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**Hitachi Freedom Storage™
Lightning 9900™ V Series
FlashAccess User's Guide**

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- Dcr45d1a (February, 2002)
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Referenced Documents

Hitachi Lightning 9900V documentation referenced in this document:

- *Hitachi Freedom Storage™ Lightning 9900™ V Series User and Reference Guide* (MK-92RD100)
- *Hitachi Freedom Storage™ Lightning 9900™ V Series Remote Console - Storage Navigator User's Guide* (MK-92RD101)
- *Hitachi Freedom Storage™ Lightning 9900™ V Series LUN Expansion (LUSE)/Virtual LVI/LUN (VLL) User's Guide* (MK-92RD104)
- *Hitachi Freedom Storage™ Lightning 9900™ V Series ShadowImage User's Guide* (MK-92RD110)
- *Hitachi Freedom Storage™ Lightning 9900™ V Series ShadowImage - S/390® User's Guide* (MK-92RD109)

Preface

This *Hitachi Freedom Storage™ Lightning 9900™ V Series Remote Console - Storage Navigator™ User's Guide* provides instructions for installing the 9900V Remote Console and using the web client Java™ Java™ applet program for the 9900V subsystem. Please read this manual carefully to understand how to manipulate your 9900V storage subsystems using your Remote Console, and maintain a copy that is accessible from your Remote Console for reference purposes.

This user's guide assumes that:

- the user has a background in data processing and understands direct-access storage device (DASD) subsystems and their basic functions,
- the user is familiar with the Hitachi 9900V array subsystem, and the user is familiar with the Windows NT® or Windows® 2000 operating systems.

For further information on the 9900V subsystem, please refer to the *Hitachi Freedom Storage™ Lightning 9900™ V Series User and Reference Guide* (MK-92RD100), or contact your Hitachi Data Systems account team.

Note: The term "9900V" refers to the entire Lightning 9900™ V Series subsystem family, unless otherwise noted.

Note: The use of the Lightning 9900™ V Series Remote Console, the web client Java™ Java™ applet and any other optional functions is governed by the terms of the applicable license and other agreement(s) with Hitachi Data Systems.

Note: This product includes software developed by the Apache Group for use in the Apache HTTP server project (<http://www.apache.org/>)

Microcode Level

This document revision applies to 9900V microcode versions 21-01-xx and higher.

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Chapter 1 Overview

1.1 FlashAccess's Functional Overview

FlashAccess is applicable to the volumes for the open systems and mainframes.

FlashAccess allows you to make part or all of LDEV data that is often accessed to reside in the FlashAccess cache area of the disk subsystem (see Figure 1.1). This enables the host to swiftly access data in the cache area in the disk drive, thus improving the data access performance of the disk subsystem.

FlashAccess supports the priority mode that only allows the data to be read at high speed and that bind mode in which to read and write data at high speed. The bind mode uses more FlashAccess cache capacity than the priority mode because written data is duplexed. Typically, data assigned to FlashAccess becomes resident, or "staged," when it is first accessed by the host. This means that the system finds data in the cache from the second and subsequent access. FlashAccess supports a pre-staging function to allow the system to find data in the cache from the first access. The function lets data assigned to FlashAccess reside in the FlashAccess cache when FlashAccess is set. This allows the host to find data in the cache from the first access, enhancing access performance.

FlashAccess requires cache memory for functionality. You can change the cache capacity by installing or removing cache.

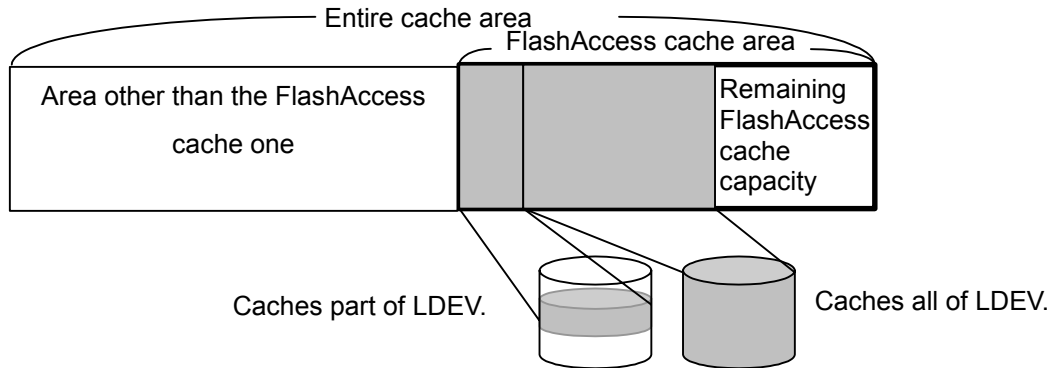


Figure 1.1 FlashAccess Cache Area

Table 1.1 lists the purposes of FlashAccess.

Table 1.1 Purposes of FlashAccess

Item	Purposes of FlashAccess	
	Open system	Mainframe
Emulation type	OPEN-3, 9, E, L	3390-3, 3A, 3B, 3C, 3R, 9
Supported volumes	LUN Expansion (LUSE) volume and Virtual LVI/LUN (VLL) volume	Virtual LVI/LUN (VLL) volume
Unit of cache area allocation	At least 96LBA (Logical Block Address): Equivalent to 48kB	At least one cache slot (or track): Equivalent to 48kB or 64kB. Up to 1LDEV
Number of cache areas	In subsystem: 1,024 In LDEV: 1,024	

Allocate any LDEV a FlashAccess cache in units of logical cylinders and heads. This means that the open system's FlashAccess detects a logical block address (LBA) in units of 96 blocks.

During a FlashAccess configuration, specify the priority or bind FlashAccess mode, and whether to activate the pre-staging function.

Note: You cannot change this specification after a configuration. To change the specification, you must reset FlashAccess, and then re-allocate FlashAccess. If you want to apply FlashAccess to an LUSE volume, you must apply FlashAccess to all the LDEVs that form the LUSE volume.

Table 1.2 lists restrictions on a FlashAccess configuration that you should follow.

Table 1.2 Restrictions on a FlashAccess Configuration

No.	Restrictions
1	Do not attempt to capacity beyond the allocated capacity of the FlashAccess cache.
2	Do not configure the Hitachi CruiseControl-reserved volume for FlashAccess.
3	Do not allocate the FlashAccess cache area allocated to LDEV in duplicate.
4	You cannot allocate FlashAccess for on-demand LDEV.

- **WARNING:** You must not perform LDEV operations for following if FlashAccess is set:
 - ShadowImage quick restoring operation
 - Hitachi CruiseControl migration

These operations may swap the internal locations of the primary and secondary volumes and cause a loss of data integrity. For details, see the *Hitachi Freedom Storage™ Lightning 9900™ V Series ShadowImage User’s Guide*(MK-92RD110), and *Hitachi Freedom Storage™ Lightning 9900™ V Series ShadowImage - S/390® User’s Guide* (MK-92RD109) for the 9900V series.

In any of the following cases, FlashAccess is reset automatically (Table 1.3):

Table 1.3 Automatic FlashAccess Reset

No.	FlashAccess is reset when:
1	An FV (Fixed Volume) part or all of which is assigned FlashAccess is converted into free space by the VLL Volume to Space function.
2	A CV (Customized Volume) part or all of which is assigned FlashAccess is converted into free space by the VLL Volume to Space function.
3	VDEV containing FD and CV assigned FlashAccess is initialized by the VLL Volume Initialization function.

For more information about the VLL function, see the *Hitachi Freedom Storage™ Lightning 9900™ V Series LUN Expansion (LUSE)/Virtual LVI/LUN (VLL) User’s Guide* (MK-92RD104) for the 9900V series.

1.2 General Parameters

The FlashAccess feature of the 9900 subsystem allows you to store specific data in cache memory. FlashAccess increases the data access speed for the cache-resident data by enabling read and write I/Os to be performed at host data transfer speeds.

Warning: Do not perform either the ShadowImage quick restore operation or the Hitachi CruiseControl™ migration operation on a FlashAccess volume. These operations swap the internal locations of the source and target volumes. For more information, please see *Hitachi Lightning 9900™ ShadowImage User's Guide (MK-90RD031)* and *Hitachi Lightning 9900™ Hitachi CruiseControl™ User's Guide (MK-91RD054)*.

