Overland Storage

SnapSAN™ Configuration Setting Tool

User Guide

S3000/S5000

overland storage

Preface

This user guide explains how to configure the SnapSAN disk arrays. The disk array configuration setting is a function for setting the configuration that is used when a disk array is installed for the first time and when physical disks are added.This guide assumes that you are familiar with computer hardware, data storage, and network administration terminology and tasks. It also assumes you have basic knowledge of Internet SCSI (iSCSI), Serial-attached SCSI (SAS), Serial ATA (SATA), Storage Area Network (SAN), and Redundant Array of Independent Disks (RAID) technology.

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Product Documentation and Firmware Updates

Overland Storage SnapSAN product documentation and additional literature are available online, along with the latest release of the SnapSAN 3000/5000 software.

Point your browser to:

http://docs.overlandstorage.com/snapsan

Follow the appropriate link to download the **latest** software file or document. For additional assistance, search at http://support.overlandstorage.com.

Overland Technical Support

For help configuring and using your SnapSAN 3000/5000, search for help at:

http://support.overlandstorage.com/kb

You can email our technical support staff at techsupport@overlandstorage.com or get additional technical support information on the Contact Us web page:

http://www.overlandstorage.com/company/contact-us/

For a complete list of support times depending on the type of coverage, visit our web site at:

http://support.overlandstorage.com/support/overland_care.html

Conventions

This user guide exercises several typographical conventions:

Convention	Description & Usage
Boldface	Words in a boldface font (**Example**) indicate items to select such as menu items or command buttons.
Ctrl-Alt-r	This type of format details the keys you press simultaneously. In this example, hold down the **Ctrl** and **Alt** keys and press the **r** key.
NOTE	A Note indicates neutral or positive information that emphasizes or supplements important points of the main text. A note supplies information that may apply only in special cases—for example, memory limitations or details that apply to specific program versions.
IMPORTANT	An Important note is a type of note that provides information essential to the completion of a task or that can impact the product and its function.
CAUTION	A Caution contains information that the user needs to know to avoid damaging or permanently deleting data or causing physical damage to the hardware or system.
WARNING	A Warning contains information concerning personal safety. Failure to follow directions in the warning could result in bodily harm or death.
Menu Flow Indicator (>)	Words in bold font with a greater than sign between them indicate the flow of actions to accomplish a task. For example, **Setup > Passwords > User** indicates that you should press the Setup button, then the Passwords button, and finally the User button to accomplish a task.

Information contained in this guide has been reviewed for accuracy, but not for product warranty because of the various environments, operating systems, or settings involved. Information and specifications may change without notice.

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Chapter 10 - Host Settings

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Chapter 12 - Configuration Change Guard

Appendix A - Specifications

Configuration Setting

Overview

This chapter describes an overview of the disk array configuration setting.

The disk array configuration setting is a function for setting the configuration that is used when a disk array is installed for the first time and when physical disks are added. This operation can be performed by using a GUI from the SnapSAN Manager.
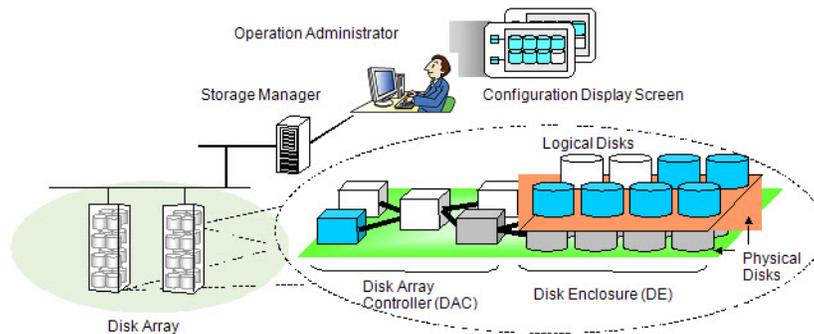
Figure 1-1: Configuration Setting

Pool

In a disk array, virtual medium that constitutes RAID is set up by combining multiple physical disks. The virtual medium space is divided (or partitioned) to configure logical disks. This virtual medium is called a pool. There are two types of pools for the disk arrays; a dynamic pool and basic pool. A dynamic pool can be bound in the SnapSAN S3000/S5000 disk array.

A dynamic pool is a virtual medium, which manages the space on the pool using a virtual storage space.

Like block management in a file system, the dynamic pool manages used space and unused space. When configuring logical disks, separate unused space from the pool according to the required capacity, then assign the physical disk space corresponding to the logical disk space. The logical disk data is stored in the related physical disk space. As the positioning of the logical disk space in the pool is hidden by the disk array, the user can use the logical disk without being aware of the positioning of the space.

Using the dynamic pool eases the limit on the number of physical disks constituting the pool and enables flexible configurations. With the dynamic pool, additional features such as pool capacity expansion and logical disk capacity expansion become available. Logical disks bound on the dynamic pool can be used for operations immediately after they are bound.
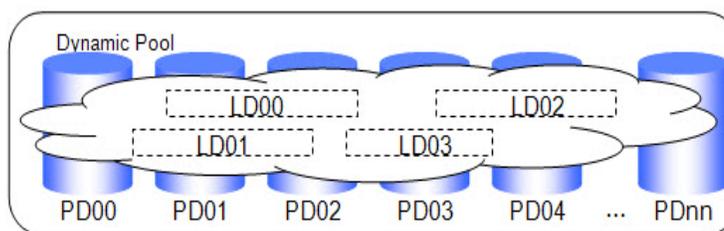
Figure 1-2: Logical Configuration - Dynamic Pool

The dynamic pool function creates a virtual storage pool from a group of physical disks on the disk array. Logical disks are created by allocating storage capacity required for operations from the unused space of the pool. If the storage capacity becomes short, you can add physical disks one by one as required to the pool to expand the unused space of the pool. The added unused space of the pool can be used to bind a new logical disk or expand the existing logical disk capacity, while keeping the current data. You can also put back logical disks no longer needed to the pool to extend the unused space of the pool.

The dynamic pool function helps to manage the capacity of the storage efficiently and sharply reduces costs of increasing storage capacity. It also helps to flexibly support any configuration changes or expansion of the storage due to newly added transactions or modification in transactions.
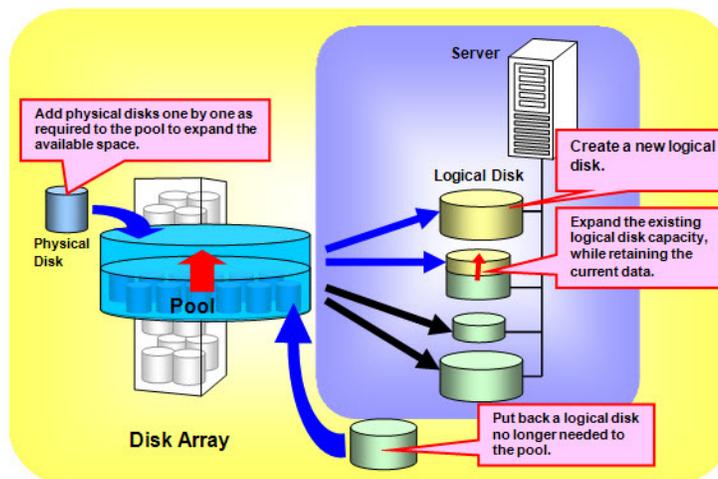
Figure 1-3: Dynamic Pool Function

The dynamic pool function provides the following benefits:

Reduction in the Cost of Storage Expansion

When some additional storage space is required due to an addition of new transactions and so forth, you can add physical disks one by one as required to configure new logical disks or expand the existing logical disk capacity. This means that you only need to add physical disks of needed capacity, which reduces costs of storage expansion.

Better Flexibility of Storage Configuration

If the amount of data to be handled increases and the storage capacity becomes short, you can expand the logical disk space, keeping the existing data in the logical disks. You can also return logical disks no longer needed to the pool to reserve the unused space of the pool which can be used for different purposes. These features enable to flexibly change the disk array configuration corresponding to changes in transactions or operations.

Configuring a Dynamic Pool

You can configure a dynamic pool, which is a virtual storage space, by selecting physical disks from a set of unused physical disks on the disk array. RAID types and the number of physical disks that can configure a dynamic pool are defined. Depending on the number of physical disks, you can select the following types of RAID. Capacity efficiency is determined by the RAID type.

RAID Type	DESCRIPTION
RAID1/10	2 or more physical disks required (capacity efficiency: approximately 50 %)
RAID5/50 (2+P)	3 or more physical disks required (capacity efficiency: approximately 67%)
RAID5/50(4+P)	5 or more physical disks required (capacity efficiency: approximately 80%)
RAID5/50(8+P)	9 or more physical disks required (capacity efficiency: approximately 89%)
RAID6/60 (4+PQ)	6 or more physical disks required (capacity efficiency: approximately 67%)
RAID6/60(8+PQ)	10 or more physical disks required (capacity efficiency: approximately 80%)
RAID-TM	3 or more physical disks required (capacity efficiency: approximately 33%)

Expanding the Dynamic Pool Capacity

You can expand the capacity of the dynamic pool by selecting unused physical disks on the disk array and incorporating them into the dynamic pool. The capacity actually added is the capacity of the additional physical disk(s) multiplied by the pool capacity efficiency. You can add physical disks one by one or you can add multiple physical disks at a time.

When the dynamic pool is expanded, some data is moved on the additional physical disk(s), and rebuilt across the pool so that the redundancy of RAID is maintained. Rebuilding data increases load on the physical disks of the dynamic pool and affects access to the existing logical disks that belong to the pool. The added space becomes available after the rebuild process finishes.

When physical disks beyond a certain number are added to the pool at a time, the dynamic pool is expanded and made available without the rebuild process. The added space is usable immediately after the physical disks are added to the pool.

The RAID configuration cannot be changed. The number of physical disks in the pool increases by keeping the RAID configuration.

Added Physical Disks	Configuration	Rebuild after Expansion of Pool
1	RAID1/10	The pool is rebuilt. Rebinding the pool influences access to the existing logical disks which belong to the pool. The additional space to the pool becomes available after the rebind process finishes.
1 to 2	RAID5/50 (2+P)	
1 to 4	RAID5/50(4+P)	
1 to 8	RAID5/50(8+P)	
1 to 5	RAID6/60 (4+PQ)	
1 to 9	RAID6/60(8+PQ)	
1 to 2	RAID-TM	
2 or more	RAID1/10	The pool is not rebuilt. Expanding a pool does not affect any existing logical disks that belong to it. The additional space to the pool becomes available immediately after it is added.
3 or more	RAID5/50(2+P)	
5 or more	RAID5/50(4+P)	
9 or more	RAID5/50(8+P)	
6 or more	RAID6/60(4+PQ)	
10 or more	RAID6/60(8+PQ)	
3 or more	RAID-TM	

Rearranging the Dynamic Pool Capacity

Rearranging the dynamic pool capacity after capacity expansion improves performance.

When using a dynamic pool, logical disks are bound so that the usage of each physical disk is averaged by extracting areas from a virtual medium. This is based on the concept that the highest performance can be achieved by averagely using as many physical disks as possible and distributing loads.

Logical disks are automatically arranged at binding based on the above mentioned concept. However, the performance depends on the number of physical disks at binding the pool. Therefore, when expanding a dynamic pool, although existing logical disks are in the dynamic pool which uses more physical disks than the time when it was bound, it is not possible to achieve high performance corresponding to the number of physical disks constituting the dynamic pool.

In this way, by rearranging the dynamic pool capacity after capacity expansion, existing logical disks are rearranged on more physical disks, achieving high performance as much as the performance of a pool which is bound by using the same number of physical disks that the expanded pool has.

Configuring Logical Disks

You can configure logical disks by allocating required capacity from the unused space in the dynamic pool.

Expanding the Logical Disk Capacity

You can expand the existing logical disk capacity by allocating required capacity from the unused space in the dynamic pool. While existing data stored in the logical disks is retained, space that can be used as logical disks is added. How the added space is recognized on the host depends on the platform. Some platforms do not support expansion of logical disk capacity. It is recommended to backup data in logical disks before expanding the logical disk capacity.

Hot Spare

In the dynamic pool, data is retained even if a physical disk fails (for RAID6 and RAID-TM, 2 disks). However, if another disk fails, data may get corrupted. Disk array reliability can be improved by switching to a spare disk (hot spare) that has been set up when a physical disk fails.

Unused physical disks in a pool can be configured as a hot spare so that when a physical disk in the pool fails, data can be restored on a hot spare in the same PD group (physical disk management group consisting of one or more DEs). When rebuilding on the hot spare is started, the pool is reconfigured and the hot spares become physical disks of the pool. The failed physical disk can be replaced without stopping the access to the disk array.

Logical Disk

Logical disks in a disk array are equivalent to physical disks viewed from the application server's OS. The OS manages physical disks it sees as multiple logical disks by dividing the physical disks into multiple partitions. In the disk array, multiple physical disks are bound as a pool, which is then divided to form logical disks.
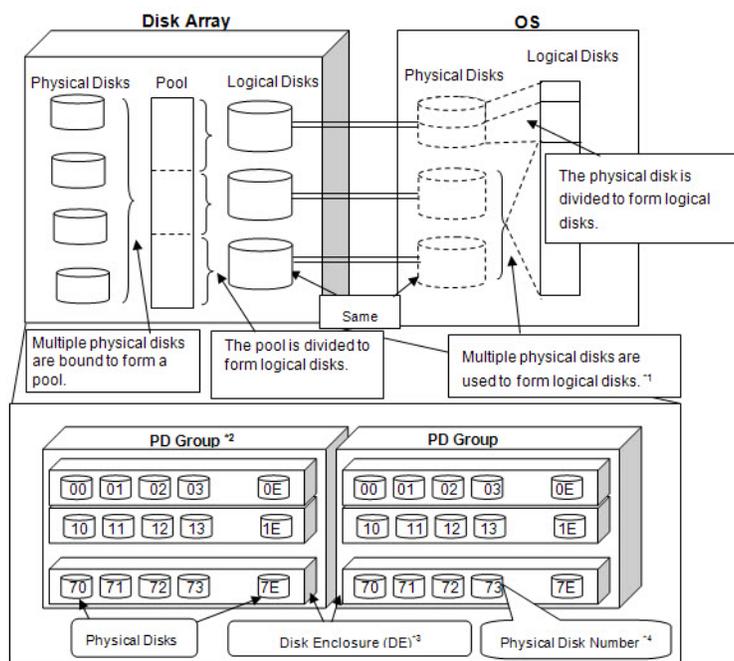
Figure 1-4: Physical and Logical Disks

*1 When the OS supports volume group, software RAID, and so on.

*2 PD group is a management group that consists of one or more DEs to manage physical disks.

*3 Disk Enclosure (DE) is a management group where 12 to 24 physical disks are installed.

*4 Physical disk numbers are assigned on a PD group basis.

Logical Disk (for System)

This is a special logical disk used to control the disk array. The logical disk for system cannot be used as the logical disk to store user data.

There are the following types of logical disks for system:

Storage System Volume

The storage system volume (called system volume below) is the logical disk that retains the information required to continuously operate or maintain the disk array.

The system volume is the logical disk required to control the disk array. Be sure to bind the system volume when installing the disk array.

The system volume is automatically bound when the first pool is bound.

Data Replication Reserved Volume

The data replication reserved volume (called replication reserved volume below) is the logical disk used to save difference information during data replication (Volume Cloning, Replication and Mirroring).

It is strongly recommended to bind the replication reserved volume when using data replication.

Data Migration Reserved Volume

The data migration reserved volume is the logical disk used to save difference information during data migration (DataMigration).

It is strongly recommended to bind the data migration reserved volume when using data migration.

Control Volume

The control volume is the logical disk with a small capacity that can be used for data replication, snapshot (Snapshots) and other operation. The control volume is used to issue control I/O to the disk array for example when you perform data replication or snapshot from the application server.

Nickname

Nicknames are names that can be set to disk arrays, logical disks, ports, and pools managed by SnapSAN Manager as desired. Since nicknames are stored in the disk array, they are retained even after SnapSAN Manager or the disk array is restarted.

Setting identification information by using nicknames before you start using a disk array allows for efficient management of the disk array.

Optional Functions

Some functions become available for disk array configuration setting by installing optional software. This section provides an overview of related optional functions.

Data Replication

Data replication is the function to create the master volume (MV) and the replication volume (RV) defined in the logical disk unit.

Snapshot

Snapshot is the function to immediately create the replica (snapshot) of the master volume.

WORM

This function stores data for a long time in the protected format by setting the access right and the data retention period in the volume unit to prevent data from being illegally tampered or corrupted due to an operation error.

Power Saving

This function saves power consumption by operating the physical disks only when needed.

AccessControl

This chapter describes functions provided by the optional software product AccessControl. When the disk array is shared by two or more servers, logical disks that each server can access must be set/restricted in order to prevent incorrect or unauthorized accesses.With AccessControl you can configure and cancel settings to allow/deny access to logical disks from application servers. AccessControl function allows users to change the logical disk configuration and configure access control easily and quickly.
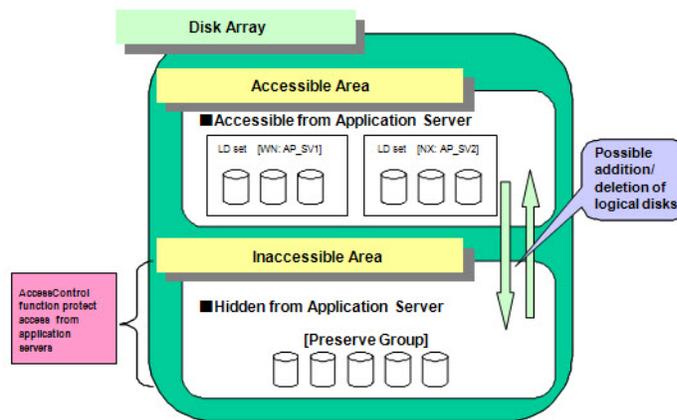
Figure 2-1: AccessControl

Inaccessible Area

Logical disk groups hidden from the application servers due to the AccessControl function exists in this area. This area is called [Preserve] Group.

[Preserve] GroupLogical disks hidden from and inaccessible by the application servers exist in this area. Contents of the logical disks are retained. Logical disks in this area include logical disks with no specific purpose, replication volumes (MV, RV), a volume for snapshots (BV), a link-volume (LV), logical disks to which the data protection settings have been set through the data retention function, and a control volume (CV).

Accessible Area

Logical disk groups accessible by the application servers due to the AccessControl function exist in this area. Contents of the logical disks depend on the application server. Logical disks that can exist here include logical disks with no specific purpose, replication volumes (MV, RV), a volume for snapshots (BV), a link-volume (LV), logical disks to which the data protection settings have been set through the data retention function, and a control volume (CV). Each logical disk is assigned to a host (LD Set).

WWN Mode

Function

With WWN mode you can set accessible logical disks on an HBA (Host Bus Adaptor) basis. This allows for setting logical disk accessibility on a server basis. An HBA has a unique ID code called WWN (World Wide Name). Use this code to set the WWN which allows access to logical disks.
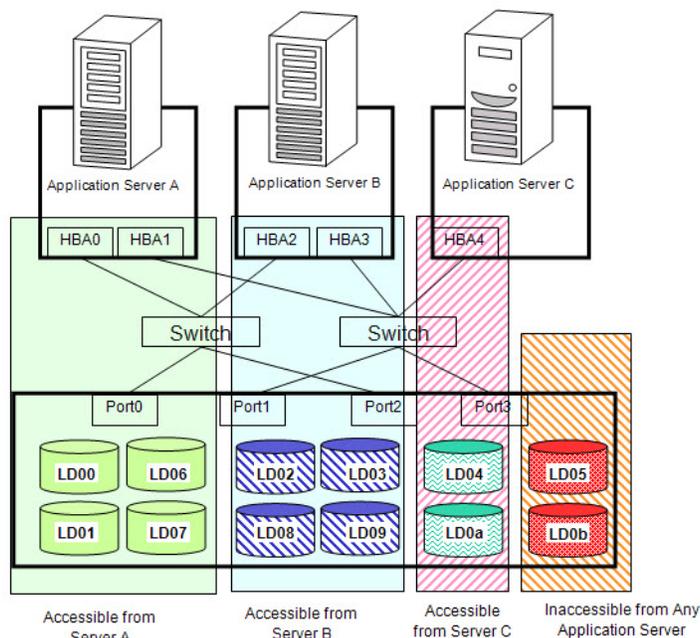
Figure 2-2: AccessControl (WWN Mode)

Logical Disk No. HBA	00	01	02	03	04	05	06	07	08	09	0a	0b
0	✓	✓	-	-	-	-	✓	✓	-	-	-	-
1	✓	✓	-	-	-	-	✓	✓	-	-	-	-
2	-	-	✓	✓	-	-	-	-	✓	✓	-	-
3	-	-	✓	✓	-	-	-	-	✓	✓	-	-
4	-	-	-	-	✓	-	-	-	-	-	✓	-

✓: Sets HBA's WWN and logical disk number as accessible.

(-): Sets HBA's WWN and logical disk number as inaccessible.

According to the settings above:

- Application server A can access logical disks LD00, LD01, LD06, and LD07.
- Application server B can access logical disks LD02, LD03, LD08, and LD09.

- Application server C can access logical disks LD04 and LD0a.
- LD05 and LD0b cannot be accessed from any application server.

With WWN mode, you can group logical disks configured on a disk array on an HBA port basis. The function also allows you to restrict access on a server basis and protect data and reserve security.

Setting

The WWN Mode can be set through the SnapSAN Manager client.

Port Mode

Function

With Port mode you can set accessible logical disks on a disk array port basis. This allows for setting logical disk accessibility per server connected to disk array port.
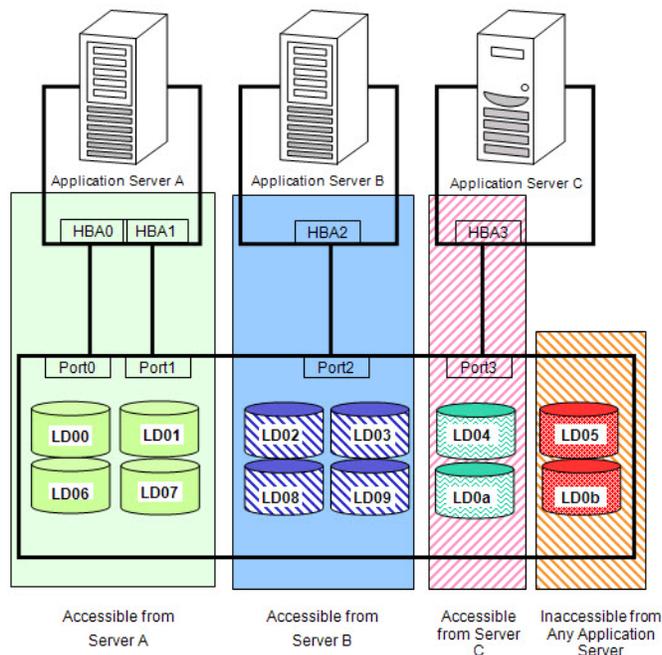
Figure 2-3: AccessControl - Port Mode

Logical Disk No. Port	00	01	02	03	04	05	06	07	08	09	0a	0b
0	✓	✓	-	-	-	-	✓	✓	-	-	-	-
1	✓	✓	-	-	-	-	✓	✓	-	-	-	-
2	-	-	✓	✓	-	-	-	-	✓	✓	-	-
3	-	-	-	-	✓	-	-	-	-	-	✓	-

✓: Sets port and logical disk number as accessible.

(-): Sets port and logical disk number as inaccessible.

According to the settings above:

- Application server A can access logical disks LD00, LD01, LD06 and LD07 through Port0 and Port1.
- Application server B can access logical disks LD02, LD03, LD08 and LD09 through Port2.
- Application server C can access logical disks LD04 and LD0a through Port3.
- LD05 and LD0b cannot be accessed from any application server.

This function can divide the logical disks which bind the disk array into logical disk groups and set whether to restrict the access or not in terms of each port. Data and security protection is achieved per server connected to the port.

Setting

The Port Mode can be set through the SnapSAN Manager   client.

LD Set

The concept of "LD set" has been introduced to AccessControl. For FC or SAS, the concept of "LD Set" enables logical disks to be collectively assigned to ports of multiple disk arrays and WWNs. For iSCSI, this concept enables logical disks to be collectively assigned to initiators. An initiator is a client of an application server that connects with a target (disk array). If a single application server has duplicated I/O paths or is clustered and has multiple access paths, you can use LD Set to define multiple access paths at a time.

AccessControl can be collectively set for a port, WWN, and initiator defined as a path of the same LD Set. When you add or delete an LD Set after setting up AccessControl, the ports, WWNs, and initiators can also be collectively set. An LD Set is also referred to as a host.
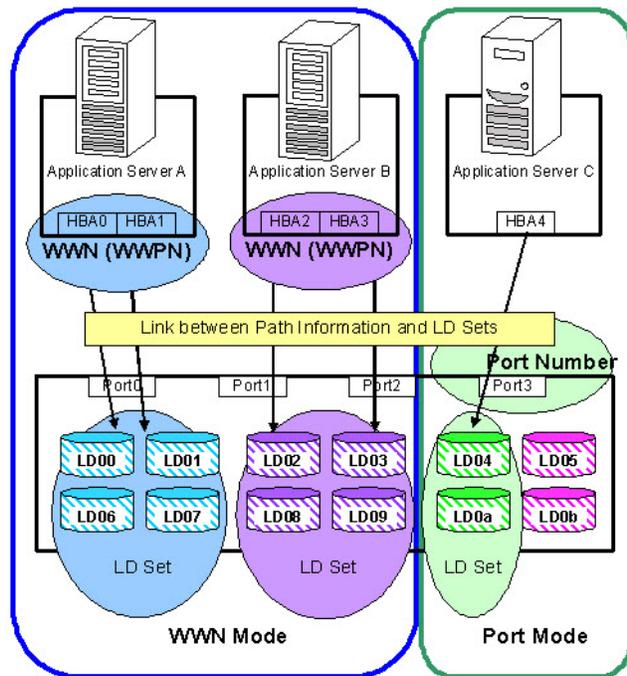
Figure 2-4: AccessControl (WWN and Port Mode)

AccessControl for iSCSI

Function

AccessControl for iSCSI can set accessible logical disks to each initiator name. This enables you to set whether logical disks are accessible or not for each server. By using AccessControl for iSCSI, you can control access on a disk array portal basis.
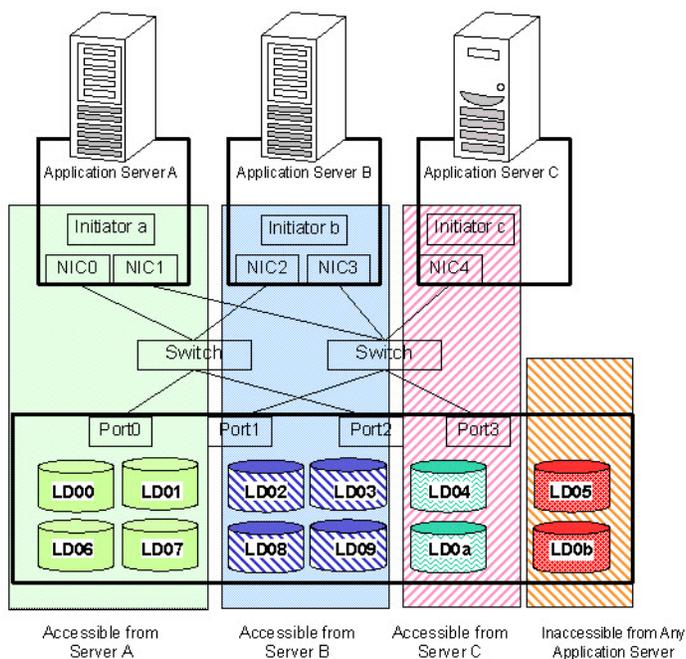
Figure 2-5: AccessControl (iSCSI)

Logical Disk No. Initiator	00	01	02	03	04	05	06	07	08	09	0a	0b
Initiator A	✓	✓	-	-	-	-	✓	✓	-	-	-	-
Initiator B	-	-	✓	✓	-	-	-	-	✓	✓	-	-
Initiator C	-	-	-	-	✓	-	-	-	-	-	✓	-

✓: Sets the initiator and logical disk number as accessible.

