HDvM - SN Interrupt Shredding Task window
- Viewing shredding results with the Tasks window

- Viewing shredding results in the compressed files
- Understanding shredding results in compressed files

Workflow for shredding

Use the following workflow to shred volumes using Volume Shredder:

1. Viewing shredding status with the Logical Devices window on page 28 (Volume status should be Normal.)
2. Blocking a volume on page 19
3. Calculating the number of overwrite passes for flash drives on page 21 if you are shredding a volume on a flash drive.
   Or, Calculating the number of overwrite passes for FMDs on page 22 if you are shredding a volume on an FMD.
4. Defining shredding conditions on page 24
5. Shredding a volume on page 25
6. Stopping a shredding operation from HDvM - SN Tasks window on page 28
7. Viewing shredding results in the compressed files on page 32 to check results in the results file.

Blocking a volume

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. Display the volume to be blocked:

   In Hitachi Command Suite:

   a. On the **Resources** tab, click **Storage Systems**, and then expand **All Storage Systems** and the target storage system.
   b. Right-click one of the following, depending on the location of the volume, **Volumes**, **DP Pools**, or **Parity Groups**, and then select **System GUI**.
   c. If you selected **DP Pools** in step (b), select the pool that contains the virtual volume you want to block, and then click the **Virtual Volumes** tab.

   In Device Manager - Storage Navigator:

   Choose one of the following steps, depending on the location of the volume:

   - To display the **LDEVs** tab, in the **Storage Systems** tree, select **Parity Groups**, **Internal**, or **External**, and then select the parity group that contains the volume you want to block.

- To display the **LDEVs** tab, in the **Storage Systems** tree, select **Logical Devices**.
- To display the **Virtual Volumes** tab, in the **Storage Systems** tree, select **Pools**, and then select the pool that contains the virtual volume you want to block.

2. Confirm the current status of the volume you want to block by viewing the **Status** column of the table.
   - If the volume is already blocked, **Blocked** appears in the status column.
   - If the volume is not blocked, a status other than **Blocked** appears in the status column.
3. Select the volume you want to block, click **More Actions**, and then select **Block LDEVs**. The **Block LDEVs** window opens.
4. Note the settings in the **Block LDEVs** window, enter a unique task name or accept the default name, and then click **Apply**.
   If **Go to tasks window for status** is selected, the **Tasks** window will open.

Related topics

Review information related to the following in the *Provisioning Guide* for your storage system:

- Blocking LDEVs
- Selecting logical devices
- Selecting internal or external parity groups

Blocking volumes in a parity group

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. Display the parity group to be blocked:

   In Hitachi Command Suite:

   a. On the **Resources** tab, click **Storage Systems**, and then expand **All Storage Systems** and the target storage system.
   b. Right-click **Parity Groups**, and then select **System GUI**.

   In Device Manager - Storage Navigator:

   Display the **Parity Groups** tab by choosing one of the following steps, depending on the location of the parity group:

- In the **Storage Systems** tree, select **Parity Groups**.
- In the **Storage Systems** tree, select **Parity Groups**, and then select **Internal** or **External**.

2. Confirm the current status of the volumes you want to block by viewing the **LDEV Status** column of the table.
   - If the volume is already blocked, **Blocked** appears in the status column.
   - If the volume is not blocked, a status other than **Blocked** appears in the status column.
3. Select the parity group you want to block, click **More Actions**, and then select **Block LDEVs**. The **Block LDEVs** window opens.
4. Note the settings in the **Block LDEVs** window, enter a unique task name or accept the default name, and then click **Apply**.
   If **Go to tasks window for status** is selected, the **Tasks** window will open.

Related topics

Review information related to the following in the *Provisioning Guide* for your storage system:

- Blocking LDEVs
- Selecting logical devices
- Selecting internal or external parity groups

Calculating the number of overwrite passes for flash drives

Because of the way space is allocated in flash drives, the dummy data that is used to overwrite the volume must exceed the capacity of the target volume. Therefore, before you shred a volume on flash drives, you need to calculate the number of times the system must overwrite the volume with dummy data.

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. Select an LDEV on the **LDEVs** tab in the **Logical Devices** window, and write down its capacity and the amount of data in the RAID configuration.
   Examples of amounts of data in a RAID configuration:

   n of RAID5(nxD + 1P)

n of RAID6(nxD + 2P)

2. Use the following formula to calculate the number of times to overwrite the data (N):

   N = (*User-capacity-for-Data* x 2) / *Capacity-of-target-volume*

   When the capacity of the flash drive is 400 GB, 400 GB x n

   Example: The capacity of the flash drive is 400 GB, the RAID configuration is 3D+1P, and the LDEV capacity is 440 GB.

   ```
   [(400 x 3) x 2 ] / 440 = 5.45 = six times
   ```

   Round up the value (5.45) to the nearest whole number. You need to overwrite the data six times.

Example of shredding data on flash drives

In this sample configuration, the flash drive capacity is 400 GB, the RAID configuration is 3D+1P, and the LDEV capacity is 440 GB.

Procedure

1. Calculate the number of shredding operations.

   ```
   [(400 × 3) × 2] / 440 = 5.45 = six times
   ```

   Round up the value (5.45) to the nearest whole number. You need to overwrite the data six times.
2. Define the shredding settings.