The FlashAccess cache areas (called cache extents) have the following parameters:

- They are dynamic and can be added and deleted at any time.
- The 9900 supports a maximum of 1024 addressable cache extents per LDEV, and up to 1,024 cache extents per subsystem.

FlashAccess operations support both open volumes (OPEN-3//9/ /E/L/) and mainframe volumes (3390-3/3A/3B/3C/3R/9). FlashAccess also supports the use of LUSE and Virtual LVI/LUN volumes. Using FlashAccess in conjunction with Virtual LVI/LUN will achieve better performance improvements than when either of these options is used individually. If a user needs an entire mainframe or open-system volume in FlashAccess, using a small Virtual LVI/LUN volume will require less cache. For more information on Virtual LVI/LUN, please see *Hitachi Lightning 9900™ Virtual LVI/LUN User's Guide (MK-90RD005)*. **Note:** OPEN-L and OPEN-M are not supported for Virtual LVI/LUN operations.

- For mainframe volumes, each FlashAccess cache area must be defined on contiguous tracks, with a minimum size one cache slot (or track) and a maximum size of one LVI.
- For open systems, FlashAccess cache extents must be defined in Logical Blocks using Logical Block Addresses (LBAs), with a minimum size of 96 LBAs. However, it is most likely that users will assign the entire open system volume for FlashAccess. If the remaining cache memory is less than 256 MB, FlashAccess is not available.
- The user has the option of pre-staging the data to the resident area. If pre-staging is not used, then the data will be loaded into the FlashAccess extents when the first 'miss' occurs. If pre-staging is used, it may affect performance for a short time while reading the data into FlashAccess cache. Pre-staging should not be performed during peak activity.
- All write I/Os to FlashAccess data are duplex writes, guaranteeing full data integrity. The FlashAccess data remains fixed in cache until the user manually deletes it. Deletion of FlashAccess extents will de-stage any write data to the affected volume(s).
- It is possible to expand the amount of FlashAccess cache without canceling the existing FlashAccess settings. Please call the Hitachi Data Systems Technical Support center for assistance.

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Table 1.4 Logical Block Addresses for Open Systems

Starting LBA	Ending LBA	Starting LBA	Ending LBA	Notes
0	95	192000	192095	
96	191	288000	288095	
192	287	384000	384095	
288	383	480000	480095	
384	479	576000	576095	
480	575	672000	672095	
576	671	768000	768095	
672	767	864000	864095	
768	863	960000	960095	
864	959	1920000	1920095	
960	1055	2880000	2880095	
1920	2015	3661824	3661919	
2880	2975	3840000	3840095	
3840	3935	4800000	4800095	
4800	4895	4806624	4806719	OPEN-3 maximum LBA
5760	5855	4806720	4806815	
6720	6815	5760000	5760095	
7680	7775	6720000	6720095	
8640	8735	7680000	7680095	
9600	9695	8640000	8640095	
19200	19295	9600000	9600095	
29900	28895	10560000	10560095	
38400	38495	11520000	11520095	
48000	48095	12480000	12480095	
57600	57695	13440000	13440095	
67200	67295	14350944	14351039	
71904	71999	14422944	14423039	OPEN-9 maximum LBA
72000	72095	28452864	28452959	OPEN-E maximum LBA
76800	76895	71192064	71192159	OPEN-L maximum LBA
86400	86495	92158464	92158559	
96000	96095			

1.3 Selecting an Appropriate FlashAccess Mode

1.3.1 Priority Mode

In the priority mode, only the read data stored in the disk drive is resident in the FlashAccess cache area. The host can read data on the FlashAccess cache at high speed rather than reading the data in the disk drive. Write data is write-duplexed in normal cache; there is no duplexed write data in the cache reserved for FlashAccess. The data stored in the cache is de-staged to the disk drive if disk usage is low.

Note: In addition to the FlashAccess cache, you should set the standard cache capacity according to the number of areas set in priority mode. This installation prevents a reduction in the performance of access to data other than the target FlashAccess data that may occur if FlashAccess is set. In other words, if data is written into an area set in the priority mode, the standard cache other than the FlashAccess cache is loaded. If data is written into an area set to priority mode, and the standard cache is overloaded, and very little cache space), the standard cache will be exhausted, often resulting in a wait for free standard cache space. This may reduce the performance of access to data other than the target FlashAccess data.

Table 1.5 Standard Cache Capacity

Item	Number of areas set in the priority mode	
	Up to 512	Up to 1,024
Standard cache capacity required to prevent a reduction in the access performance	512 MB×2	1,024 MB×2

- Open system

One slot consists of 48kB. It requires three cache segments (16kB per segment). Sixteen slots require a FlashAccess cache rated at 768kB.
- Mainframe

One slot consists of 48kB or 64kB. It requires three or four cache segments (16kB per segment). Sixteen slot images require a 1MB (model 3390 device) reserved cache.

Note: Even if one slot (track) consists of 64kB (model 3390 LDEV), the cache is split by 16kB and, requires four segments.

1.3.2 Bind mode

In the bind mode, the read data stored in the disk drive and data loaded in the disk drive are resident in the FlashAccess cache area. Data written in the disk drive set in the bind mode is only loaded into the FlashAccess cache area. The data stored in the FlashAccess cache area is duplexed for data protection, which requires much FlashAccess cache capacity. The data stored in the FlashAccess cache area is loaded into the disk drive as shown in Table 1.6.

Table 1.6 Conditions for Writing (De-staging) into the Disk Drive

No.	Written (de-staged) when:
1	The FlashAccess area is deallocated.
2	The disk subsystem is turned off.
3	Allocated LDEV is converted into a free space by the VLL Volume to Space function.
4	Allocated LDEV is initialized by the VLL Volume Initialization function.

For more information about the VLL function, see the Remote Console manual, *LUN Expansion (LUSE)/Virtual LVI/LUN (VLL) User's Guide* for the 9900V series.

- For RAID-5, FlashAccess requires a cache capacity that is three times larger than the user data.

RAID-5 for the open system

One slot consists of 48kB. It requires nine cache segments (16kB per segment). Sixteen slots require a 2.25MB FlashAccess cache.

RAID-5 for the mainframe

One slot consists of 48kB or 64kB. It requires none or 12 cache segments (16kB per segment). Sixteen slot images require a 3MB (model 3390 device) FlashAccess cache.

Note: Even if one slot (track) in a mainframe consists of 64kB (model 3390 LDEV), the cache is split by 16kB and, this requires four segments.

- For RAID-1, FlashAccess requires a cache capacity that is twice as much as user data.

RAID-1 for the open systems

One slot consists of 48kB. It requires six cache segments (16kBper segment). Sixteen slots require a 1.5MB FlashAccess cache.

RAID-1 for the mainframe

One slot consists of 48kB or 64kB. It requires six or eight cache segments (16kB per segment). Sixteen slot images require a or 2MB (model 3390 device) FlashAccess cache.

- When the area for a RAID-5 volume is changed from the priority mode to the bind mode without cache extension:

Only 33 percent of the capacity for user data in the priority mode is made to reside in the cache, and the remaining 67 percent is used to save read/write data.

Note: Changing the mode without cache extension requires a FlashAccess reconfiguration.

- When the area for a RAID-1 volume is changed from the priority mode to the bind mode without cache extension:

Only 50 percent of the capacity for user data in the priority mode is made to reside in the cache, and the remaining 50 percent is used to save read/write data.

Note: Changing the mode without cache extension requires a FlashAccess reconfiguration.

1.4 Pre-staging Function

The FlashAccess pre-staging function lets data allocated to configured FlashAccess reside in the FlashAccess cache. This allows the host to find data in the cache from the first access. You can use this function in both of the FlashAccess priority and bind modes.

Chapter 2 Preparations for FlashAccess Operations

2.1 Set Up the 9900V Subsystem and Remote Console PC(s)

Before launching FlashAccess, you must take several preliminary steps. For detailed instructions, please refer to *Hitachi Freedom Storage™ Lightning 9900™ V Series Remote Console - Storage Navigator User's Guide* (MK-92RD101). These include the following:

- Install the 9900 subsystem.
- Install the PC(s) that you intend to use as Remote Consoles, and connect them to the 9900V internal LAN.
- Enable LUN Manager on each subsystem where you intend to use the option.