(-): Sets the initiator and logical disk number as inaccessible.

According to the settings above:

- Application server A can access logical disks LD00, LD01, LD06, and LD07.
- Application server B can access logical disks LD02, LD03, LD08, and LD09.
- Application server C can access logical disks LD04 and LD0a.
- LD05 and LD0b cannot be accessed from any application server.

This function can divide the logical disks which bind the disk array into logical disk groups by application server initiator and can restrict accesses to each server. This function can also perform data protection and security protection.

Setting

iSCSI can be set through the SnapSAN Manager client.

Operations

Initial Installation

When you build a new system and install a new disk array, set up them following the procedures below:

FC and SAS Models

Specify an IP address	Specify an IP address for the disk array by using the network setting tool.
Set up Storage Manager	Set up SnapSAN Manager .
Initial setup	Set up the disk array.
Bind pools	Bind a pool.
Bind hot spares	Bind a hot spare.
Bind logical disks	Bind a logical disk.
Collect the host information	Collect the host information of the application server.
Assign logical disks	Assign logical disks to the application server.

Figure 3-1: FC and SAS Models

iSCSI Model

Specify an IP address	Specify an IP address for the disk array by using the network setting tool.
Set up Storage Manager	Set up SnapSAN Manager .
Initial setup	Set up the disk array.
Set up the iSCSI initiator	Set up the iSCSI initiator on the application server
Bind pools	Bind a pool.
Bind hot spares	Bind a hot spare.
Bind logical disks	Bind a logical disk.
Assign logical disks	Assign logical disks to the application server.

Figure 3-2: iSCSI Model

Changing the Logical Disk Configuration

When changing the logical disk configuration, make the settings following the procedure below:

Stop the Server	Stop the application server that uses logical disks.
Unassign logical disks	Unassign logical disks from the application server as necessary.
Unbind logical disks	Unbind logical disks as necessary.
Unbind pools	Unbind pools as necessary.
Bind pools	Bind pools as necessary.
Bind logical disk	Bind logical disks as necessary.
Assign logical disks	Assign logical disks as necessary.
Start the server	Start the application server.

Figure 3-3: Logical Disk Configuration

Adding Servers

Add application servers following the procedure below.

FC and SAS Models

| Bind logical disks | Bind logical disks that will be allocated to the added application servers. |

| Collect the host information | Collect the host information of the added application servers. |

| Assign logical disks | Assign the logical disks to the added application server. |

| Restart the server | Restart the servers. |

iSCSI Model

| Bind logical disks | Bind logical disks that will be allocated to the added application servers. |

| Set up the iSCSI initiator | Set up the iSCSI initiator on the application server. |

| Assign logical disks | Assign the logical disks to the added application server. |

| Restart the server | Restart the servers. |

Figure 3-4: FC, SAS and iSCSI Models - Add Servers

Changing the Logical Disk Allocation

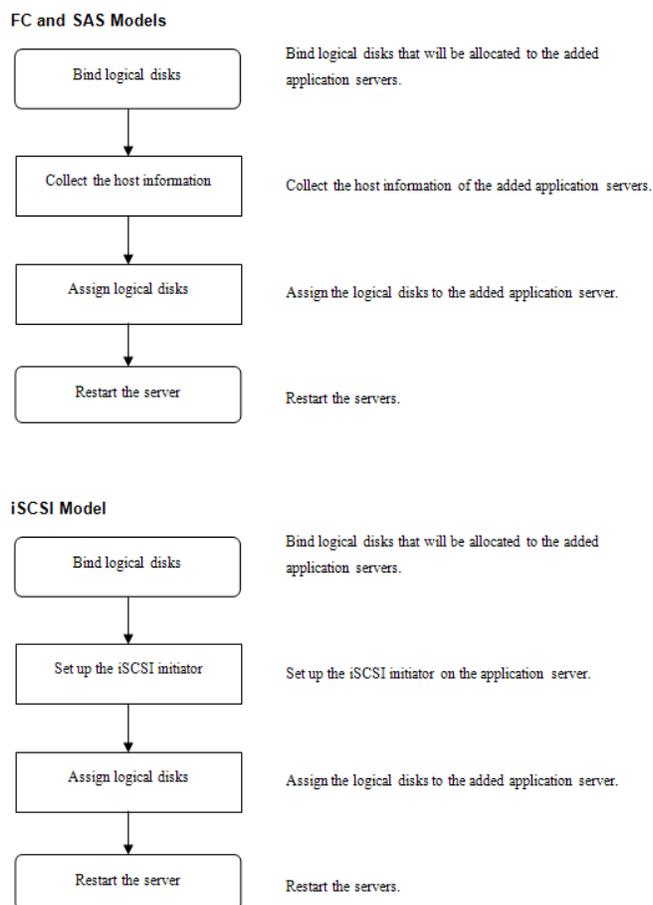Change the logical disk allocation following the procedure below.

FC and SAS Models

Stop the servers	Stop the application servers.
↓	
Unassign logical disks	Unassign logical disks as necessary.
↓	
Collect the host information	Collect the host information as necessary.
↓	
Assign logical disks	Assign the logical disks as necessary.
↓	
Start the servers	Restart the application servers.

iSCSI Model

Stop the servers	Stop the application servers.
↓	
Unassign logical disks	Unassign logical disks as necessary.
↓	
Set up the iSCSI initiator	Set up the iSCSI initiator on the application server as necessary.
↓	
Assign logical disks	Assign the logical disks as necessary.
↓	
Start the servers	Restart the application servers.

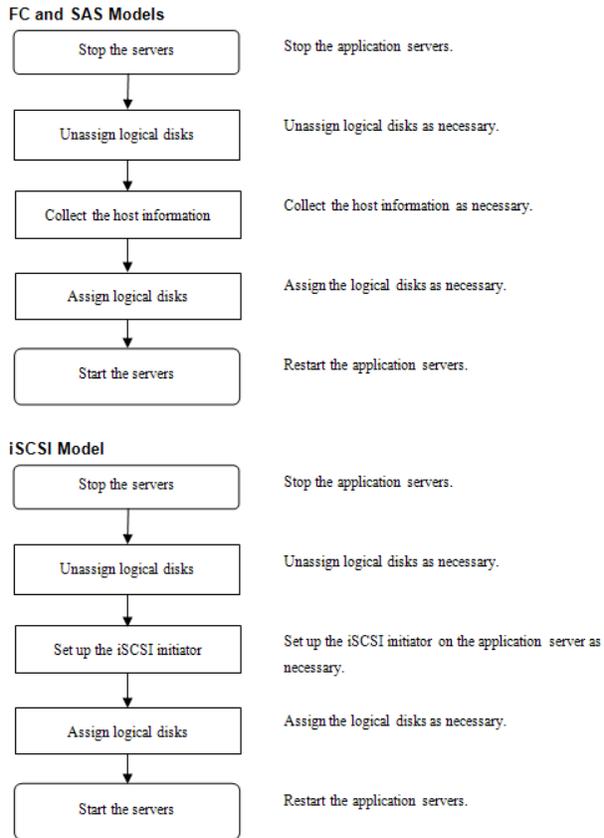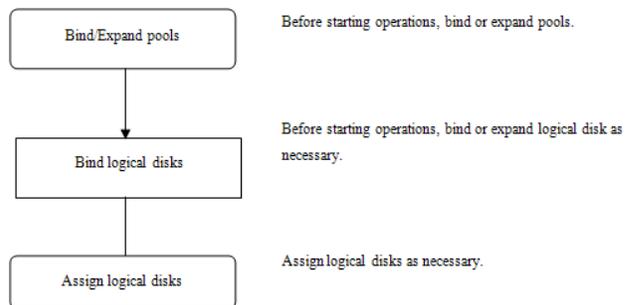*Figure 3-5: FC, SAS and iSCSI Models - Changing LDs*

Adding Physical Disks

Add physical disks to a disk array being used following the procedure below:

Bind/Expand pools	Before starting operations, bind or expand pools.
↓	
Bind logical disks	Before starting operations, bind or expand logical disk as necessary.
↓	
Assign logical disks	Assign logical disks as necessary.

Parameters and Settings

Parameters

This chapter describes parameters that can be specified for the disk arrays.

- The iSCSI- or SAS-related parameters cannot be specified for the FC models.
- The FC- or SAS-related parameters cannot be specified for the iSCSI models.
- The FC- or iSCSI-related parameters cannot be specified for the SAS models.
- Snapshot-related settings cannot be specified when using SnapSAN Manager Embedded.
- [Service Security] and [Management Software Settings] can be specified only when using SnapSAN Manager Embedded.

Starting Configuration

To start binding the disk array, log in the SnapSAN Manager client as the user defined with the administrator role and start the desired setting screen from the Binding menu.When you start the configuration and setting menu of an SnapSAN S3000/S5000 disk array with SnapSAN Manager managing two or more disk arrays, select the target disk array on the [Monitor] - [Screen Display] screen before clicking any menu item.When you use the SnapSAN Manager Embedded or when SnapSAN Manager manages only one disk array, click a desired menu item directly.When you open the setting screen to configure the disk array for the first time, stop monitoring the disk array and change the disk array status to the configuration setting status. These operations take some time.When you configure the disk array for the first time, the following dialog is displayed.

Figure 4-1: Binding a Pool Confirmation

If disk array configuration is completed or canceled or if a menu item other than configuration is selected, the system restarts monitoring the disk array and terminates the configuration setting status.

When disk array configuration is completed, the following dialog is displayed.

Figure 4-2: Binding a Pool Continue

If disk array configuration is canceled, the following dialog is displayed.
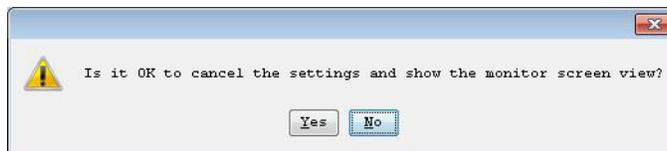

Figure 4-3: Binding a Pool Cancel

If you continue to configure another disk array using the link on the Completion screen or if you click another configuration menu with the Completion screen displayed, the system neither restarts monitoring the disk array nor terminates the configuration setting status. This allows you to configure disk arrays more efficiently without changing the disk array status.

When you continuously configure disk arrays, the following dialog is displayed.
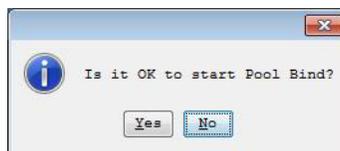

Figure 4-4: Start Pool Bind

When one client is operating the configuration menu, other clients cannot operate it. Terminating the configuration setting status allows them to operate the configuration menu.

Initialization

This chapter describes the initialization. When you start monitoring the disk array with SnapSAN Manager   for the first time after setting the IP address using the network initial setting tool, the following dialog is displayed.
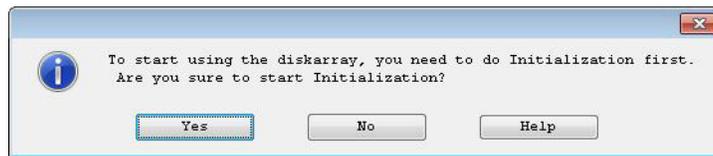

Figure 5-1: Start Initialization

If you click [Yes], initialization starts.

Initialization can be started by clicking [Configuration] - [Initialization] - [Start] from the menu. By using this wizard, the disk array is initialized.
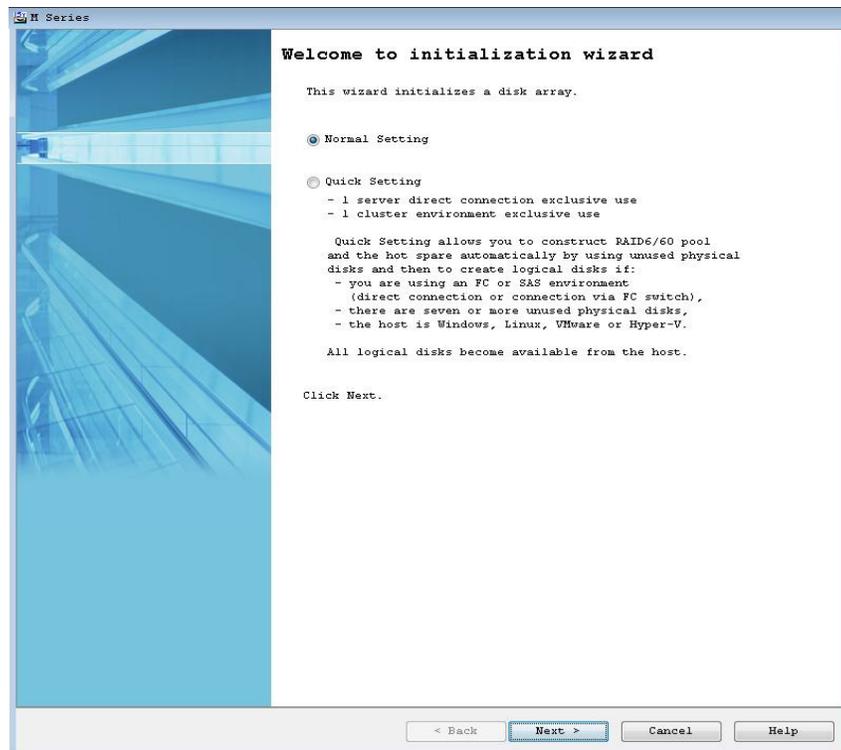

Figure 5-2: Setting Method Selection

Selecting the Setting Method

Select the initialization setting method.

Normal Setting

Sets the setting items sequentially. Normally, select this method.

Quick Setting

Automatically performs necessary setting and bind the RAID6/60 pool, hot spare, and logical disk at once. All logical disks can be then used from all hosts.

- One RAID6/60 pool and multiple hot spares are bound by using all unused physical disks.
- The usable RAID type is exclusively RAID6/60.
- The number of hot spares is automatically calculated from the type and the number of physical disks.

This setting can be used for direct connection with one server or the environment with one cluster if all the following conditions are satisfied.

- FC or SAS connection (via direct connection or switch)
- There are seven or more unused physical disks with the same type, the same capacity, and the same rotational speed.
- Windows, Linux, VMware, or Hyper-V host

Example of System Configuration where Quick Setting is Valid

- Direct connection with one server
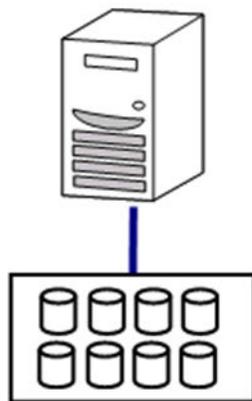
  When the disk array is connected to a single server

Figure 5-3: Single Server Connection

When the disk array is connected to a virtual machine server.
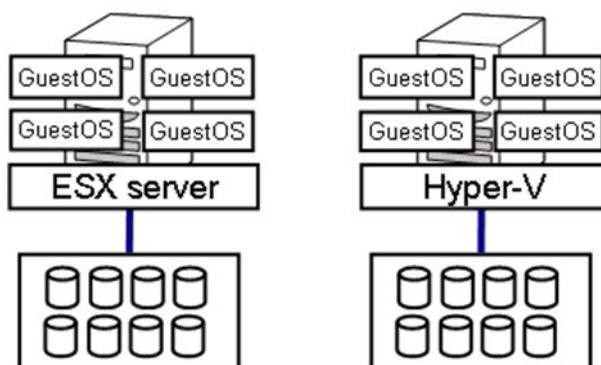
Figure 5-4: Virtual Machine Connection

Environment with One Cluster

When the disk array is directly connected to a single cluster
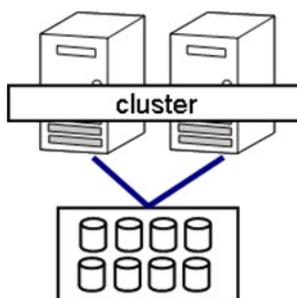
Figure 5-5: Single Cluster Connection

Quick Setting cannot be used in the following cases:

- For the iSCSI model
- For the disk arrays of the SnapSAN S3000/S5000
- When Access Control is enabled
- If unused physical disks are different in type, capacity or rotational speed

Normal Setting

The following can be set by selecting Normal Setting.

- Set Disk Array Subsystem Name
- Time Settings
- Unlock License
- Host Connection Port Parameters (FC) (for the disk arrays supporting FC)
- Port Mode Switching (for the disk arrays supporting FC)
- Host Connection Port Parameters (iSCSI) (for the disk arrays supporting iSCSI)
- Set iSNS Server (for the disk arrays supporting iSCSI)
- Host Connection Port Parameters (SAS) (for the disk arrays supporting SAS)

Set Disk Array Subsystem Name
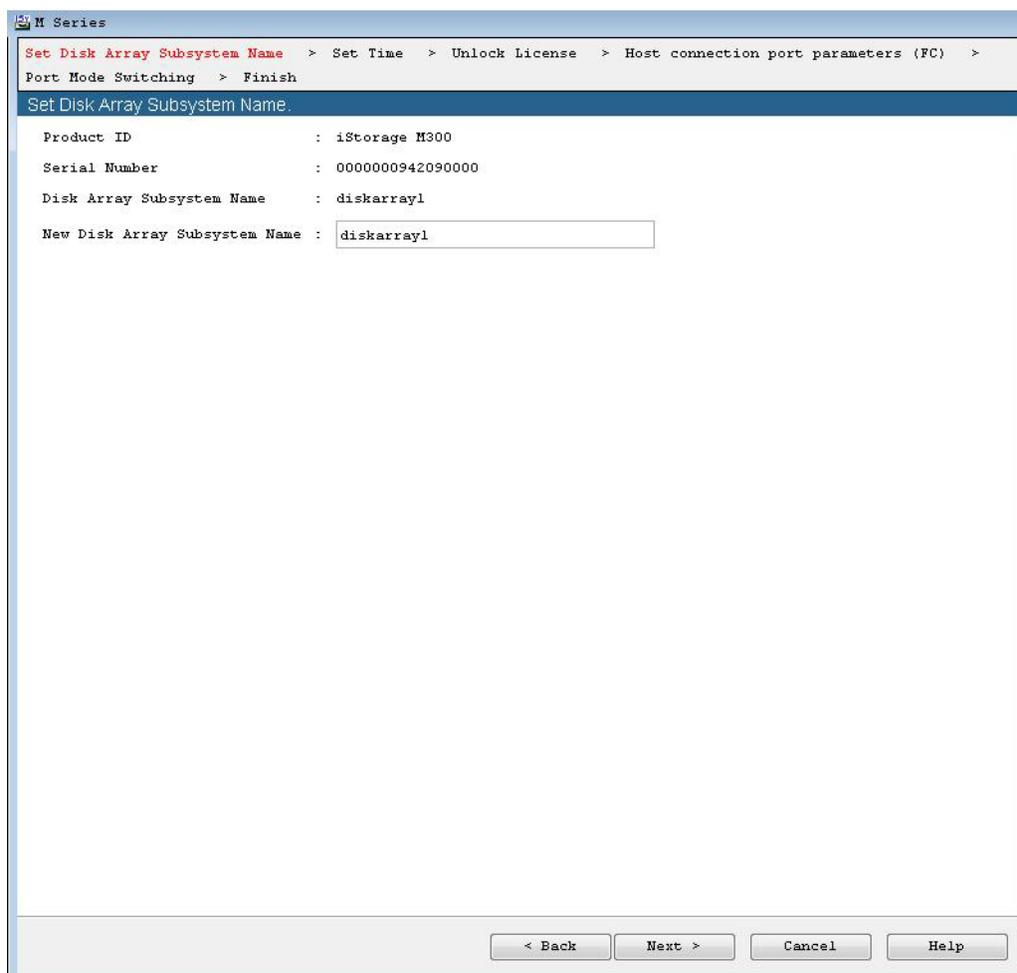
Figure 5-6: Rename Screen

The following information is displayed.

- Product ID
- Serial number
- Disk array subsystem name

To change the disk array name, enter the new name in [New Disk Array Subsystem Name].

Single-byte alphanumeric characters, "_", and "/" can be used to specify the disk array name. Up to 32 characters can be entered.

When you click [Next], the entered disk array name is set.

Time Settings

Set the time of the disk array.

*This screen is not displayed when Storage Manager is in use and the time synchronization setting with the Storage Manager server is ON.The time setting operation involves the screens mentioned below.

For Storage Manager

- Set Time

For SnapSAN Manager Embedded

- Time Setting Method Selection
- NTP Setting
- Manual Time Setting

Set Time (Storage Manager)

Figure 5-7: Set Time

Select the time setting method for the disk array.

Set the Time Manually

Select this method when you manually set the time of the disk array.

Don't set the time now.

Select this method when you do not change the time setting of the disk array.

Set Time (Manual Setting of the Time of Disk Array)
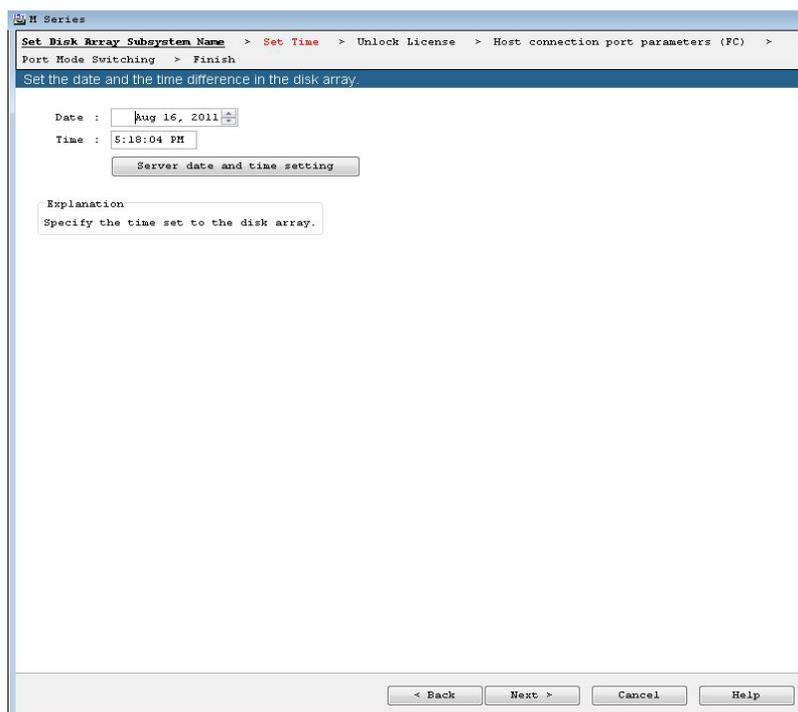
Figure 5-8: Set Time - Manual

When [Set the time manually.] is selected on the Set Time screen, this screen is displayed. Make the settings for setting the time with the disk array.

Date: Specify the date to be set for the disk array.

Time: Specify the time to be set for the disk array.

Server date and time setting:

Set the date of the server that is currently monitoring the disk array.

When you click [Next], the time is set.

When you are using Storage Manager and have selected [Automatically Correct Disk Array Subsystem's Timer] in the [State Monitoring] tab for the SnapSAN Manager server environment settings, the Set Time screen is not displayed.

In that case, the time of the disk array is synchronized with the server running the SnapSAN Manager server.

Set Time (SnapSAN Manager Embedded)
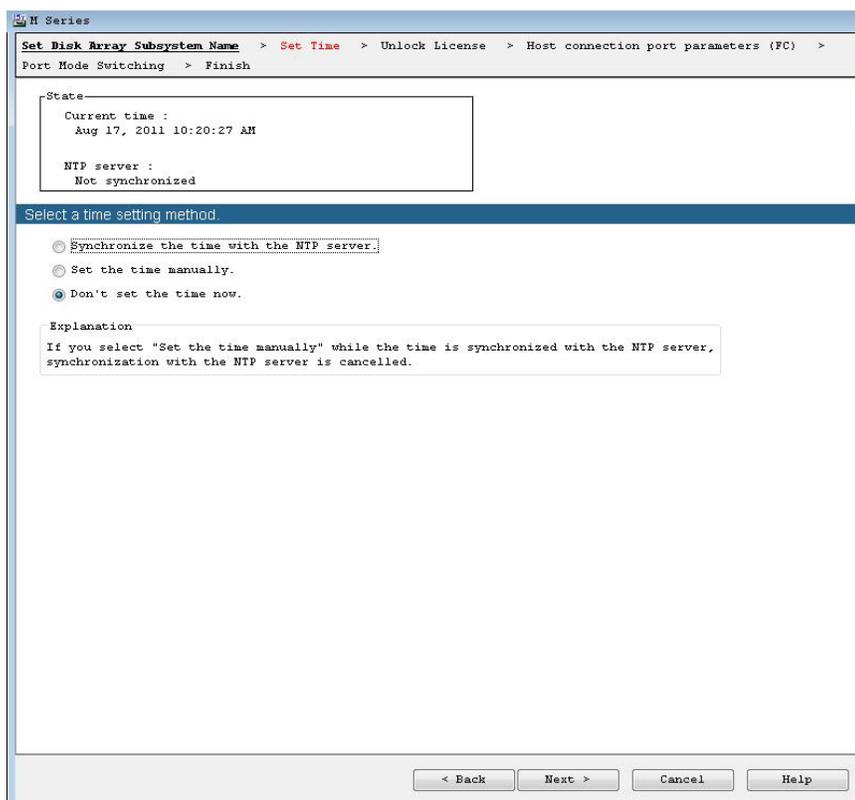
Figure 5-9: Time Setting Selection

Select the time setting method for the disk array.

Synchronize the time with the NTP server.

Select this method when you want to synchronize the time with an external NTP server.

Set the time manually.

Select this method when you manually set the time of the disk array.

Don't set the time now.

Select this option not to change the disk array time setting.

Set Time (synchronization with the NTP server)

Figure 5-10: Set Time (Synchronization NTP Server)

When [Synchronize the time with the NTP server.] is selected on the time setting method selection screen, this screen is displayed. Make the settings for synchronizing the time with the NTP server.

IP address:

You can specify up to three IP addresses of the NTP server with which to synchronize the time.

When you click [Next], the NTP server setting is made.

Set Time (Manual Setting of the Time of Disk Array)

Figure 5-11: Set Time (Manual)

When [Set the time manually.] is selected on the time setting method selection screen, this screen is displayed.

Make the settings for using the clock built in the disk array.

Date: Specify the date to be set for the disk array.

Time: Specify the time to be set for the disk array.

When you click [Next], the time is set.