   Refer to Defining shredding conditions on page 24, enter the dummy data **00** in the text box and add a row to the **Data Pattern (User Setting)** list (add rows for performing the shredding operation six times).
3. Erase the volume data.

   Refer to Defining shredding conditions on page 24 and execute the shredding operation.
4. Repeat steps 2 and 3 using the dummy data **FF.**
5. Repeat steps 2 and 3 using the dummy data **00.**

Calculating the number of overwrite passes for FMDs

Because of the way space is allocated in FMDs, the dummy data that is used to overwrite the volume must exceed the capacity of the target volume. Therefore, before you shred a volume on FMDs, you need to calculate the number of times the system must overwrite the volume with dummy data.

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. Select an LDEV on the **LDEVs** tab in the **Logical Devices** window, and write down its capacity and the amount of data in the RAID configuration.
   Examples amounts of data in a RAID configuration:

   n of RAID5(nxD + 1P)

   n of RAID6(nxD + 2P)
2. Use the following formula to calculate the number of times to overwrite the data (N):
   N = (*User-capacity-for-Data* x 2) / *Capacity-of-target-volume*
   When the capacity of the FMD is 1,600 GB, 1,600GB x n

   Example: The capacity of the FMD is 1,600 GB, the RAID configuration is 3D+1P, and the LDEV capacity is 880 GB.
   `[(1,600 x 3) x 2] / 880 = 10.9 = 11 times`

   Round up the value (10.9) to the nearest whole number. You need to overwrite the data 11 times.

   You can write dummy data up to eight times in one shredding operation. To write dummy data nine or more times, perform the shredding operation for the volume as many times as required.

Example of shredding data on FMDs

Before you begin

This example assumes that the capacity of the FMD is 1,600 GB, the RAID configuration is 3D+1P, and the LDEV capacity is 880 GB.

Procedure

1. Calculate the number of times to overwrite the data:
   `[(1,600 x 3) x 2] / 880 = 10.9 = 11 times`
   Round up the value (10.9) to the nearest whole number. You need to overwrite the data 11 times.
2. Define the shredding settings.
   Refer to Defining shredding conditions on page 24, select the **Data Pattern (User Setting)** list and **Random Data**, then click **Add** eight times.
3. Erase the volume data.

Refer to Defining shredding conditions on page 24 for procedures on erasing the volume data.

4. Repeat steps 2 and 3, three more times, clicking **Add** three times.

Defining shredding conditions

Configure data overwrite patterns and the number of overwrite passes in the Shredding Data Pattern window. By default the number of overwrite passes is three; but you can change this number from three to up to eight times. The system keeps user-specified settings while the Shred LDEVs window is open.

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. Open the **Shred LDEVs** window:

   In Hitachi Command Suite:

   a. On the **Resources** tab, click **Storage Systems**, and then expand **All Storage Systems** and the target storage system.

   b. Right-click **Volumes**, and then select **System GUI**.

   In Device Manager - Storage Navigator: In the **Storage Systems** tree, select **Logical Devices** to display the **LDEVs** tab.
2. Select a blocked volume, click **More Actions**, and then select **Shred LDEVs** to open the **Shred LDEVs** window.
3. Click **Edit Data Pattern**. The **Edit Shredding Data Pattern** window opens.
4. To use the default pattern, click **Default Pattern (00-FF-00)**.

   To specify custom settings, click **Data Pattern (User Setting)** and specify the data pattern as follows:

   Caution: For FMDs, make sure you select **Random Data** as the specified **Data Pattern**.

   a. To add a random data pass, select **Random Data**, and click **Add**. A random data pass is added in the **Data Pattern (User Setting)** table.

   b. To define a data pattern, click **Define Data**, enter the number that you want to use as dummy data in the text box, and click **Add**. You can enter a hexadecimal number of up to four digits (0 to FFFF). The data pattern is added in the **Data Pattern (User Setting)** table.

> **Caution:** You should enter three or more numbers to use as dummy data. If you overwrite data with less than three numbers, some or all data might be recoverable.

c. If you make a mistake, click **Clear** and re-enter the desired numbers.

5. When the data pattern is correct (default or user-defined), click **OK** to save your settings and close the **Edit Shredding Data Pattern** window.
6. Click **Cancel** to close the **Shred LDEVs** window.

Related topics

- Shred LDEVs window on page 36
- Edit Shredding Data Pattern window on page 40

Shredding a volume

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. Display the volume to be shredded:

   In Hitachi Command Suite:

   a. On the **Resources** tab, click **Storage Systems**, and then expand **All Storage Systems** and the target storage system.
   b. Right-click one of the following, depending on the location of the volume, **Volumes**, **DP Pools**, or **Parity Groups**, and then select **System GUI**.
   c. If you selected **DP Pools** in step (b), select the pool that contain the virtual volume you want to block, and then click the **Virtual Volumes** tab.

   In Device Manager - Storage Navigator:

   Choose one of the following steps, depending on the location of the volume:

   - To display the **LDEVs** tab, in the **Storage Systems** tree, select **Logical Devices**, or select **Parity Groups**, **Internal**, or **External** and then select the parity group that contains the volume you want to shred.