2.2 Launch FlashAccess

To use FlashAccess, you must first log on to the primary SVP. For detailed instructions on the login process, see *Hitachi Freedom Storage™ Lightning 9900™ V Series Remote Console - Storage Navigator User's Guide* (MK-92RD101).

If you successfully log on to the primary SVP, the Remote Console Main panel opens (see Figure 2.1). The **Option** buttons are displayed vertically on the left side.

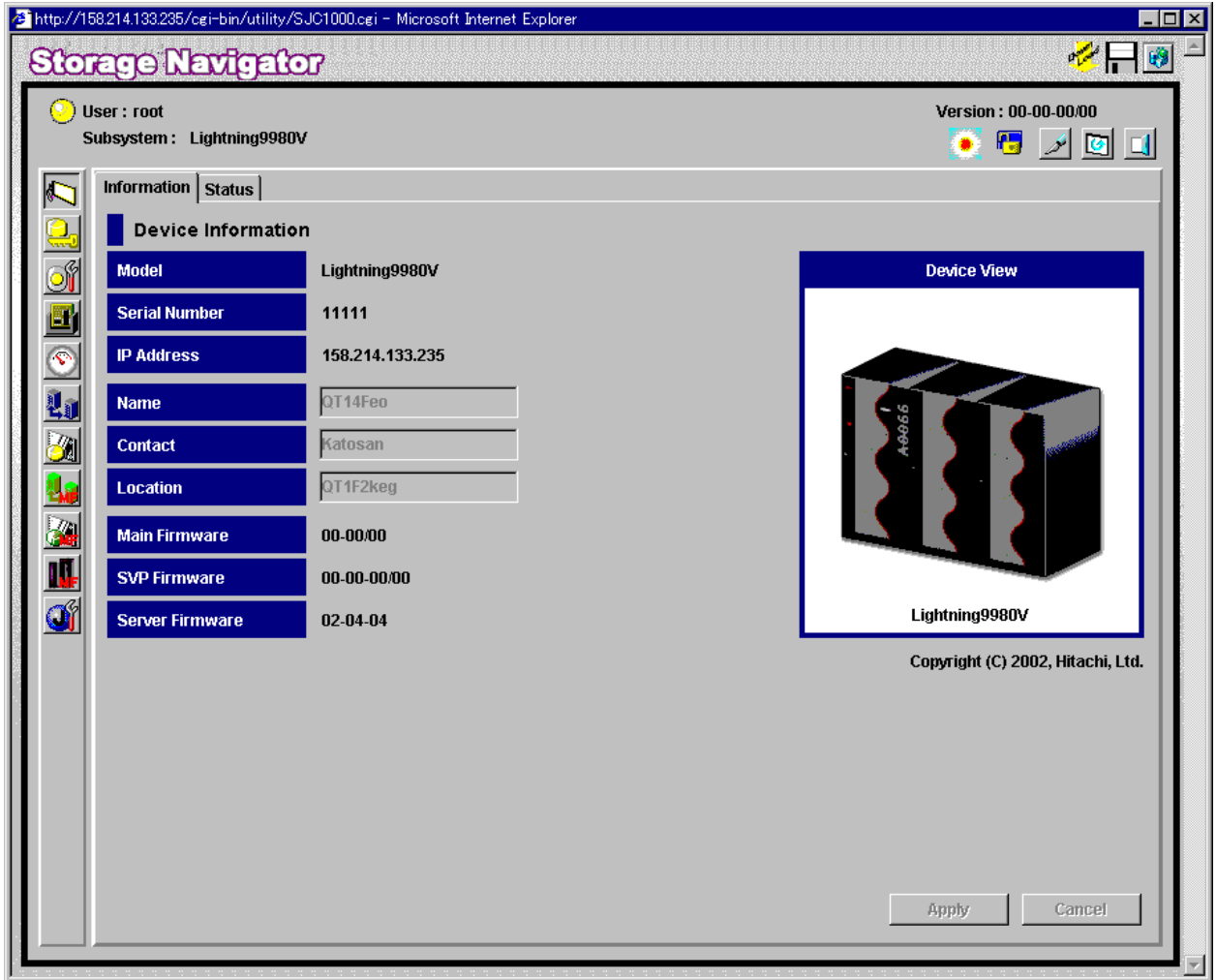






Figure 2.1 Remote Console Main Panel, Information Tab

2.3 Changing to Modify Mode

If you are going to implement any changes for FlashAccess, you must be in **Modify** mode. The subsystem information icons (see Figure 2.2) are on the upper right corner of the Remote Console Main panel, and they appear on all option panels as well. These icons are described in detail in *Hitachi Freedom Storage™ Lightning 9900™ V Series Remote Console - Storage Navigator (MK-92RD101)*. If you want to change from **View** mode to **Modify** mode and back, two of the icons are important:

- The exclusive lock icons indicate the operation mode of all currently logged-in users. If all users are operating in **View** mode, the **Unlocked** icon () is displayed. If a user is operating in **Modify** mode, or if subsystem maintenance or SNMP operations are being performed, the **Locked** icon () is displayed.
- The **Mode-Changing** buttons allow users to change the operation mode between **View** mode () and **Modify** mode (). **Note:** Only one user at a time can be in **Modify** mode.

To change between View mode to Modify mode:








1. You must have administrator or write access for the option that you want to use. For details on assigning user access, see *Hitachi Freedom Storage™ Lightning 9900™ V Series Remote Console - Storage Navigator (MK-92RD101)*.
2. Verify that the subsystem is unlocked. If all users are operating in **View** mode, the **Unlocked** icon () and the **View Mode** icon () are displayed (see Figure 2.2). If a user is operating in **Modify** mode, or if subsystem maintenance is being performed, the **Locked** icon () is displayed, and you will not be able to implement changes.
3. Select the **Mode Changing** icon, which should be in **View** mode (). Click on the icon, and a confirmation message will display (see Figure 2.3). Select **OK**.
4. Once you are in **Modify** mode, the **Mode Changing** icon will change from a gray background to a yellow background () and the **Locked** icon () is displayed (see Figure 2.4).
5. Once you have applied your desired changes, you need to change back to **View** mode. Select the **Mode Changing** icon (). The confirmation message will display (see Figure 2.3). Select **OK**, and you will be back in **View** mode.