Unlock License
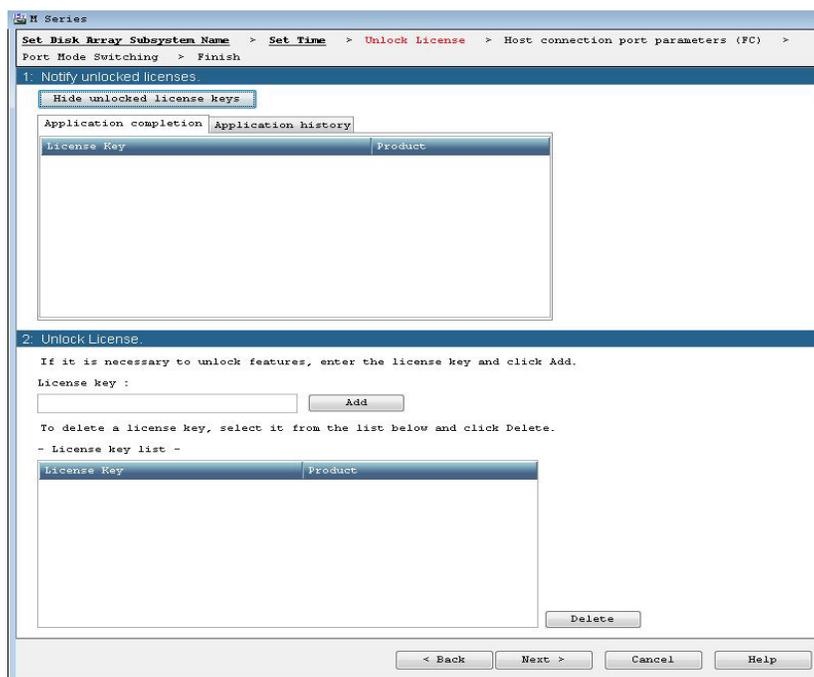
Figure 5-12: Unlock License

Unlock the license of the disk array.

Hide unlocked License Keys

The list of licenses already unlocked and the history list are hidden.

License Key

When you enter a license key and click [Add], the license key is registered in the license key list.

License Key List

The input license keys are listed.

When you click [Next], the license added to the license key list is unlocked.

Host Connection Port Parameters (FC)
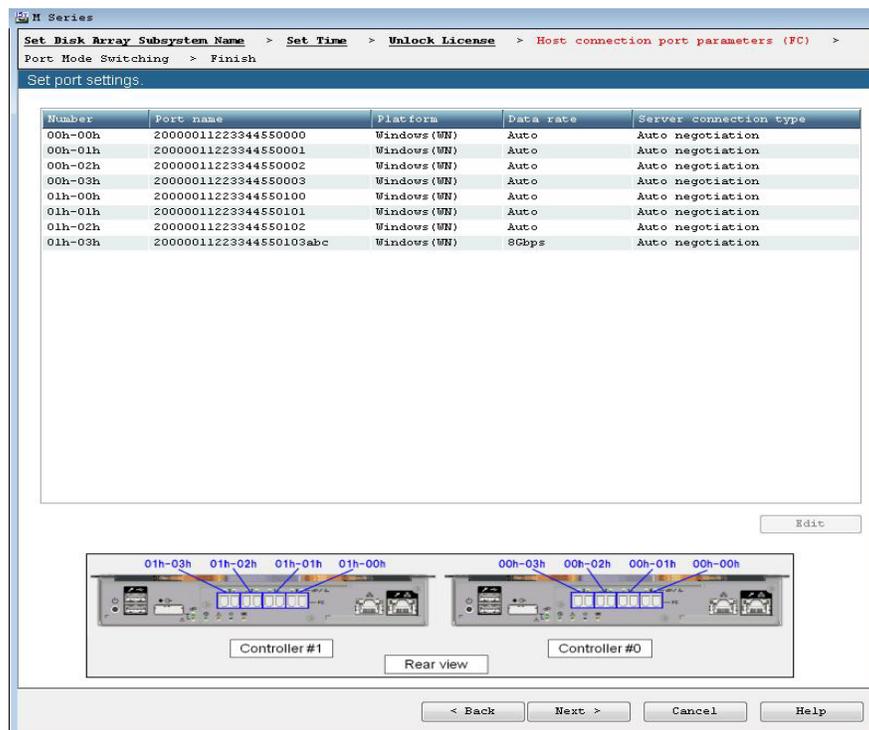
Figure 5-13: Host Connection Port Parameters (FC)

Set the host connection port for the disk array supporting FC.

This screen is displayed only for disk arrays of the SnapSAN S3000/S5000.

Port list: Select the port you want to set.

[Edit] button: A dialog box is displayed that lets you edit the settings of the selected port.

Editing Dialog
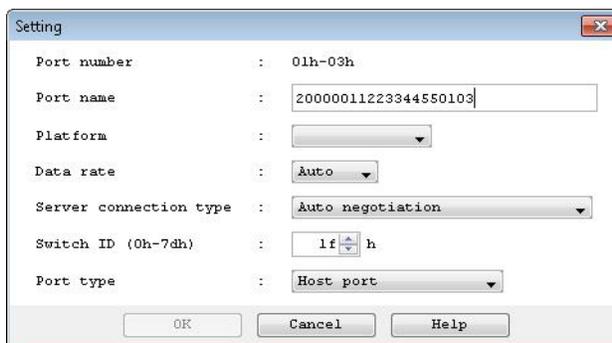
Figure 5-14: Edit

Port number: Unique port number.

Port name: Specify the name to be assigned to the port.

> Single-byte alphanumeric characters, "_", and "/" can be used to specify the port name. Up to 32 characters can be entered.

Platform: Specify the platform of the host to be connected.

Data rate: Specify the value corresponding to the data transfer rate of the HBA or HUB.

Server connection type:

> Specify the connection topology between the disk array and the host.

> **Automatic negotiation**:

>> The connection type is automatically negotiated.

> **FC-AL**: Select this when connecting the host connection port and the application server directly over an FC cable or when using a loop topology FC switch.

> **FC switch connection (Fabric)**:

>> Select this when using an FC switch other than a loop topology FC switch.

Switch ID: Specify the value of the switch for the port. The specifiable value range is 00h to 7dh.

> When connecting multiple disk arrays in a loop topology FC switch configuration, make sure that the value of each switch is unique.

Port type: Select the port type.

> **Host port**: Select this when connecting to the host.

> **Data migration port**: Select this when using the data migration function.

> **Replication port**: Select this when using the remote data replication function.

> This setting is displayed only when the data migration function and/or remote data replication function is usable.

Clicking the [OK] button applies the change of settings to the list.

When you click [Next] after changing the port settings as needed, the port settings are made.

Port Mode Switching

Figure 5-15: Port Mode Switching

You can change the FC port mode of the disk array.

(a) Port List view

The Port List view lets you check the information about the disk array ports.

A port number is expressed in the format of "director number-port number".

The following items are displayed.

Port Number

Port Name

Mode

WWN: Port in the WWN mode

Port: Port in the Port mode.

Configuration lock

Lock: Locked port

(Empty): Port not locked

Unselectable Reason

The following items are hidden by default.

Host

Interface

To display any of these items, right-click the item name and set [Display] to the relevant item.

(b) [WWN Mode] and [Port Mode] radio buttons

WWN Mode: Changes the mode of the port to the WWN mode.

Port Mode: Changes the mode of the port to the port mode.

(c) [Change All] button

If you click this button, all the ports are changed to the mode selected with [WWN Mode] or [Port Mode]. In this case, you do not need to select a port from the port list. However, you cannot change the mode by using this button if there are any ports locked by the port configuration lock/unlock function. You cannot change to the port mode if the configuration lock function confirms that any target application server is in operation. Stop all the target application servers before performing this operation.

(d) [Change Selected] button

If you select a port and then click this button, the selected port is changed to the mode selected with [WWN Mode] or [Port Mode]. You can select multiple ports in the port list if they are in the same mode. When a confirmation screen is displayed for checking the settings in advance, check the current mode of the port and the mode you are changing to. However, you cannot change the mode of a port locked by the port configuration lock/unlock function. You cannot change to the port mode if the configuration lock function confirms that any target application server is in operation. Stop all the target application servers before performing this operation.

The change to the mode of the port is immediately applied on the disk array. An invalid setting may make an application server unable to access a logical disk. Therefore, if necessary, stop the operation and application servers based on a plan.

Host Connection Port Parameters (FC)

Figure 5-16: Host Connection Port Parameters (FC)

Set the host connection port for the disk array supporting FC.

This screen is displayed only for disk arrays of the SnapSAN S3000/S5000.

Port list: Select the port you want to set.

[Edit] button: A dialog box is displayed that lets you edit the settings of the selected port.

Editing Dialog
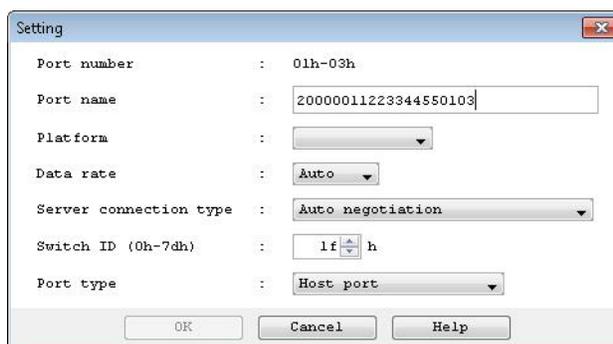
Figure 5-17: Setting

Port number: Unique port number.

Port name: Specify the name to be assigned to the port.

Single-byte alphanumeric characters, "_", and "/" can be used to specify the port name. Up to 32 characters can be entered.

Platform: Specify the platform of the host to be connected.

Data rate: Specify the value corresponding to the data transfer rate of the HBA or HUB.

Server connection type:

Specify the connection topology between the disk array and the host.

Automatic negotiation:

The connection type is automatically negotiated.

FC-AL: Select this when connecting the host connection port and the application server directly over an FC cable or when using a loop topology FC switch.

FC switch connection (Fabric):

Select this when using an FC switch other than a loop topology FC switch.

Switch ID: Specify the value of the switch for the port. The specifiable value range is 00h to 7dh.

When connecting multiple disk arrays in a loop topology FC switch configuration, make sure that the value of each switch is unique.

Port type: Select the port type.

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Host port: Select this when connecting to the host.

Data migration port: Select this when using the data migration function.

Replication port: Select this when using the remote data replication function.

This setting is displayed only when the data migration function and/or remote data replication function is usable.

Clicking the [OK] button applies the change of settings to the list.

When you click [Next] after changing the port settings as needed, the port settings are made.

Port Mode Switching

Figure 5-18: Port Mode Switching

You can change the FC port mode of the disk array.

This screen is displayed only for disk arrays of the SnapSAN S3000/S5000.

(a)   Port List view

The Port List view lets you check the information about the disk array ports.

A port number is expressed in the format of "director number-port number".

The following items are displayed.

> Port Number
>
> Port Name
>
> Mode
>
> > WWN: Port in the WWN mode
> >
> > Port: Port in the Port mode.
>
> Configuration lock
>
> > Lock: Locked port
> >
> > (Empty): Port not locked
>
> Unselectable Reason

The following items are hidden by default.

> Host
>
> Interface

To display any of these items, right-click the item name and set [Display] to the relevant item.

(b)   [WWN Mode] and [Port Mode] radio buttons

WWN Mode: Changes the mode of the port to the WWN mode.

Port Mode: Changes the mode of the port to the port mode.

(c)   [Change All] button

If you click this button, all the ports are changed to the mode selected with [WWN Mode] or [Port Mode]. In this case, you do not need to select a port from the port list. However, you cannot change the mode by using this button if there are any ports locked by the port configuration lock/unlock function. You cannot change to the port mode if the configuration lock function confirms that any target application server is in operation. Stop all the target application servers before performing this operation.

(d)   [Change Selected] button

If you select a port and then click this button, the selected port is changed to the mode selected with [WWN Mode] or [Port Mode]. You can select multiple ports in the port list if they are in the same mode. When a confirmation screen is displayed for checking the settings in advance, check the current mode of the port and the mode you are changing to. However,

you cannot change the mode of a port locked by the port configuration lock/unlock function. You cannot change to the port mode if the configuration lock function confirms that any target application server is in operation. Stop all the target application servers before performing this operation.

The change to the mode of the port is immediately applied on the disk array. An invalid setting may make an application server unable to access a logical disk. Therefore, if necessary, stop the operation and application servers based on a plan.

Host Connection Port Parameters (iSCSI)

Figure 5-19: Host Connection Port Parameters (iSCSI)

Set the host connection port for the disk array supporting iSCSI.

This is not displayed for disk arrays that do not support iSCSI.

Port list: Select the port you want to set.

Ports that fit to the following condition cannot be selected.

Conditions Making Ports Unselectable

Condition: Locked

Description: Operation guard is set to the port.

[Edit] button: A dialog box is displayed that lets you edit the settings of the selected port.

Editing Dialog

Figure 5-20: Edit Dialog

Port number: Unique port number.

Port name: Specify the name to be assigned to the port.

Single-byte alphanumeric characters, "_", and "/" can be used to specify the port name. Up to 32 characters can be entered.

Link Speed & Duplex:

The link speed and duplex values set for the port are displayed. This value cannot be changed.

MTU: You can change the MTU (Maximum Transmission Unit) size by selecting a desired one from a drop-down list.

Select an appropriate value for your network environment. The default value is 1500.

Port type: Select the port type.

Host port: Select this when connecting to the host.

Host/Replication port: Select this when using the remote data replication function.

This setting is displayed only when the remote data replication function is usable.

IP address (IPv4): Specify the IP address to be set for the port.

Subnet mask (IPv4): Specify the subnet mask to be set for the port.

> **Gateway address (IPv4)**:
>
> > Specify the gateway address to be set for the port.
>
> **IP address (IPv6)**: Specify the IP address to be set for the port.
>
> **Gateway address (IPv6)**:
>
> > Specify the gateway address to be set for the port.
>
> Clicking the [OK] button applies the change of settings to the list.
>
> When you click [Next] after changing the port settings as needed, the port
>
> settings are made.

Perform another setup after waiting about 30 seconds after processing, when a setup or change of an IP address is made. When MTU is changed, communication with other ports in addition to the iSCSI port may temporarily be interrupted.

Set iSNS Server
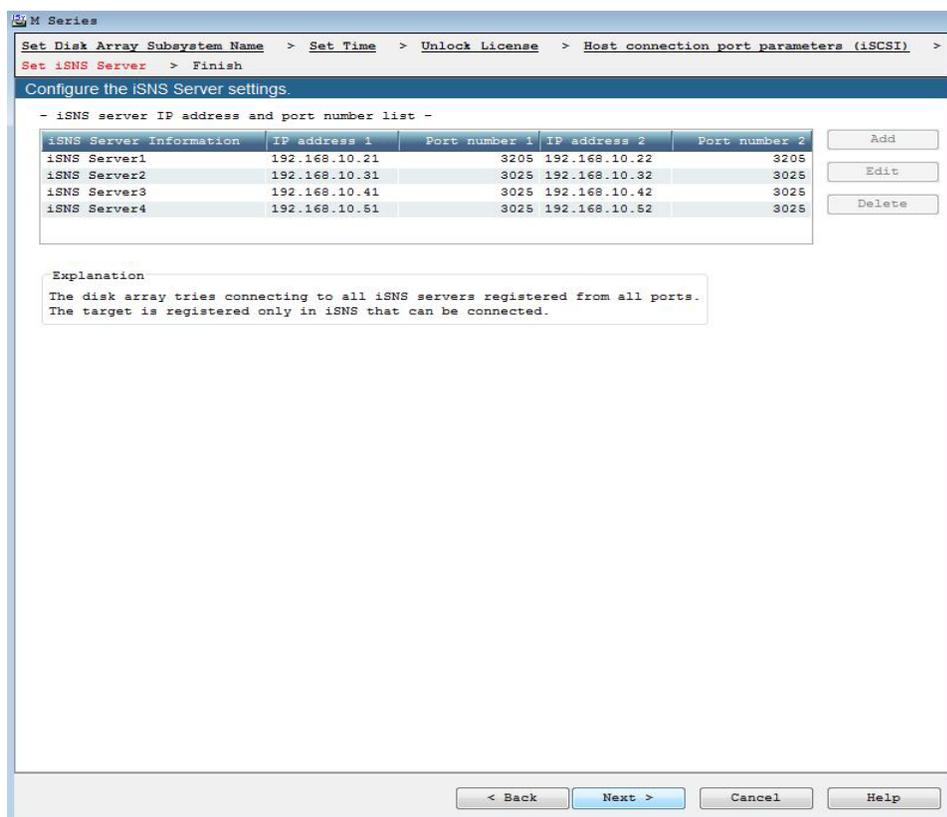
Figure 5-21: Set iSNS

> Set the iSNS server with which the disk array registers the iSCSI target for the
>
> disk array in the iSCSI model.

This screen is displayed only for iSCSI model disk arrays.

iSNS Server IP Address and Port Number List

Register the IP address and port number of the iSNS server.

Clicking [Add] or [Edit] displays IP Address Setting.

Clicking [Delete] deletes the IP address and port number settings of the selected iSNS server.

iSNS Server IP Address Setting

Figure 5-22: iSNS Server IP Address

Two pairs of IP address and port number the iSNS server can be specified.

IP version This can be changed by selecting IPv4 or IPv6 from the drop-down list.

Select an appropriate value for your network environment.

IP address Specify the IP address of NTP server with a 32-bit numerical value for IPv4 and a 128-bit numerical value for IPv6.

Port number Specify the port number.

Clicking the [OK] button applies the change of settings to the list.

When you click [Next], the iSNS server is set.

Host Connection Port Parameters (SAS)
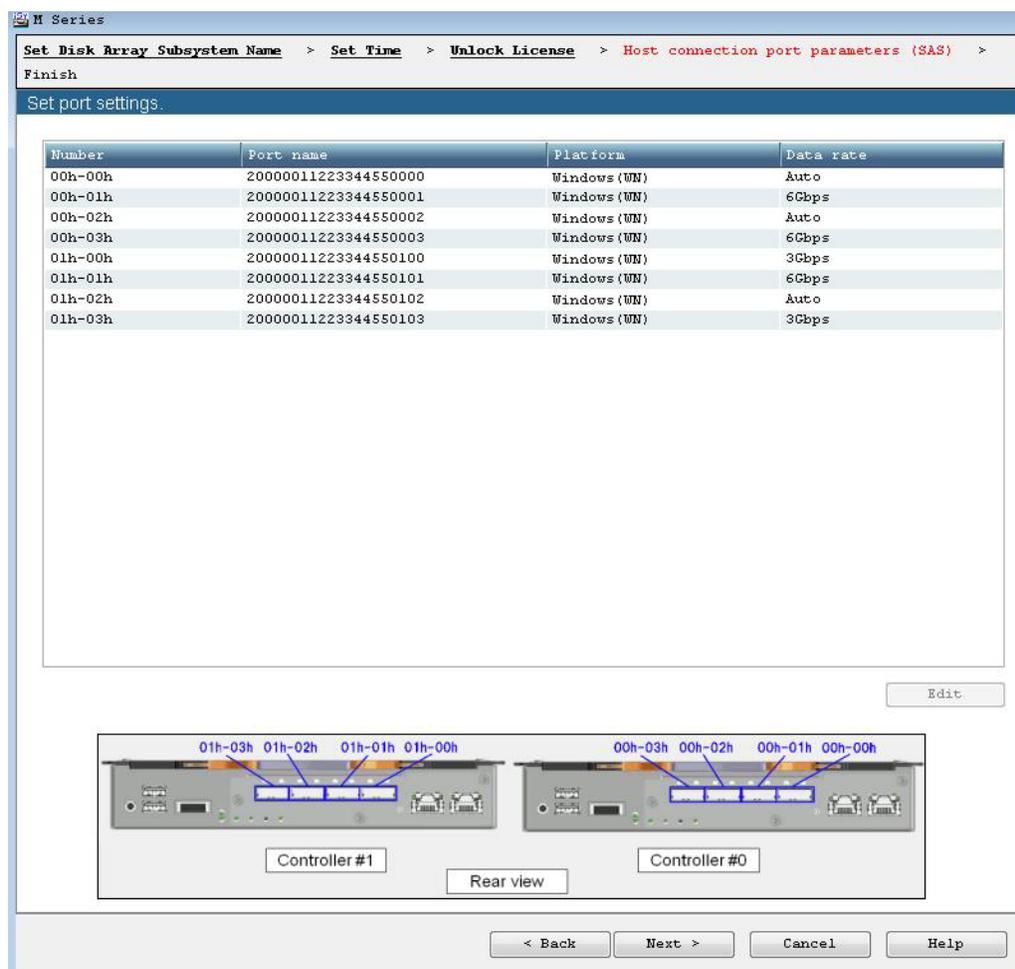
Figure 5-23: Host Connection Port Parameters (SAS)

Set the host connection port for the disk array supporting SAS.

This screen is displayed only for disk arrays of the SnapSAN S3000/S5000.

Port list: Select the port you want to set.

[Edit] button: A dialog box is displayed that lets you edit the settings of the selected port.
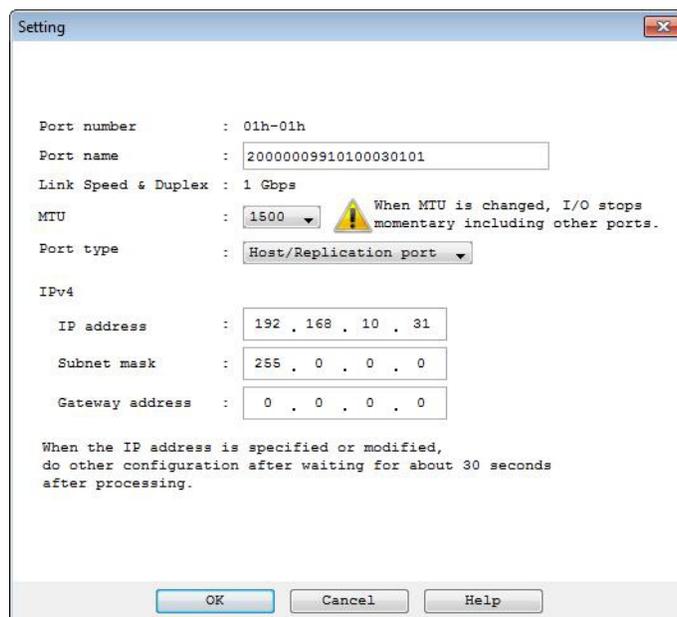
Editing Dialog

Figure 5-24: Edit Setting

Port number: Unique port number.

Port name: Specify the name to be assigned to the port.

Single-byte alphanumeric characters, "_", and "/" can be used to specify the port name. Up to 32 characters can be entered.

Platform: Specify the platform of the host to be connected.

Data rate: Specify the value corresponding to the data transfer rate of the SAS port and destination port.

Clicking the [OK] button applies the change of settings to the list.

When you click [Next] after changing the port settings as needed, the port settings are made.

Finish
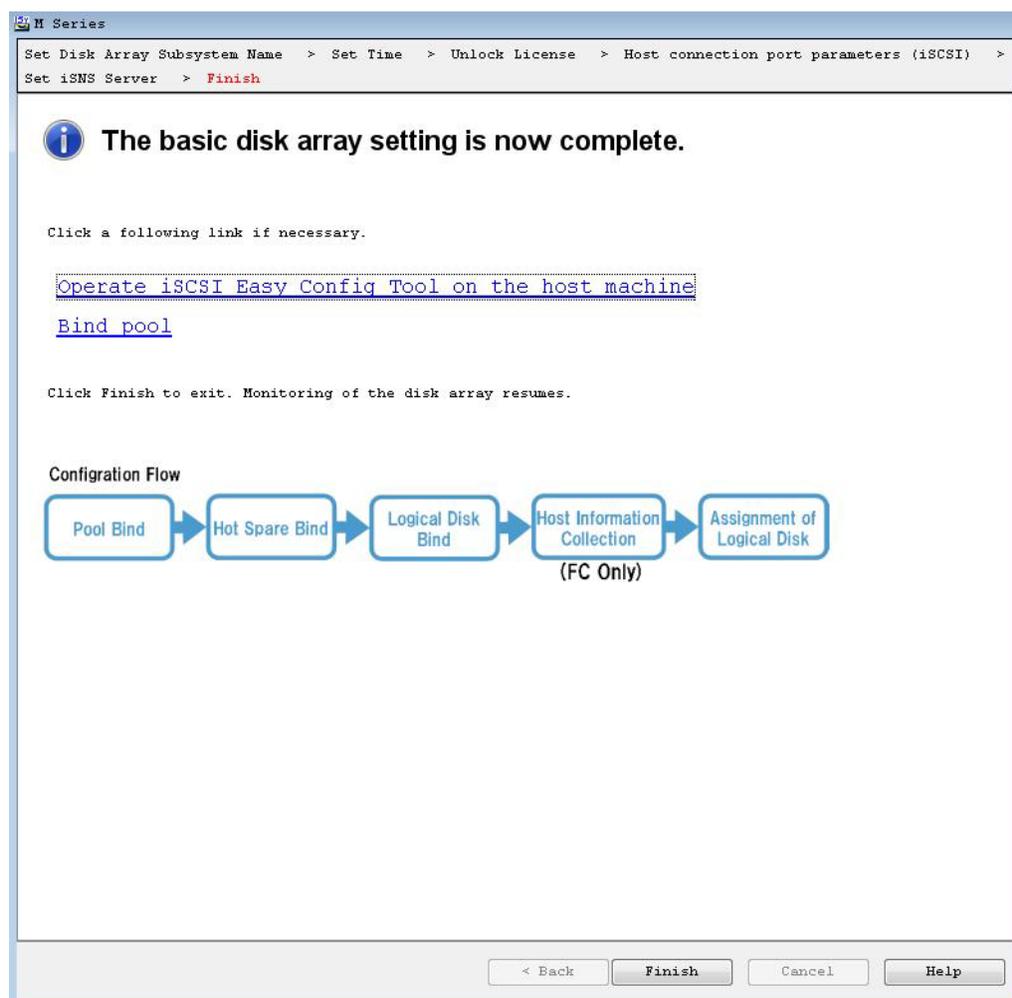
Figure 5-25: Initialization Completion

When this operation is successful, the following link is displayed.

· **Operate iSCSI Setup Tool on the host machine**

The Set Host Information screen is displayed to operate the iSCSI

Setup Tool on the host to make necessary settings.

* This link is displayed only for the iSCSI model disk array.

· **Bind pool**

The [Bind Pool] screen is displayed for binding another pool.

Navigation button(s)

· **[Finish]**

The [Monitor] - [Screen Display] screen is displayed.

When the initialization is complete, the Access Control function starts automatically for FC and SAS models.

When the initialization is complete, all the SAS ports change to the port mode for SAS model.