- To display the **Virtual Volumes** tab, in the **Storage Systems** tree, select **Pools**, and then select the pool that contains the virtual volume you want to shred.

2. Select the volume you want to shred and confirm the current status of the volume by viewing the **Status** column of the table.
   - If the volume is already blocked, **Blocked** appears in the status column.
   - If the volume is not blocked, a status other than **Blocked** appears in the status column. In this case, you need to block the volume before you can shred it. See Blocking a volume on page 19.
3. Click **More Actions > Shred LDEVs**.
4. To save the shredding results to a file, click **Set Data Output** (you can output the shredding results of up to three volumes). If you don't want to save the results to a file, click **Cancel Data Output**.
5. Click **Finish**.
6. Verify the settings in the **Shred LDEVs** window.

   When the settings are correct, enter a unique task name or accept the default name, and click **Apply**.

   If **Go to tasks window for status** is selected, the **Tasks** window will open.

Related topics

- Shred LDEVs window on page 36
- Shred LDEVs wizard Confirm window on page 38
- Blocking a volume on page 19
- Stopping a shredding operation from HDvM - SN Tasks window on page 28

Shredding volumes in parity groups

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. Display the parity group to be shredded:

   In Hitachi Command Suite:

   a. On the **Resources** tab, click **Storage Systems**, and then expand **All Storage Systems** and the target storage system.

b. Right-click **Parity Groups**, and then select **System GUI**.

In Device Manager - Storage Navigator: Display the **Parity Groups** tab by choosing one of the following steps, depending on the location of the parity group:

- In the **Storage Systems** tree, select **Parity Groups**.
- In the **Storage Systems** tree, select **Parity Groups**, and then select **Internal** or **External**.

2. Select the parity group you want to shred and confirm the current status by viewing the **Status** column of the table.
   - If the parity group is already blocked, **Blocked** appears in the status column.
   - If the parity group is not blocked, a status other than **Blocked** appears in the status column. In this case, you need to block the parity group before you can shred it. See Blocking volumes in a parity group on page 20.
3. Click **More Actions > Shred LDEVs**.
4. To save the shredding results to a file, click **Set Data Output** (you can output the shredding results of up to three volumes). If you don't want to save the results to a file, click **Cancel Data Output**.
5. Click **Finish**.
6. Verify the settings in the **Shred LDEVs** window.

   When the settings are correct, enter a unique task name or accept the default name, and click **Apply**.

   If **Go to tasks window for status** is selected, the **Tasks** window will open.

Related topics

- Shred LDEVs window on page 36
- Shred LDEVs wizard Confirm window on page 38
- Blocking a volume on page 19
- Stopping a shredding operation from HDvM - SN Tasks window on page 28

Viewing shredding status with the Tasks window

You can verify the progress of shredding operations using either the Tasks window or the Logical Devices window. For details about using the Logical Devices window, see Viewing shredding status with the Logical Devices window on page 28.

Procedure

1. Open the **Tasks** window:

   In Hitachi Command Suite:

   a. On the **Tasks & Alerts** tab, click **All Tasks**, select the **System Tasks** tab, and then click **Manage System Tasks**.

   b. In the **Manage System Tasks** window, select the desired storage system, and then click **OK**.

   In Device Manager - Storage Navigator: In the **Storage Systems** tree, select **Tasks**.

2. Verify the shredding status in the **Tasks** window. For detailed information, click the task name in the **Task Name** column to open the **Task Properties** window.

   For more information, see the *Managing tasks* section in the *Hitachi Command Suite User Guide* or the *System Administrator Guide* for your storage system.

Viewing shredding status with the Logical Devices window

You can verify the progress of shredding operations using either the Logical Devices window or the Tasks window. For details about using the Tasks window, see Viewing shredding status with the Tasks window on page 27.

Procedure

1. Open the **Logical Devices** window:

   In Hitachi Command Suite:

   a. On the **Resources** tab, click **Storage Systems**, and then expand **All Storage Systems** and the target storage system.

   b. Right-click **Volumes**, and then select **System GUI**.

   In Device Manager - Storage Navigator: In the **Storage Systems** tree, click **Logical Devices**.

2. Verify the shredding progress in the **Logical Devices** window. When the volume shredding is in progress, the **Status** column displays **Shredding**.

   For details about the **Logical Devices** window, see the *Provisioning Guide* for your storage system.

Stopping a shredding operation from HDvM - SN Tasks window

You can stop the volume shredding process.



Caution: If you stop the shredding process, you cannot restart the process. Data integrity of the volume is not guaranteed.

Tip: For VSP G200, G400, G600, G800: You can interrupt the shredding process by using one of following:

- Tasks window
- The menu in Interrupt Shredding Task window.

We recommend to use the Task window to stop the shredding operation if you want faster response.

Note: For VSP G200, G400, G600, G800: The shredding tasks cannot be interrupted if any one of the following two conditions are satisfied:

- Status of the shredding task is Failed.
- Format/Shredding Task Status is Shredding on the Parity Groups window or Logical Devices window.

In this case, perform the interrupt operation from Interrupt Shredding Task window.