Figure 2.2 View Mode

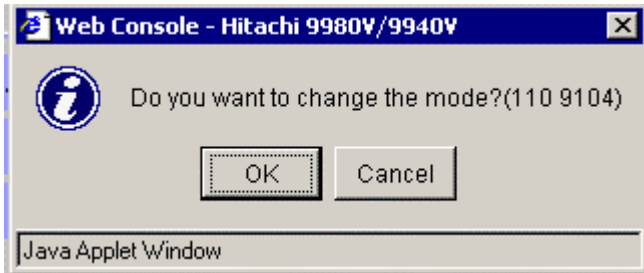


Figure 2.3 Mode Changing Confirmation Message

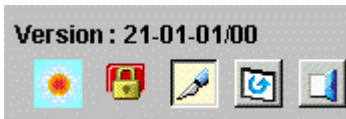



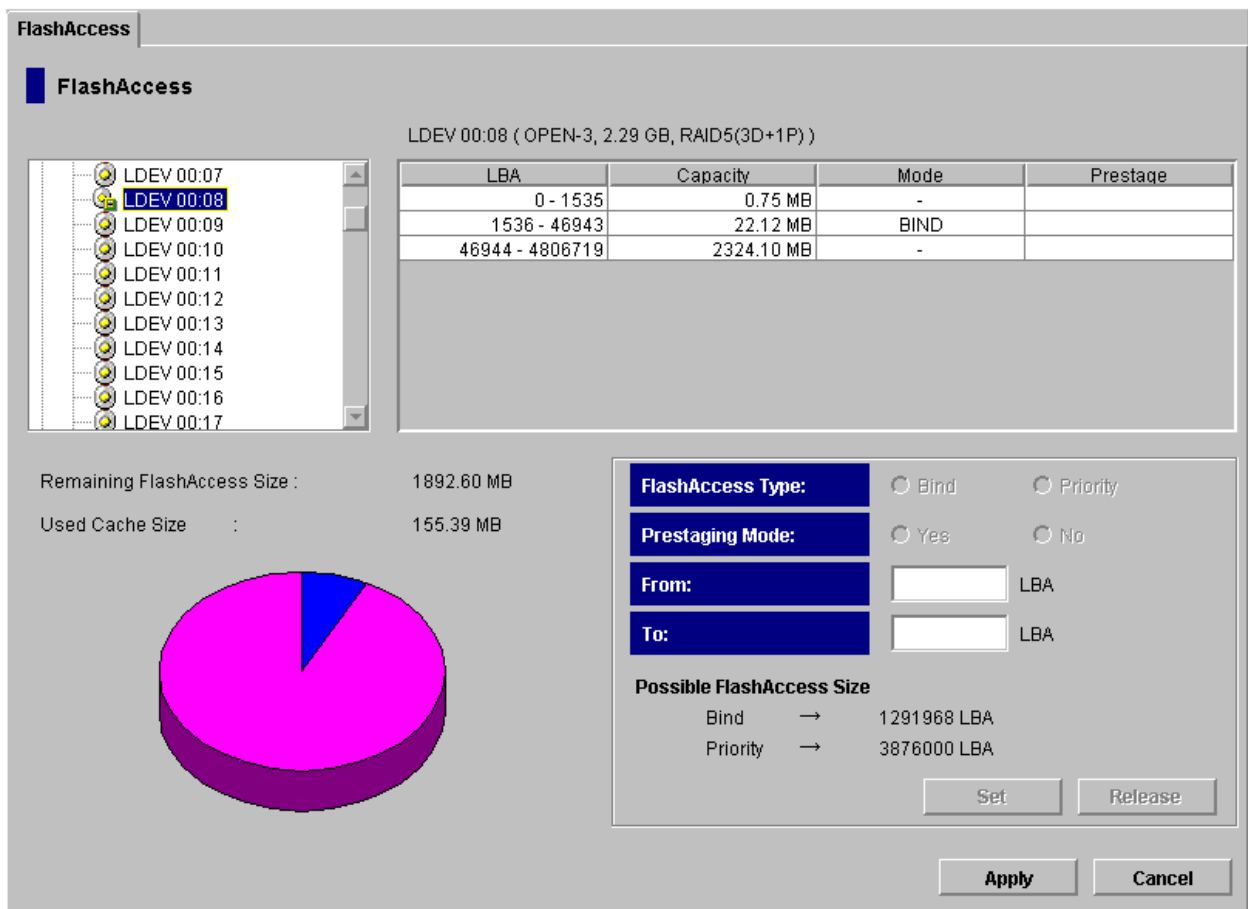
Figure 2.4 Modify Mode

Chapter 3 FlashAccess Panel

3.1 FlashAccess Main Panel

The FlashAccess main panel (Figure 3.1 covers the open systems, while Figure 3.2 covers the mainframe system) provides LDEV information, FlashAccess cache settings and FlashAccess cache information charts. In it, you can configure the FlashAccess cache.

Note: With the  button (View Mode/Modify Mode button) placed in the View Mode, the FlashAccess main panel displays information. In the Modify Mode, you can configure the FlashAccess cache.



The screenshot shows the FlashAccess main panel for an open system. The title bar reads "FlashAccess". The main area is titled "FlashAccess" and displays information for LDEV 00:08 (OPEN-3, 2.29 GB, RAID5(3D+1P)).

On the left, a list of LDEVs is shown, with LDEV 00:08 selected. The main area displays a table of LDEV information:

LBA	Capacity	Mode	Prestage
0 - 1535	0.75 MB	-	
1536 - 46943	22.12 MB	BIND	
46944 - 4806719	2324.10 MB	-	

Below the table, the remaining FlashAccess size is 1892.60 MB and the used cache size is 155.39 MB. A pie chart shows the used cache size as a small blue slice of a larger pink pie.

On the right, the FlashAccess Type is set to Bind (radio button selected). The Prestaging Mode is set to No (radio button selected). The From and To fields are empty, with LBA labels. Below these fields, the Possible FlashAccess Size is shown: Bind → 1291968 LBA and Priority → 3876000 LBA. Buttons for Set, Release, Apply, and Cancel are visible at the bottom.

Figure 3.1 FlashAccess Main Panel (Open System)

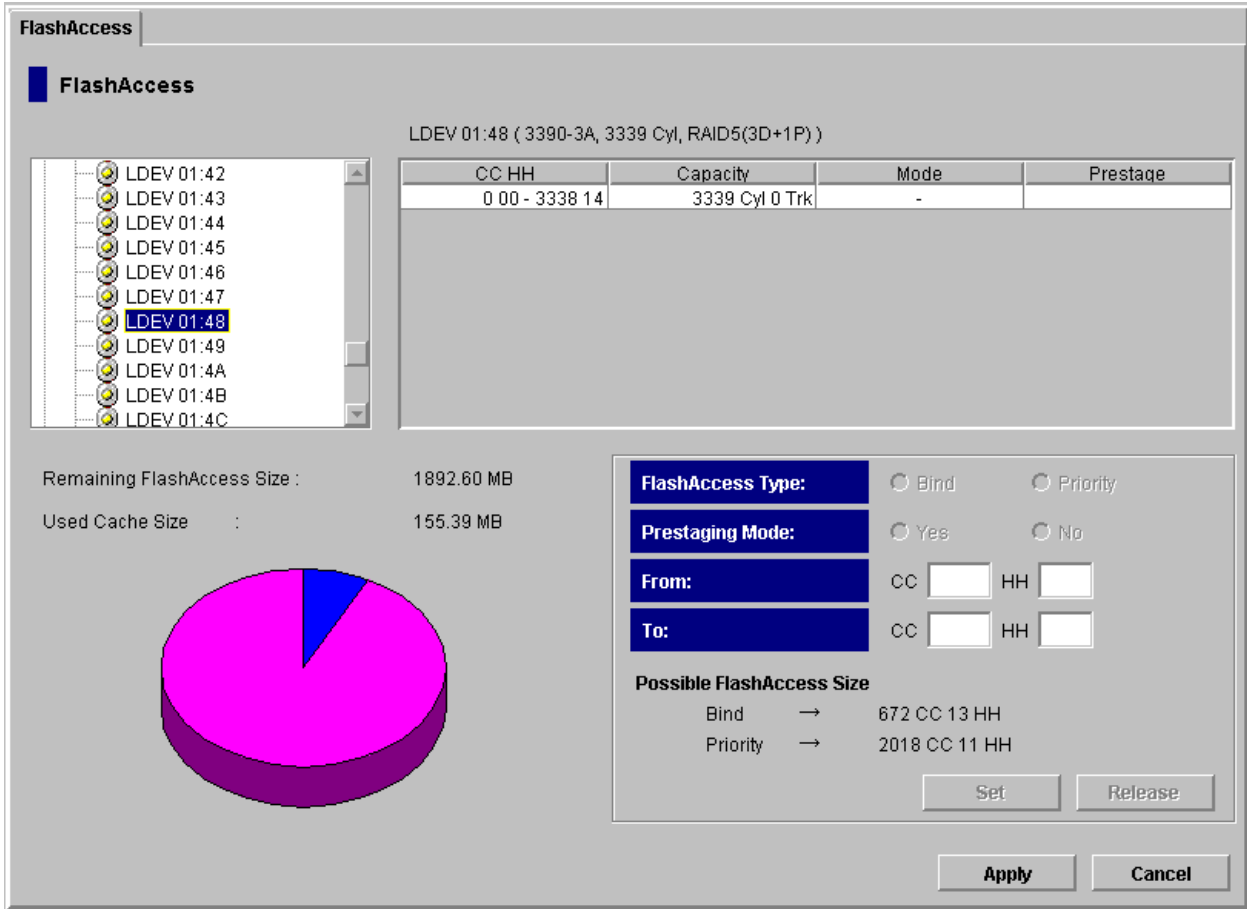


Figure 3.2 FlashAccess Main Panel (Mainframe System)

- LDEV tree view

Displays the CU number (CU 00) and LDEV number (LDEV 00:00) for FlashAccess operations in a tree. The tree covers the following icons indicating the FlashAccess settings.

Icon	Description
	Indicates an opened folder.
	Indicates a folder not opened.
	Indicates LDEV for which FlashAccess is not set.
	Indicates LDEV for which FlashAccess is set.

Note: The LDEV tree view does not provide the Hitachi CruiseControl-reserved volume that is not subject to FlashAccess operations.

- LDEV information

Information about LDEV selected in the tree (LDEV number, emulation type, volume capacity and RAID level) is displayed.