Set Host Information Screen
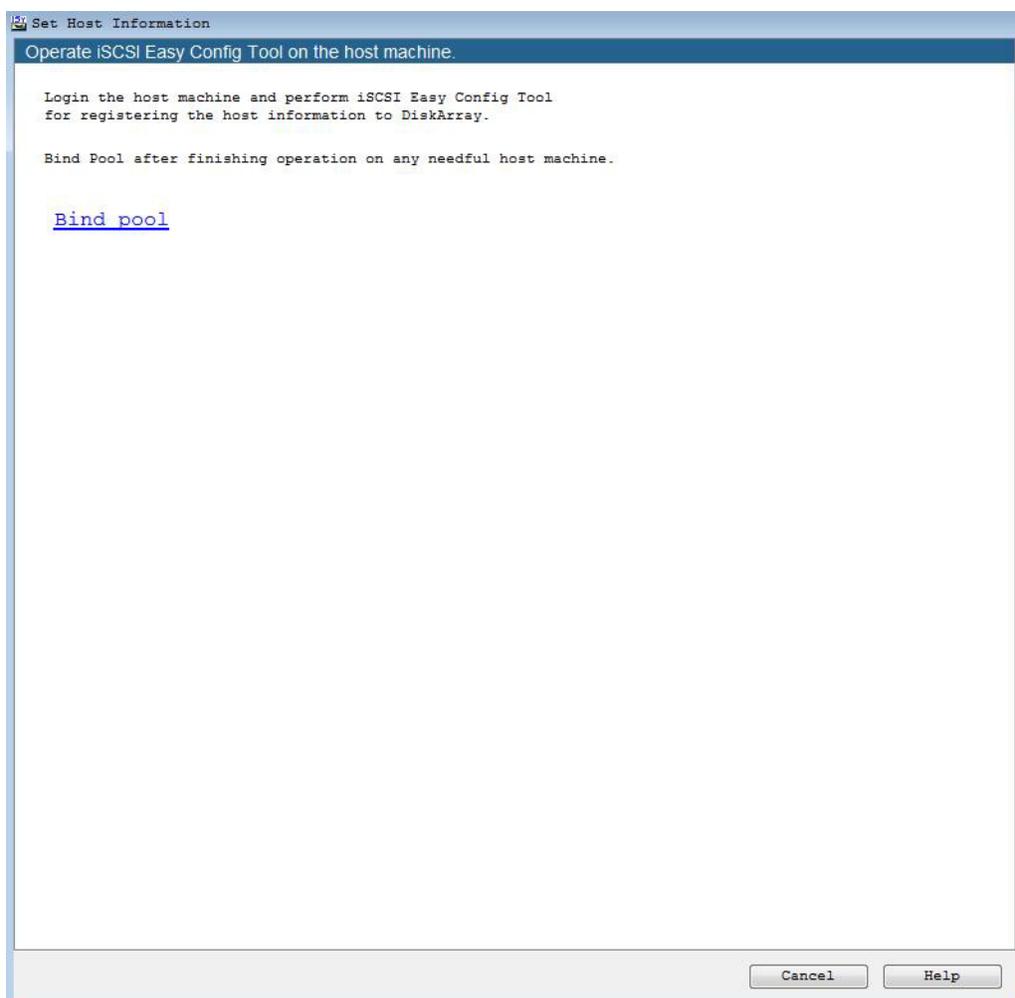
Figure 5-26: Set Host Information

The SnapSAN Manager   client separately logs in the host with this screen open to operate the iSCSI Setup Tool.
When completing all the work on the host, return to this screen and continue the binding operation.

The following links are displayed.

· **Bind pool**

The "Pool Bind" screen is displayed for binding the pool.

Navigation button(s)

[Cancel]
The binding operation is aborted and the [Monitor] - [Screen Display] screen is displayed.

Quick Setting

LD Binding

Figure 5-27: LD Binding

Platform selection

Select the platform of the connected host.

Windows, Linux, VMware, or Hyper-V can be selected.

Binding logical disks

When you specify the number of logical disks and their capacity and click [Add], they are registered in the logical disk list.

When you click [Delete], the logical disk selected in the list is excluded from the binding range.

When you click [Next], the RAID6/60 pool, hot spare, and system volume as well as the logical disks in the list are bound.

Initialization Completion
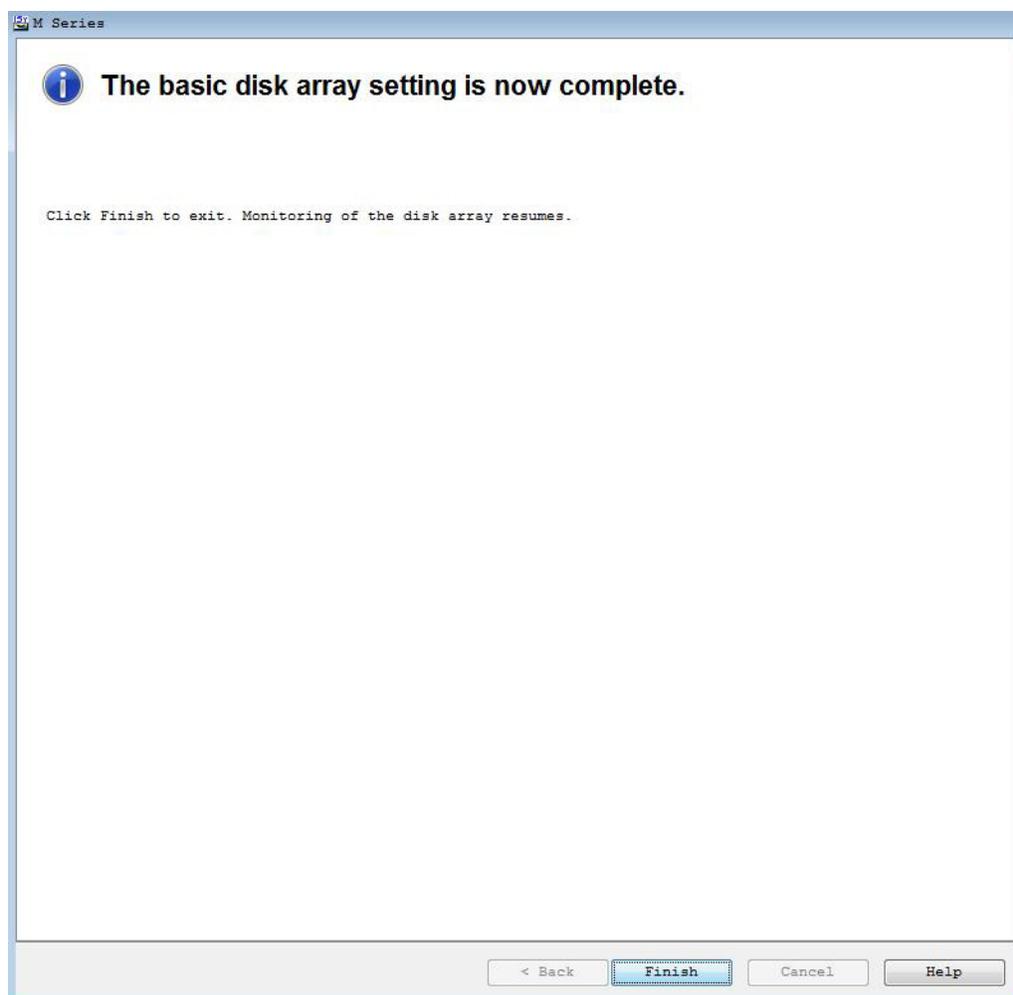
Figure 5-28: Initialization Completion

The result of the initialization is displayed.

The logical disk can be now used from the host if Quick Setting has been selected.

Navigation button(s)

[Finish]

The [Monitor] - [Screen Display] screen is displayed.

User Setting

User Types

Before using SnapSAN Manager, define SnapSAN Manager users. The defined user name and password are necessary to connect to the SnapSAN Manager server and to perform various operations and disk array monitoring on the SnapSAN Manager client.

There are three user types and three user roles. By combining and assigning the types and roles to users, disk arrays to be managed by the users and operations that the users are permitted to perform can be appropriately managed.

User Roles

User Types	Description
Storage Group User	A user who manages multiple disk arrays that are managed by the SnapSAN Manager server. (This user type can be specified only when using SnapSAN Manager.)
Storage User	A user who manages specific disk array(s). (This user type can be specified when using either SnapSAN Manager or SnapSAN Manager Embedded.)
Partition User	A user who manages specific partition. (This user type can be specified only when using SnapSAN Manager while VirtualStoragePartitioning installed.)

User Types	Description	User Role
Administrator	Allowed to perform all operations to disk arrays, including configuration setting.	System Administrators
Operator	Allowed to perform necessary operations in replication, snapshot, performance monitoring, and performance optimization functions.	Operators
Monitor	Allowed to view the configuration and status display.	Standard Users

User Definition

User Definition Method

To define a user, perform the following procedure.

Note that the user definition is managed by each SnapSAN Manager   server. (The user definition is managed on the embedded SnapSAN Manager   server when SnapSAN Manager Embedded is used.)

- Define a user on the SnapSAN Manager server

  The definition procedure may be different depending on the OS running the SnapSAN Manager   server.

- Define a user on the SnapSAN Manager   client (Web GUI)

  You can define a user on the User Setting screen on the SnapSAN Manager   client (Web GUI). This manual describes this procedure.

User Setting Screen

To display the User Setting screen, select "Configuration"? "User Setting" from the main screen of the SnapSAN Manager   client (Web GUI).

User Setting screen is available to storage group users and storage users who have the administrator role.
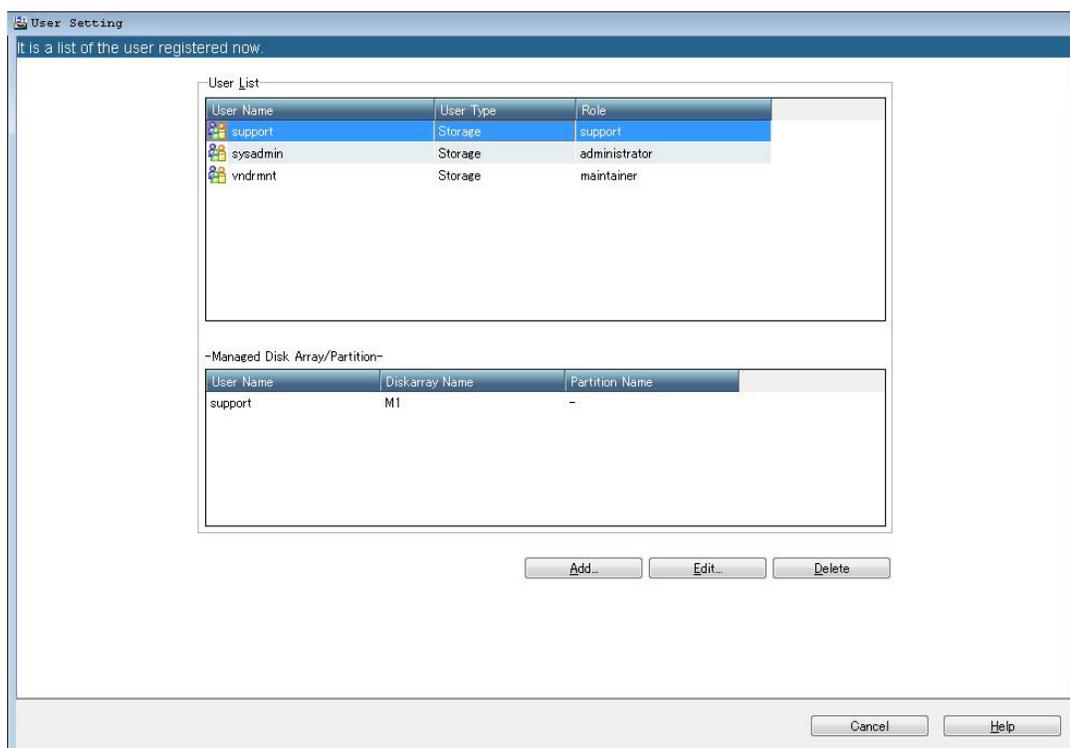
Figure 6-1: User Setting

[User List] displays the users defined in the currently connected SnapSAN Manager   server.

1. The User Setting screen cannot be simultaneously started from multiple clients connected to the same SnapSAN Manager   server.

2. The [VSPAR Setting], [Setting Cache Segment], and [User Setting] menus cannot be simultaneously selected and started from multiple clients connected to the same SnapSAN Manager   server.

3. Users who cannot perform operations ([Edit] and [Delete]) because of the user type currently used are grayed out.

Operations

The range of possible operations is as follows.

- Storage Group User: Operations can be performed for all users.
- Storage User: Operations can be performed for the storage users and partition users of the managed storage.

Each displayed item is described below.

(1) User Name

The user name is displayed.

(2) User Type

The user type is displayed.

Storage group: Storage group user

Storage: Storage user

Partition: Partition user

(3) Role

The user's role is displayed.

(4) Managed Disk Array/Partition

The disk array or partition to be managed by the user selected in the user list is

displayed. This item is displayed only when SnapSAN Manager   is used.

The name of the disk array to be managed by the user is displayed in [Disk array

Name]. In the case of the storage group user, "-" is displayed.

The name of the partition to be managed by the user is displayed in [Partition

Name]. In the case of the storage group user or storage user, "-" is displayed.

(5) [Add] button

The User - Add screen is displayed that lets you add a new user.

(6) [Edit] button

The User - Edit screen is displayed that lets you edit the settings for the user selected in the user list.

(7) [Delete] button

The selected user is deleted. The user cannot be recovered once deleted.

*The user who has logged in the SnapSAN Manager cannot be deleted. Log in the SnapSAN Manager again as another user and delete it.

(8) [Cancel] button

This screen is closed, and the monitor screen is displayed again.

User - Add

When you add the [Add] button on the User Setting screen, the User - Add screen is displayed. This screen allows you to add a new user.

Figure 6-2: User - Add

Each displayed item is described below.

(1) User Name

Specify the user name.

The following restrictions apply to the characters that can be specified as the user name.

When using SnapSAN Manager Embedded

Specify two to eight alphanumeric characters. The user name is case sensitive.

The first letter must be an alphabet and the name must include at least one lowercase letter.

When using SnapSAN Manager

Specify one to twenty alphanumeric characters and/or symbol (excluding the double quotation).

The user name is case sensitive.

(2) Password

Specify a user password consisting of one to fourteen alphanumeric characters and/or symbol (excluding the double quotation). The password is case sensitive.

(3) Confirm Password

Retype the value entered in [Password] for confirmation.

(4) User Type

Select the type of the user to be added.

When you are currently connected as a storage user, you cannot select a storage group user. When there is no disk array for which VirtualStoragePartitioning (This is the partitioning function.

(5) Role

Select the role of the user to be added.

(6) Managed Disk Array

When the user type is the storage user, select the disk array to be managed.

This item is displayed only when SnapSAN Manager is used. In the case of a storage group user or partition user, you do not need to select this item.

*To set the partition to be managed by the partition user, use the partitioning wizard.

(7) [OK] button

When the user is successfully added, the added user is displayed in the user list on the User Information List screen.

(8) [Cancel] button

All the contents currently displayed on the screen are discarded, and the User Information List screen is displayed again without adding the user.

(9) [Help] button

The Help screen is displayed.

Change the Defined User Settings

(1) User - Edit

When you click the [Edit] button on the User Setting screen, the User - Edit screen is displayed. This screen allows you to.

Figure 6-3: User - Edit

Each displayed item is the same as the User - Add screen.

When you update the item to change and click the [OK] button, the change is added.

1. The maximum number of users that can be created on SnapSAN Manager (including SnapSAN Manager Embedded) is as follows:

   Storage group user: 100

   Storage user: 32

   Partition user: 128

2. The user created by default in SnapSAN Manager Embedded (sysadmin) cannot be deleted. It is recommended to promptly change the password when using the product for the first time.

3. The following character strings cannot be used to specify a user name on SnapSAN Manager Embedded.

   adm bin daemon dladm gdm listen lp noaccess nobody nobody4 nuucp mysql openldap postgres root smmsp support sys uucp vndrmnt webservd xvm zfssnap

Pool

A pool is a virtual medium that binds multiple physical disks to form a RAID. The area of the created pool is divided into logical disks.

When a physical disk is added, a pool can be created using the added physical disk and logical disks can be created in that pool. It is also possible to expand the capacity by adding a physical disk to an existing pool. Doing so does not affect any other logical disks that are already in use.

You can choose one of the following RAID pool configurations:

- RAID6/60 (4+PQ)/(8+PQ)
- RAID-TM (Triple Mirror)
- RAID5/50 (2+P)/(4+P)/(8+P)
- RAID1/10 (Mirror)

You can perform the following operations in relation to a pool. When you are managing two or more disk arrays, select the target disk array on the main screen before clicking the desired operation.

- Pool Bind
- Pool Unbind
- Pool Management
    - Capacity Expansion
    - Rearrangement
    - Change Of Settings

Pool Bind

Bind a new pool.

The Pool Bind screen consists of the following screens:

- Pool Bind
    Select physical disks
- Confirmation
    Advanced Settings
- Completion

Pool Bind

Set the pool you want to bind.

Figure 7-1: Pool Bind

1. **Show pool list**

   Clicking the [Show pool list] button displays a list of existing pools.

   Clicking the [Close pool list] button hides the pool list.

2. **Physical disk type**

RAID Type

- · The available physical disk types and RAID types differ for each disk array.
- · Only the physical disk types and RAID types that are available for the target array disk are shown in drop-down lists.

3. **Number of physical disks and Physical disk capacity**
   Select the physical disks to be used.

Auto Disk Selection

Select the number of physical disks to be used and the capacity per physical disk.

As the number of physical disks, you can select one of the following:

RAID6/60(4+PQ): 6 physical disks or more
RAID6/60(8+PQ): 10 physical disks or more
RAID5/50(2+P): 3 physical disks or more
RAID5/50(4+P): 5 physical disks or more
RAID5/50(8+P): 9 physical disks or more
RAID-TM: 3 physical disks or more
RAID1/10: 2 physical disks or more

Manual Disk Selection

If you click [Select physical disks] button, you can manually select the physical disks to be used for the pool.

[Calculate pool capacity] button

When you click this button, the [Total capacity of the pool] field displays the pool capacity (estimate).

When you have changed the physical disk type, the RAID type, the number of physical disks, the physical disk capacity, or the selected physical disk for manual selection, [0 GB] may be displayed temporarily.

· If you bind a pool with 61 physical disks or more, pool expansion is executed automatically.

· If you bind a pool with 61 physical disks or more, the [Total capacity of the pool] field displays a roughly estimated value.

Navigation button(s)

· **[Next]**

The Confirmation screen is displayed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Select Physical Disks

Select the physical disk.

The physical disk selection section can be displayed on the list tab or view tab. You can switch the display by selecting the tab at the top of the section.

On the list tab, the physical disks that cannot be used to bind a pool are not displayed in the list; on the view tab, the corresponding check boxes are grayed out.
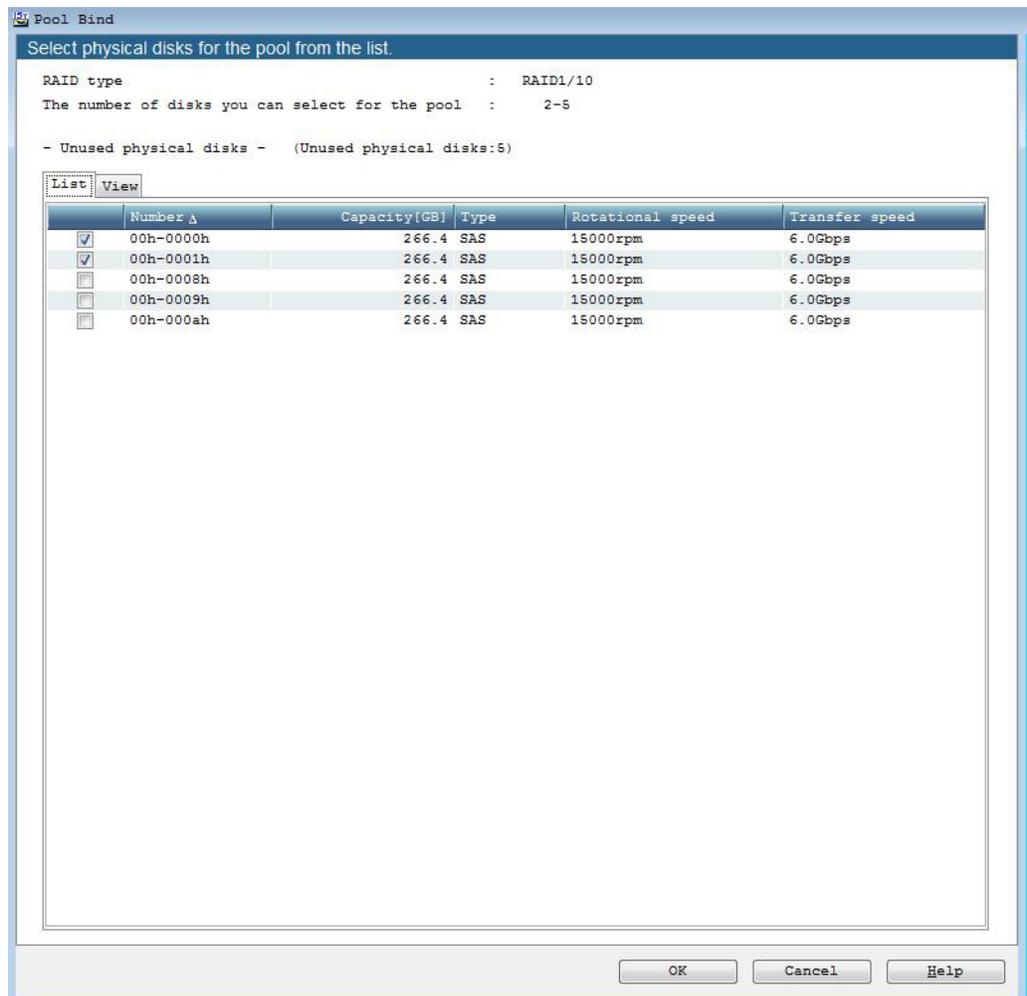
[List] tab

Figure 7-2: List Tab

View Tab
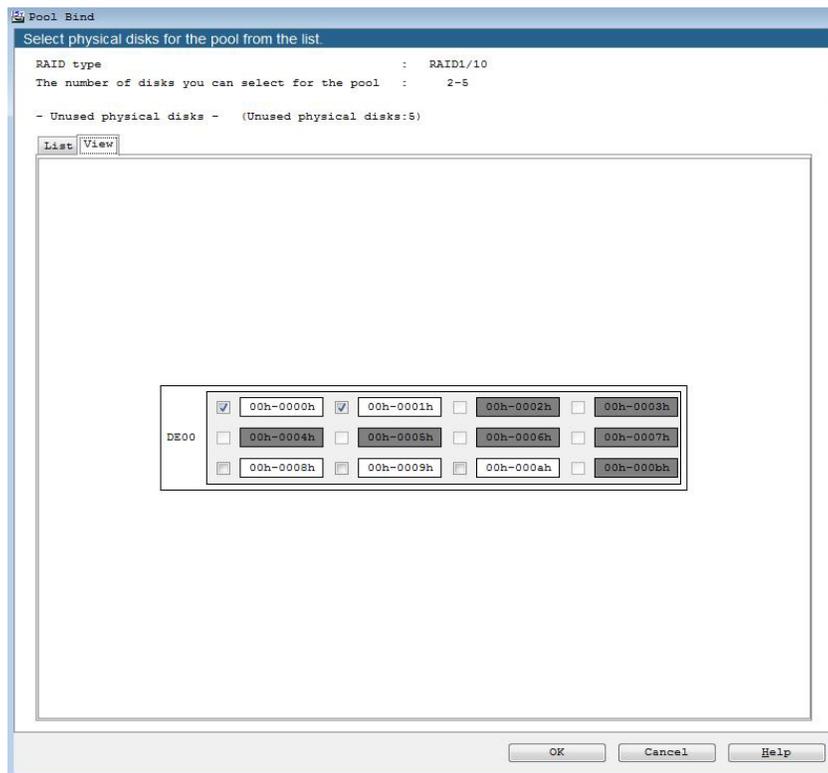
Figure 7-3: View Tab

Confirmation

The settings of the pool are displayed.
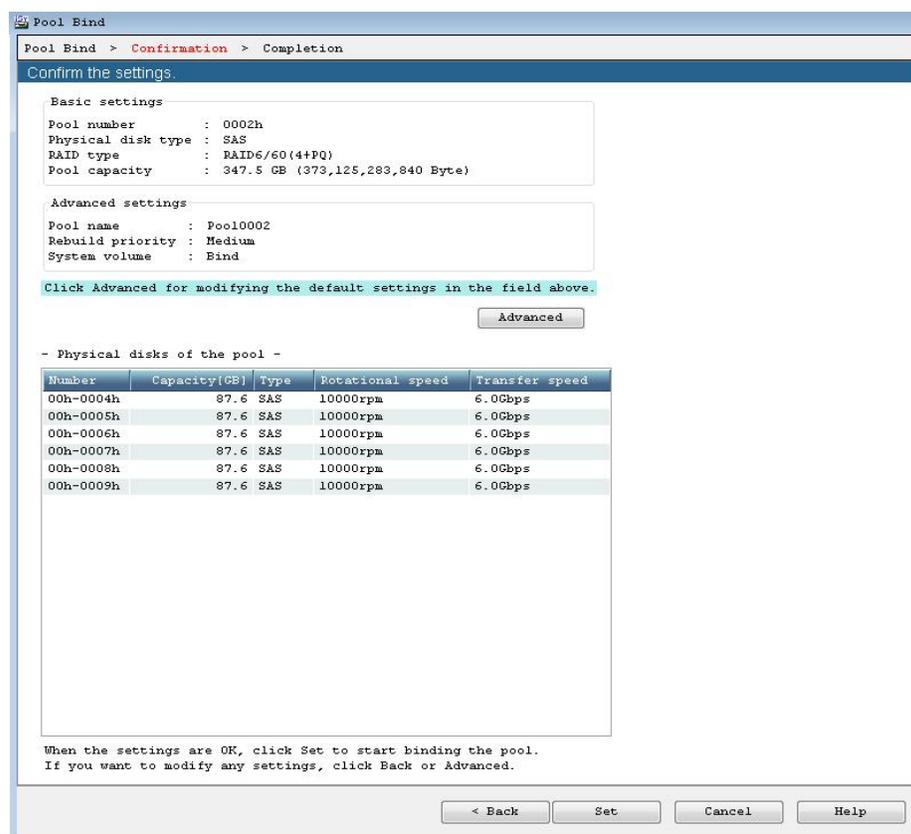
Figure 7-4: Confirmation

The settings of the pool you are binding are listed. Check the settings to see whether they are correct.

Clicking the [Advanced] button displays the Advanced Settings screen.

Basic Settings

Pool number

Number unique in the disk array automatically assigned to the pool to be bound.

Physical disk type

Selected physical disk type.

RAID type

Selected RAID type.

Pool capacity

Capacity of the pool to be bound.

Advanced Settings - Change

The following items can be changed on the [Advanced Settings] screen.

Pool Name

Name of the pool to be bound.

Rebuild Priority

> When one of the physical disks consisting of the pool fails, that disk is switched to the hot spare disk or the RAID configuration is restored to the replaced physical disk according to this priority.

System Volume

> Indicates whether to create the system volume when binding a pool. When you bind the first pool, [Bind] is selected by default. If the system volume has been already created, this item is not displayed.

Navigation button(s)

[Set]

> The following confirmation dialog box is displayed.
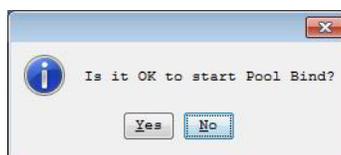
Figure 7-5: Confirmation

If you click [Yes], the pool binding operation is executed and then the Completion screen is displayed.