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. Open the **Tasks** window:
   In Hitachi Command Suite:
   a. On the **Tasks & Alerts** tab, click **All Tasks**, select the **System Tasks** tab, and then click **Manage System Tasks**.
   b. In the **Manage System Tasks** window, select the desired storage system, and then click **OK**.

   In Device Manager - Storage Navigator:

   In the **Storage Systems** tree, select **Tasks**.
2. Click the task name of the desired task in the **Task Name** column.
   The **Task Properties** window opens.
3. Click **Abort** in the **Shredding Data pattern** field.
4. Verify the displayed settings and click **Yes**.
   The shredding process stops.
5. Click **Close** in the **Task Properties** window.

Stopping a shredding operation from HDvM - SN Interrupt Shredding Task window

For VSP G200, G400, G600, G800, you can stop the volume shredding process from the Interrupt Shredding Task window.

Caution: If you stop the shredding process, you cannot restart the process. Data integrity of the volume is not guaranteed.

Note: We recommend to use the Tasks window to stop the shredding operation if you want faster response.

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. You can stop shredding operation from any of the tabs given below
   - To display the **Parity Groups** tab in the **Storage Systems** tree, select **Parity Groups**.
   - To display the **LDEVs** tab in the **Storage Systems** tree, select **Logical Devices**.
2. You can select **Interrupt Shredding Task** from the following:
   In Hitachi Command Suite: Click **More Actions**, and then select **Interrupt Shredding Task**.
   In Device Manager - Storage Navigator: Click **Actions**, and then select **Interrupt Shredding Task**.
3. Verify the display settings and click **Apply**.
   The shredding process stops.

   Note: If the shredding operation being performed is interrupted, the end times of following tasks in the **Tasks** window differ:
   - End time of the shredding task being performed.
   - End time of the task for the interruption of shredding.
     The time difference above is approximately 10 minutes.
     To determine whether the shredding task is finished or not, confirm the status of the task. If **Status** is Completed or Failed, the shredding task is finished.

Viewing shredding results with the Tasks window

To verify the results of shredding with the Tasks window.

Procedure

1. Open the **Tasks** window:
   In Hitachi Command Suite:

a. On the **Tasks & Alerts** tab, click **All Tasks**, select the **System Tasks** tab, and then click **Manage System Tasks**.
b. In the **Manage System Tasks** window, select the desired storage system, and then click **OK**.

In Device Manager - Storage Navigator: In the **Storage Systems** tree, select **Tasks**.

2. Click the task name of the desired task in the **Task Name** column. The **Task Properties** window opens.
3. In the **Task Properties** window, see the **Result** column in the **Shredding Data Pattern** table.

   Check the contents to verify whether all the overwriting operations have been completed normally. If an overwriting pass is not completed normally, it means the shredding was not successful. If shredding fails, try shredding the volume again. If shredding fails again, contact customer support to resolve the error. If the storage system experiences a power outage during the shredding process, one of the following error messages will appear:

   - **Shredding operation canceled**
   - **Shredding operation failed**
4. Click **Close** to close the **Task Properties** window.

   For more information, see the *Managing tasks* section in the *Hitachi Command Suite User Guide* or the *System Administrator Guide* for your storage system.

   The following table lists and describes the Volume Shredder status messages that are displayed in the shredding results.

Status	Description
--	The shredding operation was not performed.
Shredding operation Normal.	The shredding operation was successful.
Writing.	The shredding operation is in progress.
Shredding operation not executed.	The shredding operation did not occur as specified.
Shredding operation canceled.	The shredding operation was canceled, or power to the system was interrupted.
Shredding operation Failed.	The shredding operation was not successful, or power to the system was interrupted.
Shredding data transfer error.	The system could not write the shredding results to a file.
Shredding data verify error.	An error was detected in the file containing the shredding results.
No-data assigned.	When you shred an unused Dynamic Provisioning virtual volume, no dummy data is written to the volume. In this case the status of the shredding operation in the shredding results file is **No-data assigned**.

Viewing shredding results in the compressed files

In the Selected LDEVs table on the Shred LDEVs window, if the Data Output column is set to YES, the result of shredding a volume can be saved as files on the computer. Use this file to check the results of shredding a volume.

Before you begin

You must have the Storage Administrator (Provisioning) role to perform this task.

Procedure

1. Navigate to the **Reports** menu for the storage system:
   In Hitachi Command Suite: On the **Resources** tab, expand the **Storage Systems** tree, right-click the target storage system, and then select **Other Functions**.

   In Device Manager - Storage Navigator: Display the Device Manager - Storage Navigator main window.
2. On the menu bar, select **Reports > Shredding Report**, and then click either **Download Latest Report** to download the latest result file or **Download Other Reports** to download the past ten times result files. When the preparation for download is complete, a message appears.
3. Click **OK**.
4. Specify the folder in which to download the file.
5. Click **Save**.
   Compressed files are downloaded.
6. Decompress the file. The binary file showing the results of shredding, the text file showing the contents of shredding operation, and its result are output.

Understanding shredding results in compressed files

When you open the compressed file, you see binary and text files that contain shredding results.