Note: The volume's capacity is displayed in units of MB for the open system, and in units of Cyl for the mainframe system.

- FlashAccess cache information list

Lists the FlashAccess cache settings for LDEV selected in the tree.

- **LBA** (open system)/**CC HH** (mainframe system): The starting and ending addresses of the logical block are displayed for the open system. The starting and ending addresses of the cylinder and head are displayed for the mainframe system.

- **Capacity:** The capacity of the FlashAccess cache specified in the **LBA** (open system)/**CC HH** (mainframe system) column is displayed in units of MB for the open system, and in units of Cyl/Trk for the mainframe system.

- **Mode:** The mode set of the cache is displayed.

PRIO: Indicates the priority mode.

BIND: Indicates the bind mode.

-: Indicates the area not allocated the FlashAccess cache.

- **Prestage:** Information on how the pre-staging function is set is displayed.

Blank: Indicates that the pre-staging function is not set.

ON: Indicates that the pre-staging function is set.

- FlashAccess cache information chart

Information about the usage of the FlashAccess cache and the amount of free space in the entire disk subsystem is displayed three-dimensionally.

- **Remaining FlashAccess Size:** Displays the amount of free space of the FlashAccess cache in pink.

- **Used Cache Size:** Displays the usage of FlashAccess cahce (blue and yellow).

- Colors in the pie chart

Blue: Indicates cache usage.

Yellow: Indicates the increase in the specified size of the cache.

Pink: Indicates the amount of cache remaining available.

- **FlashAccess cache field**

Sets the mode and area for data that will reside in the FlashAccess cache.

 - **FlashAccess Type:** Selects the FlashAccess mode for data that will reside in the FlashAccess cache.

Bind: Sets the bind mode.
Priority: Sets the priority mode.
 - **Prestaging Mode:** Select the pre-staging mode for data that will reside in the FlashAccess cache.

Yes: Enables the pre-staging mode.
No: Disables the pre-staging mode.
 - **From:** Enter the starting address for data that will reside in the FlashAccess cache using a logical block address for the open system, and using the cylinder (CC) and head (HH) numbers for the mainframe system.
 - **To:** Enter the ending address of data that will reside in the FlashAccess cache using a logical block address for the open system, and using the cylinder (CC) and head (HH) numbers for the mainframe system.
 - **Possible FlashAccess Size:** Displays the size you can set for the FlashAccess.

Bind: Displays the size you can set in the bind mode for the FlashAccess cache.
Priority: Displays the size you can set in the priority mode for FlashAccess cache.
- **Set button**

Adds the data set in the FlashAccess cache setup field to the FlashAccess cache information list.
- **Release button**

Deletes a FlashAccess area selected on the FlashAccess cache information list from the FlashAccess cache information list. The deleted FlashAccess area is reflected in the area not allocated a FlashAccess cache in the FlashAccess cache information list.
- **Apply button**

Reflects the contents set during FlashAccess operations in the disk subsystem.
- **Cancel button**

Cancels the contents set during FlashAccess operations.

Chapter 4 Operating FlashAccess

4.1 FlashAccess Operations

Only the user who has the administrator's access privileges (root) or the FlashAccess custom access privileges (Write Permission) can configure FlashAccess. The other users can reference FlashAccess settings for a connected disk subsystem, but cannot configure and change FlashAccess.


FlashAccess operations include:

- referencing the current FlashAccess settings;
- making data reside in the FlashAccess cache;
- deleting data resident in the FlashAccess cache; and
- changing the mode set for the FlashAccess cache.

4.2 Referencing current FlashAccess settings


In the FlashAccess main panel (see Figure 3.1 and Figure 3.2), you can reference FlashAccess settings.

- You can reference the number of CU and LDEV for FlashAccess operations in the tree format.
- You can reference a list of FlashAccess cache settings associated with a LDEV number selected in the tree.
- You can reference information on how the FlashAccess cache in the entire disk subsystem is used, in a three-dimensional chart format.

Choosing the  button (FlashAccess) in the main panel for the Remote Console Java™ applet (see Figure 3.1) displays the FlashAccess main panel.

4.3 Making Data Reside in the FlashAccess Cache

The following gives the procedure for making data reside in the FlashAccess cache.

1. Choose the  button (View Mode/Modify Mode button) located at the top right of the FlashAccess main panel to set the Modify mode. The panel for checking the operating mode modifications appears.
2. Choose the **OK** button in the panel for checking the operating mode modifications. Now, you can configure FlashAccess.
3. In the LDEV tree view shown on the FlashAccess main panel, select the numbers of CU and LDEV subject to FlashAccess operations. The FlashAccess cache information list displays FlashAccess cache information of the LDEV number you select.
4. According to the "-" indication providing the areas not allocated the FlashAccess cache in the **Mode** column on the FlashAccess cache information list, select an area to be made resident in the FlashAccess cache. The **Set** button is enabled.
Note: If you have selected an area given the "-" indication in the FlashAccess cache information list, the **From** and **To** input boxes in the FlashAccess cache setup field display the selected area value.
5. In **FlashAccess Type** mode in the FlashAccess cache setup field, select the radio button for the desired mode, either **Bind** or **Priority**. FlashAccess mode is set.
6. Select the radio button (**Yes** or **No**) for desired **Prestaging mode**. Pre-staging mode is set.
7. Set the starting and ending addresses of the area to be made resident in the FlashAccess cache.

a) Volume in the open system

Enter the starting logical block address to the **From** input box, and the ending address to the **To** input box.

Note: The FlashAccess program identifies a logical area in units of 96 blocks. For example, if you have entered a value of one as the starting logical block address and a value less than 96 as the ending logical block address, the FlashAccess program automatically changes the ending block address to a value of 96.

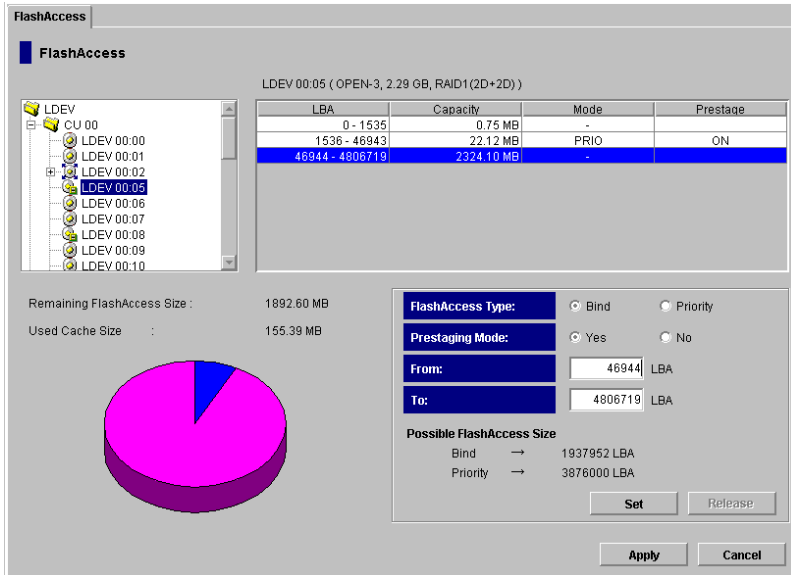
b) Volume in the mainframe system

Enter the numbers of the starting cylinder and head to the **CC** and **HH** input boxes in the **From** input portion. Enter the numbers of the ending cylinder and head to the **CC** and **HH** input boxes in the **To** input portion.

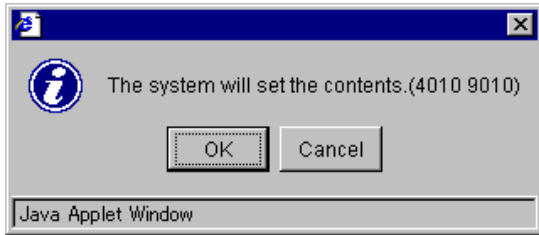
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1. Choose the **Set** button. The confirmation panel appears.
2. In the confirmation panel, choose the **OK** button to continue operations.
The status after the setting is made is displayed in blue.
The LDEV tree view displays only the LDEV directory, with the **Apply** and **Cancel** buttons enabled. To cancel operations, choose the **Cancel** button.
Note: You cannot use the **Release** button to delete the set data until you click the **Apply** button or the **Cancel** button.
3. To make data in other volumes reside in the FlashAccess cache, repeat steps 3 to 9.
4. If the contents you have set are correct, choose the **Apply** button. The confirmation panel appears.
5. In the confirmation panel, choose the **OK** button to continue operations. The disk subsystem will reflect the contents you set. To cancel the contents set, choose the **Cancel** button.