[Back]

> The Pool Bind screen is displayed again.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Advanced Settings - Configuration

Set the advanced settings for pool binding.
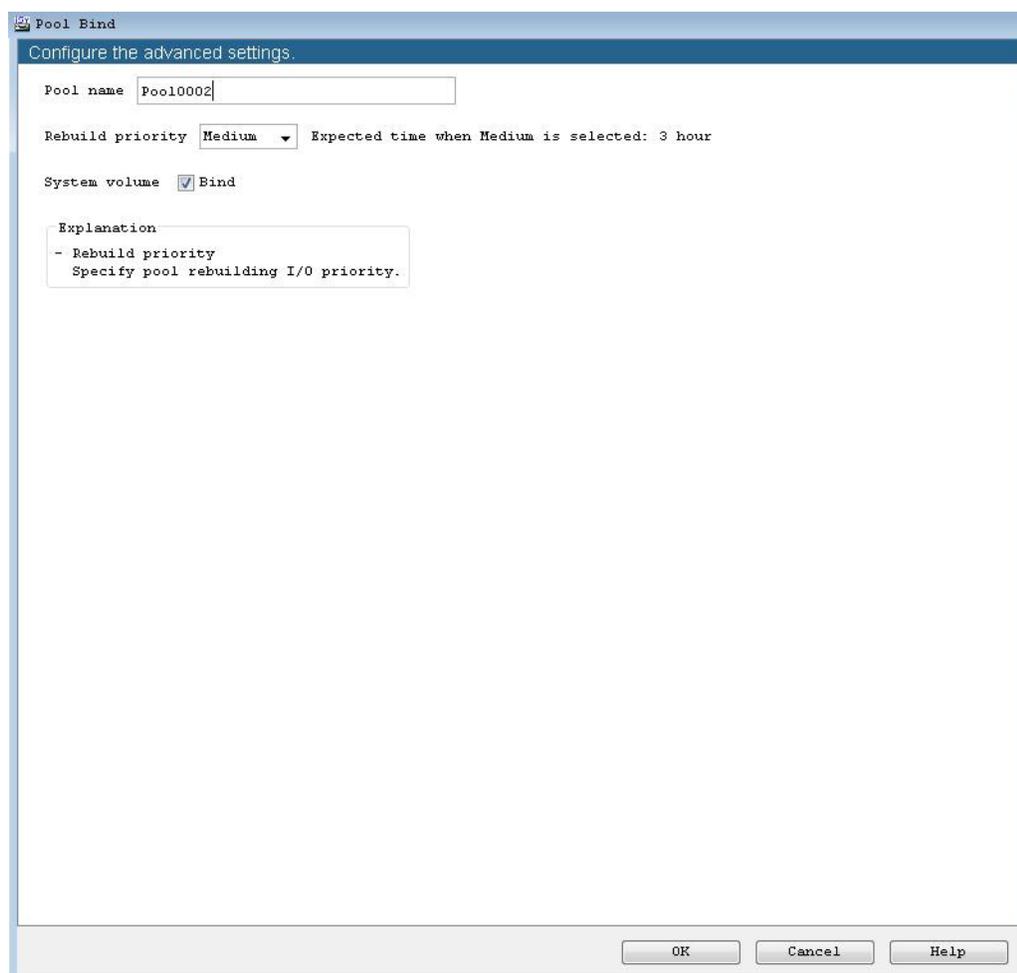
Figure 7-6: Advanced Settings

Pool Name

Specify a name for the pool to be built. Characters that can be used in a pool name are single-byte alphanumeric characters, "/", and "_".

Rebuild Priority

Specify the rebuild priority. The initial value is [Medium].

- High: Top priority is given to rebuilding. The disk access performance from the application server is degraded.
- Medium: The rebuilding operation is executed to take 24 hours for 1 TB considering the performance of the data transfer with the application server. Rebuilding and disk access from the application server are balanced. If the disk is frequently accessed, the disk access performance may be degraded during rebuilding. (When [Medium] is selected, the estimated time will be displayed.)
- Low: Priority is given to disk access from the application server.

System Volume

Disk arrays require the volume for disk array management.

This check box is enabled if the system volume must be created.

Be sure to create the system volume to retain information that would be required for investigation in case that a failure or malfunction occurs.

Completion

The result of the pool binding is displayed.
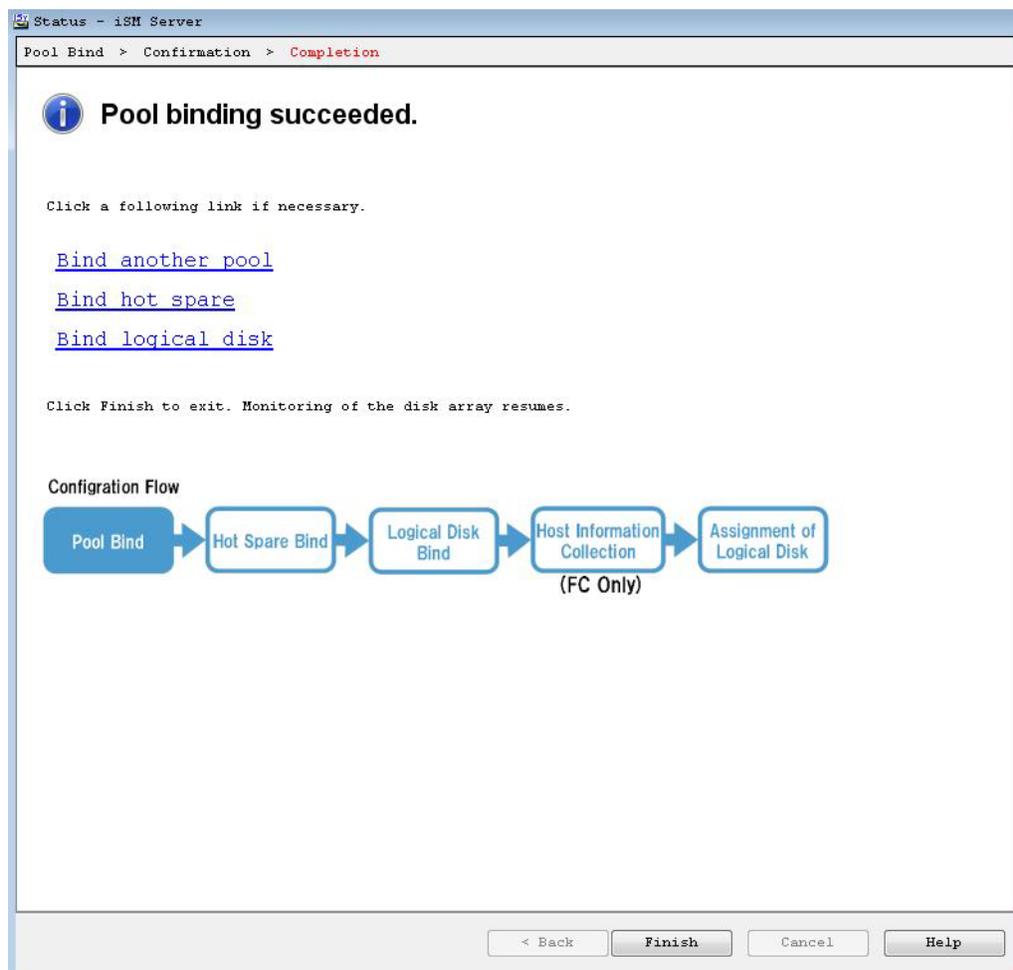
Figure 7-7: Completion

When this operation is successful, the following links are displayed.

Bind another pool

> The Pool Bind screen is displayed again for binding another pool.

Bind hot spare

> The Hot Spare Bind screen is displayed.

Bind logical disk

> The Logical Disk Bind screen is displayed.

• When [Power saving setting of physical disk] is set in power saving mode, binding may take time because the physical disks need to be started.

- If the pool binding fails, check the latest state of the disk array.
- If the pool binding fails, there may be a pool in which no physical disk exists. In that case, unbind that pool to eliminate the cause of the failure and then execute the pool binding again.

Navigation button(s)

[Finish]

The [Monitor] - [Screen Display] screen is displayed.

- If a pool is bound by using the encryption HDD (PD type: SAS (SED)), the authentication key is automatically set for the encryption HDD for security.
- If you want to change the specified authentication key again, perform [Pool Management] - [Change Of Settings].

Pool Unbind

Unbind a pool and place the physical disks assigned to it in the unused state.

Select the pool you want to unbind.

Figure 7-8: Pool Unbind

You can select only one pool to unbind.

Pools that fit any of the following conditions cannot be selected.

Conditions Making Pools Unselectable

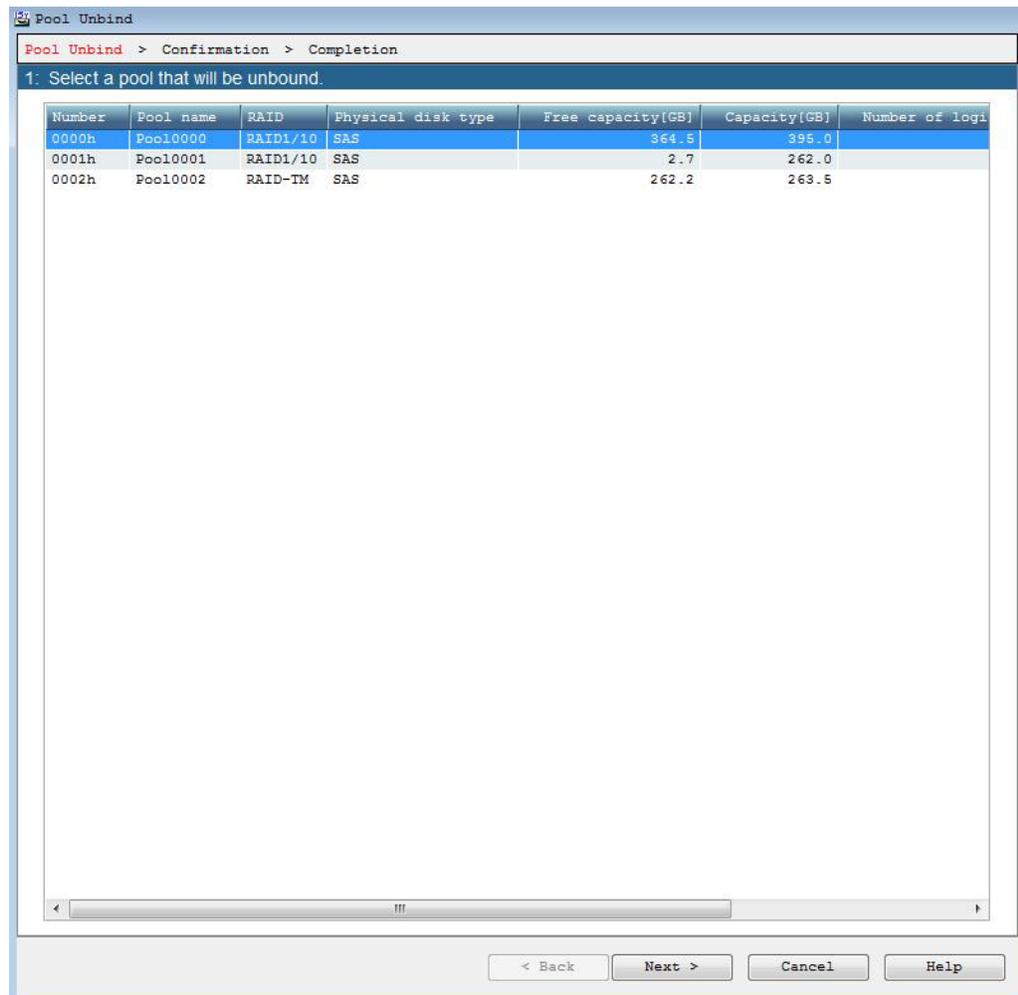| Condition	Description
assign(FC)	Logical disks in the pool have already assigned to the host connected via FC.
assign(iSCSI)	Logical disks in the pool have already assigned to the host connected via iSCSI.
assign(SAS)	Logical disks in the pool have already assigned to the host connected via SAS.
pairing(repli)	Logical disks in the pool have been paired for replication.
pairing(data migration)	Logical disks in the pool have been paired for data migration.
snap shot	There is a BV, SV, or SDV in the pool.
linked	Snapshot link is set for LVs in the pool.
reserved	Logical disks in the pool belong to the reserve group.
data protection	Logical disks in the pool are secured by the data retention.
during reinit	Logical disks in the pool are being initialized by the data retention.
locked	Operation guard is set to logical disks in the pool.
locked (BV)	Operation guard is set to BV corresponding LV in the pool.
PD rotation stop	Rotation of the pool is stopped by the power saving function.
work disk	There is a work disk for optimization in the pool.
moving	The pool includes a logical disk that is being moved by the data allocation optimization.
assign (cache)	Logical disks in the pool have been assigned to the cache segment.
Pool Group	The pool is set as a pool group for data allocation optimization.

Navigation button(s)

[Next]

> The Confirmation screen is displayed.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and the monitor screen is displayed.

Confirmation

The settings of the pool to be unbound are displayed.
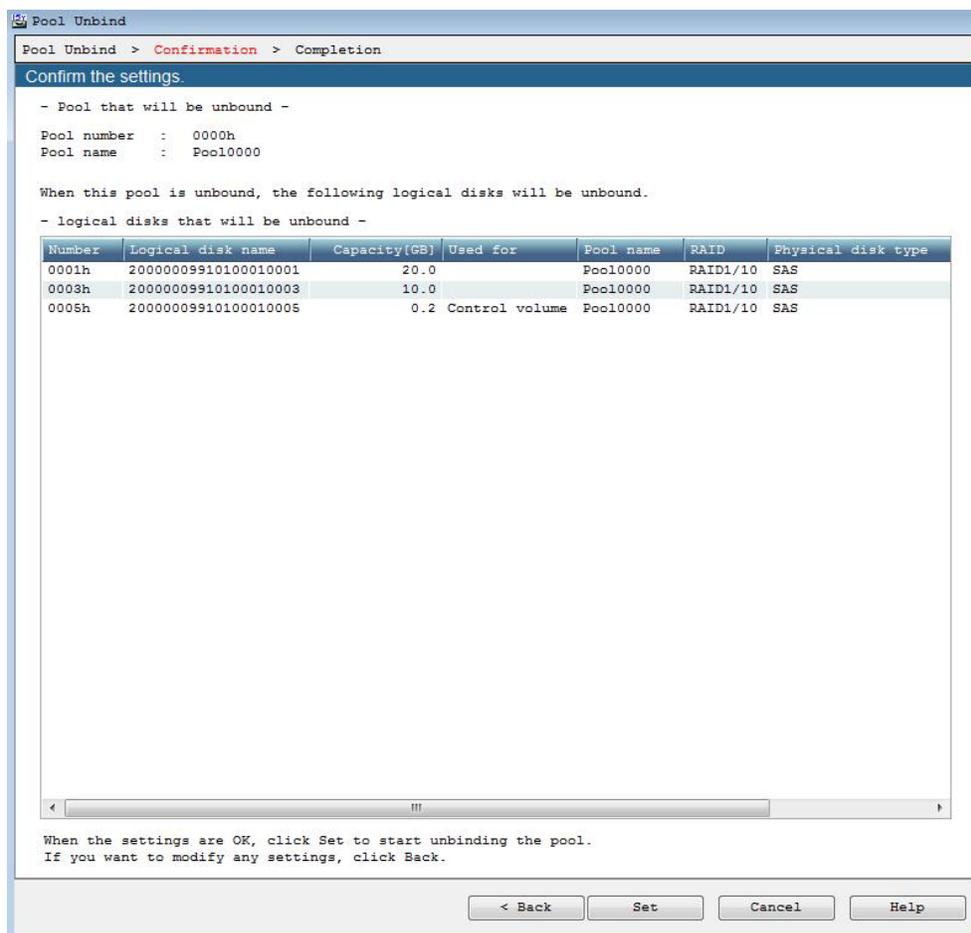
Figure 7-9: Confirmation

If the pool includes physical disks, they are displayed in a list.

- If access control is not used when configuration lock is enabled, the operation of the application server is checked before the pool including logical disks is unbound. For this reason, the pool unbinding operation may take time.

- After the pool including the logical disk of LDN0000h is unbound when access control is not used, the application server may become unable to recognize any of the logical disks.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.
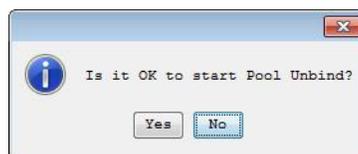
Figure 7-10: Confirmation

If you click [Yes], the operation of unbinding the pool is executed and then the Completion screen is displayed.

[Back]

The Pool Unbind screen is displayed again.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Completion

The pool unbinding result is displayed.
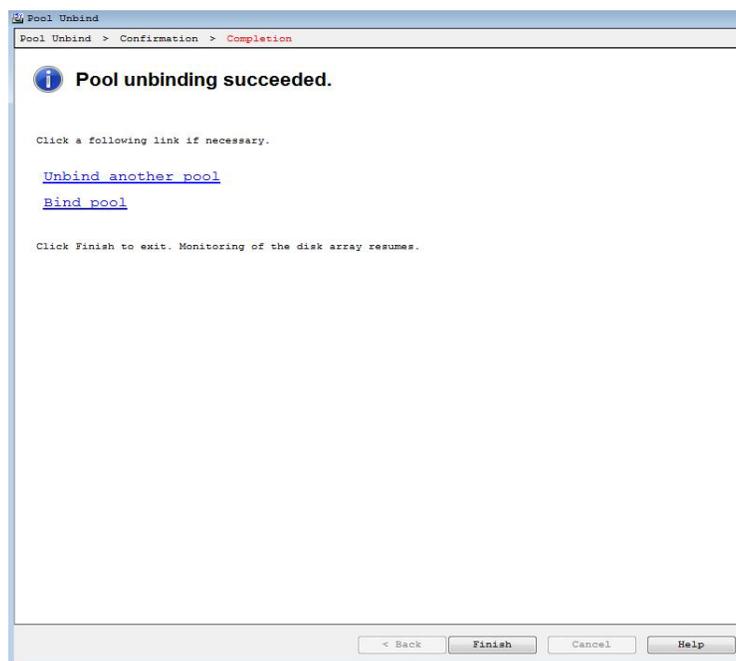
Figure 7-11: Completion

When this operation is successful, the following links are displayed.

Unbind another pool

The Pool Unbind screen is displayed again for unbinding another pool.

Bind pool

The Pool Bind screen is displayed.

Navigation button(s)

[Finish]

The [Monitor] - [Screen Display] screen is displayed.

• If a pool in the encrypted HDD (PD type: SAS (SED)) is bound, the authentication key set in the encrypted HDD during binding returns to the value. The user does not have to change the authentication key setting.

- It takes some time to initialize the authentication key for the encrypted HDD. Wait for about one minute before rebinding a pool using the encrypted HDD whose pool was unbound. If you try to bind a pool while the authentication key is being initialized, the pool binding operation fails.

Pool Management

Capacity Expansion

Expand the capacity of a pool.

The Pool Capacity Expansion screen consists of the following screens:

Pool Capacity Expansion

    Physical Disk Selection

Confirmation

    Advanced Settings

Completion

    After capacity expansion, the result is displayed.

Pool Capacity Expansion

This screen is used to specify the settings for pool capacity expansion
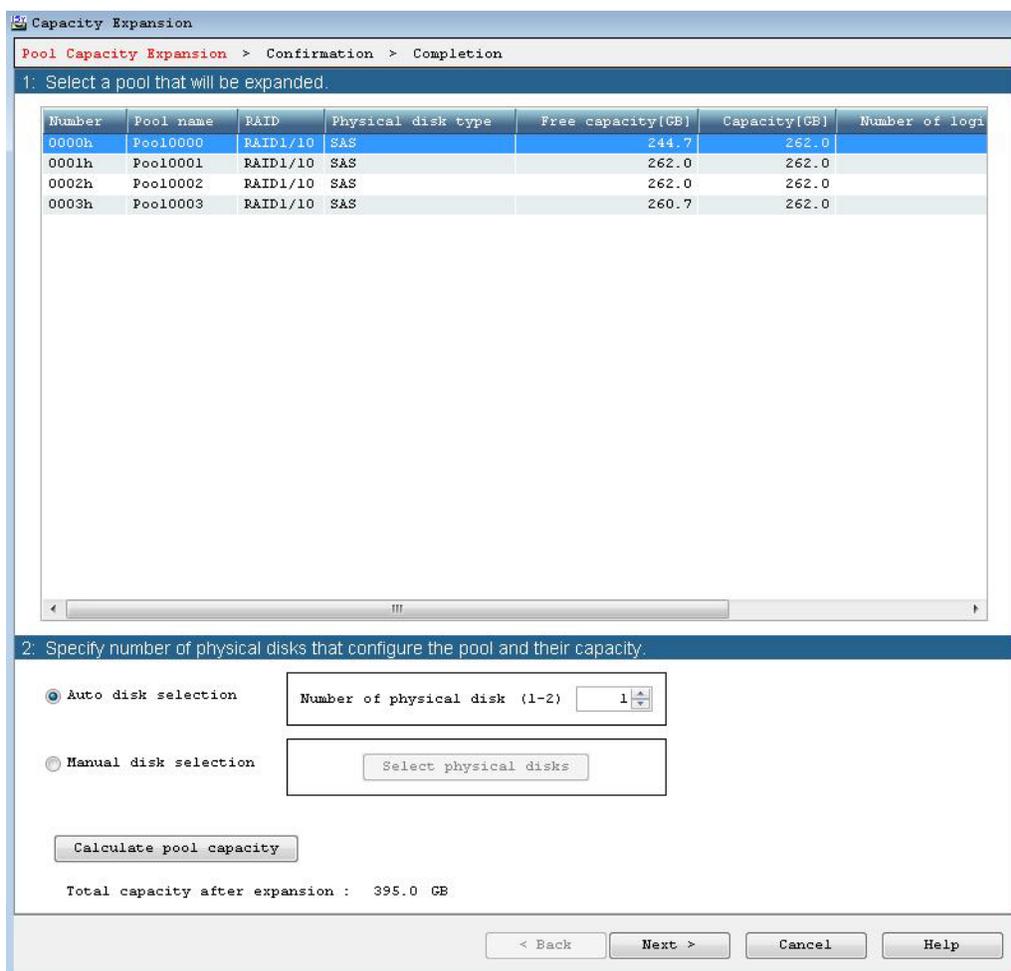
Figure 7-12: Pool Capacity Expansion

Pool selection

Select the pool you want to expand from the list.

Pools that fit any of the following conditions cannot be selected.

Condition	Description
expanding	The pool is being expanded.
rearranging	The pool is being rearranged.
PD rotation stop	Rotation of the pool is stopped by the power saving function.

Number of physical disk

Select the number of physical disks to be added.

Auto disk selection

When you set the number of physical disks, the disks to be added are selected automatically.

Manual disk selection

[Select physical disks] button

The physical disk selection screen is displayed that lets you select the disks to be added individually.

[Calculate pool capacity] button

The actual pool capacity after expansion is recalculated and displayed in the [Total capacity after expansion] field.

Navigation button(s)

[Next]

The Confirmation screen is displayed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Physical Disk Selection

Select the physical disk.

The physical disk selection section can be displayed on the list tab or view tab. You can switch the display by selecting the tab at the top of the section.

On the list tab, the physical disks that cannot be used to expand the capacity are not displayed in the list; on the view tab, the corresponding check boxes are grayed out.
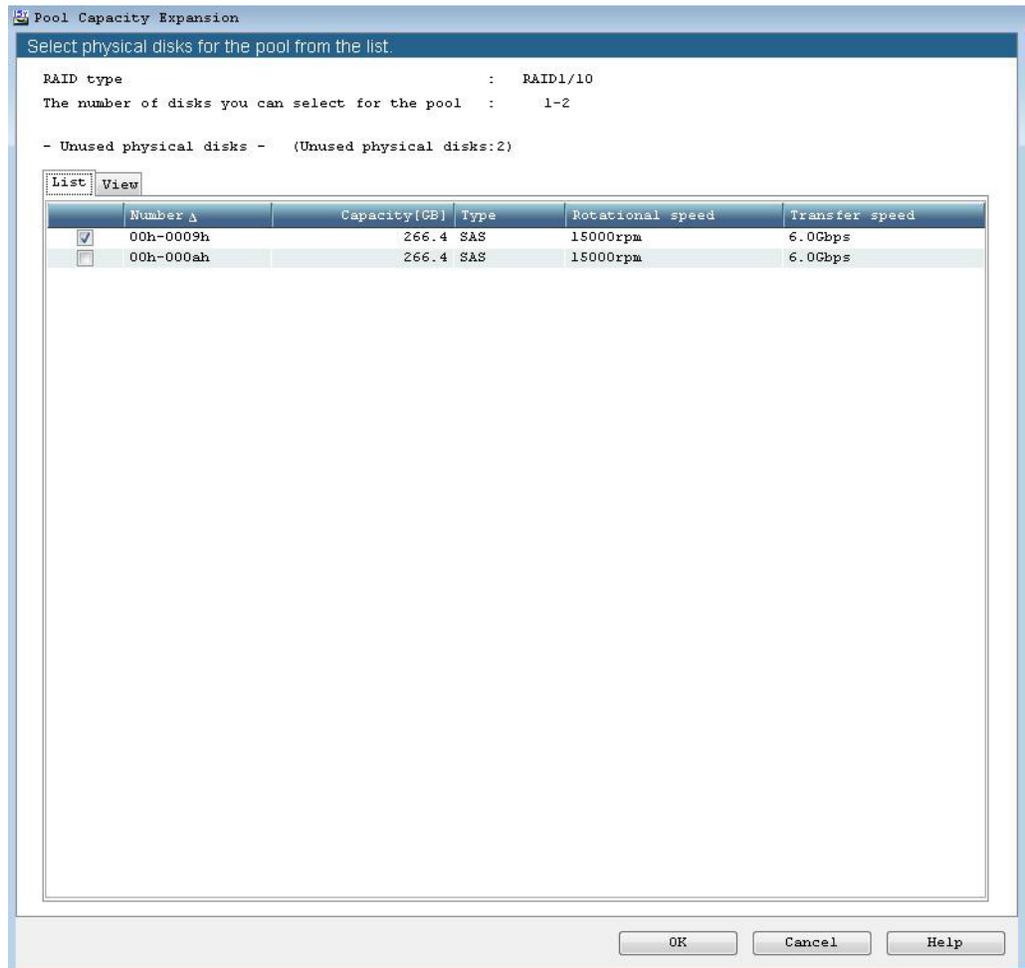
[List] tab