- The name of the binary file indicates LDKC, CU, and LDEV numbers of the shredded volumes, and the number of times the system wrote dummy data to the volumes. For example, if a binary file is named `00-01-11-03.bin`, the LDKC number is 00, the CU number is 01, and the LDEV number is 11. The filename also indicates that the system wrote dummy data to that volume three times. A binary file contains the first 512 bytes of data of a shredded volume (LDEV).
- The file name of a text file appears as follows:
  `shred_`*`finish-time-of-shredding-operation`*`.txt`

The compressed file is saved with the time zone setting of the SVP. If the compressed file is decompressed on the computer, the time stamp of the decompressed file appears with the time zone setting of the computer. The time stamp of the decompressed file might be different from the actual finish time of the shredding operation.

The text file contains the following summary information:

- Results of the shredding operation (see Viewing shredding status with the Logical Devices window on page 28)
- Contents of the dummy data
- Shredded volumes
- Start and finish time of the shredding operation

A

Volume Shredder GUI reference

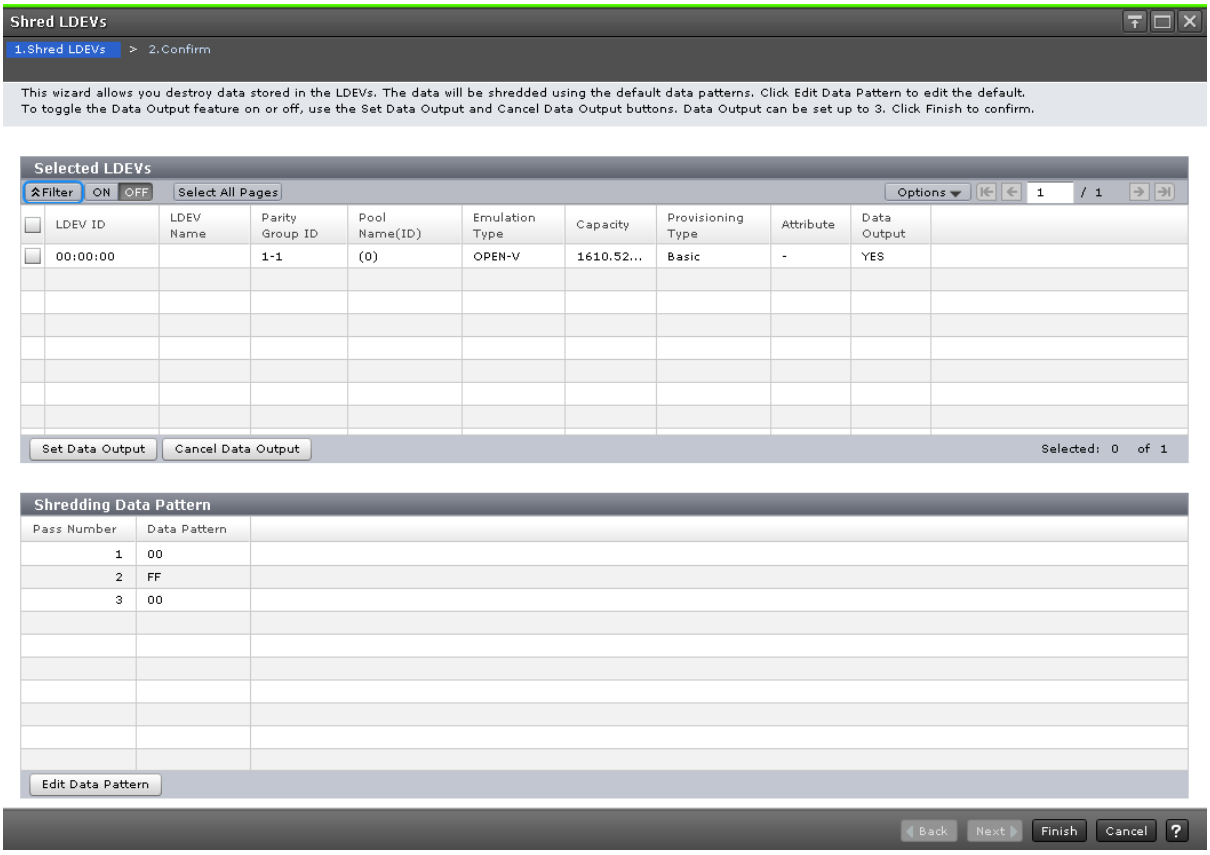
This section describes the Device Manager - Storage Navigator windows for Volume Shredder.

- Shred LDEVs wizard
- Edit Shredding Data Pattern window
- Interrupt Shredding Task window

Shred LDEVs wizard

Shred LDEVs window

Use the Shred LDEVs window to select the volumes (LDEVs) to be shredded, configure the shredding operations (number of overwrite passes, data patterns), and enable/disable the output of shredding results to files.



Selected LDEVs table in the Shred LDEVs window

Item	Description
LDEV ID	ID of the selected LDEV. The ID is a combination of the logical disk controller (LDKC) number, control unit (CU) number, and LDEV number.
LDEV Name	Name of the selected LDEV.
Parity Group ID	Parity group number (for example, 1-1) of the selected LDEV. • A parity group number starting with E (for example, E1-1) indicates that the parity group contains one or more external volumes.