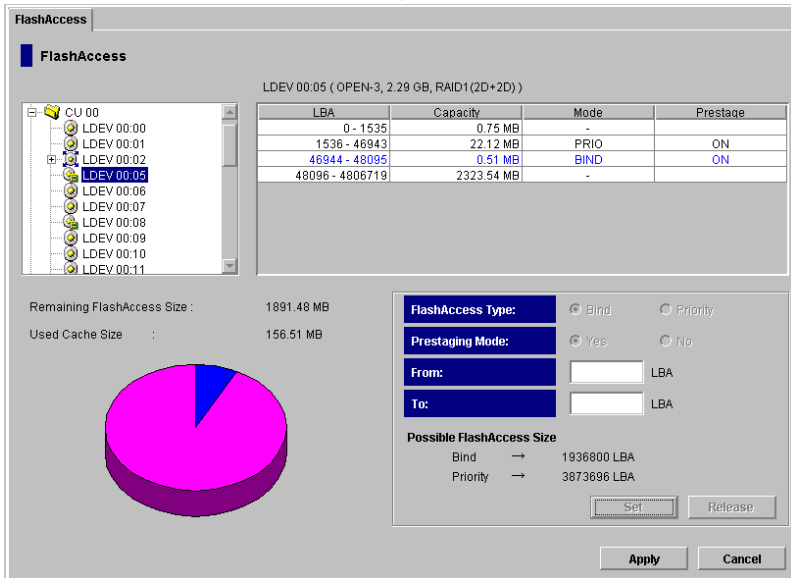
Start



FlashAccess main panel (View mode)



Confirmation panel



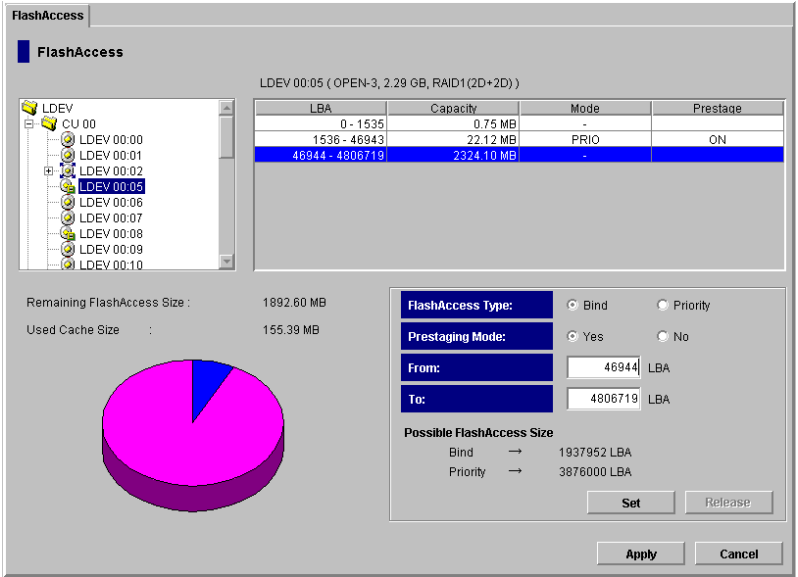
FlashAccess main panel (Modify mode)



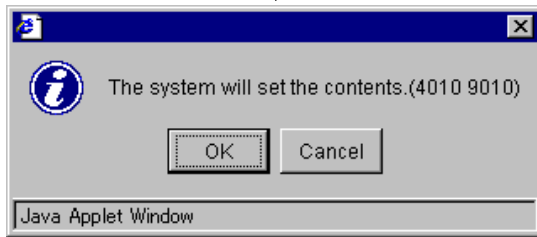
Continues to (a)

(a)

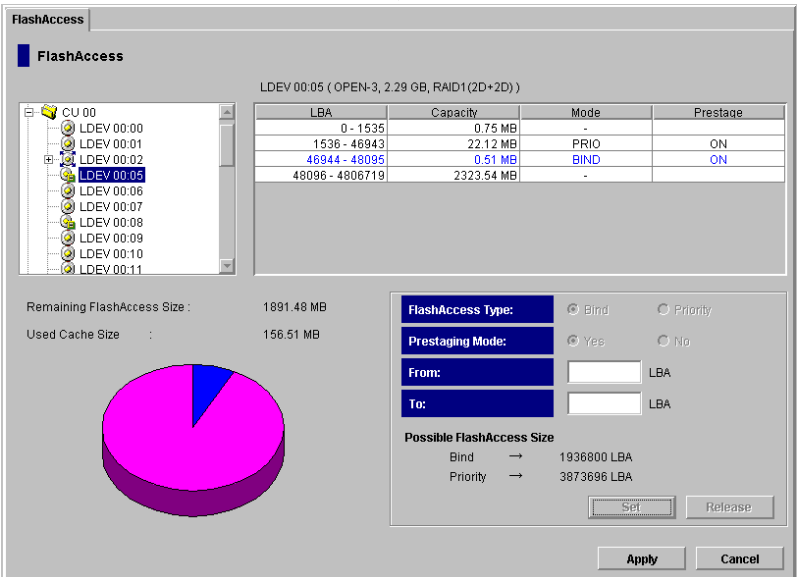




FlashAccess main panel (When you have selected an area not allocated FlashAccess)



Confirmation panel



FlashAccess main panel (After you have chosen the Set button)

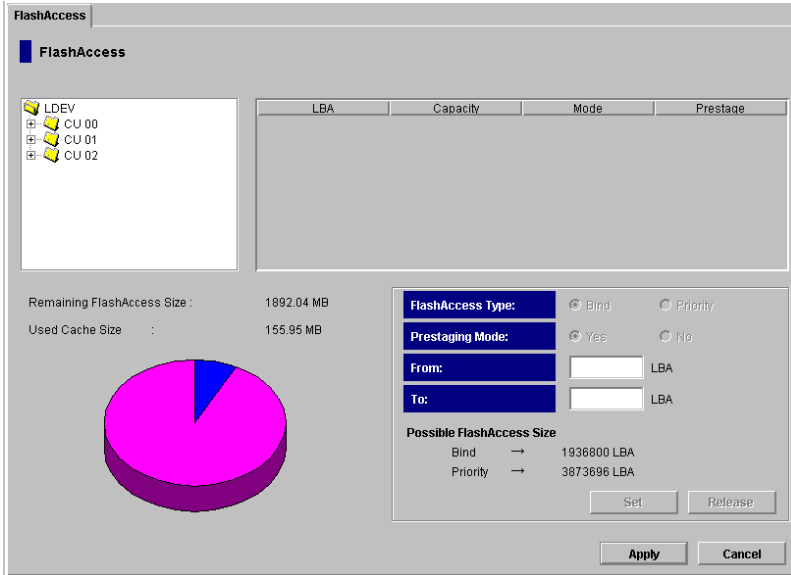
Continued to (b)

(b)
↓



Confirmation panel

↓




FlashAccess main panel (After you have chosen the Set button)

↓
End

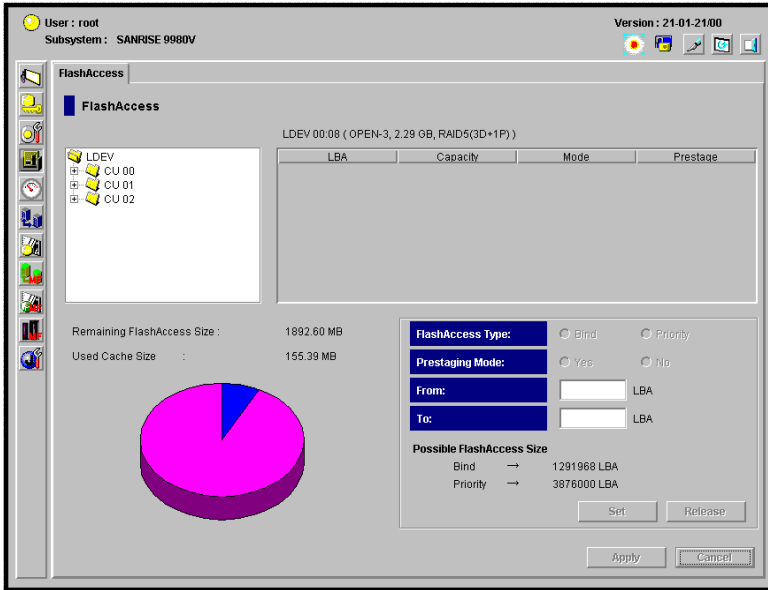
Figure 4.1 Placing Data into FlashAccess Cache

4.4 Deleting Data Resident in the FlashAccess Cache

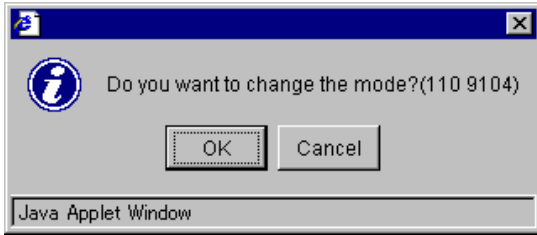
The following gives the procedure for deleting data that is resident in the FlashAccess cache (see Figure 4.2).