Figure 7-13: List Tab

[View] tab
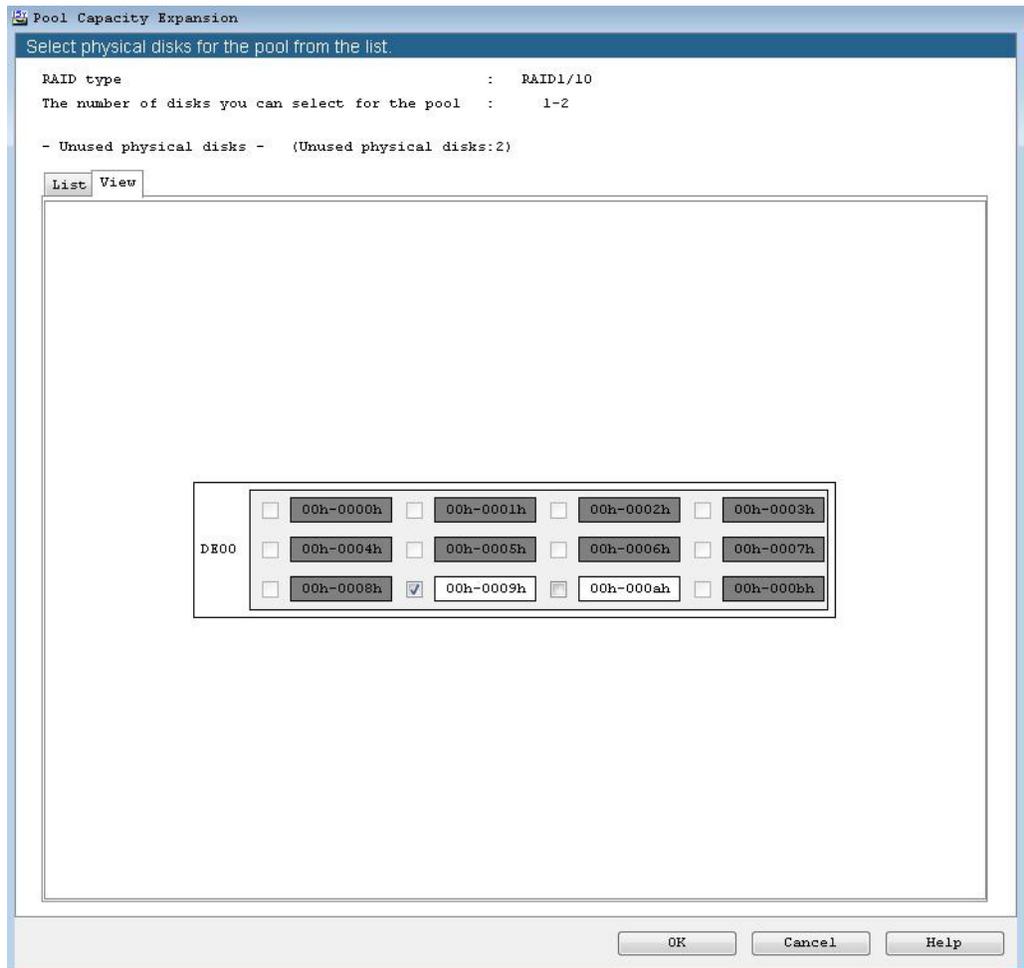
Figure 7-14: View Tab

Confirmation

Check the settings for pool capacity expansion.
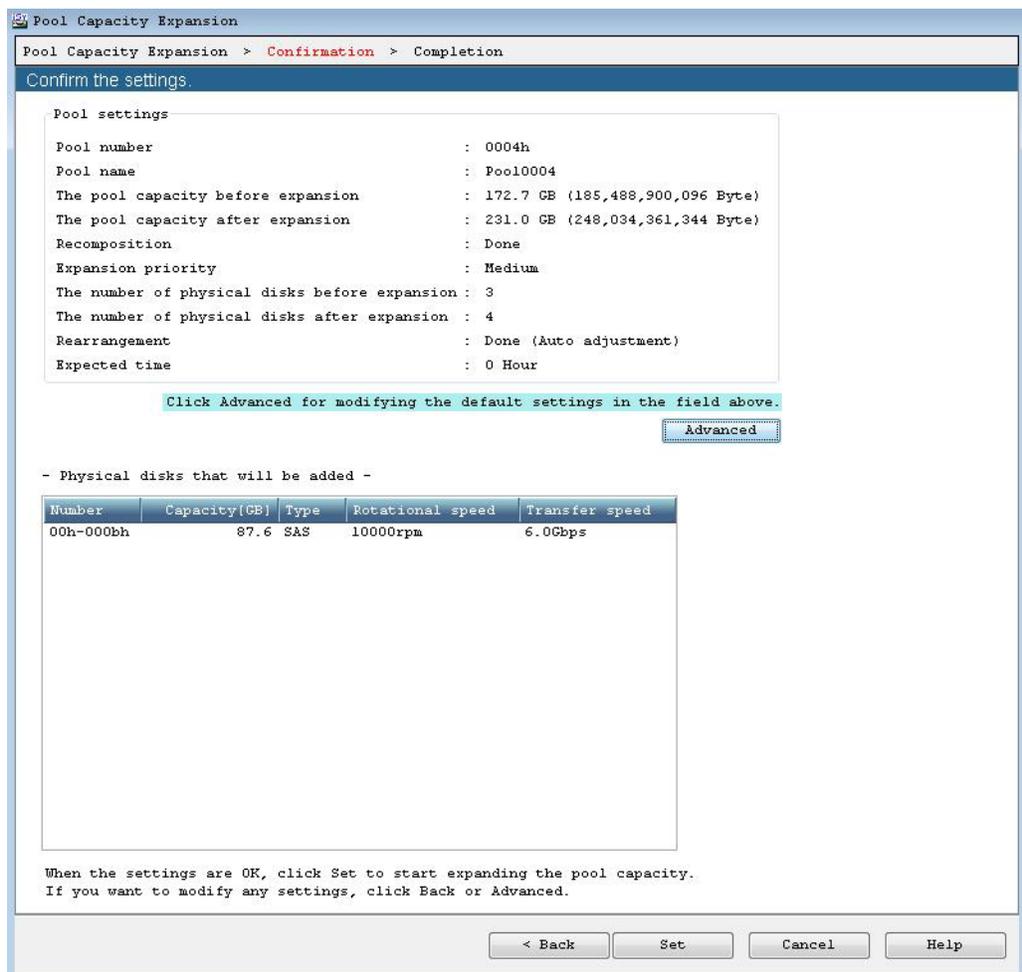
Figure 7-15: Confirmation

[Advanced] button

The Advanced Settings screen is displayed. Specify the settings concerning the expansion method.

The settings of the pool you are expanding are listed. Check the settings to see whether they are correct.

Pool number: Number of the pool to be expanded.

Pool name: Name of the pool to be expanded.

The pool capacity before expansion:

> Pool capacity before expansion.

The pool capacity after expansion:

> Pool capacity after expansion.

Recomposition: Whether to reconfigure the pool during expansion.

> This can be changed in the Advanced settings.

Expansion priority

The priority for expanding the pool capacity.

The number of physical disks before expansion:

Number of physical disks configuring the pool before
expansion.

The number of physical disks after expansion:

Number of physical disks configuring the pool after
expansion.

Rearrangement: Whether to rearrange the data in the pool during expansion.

This can be changed in the Advanced settings.

Expected time: Expected rearrangement time if the pool data is rearranged.
The actual time may be more or less different depending on the load on the disk array.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.

Figure 7-16: Confirmation

If you click [Yes], the pool capacity expansion operation is executed and then the Completion
screen is displayed.

[Back]

The Pool Capacity Expansion screen is displayed again.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK]
button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display]
screen.

Advanced Settings

Set the advanced settings for pool capacity expansion.
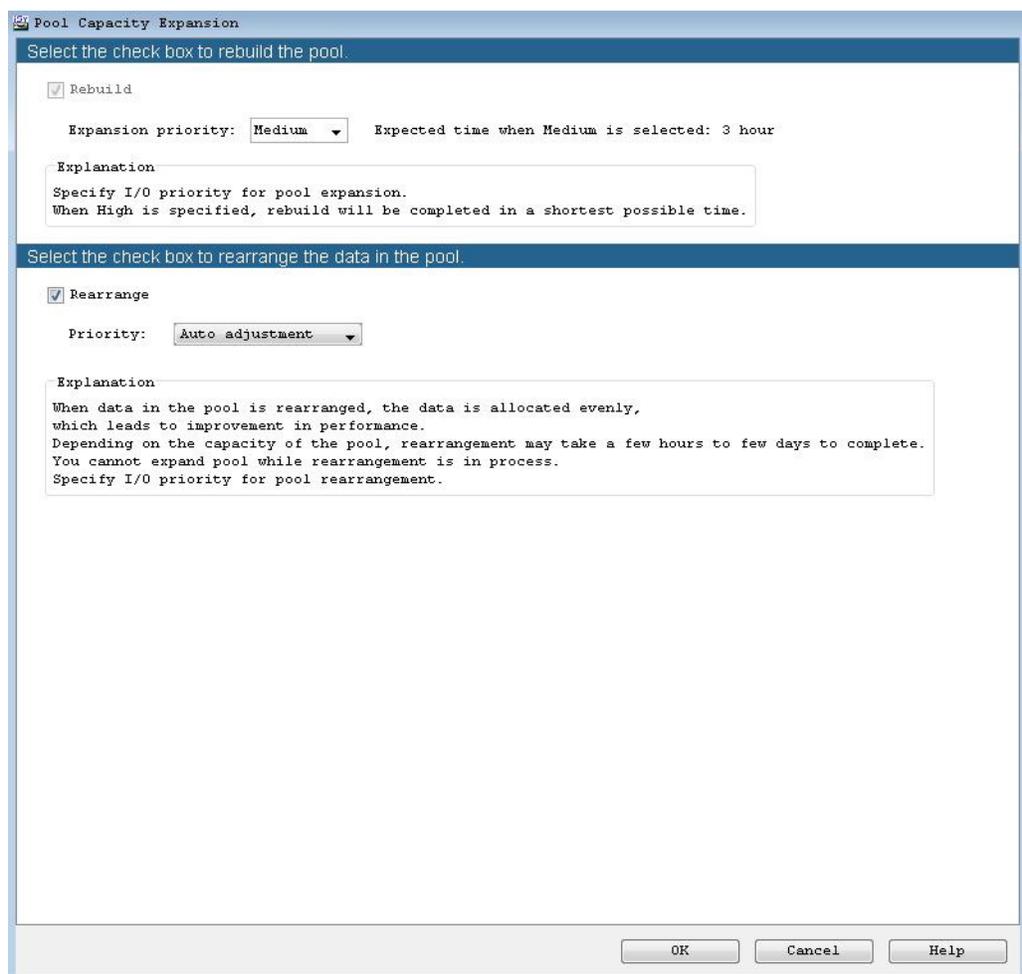
Figure 7-17: Advanced Setting

Rebuild

If you rebuild the pool, the blocks in the RAID configuration are rearranged so that they are evenly distributed to each physical disk.

If the number of physical disks to be used for expansion is not sufficient for the RADI configuration, rearrangement is executed automatically.

Expansion priority

Set the priority of the pool capacity expansion operation to [High], [Medium], or [Low].

High: The expansion operation is executed as fast as possible. Selecting [High] might affect performance of the data transfer with the application server.

Medium: The expansion operation is executed to take 24 hours for 1 TB considering the performance of the data transfer with the application server. (When [Medium] is selected, the estimated time will be displayed.)

Low: The expansion operation is executed so as not to affect the performance of the data transfer with the application server.

This priority does not apply to the rearrangement operation, which is included in the expansion operation.

Rearrange

The data in the logical disks bound in the pool is rearranged so that it is distributed to the expanded physical disks, improving performance.

Priority

Set the priority of the pool rearrangement operation to fastest or automatic adjustment.

If the priority is set to fastest, the rearrangement operation is executed as fast as possible.

If it is set to automatic adjustment, the speed of the rearrangement operation is adjusted so as to reduce the effect on data transfer with the application server.

Completion

The result of the pool capacity expansion is displayed.
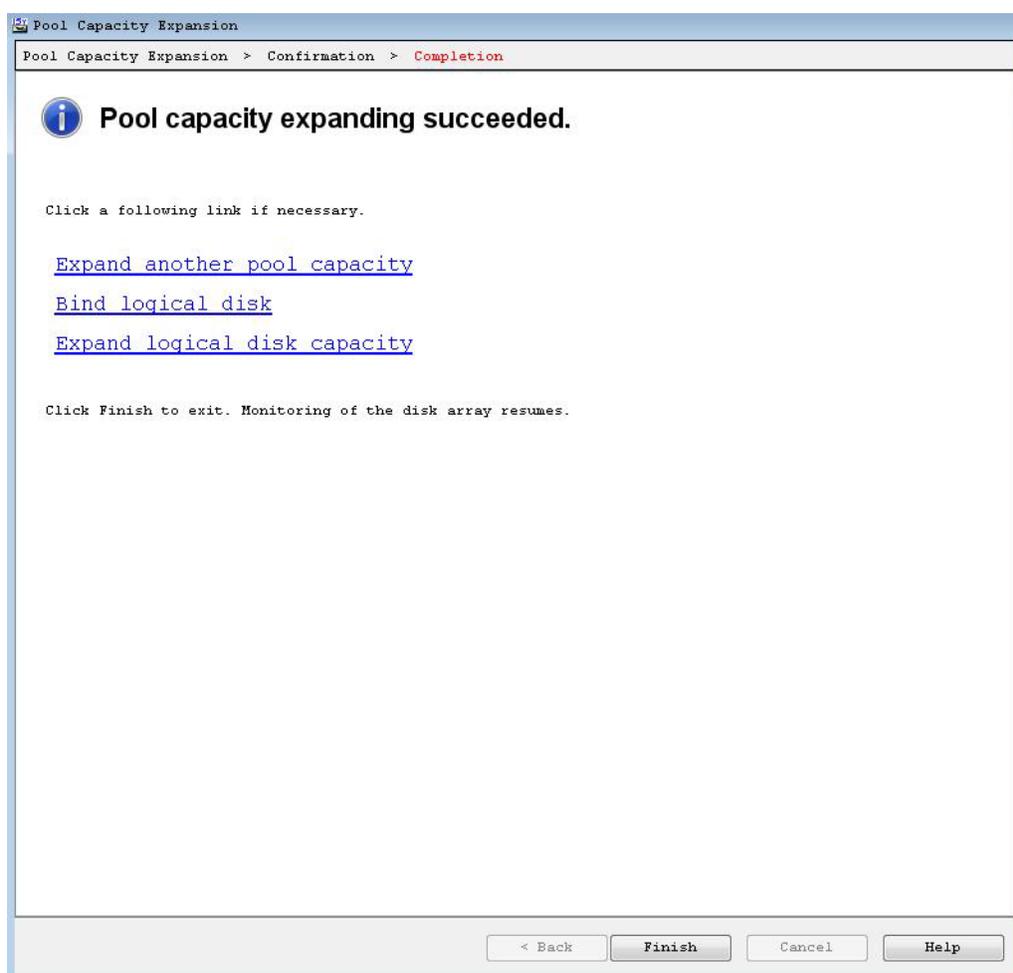
Figure 7-18: Confirmation

When this operation is successful, the following links are displayed.

Expand another pool capacity

> The Pool Capacity Expansion screen is displayed again for expanding another pool capacity.

Bind logical disk

    The Logical Disk Bind screen is displayed.

Expand logical disk capacity

    The Logical Disk Capacity Expansion screen is displayed.

Navigation button(s)

[Finish]

    The [Monitor] - [Screen Display] screen is displayed.

If the authentication key has already been changed from the default one, it is not necessary to specify a new authentication key (or change the existing one) when expanding the capacity of the pool that was bound by using an encryption HDD (PD type: SAS (SED)). The specified authentication key is automatically assigned to the added encryption HDD.

When many physical disks are expanded with [Rebuild] and [Medium] selected for [Expansion Priority], it may impact the performance of the data transfer from/to application servers.

If performance of the data transfer from/to application servers is significantly impacted, change the [Expansion Priority] to [Low].

Rearrangement

Start or stop the rearrangement of the pool whose capacity you have expanded.
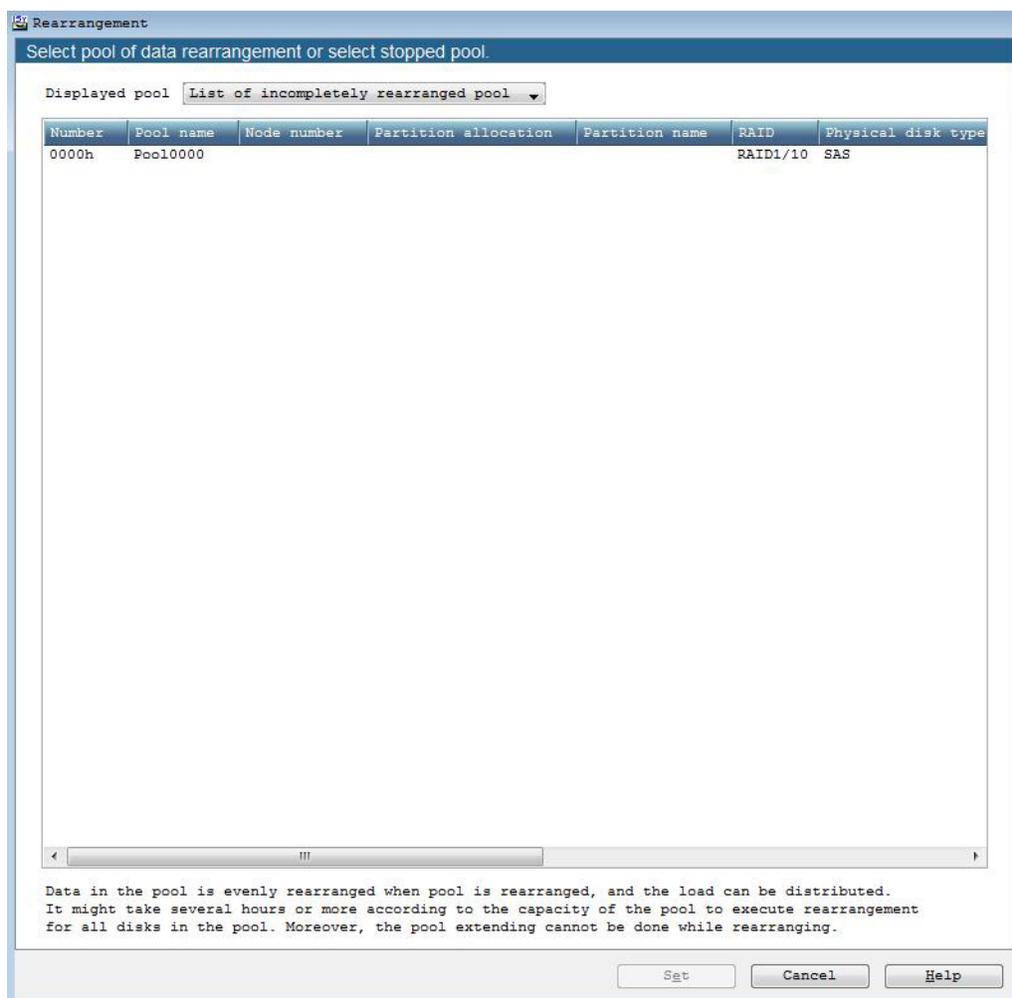
Figure 7-19: Rearrangement

Displayed Pool

Switch the content of the pool list.

List of incompletely rearranged pool

> The list displays pools that are not rearranged and those whose rearrangement has been interrupted or failed.

List of pools during rearrangement

> The list displays pools that are being rearranged and those to be rearranged after expansion.

Pool List

This is a list of the target pools. Select the pool you want to rearrange.

Pools that fit the following condition cannot be selected.

PD Rotation Stop: Rotation of the pool is stopped by the power saving function.

Buttons

[Set]

The following confirmation dialog box is displayed.
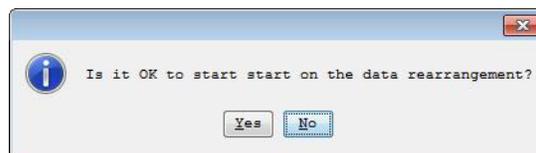
Figure 7-20: Confirmation

If you select [Yes], the selected pool is rearranged.

When [List of incompletely rearranged pool] is displayed, rearrangement is started or resumed.

When [List of pools during rearrangement] is displayed, rearrangement is stopped.

[Cancel]

The [Monitor] - [Screen Display] screen is displayed again without changing the settings.

Change of Settings

Change the settings of a pool.

The Change of Settings screen consists of the following screen:

Change of Settings (Pool)

This screen is used to change the settings for a pool.
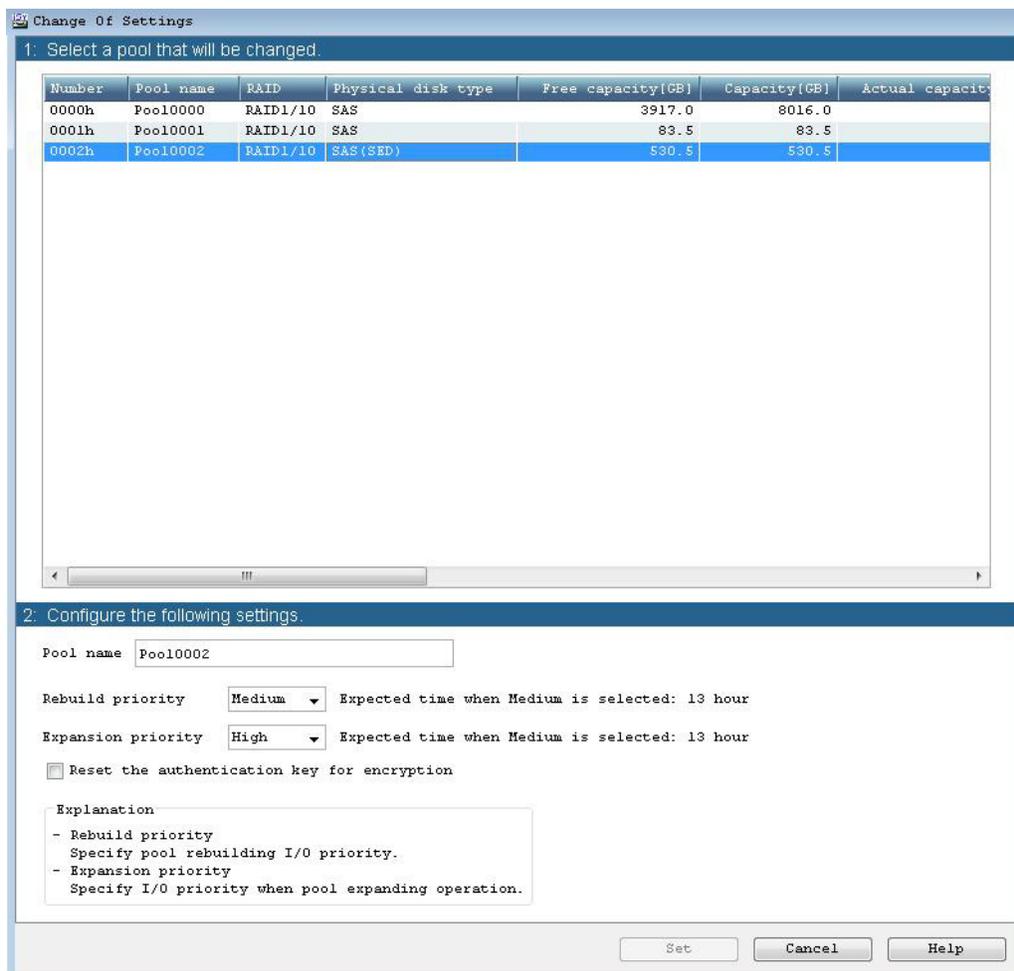
Figure 7-21: Change of Settings (Pool)

Pool selection

From the list, select a pool whose settings you want to change.

Pools that fit the following condition cannot be selected.

PD rotation stop Rotation of the pool is stopped by the power saving function.

Change of Settings

Pool name

Change the pool name. Characters that can be used in a pool name are alphanumeric characters, "/", and "_".

A name same as the existing pool names cannot be specified. When the same name is specified, the [Set] button cannot be clicked.

Rebuild Priority

Set the priority of the RAID configuration rebuilding operation to be performed when any physical disk belonging to a pool is changed to [High], [Medium], or [Low].

High: The RAID configuration is rebuilt as fast as possible. Selecting [High] might affect performance of the data transfer with the application server.

Medium: The rebuilding operation is executed to take 24 hours for 1 TB considering the performance of the data transfer with the application server. (When [Medium] is selected, the estimated time will be displayed.)

Low: The rebuilding operation is executed so as not to affect the performance of the data transfer with the application server.

Expansion Priority

Set the priority of the pool capacity expansion operation to [High], [Medium], or [Low].

High: The expansion operation is executed as fast as possible.

Medium: The expansion operation is executed to take 24 hours for 1 TB considering the performance of the data transfer with the application server. (When [Medium] is selected, the estimated time will be displayed.)

Low: The expansion operation is executed so as not to affect the performance of the data transfer with the application server.

This priority does not apply to the rearrangement operation, which is included in the expansion operation and executed with the priority set for pool capacity expansion.

Reset the Authentication Key for Encryption

You can change the authentication key for the pool bound using the encryption HDD (PD type: SAS(SED)).

Select this check box to change the authentication key.

This setting is displayed only when the pool bound using the encryption HDD (PD type: SAS(SED)) is selected.

Navigation button(s)

[Set]

> The following confirmation dialog box is displayed.
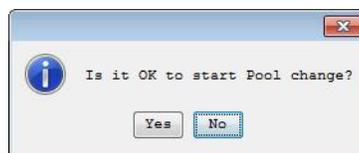
Figure 7-22: Confirmation

If you select [Yes], the pool setting changes are made.

[Cancel]

> The [Monitor] - [Screen Display] screen is displayed again without changing the settings.

Hot Spare

You can perform the following operations in relation to a hot spare.

- Hot Spare Bind
- Hot Spare Unbind
- Hot Spare Management

Change Of Settings

Hot Spare Bind

Bind a hot spare.

The following screens are used to bind a hot spare.

- Hot Spare Bind
- Completion

Hot Spare Bind

Make the settings for binding a hot spare
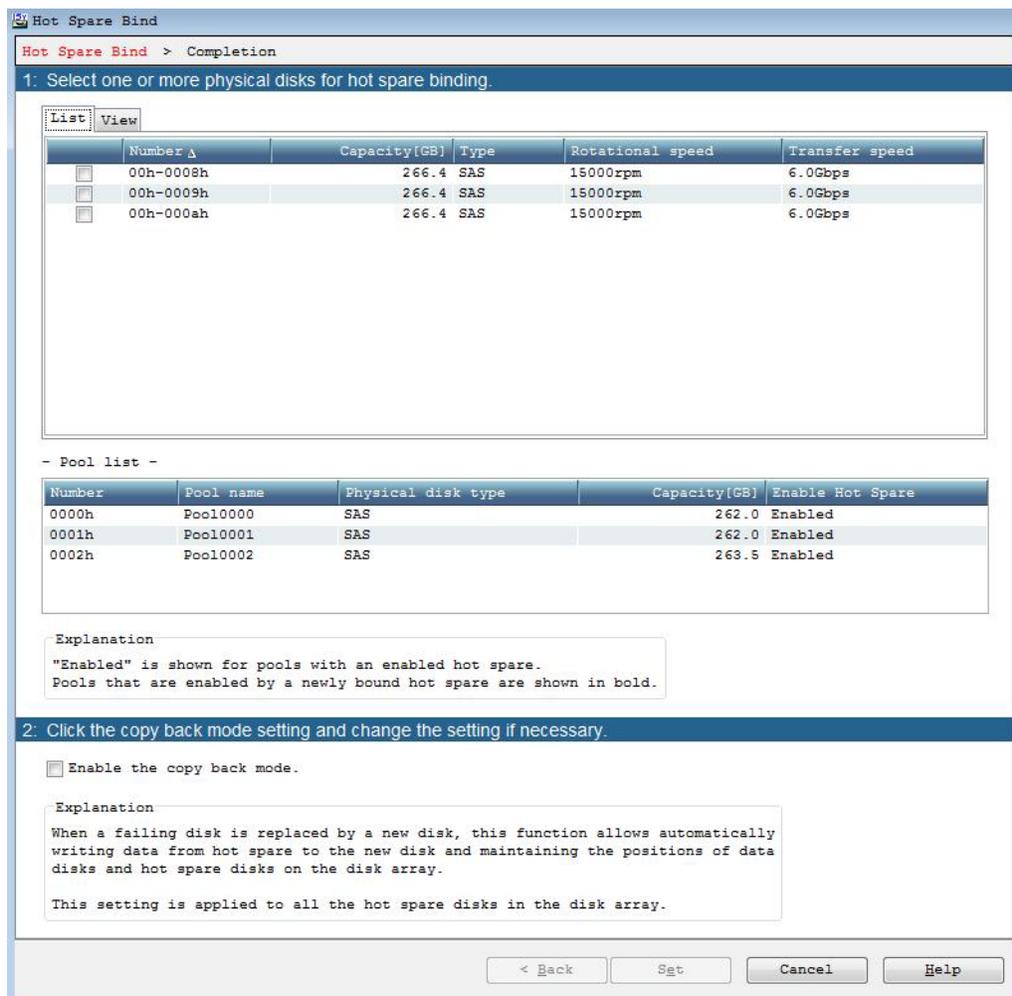
Figure 8-1: Hot Spare Bind

Selecting the physical disks for which to bind a hot spare

Physical disk selection

Select the check box of each physical disk for which to bind a hot spare. The physical disk set as a hot spare must be of the same type as the physical disks in the pool and must have the same or superior capacity and rotation speed.