Item	Description
	• VSP G1000 and G1500, and VSP F1500: A parity group number starting with V (for example, V1-1) indicates that the parity group contains one or more Copy-on-Write Snapshot virtual volumes. • A parity group number starting with X (for example, X1-1) indicates that the parity group contains one or more Dynamic Provisioning virtual volumes.
Pool Name(ID)	Pool volume (pool-VOL) name and ID.
Emulation Type	VSP G1000 and G1500, and VSP F1500: Emulation type of the selected LDEV.
Capacity	Capacity of the selected LDEV. To change the capacity unit, select Option > Capacity Unit.
Provisioning Type	Provisioning type of the selected LDEV: • Basic: Internal volume • External: External volume • DP: Virtual volume of Dynamic Provisioning
Attribute	The following LDEV attributes are displayed: • Command device: The volume has the command device attribute. • SLU: The volume has the SLU attribute. • Data Direct Mapping: The volume has the data direct map attribute. • (VSP Gx00 models only) NAS Platform (User LU): User LU of NAS • (-): The volume does not have an attribute.
Data Output	**YES**: The results of the shredding operation will be saved in a file. **NO**: The results of the shredding operation will be not saved in a file.
Set Data Output	If this button is selected, Yes appears in the Data Output column. If the data output setting is enabled, the results of the shredding operation will be saved in a file. Results can be saved for up to three volumes.
Cancel Data Output	If this button is selected, No appears in the Data Output column. If the data output setting is disabled, the results of the shredding operation will be not saved in a file.

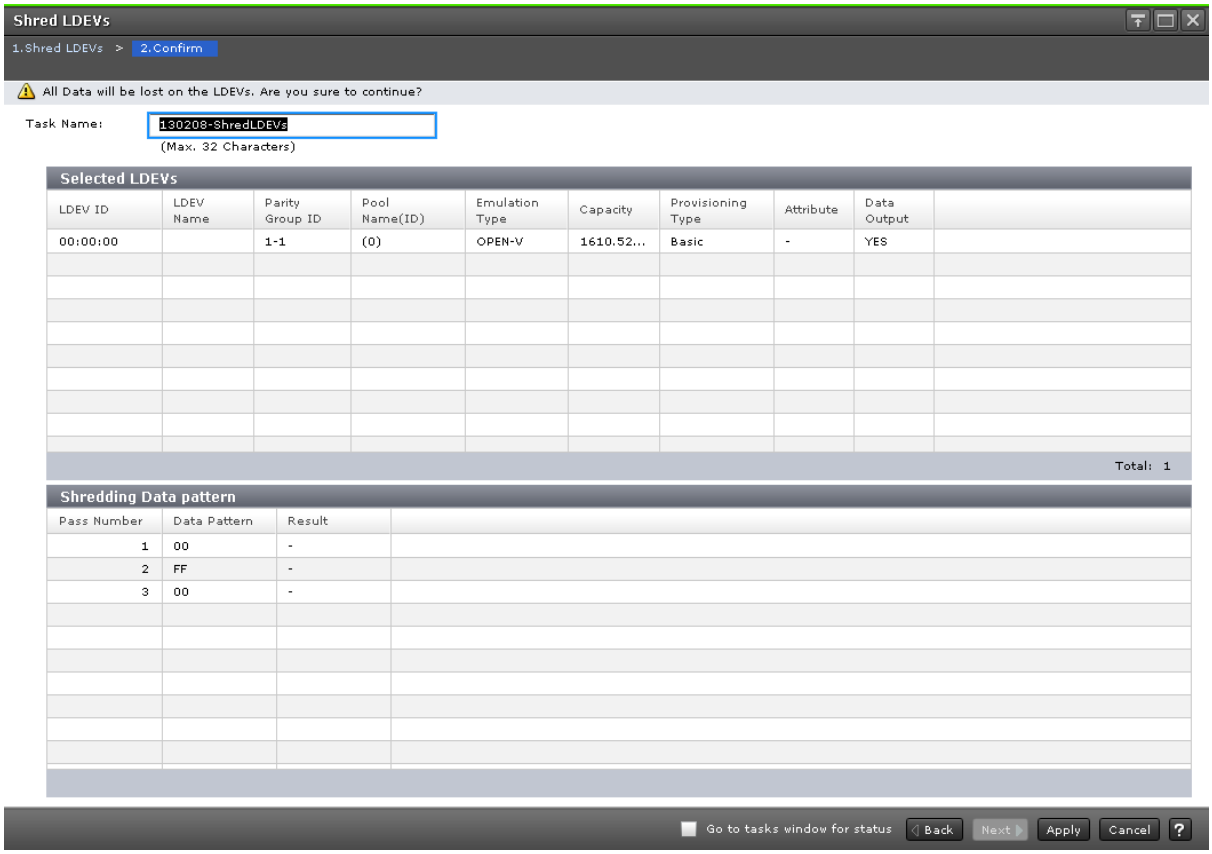
Shredding Data Pattern table in the Shred LDEVs window

Item	Description
Pass Number	Order of the overwrite pass.
Data Pattern	Dummy data pattern for the overwrite pass.

Item	Description
Edit Data Pattern	Click to open the Edit Shredding Data Pattern dialog box, which allows you to change the data pattern setting.

Shred LDEVs wizard Confirm window

Use the Confirm window to review the information for the volume shredding operations and start the shredding task. When you are ready to start the specified volume shredding operations, enter a unique name for the shredding task, and then click Apply to start the shredding operations.