1. Choose the  button (View Mode/Modify Mode button) located at the top right of the FlashAccess main panel. The confirmation panel for changing operating mode appears.
2. In the confirmation panel, choose the **OK** button. Now, you can configure FlashAccess.
3. On the LDEV tree view in the FlashAccess main panel, select the numbers of CU and LDEV subject to FlashAccess operations. The FlashAccess cache information list displays FlashAccess cache information for the selected LDEV number.
4. According to **PRIO** or **BIND** indications in the **Mode** column of the FlashAccess cache information list, select an area from which to delete data that is resident in the FlashAccess cache. The **Release** button is enabled.
5. Choose the **Release** button. The confirmation panel appears.
6. In the confirmation panel, choose the **OK** button to continue operations.
The status after deletion is displayed in blue.
The LDEV tree view displays only the LDEV directory, with the **Apply** and **Cancel** buttons enabled. In the confirmation panel, choose the **Cancel** button to cancel operations.
7. To delete data that is resident in the FlashAccess cache for another volume, repeat above steps 3 to 6.
8. If the contents set are correct, choose the **Apply** button. The confirmation panel appears.
9. In the confirmation panel, choose the **OK** button to continue operations. The disk subsystem will reflect the contents set. In the confirmation panel, choose the **Cancel** button to cancel the configuration.

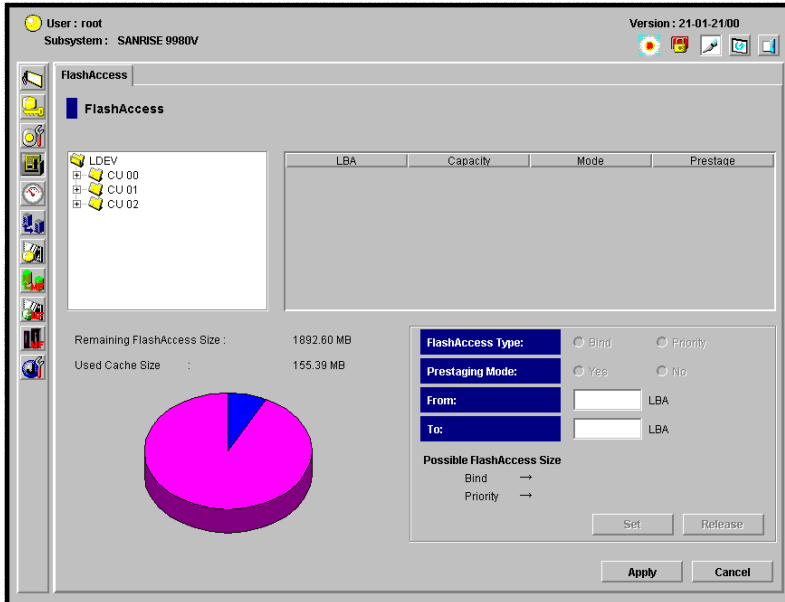
Start



FlashAccess main panel (View mode)



Confirmation panel

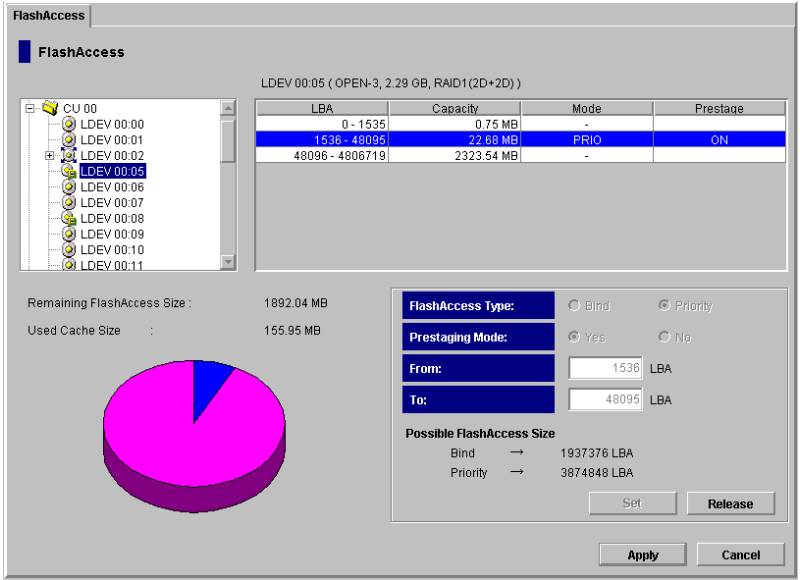


FlashAccess main panel (Modify mode)

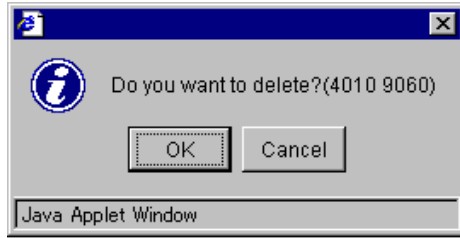


Continues to (a)

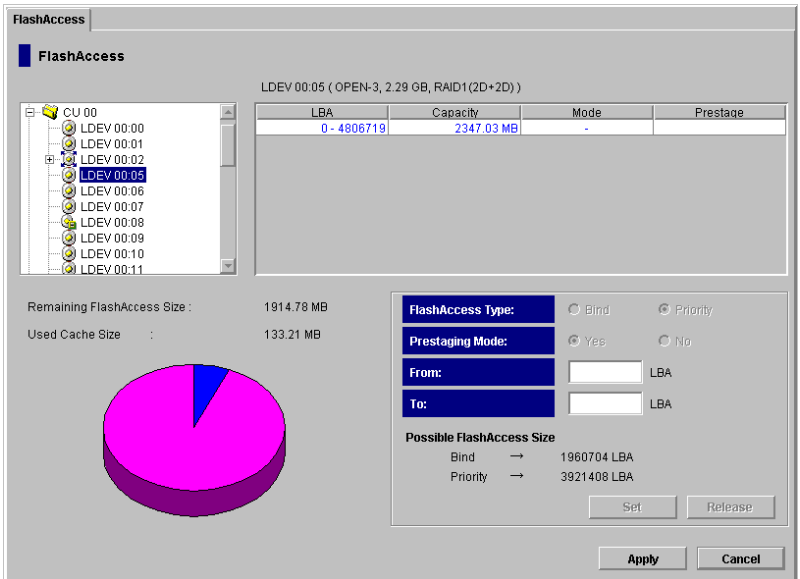
(a)



FlashAccess main panel (When you have selected an area allocated FlashAccess)



Confirmation panel



FlashAccess main panel (After you have chosen the **Release** button)