- On the list tab, those slots for which no physical disk exists are not displayed in the list; on the view tab, the slots and the corresponding check boxes are grayed out.
- On the list tab, those physical disks bound for a pool are not displayed in the list; on the view tab, the corresponding check boxes are grayed out.

The physical disk selection section can be displayed on the view tab or list tab.

You can switch the display by selecting the tab at the top of the section.

[List] tab

	Number △	Capacity[GB]	Type	Rotational speed	Transfer speed
☐	00h-0008h	266.4	SAS	15000rpm	6.0Gbps
☐	00h-0009h	266.4	SAS	15000rpm	6.0Gbps
☐	00h-000ah	266.4	SAS	15000rpm	6.0Gbps

Figure 8-2: List Tab

[View] tab
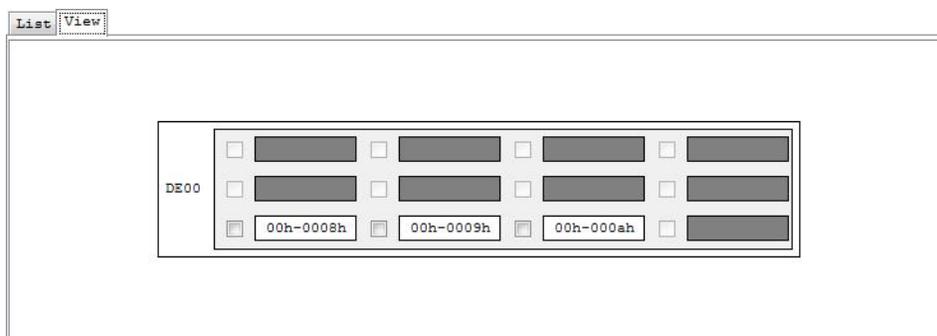
Figure 8-3: View Tab

Pool list

This list indicates whether the hot spare is to be enabled or disabled for each pool after the host spare binding operation.

A pool is shown in bold when the host spare binding operation creates a new enabled host spare for it.

Enable the copy back mode.

When the function is enabled and a failed disk is replaced with a normal disk, the data is automatically written to the normal disk.

- The disk used for the hot spare before the fault is reserved as a spare disk after the data is written.
- The positions of data disks and hot spare disks can be maintained.
- The repair time increases by as much as it takes to write data after the replacement.

When the function is disabled and a failed disk is replaced with a normal disk, the disk after the replacement is used as the new hot spare disk.

This setting applies all the hot spares in the disk array.

If the capacity or rotation speed of the replaced data disk is different from that of the hot spare, the copy back operation is performed regardless of the copy back setting.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.

Figure 8-4: Confirmation

If you click [Yes], the hot spare binding operation is executed and then the Completion screen is displayed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen.

Completion

The result of the hot spare binding is displayed.

Figure 8-5: Confirmation

When this operation is successful, the following links are displayed.

Bind another hot spare

The Hot Spare Bind screen is displayed again for binding another hot spare.

Bind pool

The Pool Bind screen is displayed.

Bind logical disk

The Logical Disk Bind screen is displayed.

Navigation button(s)

[Finish]

The [Monitor] - [Screen Display] screen is displayed.

Hot Spare Unbind

Unbind a hot spare.

The Hot Spare Unbind screen consists of the following screens:

* Hot Spare Unbind
* Completion

Hot Spare Unbind

Make the settings for unbinding a hot spare
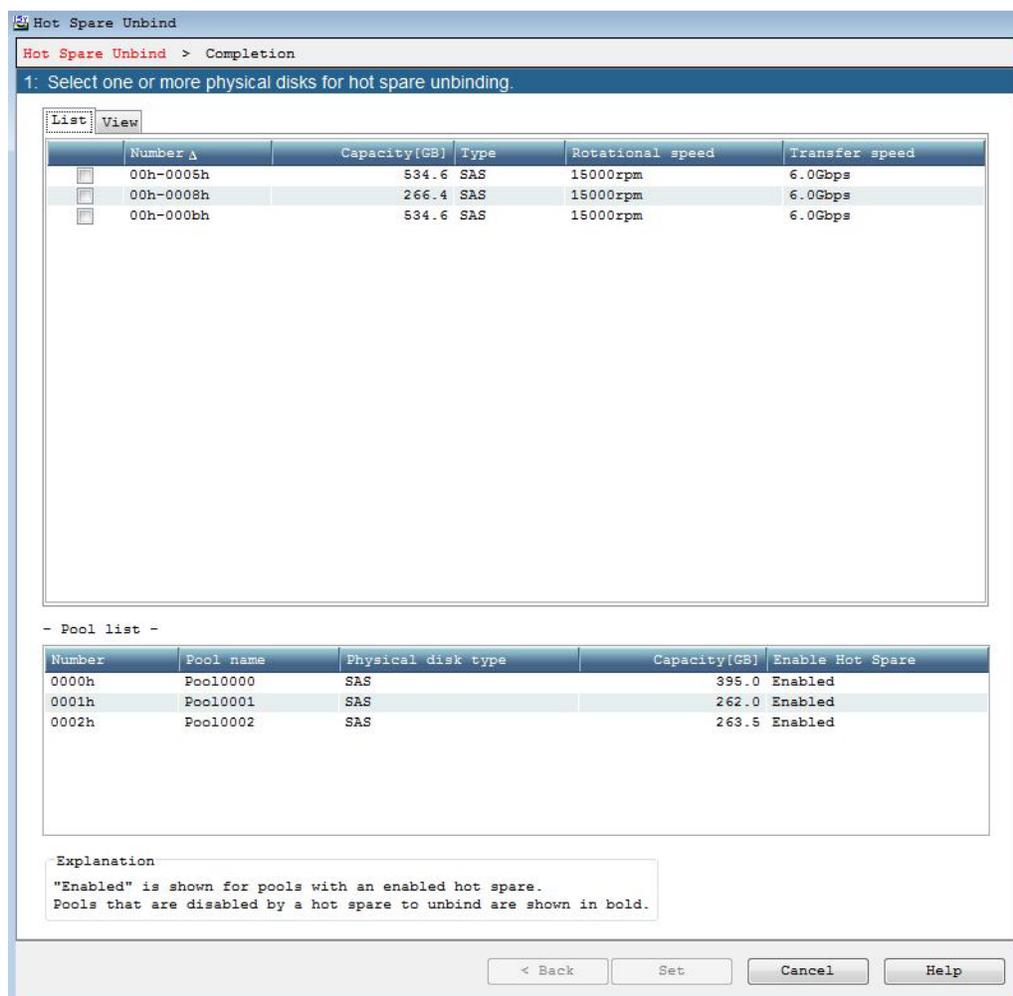
Figure 8-6: Hot Spare Unbind

Selecting the physical disks for which to unbind a hot spare

Physical disk selection

Select the check box of each physical disk for which to unbind a hot spare.

> On the [List] tab, those slots for which no physical disk exists are not displayed in the list; on the [View] tab, the slots and the corresponding check boxes are grayed out.

Hot spares that fit to the following condition cannot be unbound.

Condition: locked

Description: Operation guard is set to the logical disk

The physical disk selection section in the Hot Spare Unbind screen can be displayed on the view tab or list tab. You can switch the display by selecting the tab at the top of the section.

[List] tab

Figure 8-7: List Tab

[View] tab

Figure 8-8: View Tab

Pool List

This list indicates whether the hot spare is to be enabled or disabled for each pool after the host spare unbinding operation.

A pool is shown in bold when the host spare unbinding operation leaves no enabled host spare for it.

If the disk array configuration change is locked, you cannot unbind the hot spare.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.

Figure 8-9: Confirmation

If you click [Yes], the hot spare unbinding operation is executed and then the Completion screen is displayed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard.

Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Completion

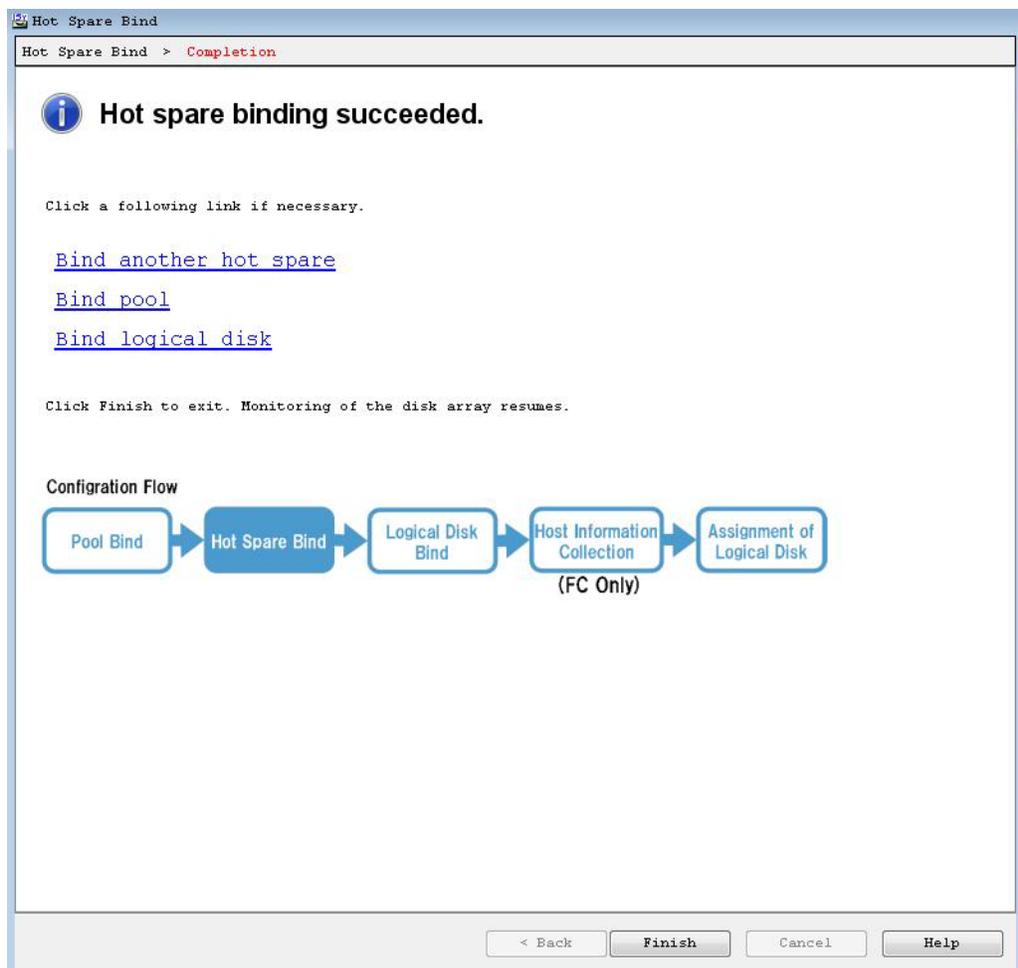The result of the hot spare unbinding is displayed.
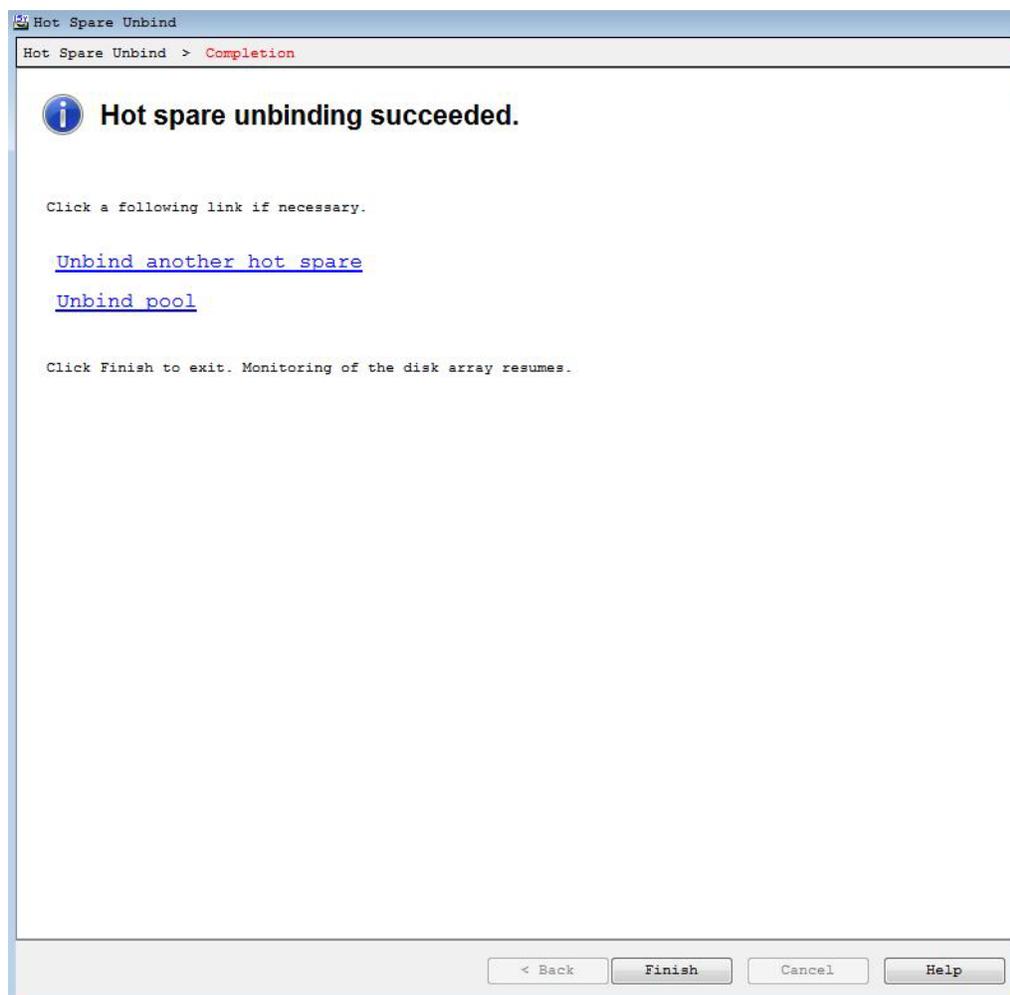
Figure 8-10: Confirmation

When this operation is successful, the following links are displayed.

Unbind another hot spare

The Hot Spare Unbind screen is displayed again for unbinding another hot spare.

Unbind pool

The Pool Unbind screen is displayed.

Navigation button(s)

[Finish]

The [Monitor] - [Screen Display] screen is displayed.

Hot Spare Management

Change of Settings

Change the settings for a hot spare.
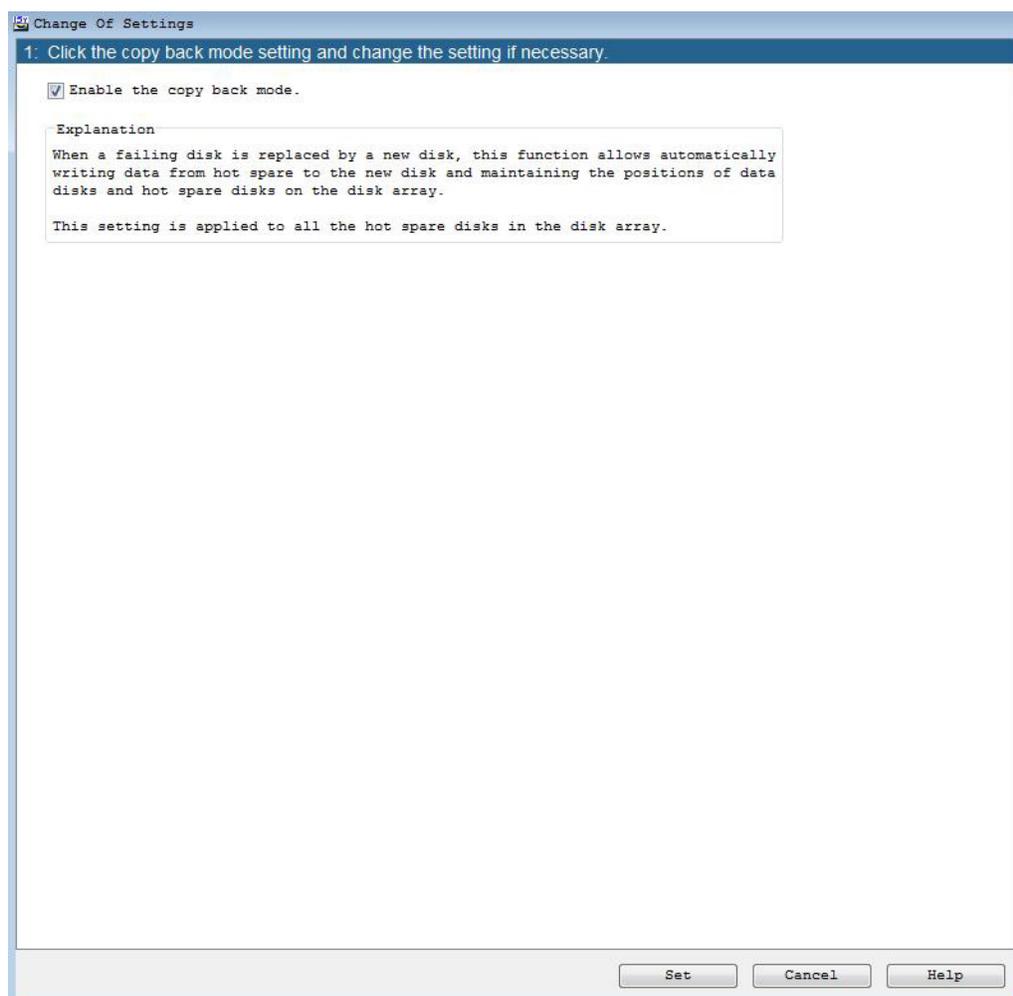
Figure 8-11: Change of Settings - Hot Spare

Enable the copy back mode.

When the function is enabled and a failed disk is replaced with a normal disk, the data is automatically written to the normal disk.

- The disk used for the hot spare before the fault is reserved as a spare disk after the data is written.
- The positions of data disks and hot spare disks can be maintained.
- The repair time increases by as much as it takes to write data after the replacement.

When the function is disabled and a failed disk is replaced with a normal disk, the disk after the replacement is used as the new hot spare disk.

This setting applies all the hot spares in the disk array.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.

Figure 8-12: Confirmation

If you select [Yes], the hot spare setting changes are made.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard.

Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen without changing the hot spare settings.

Logical Disk

A logical disk is a unit of access from the higher-level device (host) to the disk array. It is one of those memory areas obtained when a virtual medium (pool) that binds multiple physical disks into a RAID configuration is divided into sizes that are easy to use for the user.

You can perform the following operations in relation to a logical disk.

- Logical Disk Bind
- Logical Disk Bind (for system or control volume)
- Logical Disk Unbind
- Logical Disk Management
  - Assignment To Host
  - Unassignment To Host
  - Capacity Expansion
  - Group Setting
  - Configuration Lock/Unlock
  - Change Of Settings
  - Format Time Change

Logical Disk Bind

Bind a new logical disk.

The Logical Disk Bind screen consists of the following screens:

Logical Disk Bind
Confirmation
- Advanced Settings
Completion

Logical Disk Bind

Set the logical disk you want to bind.
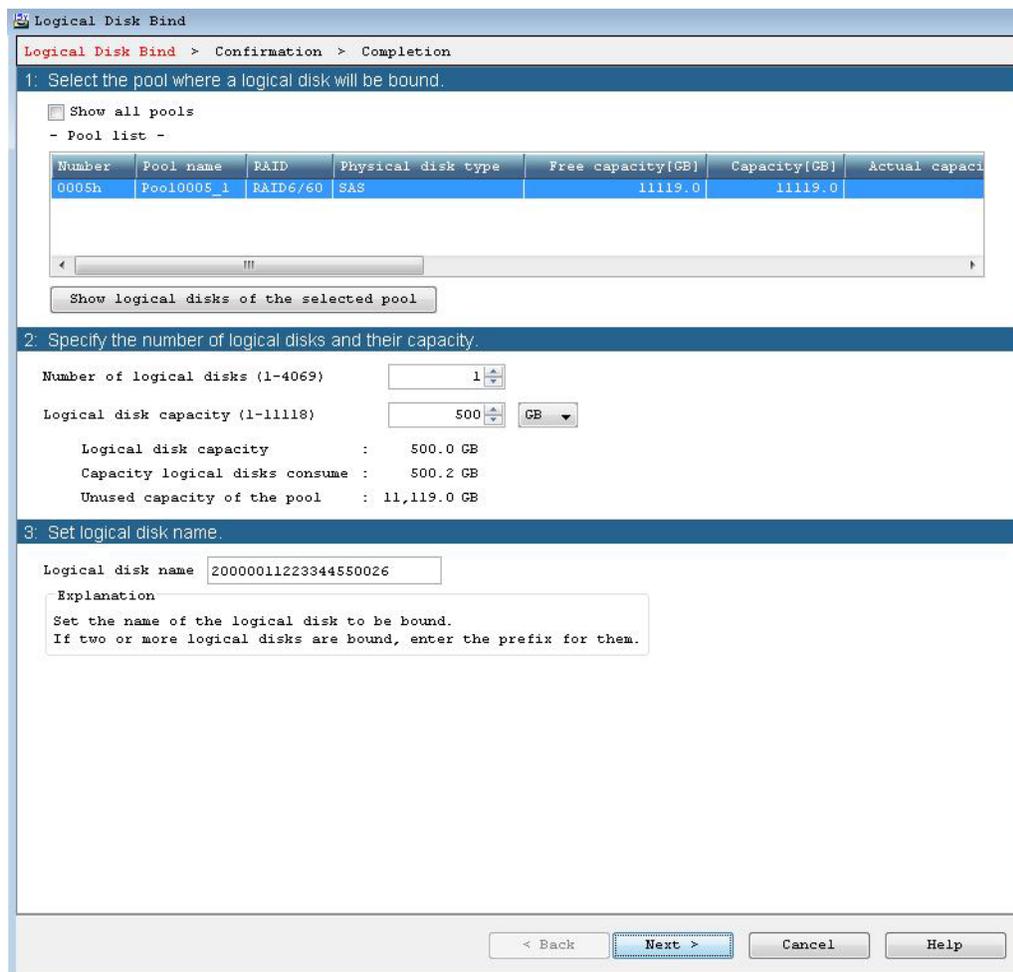
Figure 9-1: Logical Disk Bind

Pool selection

Select the pool for which to bind a logical disk.

By clicking the [Show logical disks of the selected pool] button, you can view the list of logical disks bound in the currently selected pool.

By clearing the [Show all pools] check box, you can view only the pool that is bound this time.

Pools that fit any of the following conditions cannot be selected.

Lack Capacity: The free capacity of the pool is insufficient to bind a logical disk.

PD Rotation Stop: Rotation of the pool is stopped by the power saving function.

Number of logical disks and Logical disk capacity

Specify the number of logical disks to bind and their capacity.

The value is restricted by the free space of the pool, the unit of the capacity, the number of logical disks and their capacity.

You can also check the detailed logical disk capacity as well as the occupied pool capacity and free pool capacity after the logical disk binding.

Set logical disk name

Set the name of the logical disk you want to bind. When binding more than one logical disk, enter a prefix.

Navigation button(s)

[Next]

The Confirmation screen is displayed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Specify the logical disk name

 according to the rules below.
(The characters violating these rules cannot be specified.)

- Number of usable characters: 1 to 24 characters
- Usable characters: alphabets (A to Z (a to z)) *The name is case sensitive.
        Number (0 to 9)
        Underscore (_)
        Slash (/)
   * All characters must be single-byte.
- The logical disk name needs to be unique across all the disk arrays managed by the SnapSAN Manager. Therefore, when you click [Next], a check is made to see whether there is not any identical name.
- The logical disk capacity can be specified in MB. However, since specifying the capacity in MB makes complicated to bind a logical disk with the same capacity as other logical disks, it is recommended to specify the capacity in GB or a lager unit.

Confirmation

The settings for binding the logical disk are displayed.
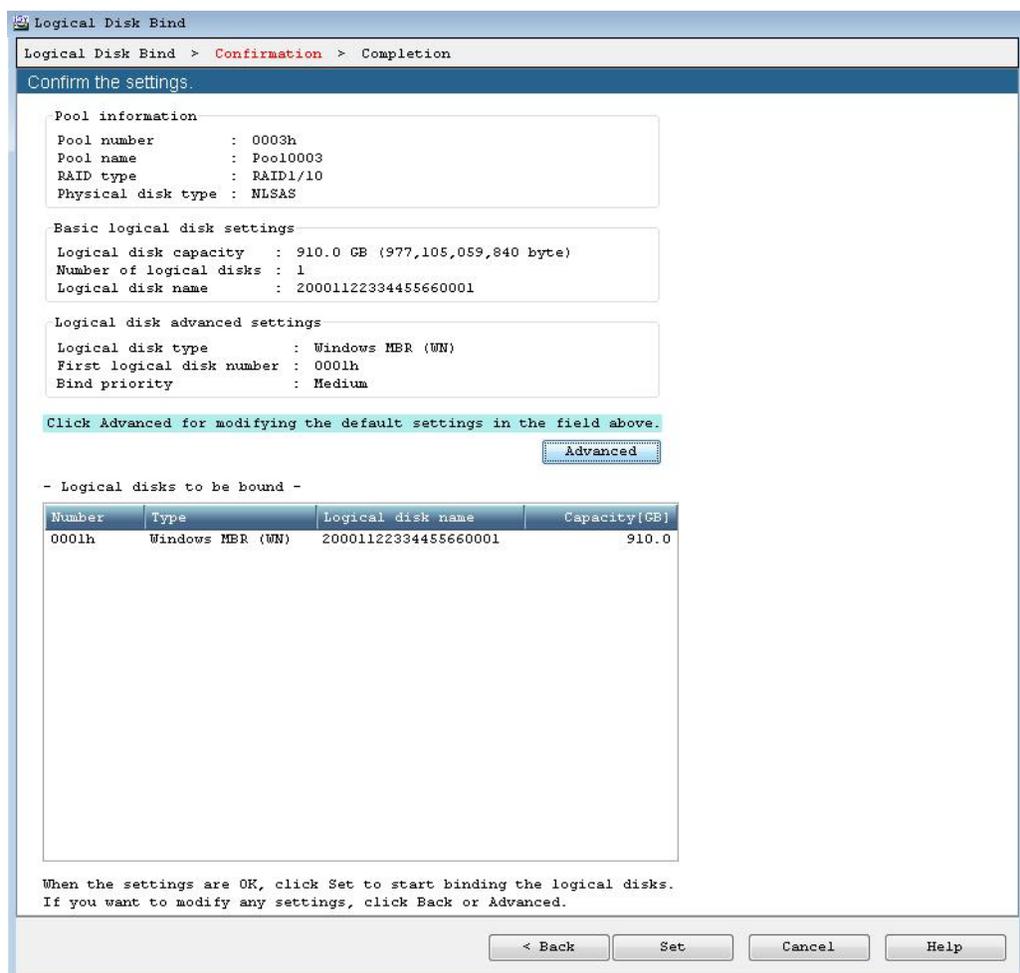
Figure 9-2: Confirmation

The settings of the logical disk you are binding are listed. Check the settings to see whether they are correct.