Selected LDEVs table in the Confirm window

Item	Description
LDEV ID	ID of the LDEV to be shredded. The ID is a combination of the logical disk controller (LDKC) number, control unit (CU) number, and LDEV number.
LDEV Name	Name of the LDEV to be shredded.
Parity Group ID	Parity group number (for example, 1-1) of the LDEV to be shredded.

Item	Description
	• A parity group number starting with E (for example, E1-1) indicates that the parity group contains one or more external volumes. • VSP G1000 and G1500, and VSP F1500: A parity group number starting with V (for example, V1-1) indicates that the parity group contains one or more Copy-on-Write Snapshot virtual volumes. • A parity group number starting with X (for example, X1-1) indicates that the parity group contains one or more Dynamic Provisioning virtual volumes.
Pool Name(ID)	Pool volume (pool-VOL) name and ID.
Emulation Type	VSP G1000 and G1500, and VSP F1500: Emulation type of the LDEV to be shredded.
Capacity	Capacity of the LDEV to be shredded. To change the capacity unit, select Option > Capacity Unit.
Provisioning Type	Provisioning type of the LDEV to be shredded: • Basic: Internal volume • External: External volume • DP: Virtual volume of Dynamic Provisioning
Attribute	The following LDEV attributes are displayed: • Command device: The volume has the command device attribute. • SLU: The volume has the SLU attribute. • Data Direct Mapping: The volume has the data direct map attribute. • (VSP Gx00 models only) NAS Platform (User LU): User LU of NAS • (-): The volume does not have any attribute.
Data Output	YES: The results of the shredding operation will be saved in a file. NO: The results of the shredding operation will be not saved in a file.

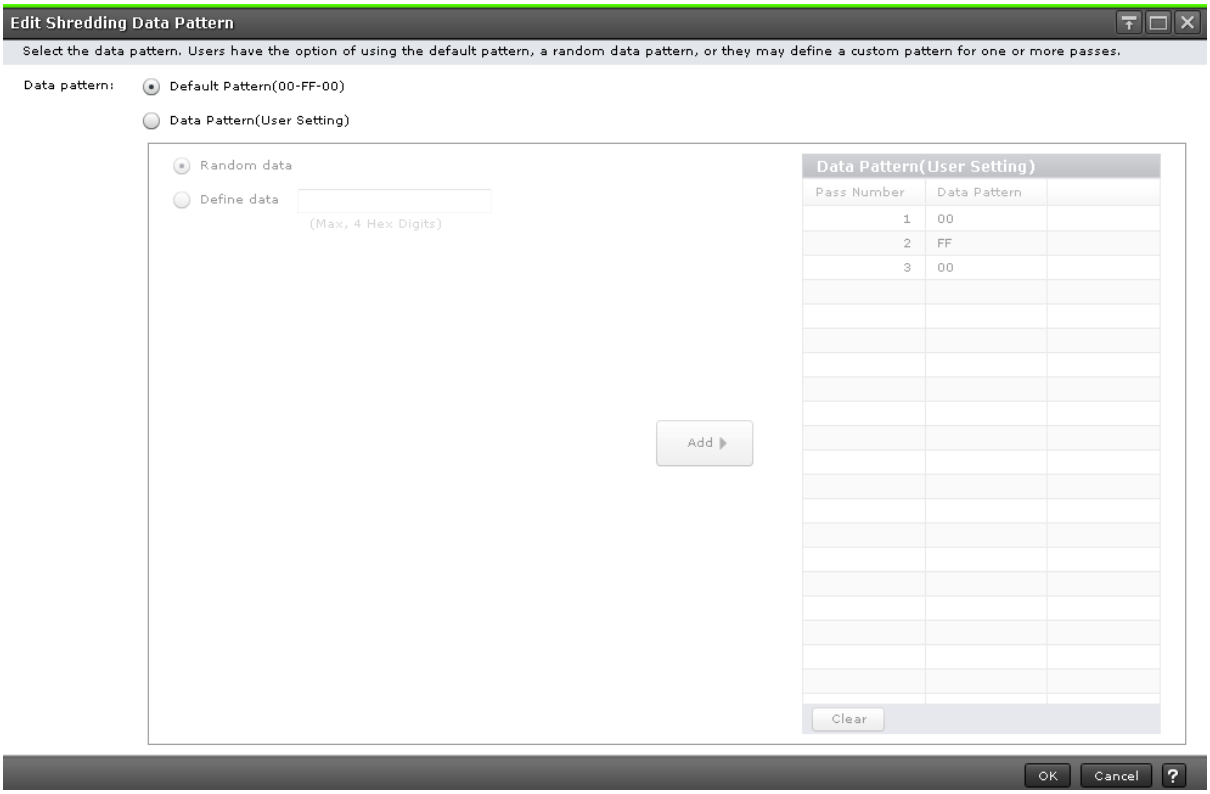
Shredding Data Pattern table in the Confirm window

Item	Description
Pass Number	Order of the overwrite pass.
Data Pattern	Dummy data pattern for the overwrite pass.
Result	Results of the shredding operations: • -: The system did not overwrite the volume. • Shredding operation Normal: The system successfully overwrote the volume. • Writing: The system is overwriting the volume now.