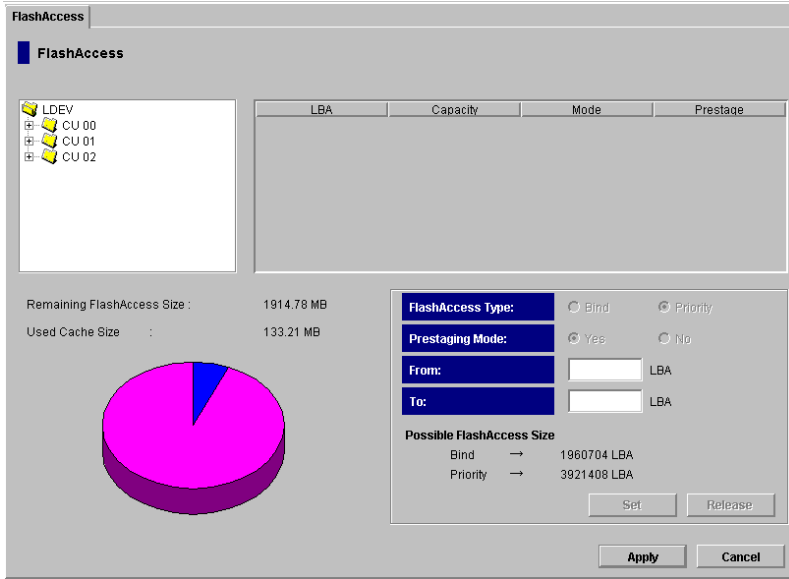
Continues to (b)

(b)
↓



Confirmation panel

↓



FlashAccess main panel (After you have chosen the **Apply** button)

↓
End

Figure 4.2 Deleting Data Resident in the FlashAccess Cache

4.5 Changing the Mode for Configuring the FlashAccess Cache

When changing the mode (FlashAccess type and Prestaging mode) for setting data to be resident in the FlashAccess cache, you cannot directly change the settings. In this case, cancel the FlashAccess cache settings, and then perform operations for reconfiguring the FlashAccess cache in the new configuration mode.

The following gives the procedure for changing the FlashAccess cache configuration mode.

1. Select and delete data resident in the FlashAccess cache whose configuration mode you want to change. (For more information, see section 4.4.)
2. Instead of the data deleted in step 1, make data reside in the FlashAccess cache in the new configuration mode. (For more information, see section 4.3.)

Chapter 5 Troubleshooting

For details on trouble that might occur in the 9900V series disk subsystem, see the manual, *9900V User and Reference Guide (MK-RD008)*, for the 9900V series.

The user must be responsible for operating and inspecting the Remote Console. When using the Remote Console, note the following:

- Checking cable connections with the network

Check that cables (LAN) are connected correctly to your Remote Console and the network.

- Checking error codes

Table 5.1 covers actions to be taken against typical errors. For more information about the Remote Console's error codes and actions you can take, see the manual, *Remote Console User's Guide (Messages)*, for the 9900V series. For an unrecoverable error, contact our maintenance service center.

Table 5.1 Typical Errors

Error	Action
You cannot access the 9900V disk subsystem.	Cancel connection operations, then check that the subsystem's IP address specified in the URL is correct. Also verify that the destination disk subsystem can be connected. Close all the other application programs, then restart the PC and try to re-access the disk subsystem. If you cannot eliminate the error, contact the maintenance service center.
Your Remote Console incurs an error.	Terminate operations and close all the other application programs, then restart your PC to perform operations again. If the error reoccurs, check your Remote Console's environment, and the LAN's hardware and software for a proper configuration. If you cannot eliminate the error, contact our maintenance service center.
The 9900V disk subsystem has a problem.	See information about actions to take against trouble in the <i>9900V User and Reference Guide (MK-RD008)</i> for the 9900V series. For an unrecoverable error, contact our maintenance service center.

Glossary, Acronyms, and Abbreviations

CruiseControl	CruiseControl performs automatic relocation of volumes to optimize performance.
CU	Control Unit. The 9900V subsystem supports a maximum of 16 logical control unit (CU) images, numbered sequentially from 0 to F. Each CU image controls up to 256 LDEVs.
Custom Access	A feature that allows a non-administrator to be assigned update access to one or more of the restricted Remote Console functions.
DASD	Direct-Access Storage Device
DKC	Disk Controller. The 9900V disk controller provides up to sixteen logical control unit (CU) images and supports 3990-6, 3990-6E, and 2105-F20 disk controller emulation.
DKU	Disk Array Unit. The 9900V subsystem has up to six disk array frames containing the storage components (disk drive arrays) of the subsystem.
ESCON®	Enterprise System Connection
Export File	The Export File function allows you to export data (e.g., monitoring data used by Performance Monitor or Hitachi TrueCopy) to data files.
FD	floppy disk
FD Dump Tool	This function downloads the 9900V Remote Console configuration information onto a floppy diskette or a hard disk drive, and is generally used for troubleshooting purposes.
FICON™	Fibre Connection
FlashAccess	FlashAccess (Dynamic Cache Residence) enables you to store specific high-usage data directly in cache memory to provide virtually immediate data availability.
GB	gigabyte(s)
(Hi-Star™)	Hierarchical Star Network architecture improves the total performance of internal data transfer by using high-speed crossbar switches.
HMBR	Hitachi Multiplatform Backup/Restore
Java™ Java™ applet program	The web client Java™ Java™ applet program runs on a web browser on the Remote Console. When a Remote Console user accesses and logs on to the desired SVP, the web client Java™ Java™ applet is downloaded from the SVP to the Remote Console. The web client Java™ Java™ applet program runs on a web browser on the Remote Console.
JVM™	Java Virtual Machine™ is the web client Java™ Java™ applet program that is installed in each SVP and runs using web browsers to provide a user-friendly interface for the 9900V Remote Console functions.
kB	kilobyte(s)
LAN	local-area network
LBA	logical block address

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LDEV	logical device. An LDEV used by mainframe hosts can be called a device, logical volume image (LVI) or a volume. An LDEV used by open-system hosts is called a logical unit (LU).
LU	An LDEV used by open-system hosts is called a logical unit (LU). Open-system fibre interfaces access LUs that are mapped to one or more LDEVs.
LUSE	LUN Expansion. This function allows you to concatenate two or more volumes into a larger volume.
LVI	Logical Volume Image (also called device emulation)
MB	megabyte(s)
MIB	message information block
Open Volume Management	A suite of options that includes Virtual LVI/LUN and LUSE (LUN Expansion). Virtual LVI/LUN divides a logical volume for open-system into two or more volumes. LUN Expansion allows you to concatenate two or more volumes into a larger volume.
Parity group	A set of hard disk drives that have the same capacity and are treated as one group. A parity group contains both user data and parity information, which allows the user data to be accessed in the event that one or more of the drives within the group are not available.
Performance Maximizer	An option that includes Performance Monitor, CruiseControl, and Priority Access. The Performance Monitor option monitors subsystem and volume activity, and the Hitachi CruiseControl option performs automatic relocation of volumes to optimize performance, and Priority Access***
RMI™	Remote Method Invocation. RMI™ is a remote procedure call, which allows Java™ objects stored in the network to be run remotely.
R-SIM	remote service information message (generated by the 9900V when it detects an error or service requirement).
SIM	service information message (generated by a subsystem when it detects an error or service requirement).
ShadowImage	An option that allows you to maintain subsystem-internal copies of all user data for purposes such as data backup and duplication.
SNMP	simple network management protocol (part of the TCP/IP protocol suite)
SSID	storage subsystem ID. The 9900V is configured with one SSID for each 64 devices, and up to four SSIDs for each CU image.
SVP	Service Processor (this is the notebook computer that is inside the 9900V).
TCP/IP	transmission control protocol/internet protocol
TID	target ID
Trap	An SNMP agent initiates trap operations when R-SIMs occur, in order to send the R-SIMs to the SNMP manager (see Figure 4.1). An SNMP agent can be configured to deliver traps to more than one SNMP manager.
TrueCopy	TrueCopy is an option product that allows you to perform host-free remote copy operations between 9900V subsystems in different locations for data backup and disaster recovery purposes.
UCB	unit control block
User account	The user account list includes user information such as user ID, password,

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list	and write permission for each 9900V option.
VIR	Virtual LVI/ LUN is an option that enables you to configure custom-size logical device images and logical units, which are smaller than standard-size devices.
Volser	volume serial number (mainframe volume identifier, not related to the LDEV ID)
Remote Console	The Remote Console communicates directly with the service processor (SVP) of each attached subsystem to obtain subsystem configuration and status information and send user-requested commands to the subsystem.
WWN	WorldwideName, which is a unique identifier for a particular open-system host bus adapter, consisting of a 64-bit physical address (the IEEE 48-bit format with 12-bit extension and 4-bit prefix).
WWN Group	A WWN group gives every host in the specified WWN group access to a specified LU or group of LUs. This is part of the Hitachi SANTinel feature.