Item	Description
	• Shredding operation not executed: The system did not overwrite the volume as configured. • Shredding operation canceled: The system or user cancelled the overwrite request. • Shredding operation Failed: The overwrite process ended unsuccessfully. • Shredding data transfer error: The results could not be written to a file. • Shredding data verify error: An error was detected while verifying the file containing the result. • No-data assigned: The Dynamic Provisioning virtual volume was unused; no dummy data was written to the volume. However, if the following volumes are included in the shredding volumes, the dummy data is written to volumes: Used Dynamic Provisioning virtual volumes, Internal volumes with normal status, and External volumes.

Edit Shredding Data Pattern window

Use the Edit Shredding Data Pattern window to configure the volume shredding settings, including number of overwrite passes and dummy data patterns.



Item	Description
Data Pattern	Type of data pattern: default data pattern or custom. • Default Pattern(00-FF-00): Three passes with the following dummy data patterns: "00" for the first pass, "FF" for the second pass, and "00" for the third pass. • Data Pattern(User Setting): Selected to define the number of passes and the data pattern for each pass.
Random Data	Volume Shredder selects a 4-digit hexadecimal number at random to be used as the dummy data pattern for the pass.
Define Data	Enter a hexadecimal number (from 0 to FFFF) to be used as the dummy data for the user-defined pass.
Add	Adds the user-defined data pattern to the Data Pattern(User Setting) table. This button is available only when you select Data Pattern(User Setting) for the Data pattern type.

Data Pattern (User Setting) table in the Edit Shredding Data Pattern window

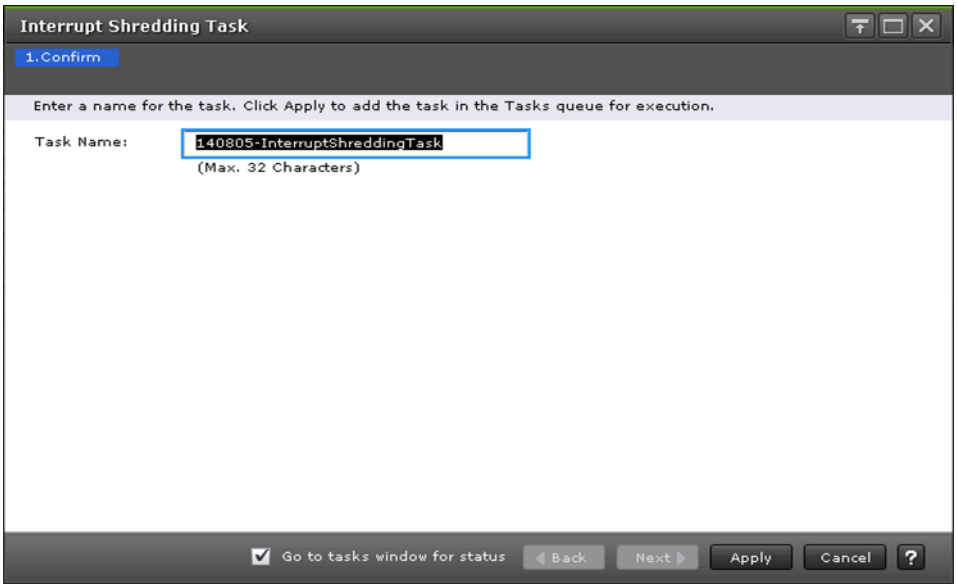
Item	Description
Pass Number	Order of the overwrite pass.
Data Pattern	Dummy data pattern for the overwrite pass.
Clear	Clears the values (other than 00) in the bottom row of the Data Pattern(User Setting) table.

Related topics

Defining shredding conditions on page 24

Interrupt Shredding Task window

For VSP G200, G400, G600, G800, you can use the Interrupt Shredding Task window to stop shredding tasks.



Item	Description
Task Name	Enter the task name to be interrupted. A task name can be up to 32 ASCII characters (letters, numerals and symbols).

Related Topics

[Stopping a shredding operation from HDvM - SN Tasks window on page 28]

Index

B
blocking volumes 19

E
editing shredding data patterns 24

F
flash drives
  calculating shredding passes 21
flash module drives
  calculating shredding passes 22

J
journal volumes
  shredding restrictions 12

O
overwriting the data with dummy data 12

P
pool volumes
  shredding restrictions 12

S
Shred LDEVs window
  defining shredding settings 24
shredding
  calculating shredding passes 21, 22
  defining settings 24
  stopping 28
shredding restrictions
  journal volumes 12
  pool volumes 12
stopping shredding
  Main window 29
  Tasks window 28

V
volumes
  blocking 19
  stopping shredding 28

Hitachi Data Systems

Corporate Headquarters
2845 Lafayette Street
Santa Clara, California 95050-2639
U.S.A.
www.hds.com

Regional Contact Information

Americas
+1 408 970 1000
info@hds.com

Europe, Middle East, and Africa
+44 (0) 1753 618000
info.emea@hds.com

Asia Pacific
+852 3189 7900
hds.marketing.apac@hds.com

Contact Us
www.hds.com/en-us/contact.html

Hitachi Data Systems

MK-92RD8025-07

October 2016