Clicking the [Advanced] button displays the Advanced Settings screen.

Pool information

The logical disk is bound in the displayed pool.

Basic logical disk settings

The settings for the logical disk to bind are displayed.

Logical disk advanced settings

The following items can be changed on the Advanced Settings screen.

Logical disk type: Type of OS that uses the logical disk.

The logical disk type can be specified when the license for data replication or snapshot is unlocked.

First logical disk number: Number that will be assigned to the logical disk to bind.

Binding priority: Format priority when binding the logical disk.

Navigation button(s)

[Set]

> The following confirmation dialog box is displayed.
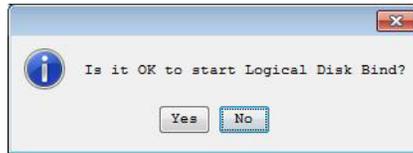
Figure 9-3: Confirmation

If you click [Yes], the logical disk binding operation is executed and then the Completion screen is displayed.

[Back]

> The Logical Disk Bind screen is displayed again.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Advanced Settings

Set the advanced settings for the logical disk you want to bind.
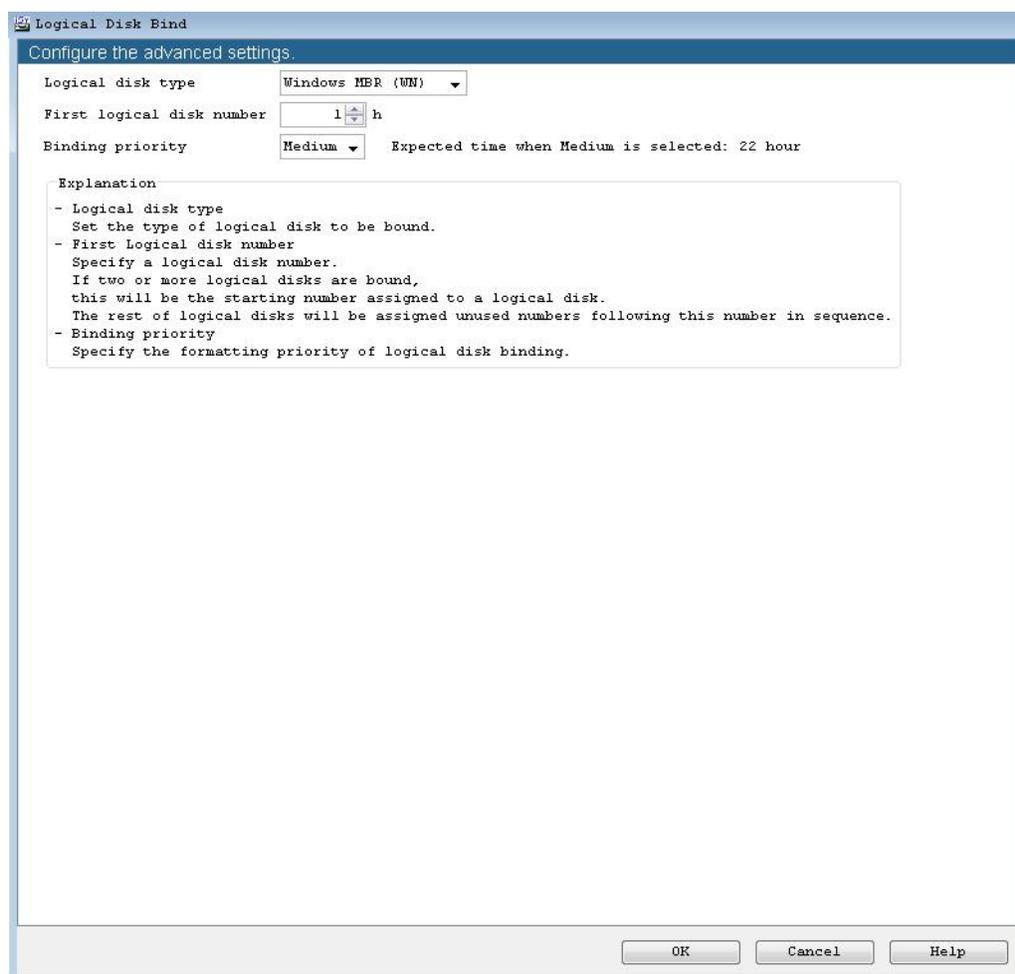
Figure 9-4: Advanced Settings

Logical Disk Type

Specify the type of OS that uses the logical disk.

First Logical Disk Number

Specify the number to be assigned to the logical disk. When binding more than one logical disk, enter a start number.

Binding Priority

Specify the format priority when binding the logical disk.

High: The binding operation is executed in the shortest possible time.

Medium: The binding operation is executed to take 24 hours for 1 TB considering the performance of the data transfer with the application server.

Low: The binding operation is executed so as not to affect the performance of the data transfer with the application server.

Completion

The result of the logical disk binding is displayed.
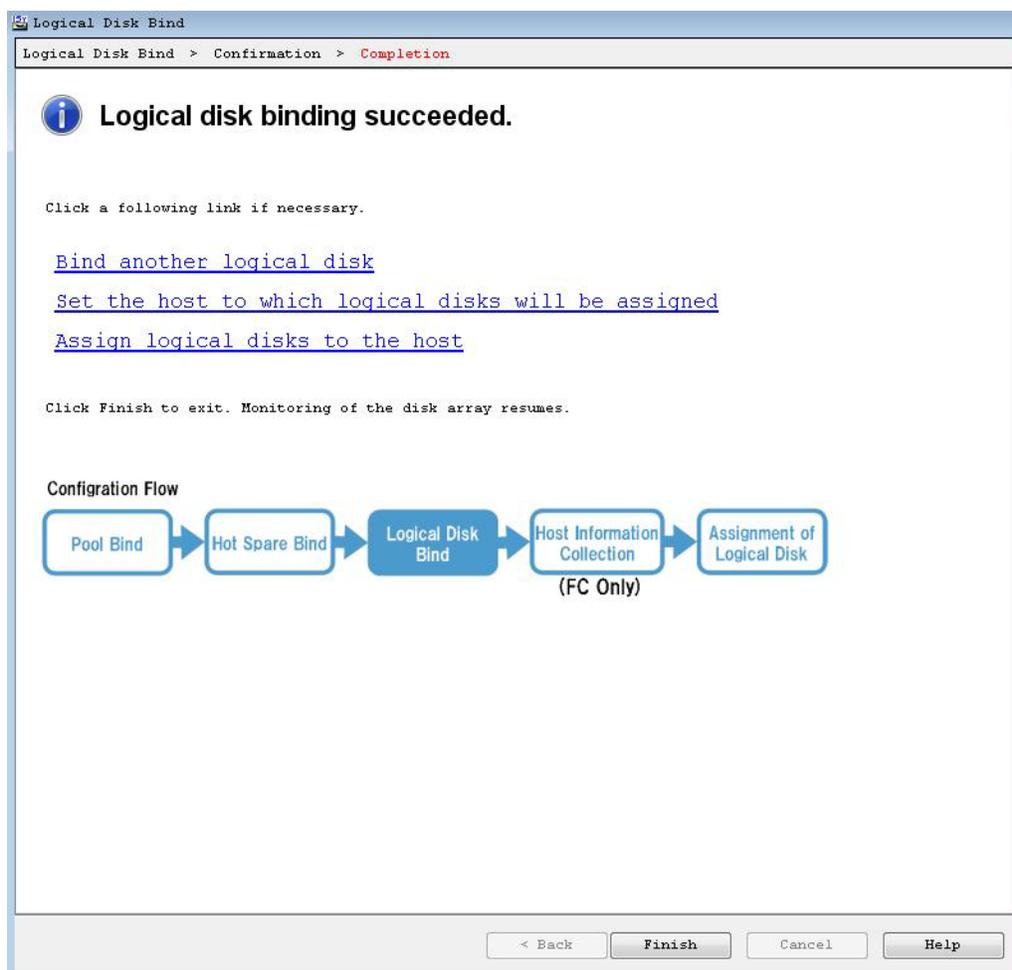
Figure 9-5: Completion

When this operation is successful, the following links are displayed.

Bind another logical disk

> The Logical Disk Bind screen is displayed again for binding another logical disk.

Set the host to which logical disks will be assigned

> The Host Information Collection screen is displayed.
> This link is not displayed for the iSCSI model.

Assign logical disks to the host

> The assignment screen is displayed.

Navigation button(s)

[Finish]

> The monitor screen is displayed.

Logical Disk Bind (for System or Control Volume)

Bind a new logical disk for system

The Logical Disk Bind (for system or control volume) screen consists of the following three pages of screens:

Logical Disk Bind (for system or control volume)

Confirmation

　　Advanced Settings

Completion

Logical Disk Bind (for system or control volume)

Set the control logical disk you want to bind.
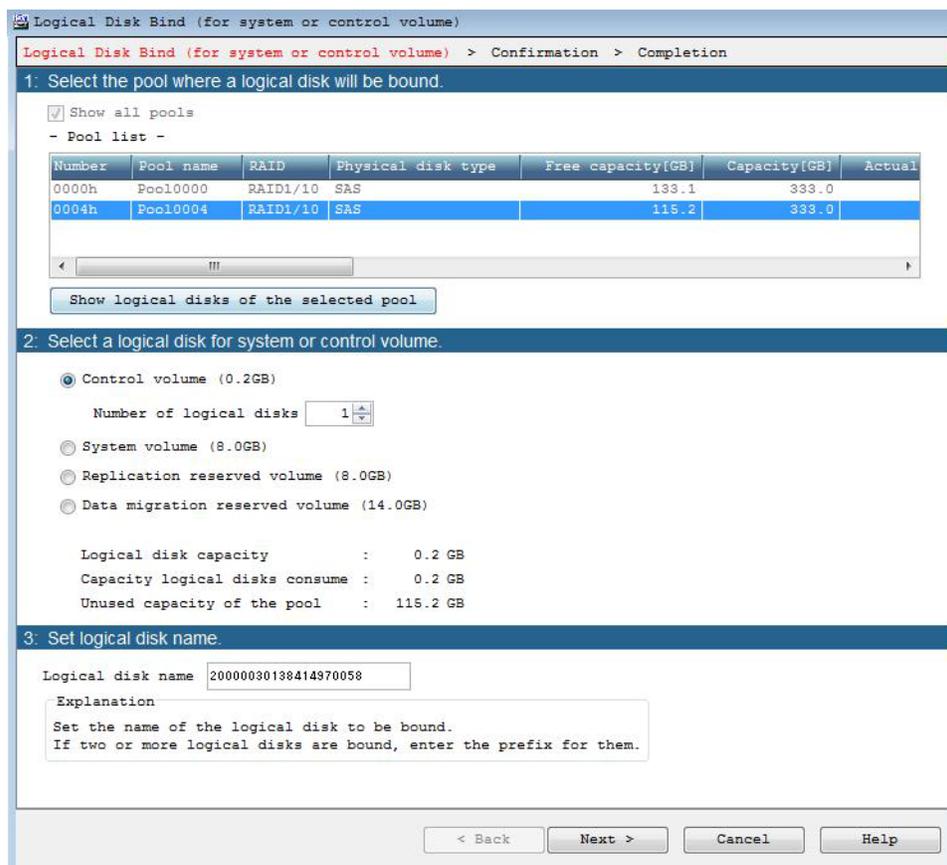
Figure 9-6: Logical Disk Bind - System or Control Volume

Select the pool where a logical disk will be bound.

　　Select the pool for which to bind a logical disk for control.

　　By clicking the [Show logical disks of the selected pool] button, you can view the list of logical disks bound in the currently selected pool.

　　By clearing the [Show all pools] check box, you can view only the pool that is bound this time.

Select a logical disk for system or control volume

Specify the type and number of logical disks for system you want to bind.

You can also check the detailed logical disk capacity as well as the occupied pool capacity and free pool capacity after the logical disk binding.

There are the following types of logical disks for system:

- Control volume
- System volume
- Replication reserved volume
- Data migration reserved volume

Set logical disk name

Specify the name of the control logical disk you want to bind.

When binding more than one logical disks, enter a prefix.

Navigation button(s)

[Next]

> The Confirmation screen is displayed.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

- The replication reserved volume can be bound when the license for data replication is unlocked.
- The migration reserved volume can be bound when the license for data migration is unlocked.
- You can bind a system volume, replication reserved volume, and migration reserved volume only each one volume in a disk array. If already bound it, the button can not select.
- You can bind a system volume, a replication reserved volume, and a migration reserved volume per disk array. If they have already been bound, [System volume] and [Replication reserved volume] cannot be selected.
- Specify the logical disk name according to the rules below.(The characters violating these rules cannot be specified.)
  - Number of usable characters: 1 to 24 characters
  - Usable characters: alphabets (A to Z (a to z)) *The name is case sensitive.

    Number (0 to 9)

    Underscore (_)

    Slash (/)

  * All characters must be single-byte.
- The logical disk name needs to be unique across all the disk arrays managed by the SnapSAN Manager. Therefore, when you click [Next], a check is made to see whether there is not any identical name

Confirmation

The settings of the logical disk you are binding are listed.
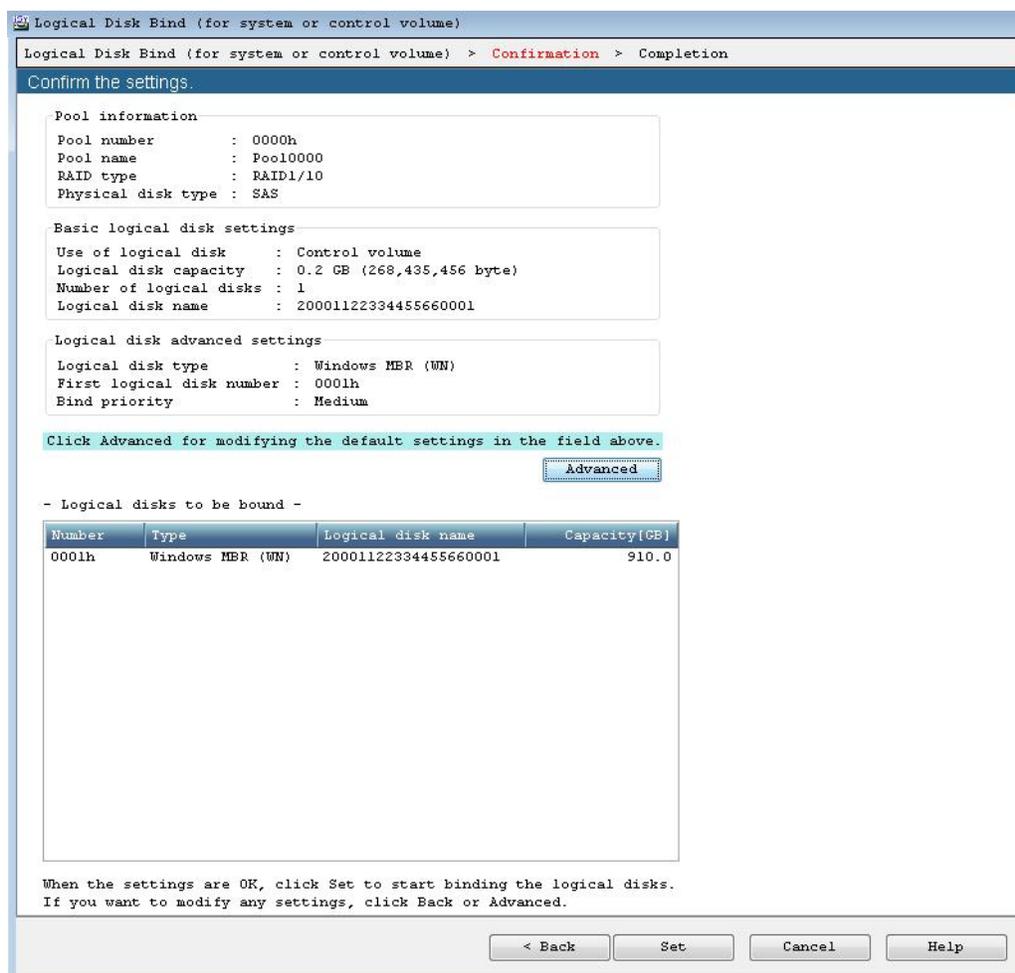
Figure 9-7: Confirmation

This is the confirmation screen for the settings concerning the binding of the logical disk for control. The settings of the logical disk you are binding are listed. Check the settings to see whether they are correct.

Clicking the [Advanced] button displays the Advanced Settings screen.

Pool information

The control logical disk is bound in the displayed pool.

Basic logical disk settings

The settings for the control logical disk to bind are displayed.

Logical disk advanced settings

The following items can be changed on the advanced settings screen.

Logical disk type: Type of OS that uses the logical disk.

The logical disk type can be specified when the license for data replication or snapshot is unlocked.

First logical disk number: Number that will be assigned to the logical disk to bind.

When rebinding the system volume/replication reserved volume/migration reserved volume, it is recommended to use a default value or the logical disk number bound last time.

Bind priority: Format priority when binding the logical disk.

Navigation button(s)

[Set]

> The following confirmation dialog box is displayed.

Figure 9-8: Confirmation

If you click [Yes], the operation of binding the logical disk for system is executed and then the Completion screen is displayed.

[Back]

> The Logical Disk Bind (for system or control volume) screen is displayed again.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Advanced Settings

> Set the advanced settings of the logical disk for system you want to bind.

Figure 9-9: Advanced Settings

Logical disk type

Specify the type of OS that uses the logical disk.

This item cannot be specified for the system volume or replication reserved volume.

First logical disk number

Specify the number to be assigned to the logical disk. When binding more than one logical disk, enter a start number.

Binding priority

Specify the format priority when binding the logical disk.

High: The binding operation is executed in the shortest possible time. Selecting [High] might affect performance of the data transfer with the application server.

Medium: The binding operation is executed to take 24 hours for 1 TB considering the performance of the data transfer with the application server. (When [Medium] is selected, the estimated time will be displayed.)

Low: The binding operation is executed so as not to affect the performance of the data transfer with the application server.

Completion

The result of the control logical disk binding is displayed.

```
Logical Disk Bind (for system or control volume)
Logical Disk Bind (for system or control volume)  >  Confirmation  >  Completion

     (i)  Logical disk binding for system or control volume succeeded.


     Click a following link if necessary.

     Bind another logical disk for system or control volume
     Assign logical disks to the host


     Click Finish to exit. Monitoring of the disk array resumes.




                                              < Back    Finish    Cancel      Help
```
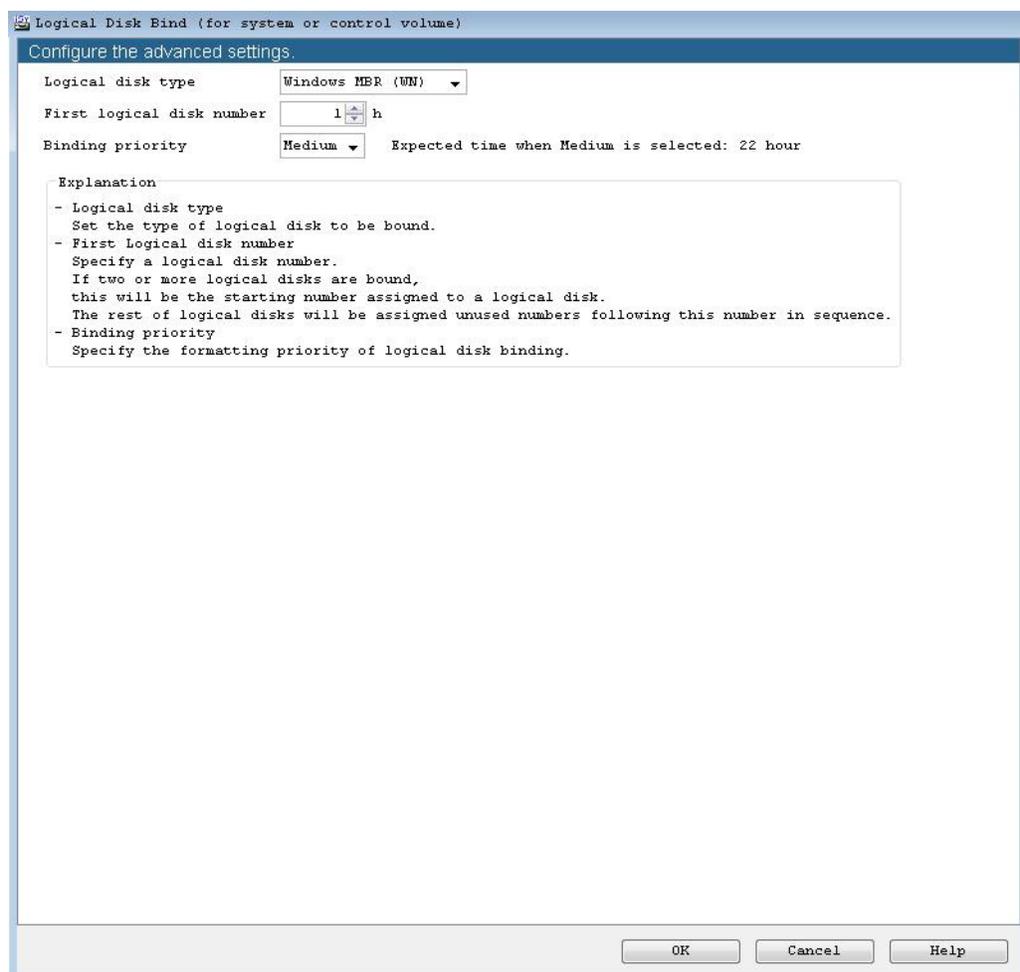
Figure 9-10: Confirmation

Logical disk type

Specify the type of OS that uses the logical disk.

This item cannot be specified for the system volume or replication reserved volume.

First logical disk number

Specify the number to be assigned to the logical disk. When binding more than one logical disk, enter a start number.

Binding priority

Specify the format priority when binding the logical disk.

High: The binding operation is executed in the shortest possible time. Selecting [High] might affect performance of the data transfer with the application server.

Medium: The binding operation is executed to take 24 hours for 1 TB considering the performance of the data transfer with the application server. (When [Medium] is selected, the estimated time will be displayed.)

Low: The binding operation is executed so as not to affect the performance of the data transfer with the application server.

Completion

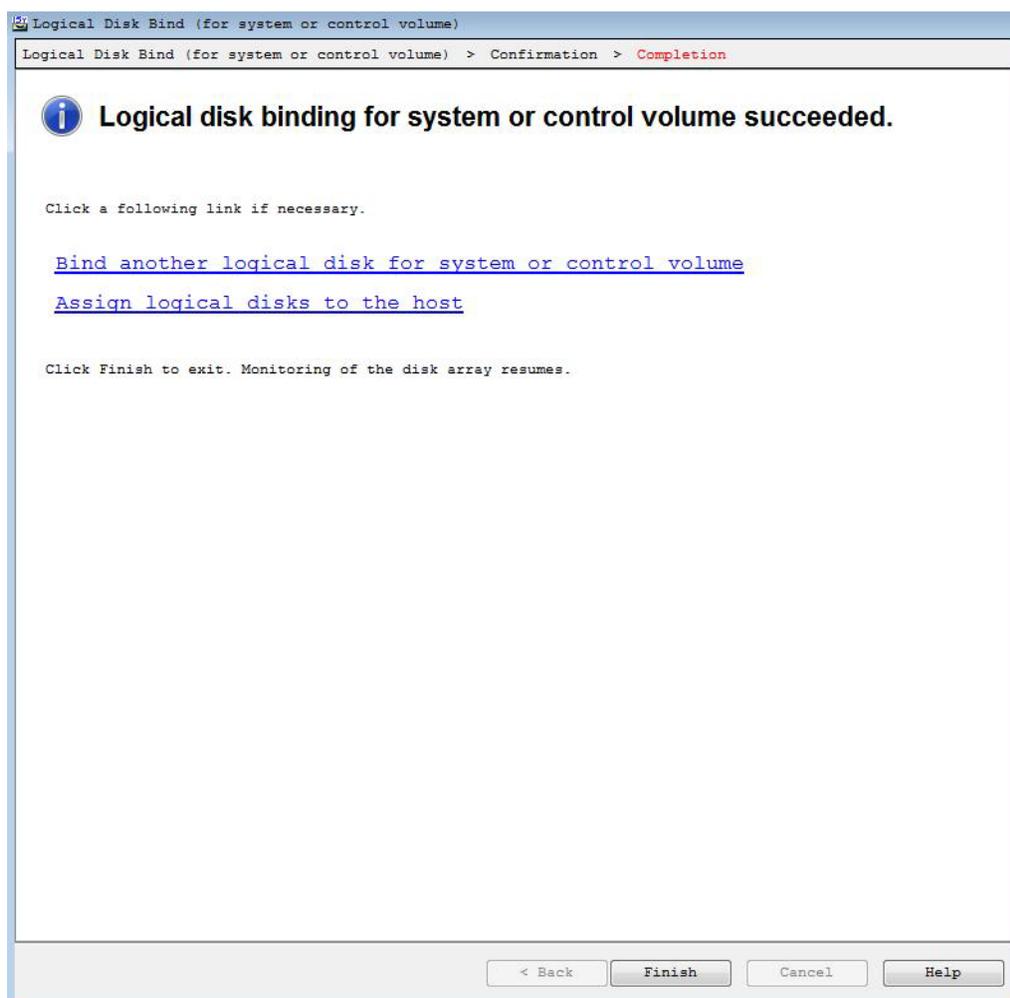The result of the control logical disk binding is displayed.

Logical Disk Unbind

Unbind a logical disk.

The Logical Disk Unbind screen is a wizard consisting of the following three pages of screens:

Logical Disk Unbind

Confirmation

Completion

- If access control is not used when configuration lock is enabled, the operation of the application server is checked before the pool including logical disks is unbound. For this reason, the pool unbinding operation may take time.
- After the pool including the logical disk of LDN0000h is unbound when access control is not used, the application server may become unable to recognize any of the logical disks. For this reason, when you perform unbinding, the following warning is displayed.

Logical disks that fit any of the following conditions cannot be unbound.

Condition	Description
assign(FC)	The logical disk is assigned to the host connected via FC.
assign(iSCSI)	The logical disk is assigned to the host connected via iSCSI.
assign(SAS)	The logical disk is assigned to the host connected via SAS.
pairing(repli)	The logical disk is paired for replication.
Pairing(data migration)	The logical disk is paired for data migration.
snap shot	The logical disk is a base-volume (BV), snapshot-volume (SV), or snapshot data volume (SDV).
linked	A snapshot link is set to the logical disk.
reserved	The logical disk belongs to the reserve group.
data protection	The logical disk is secured by the data retention.
during reinit	The logical disk is being re-initialized by the data retention.
locked	Operation guard is set to the logical disk.
locked(BV)	Operation guard is set to the base-volume.
PD rotation stop	Rotation of the pool is stopped by the power saving function.
work disk	There is a work disk for optimization in the pool.
moving	The pool includes a logical disk that is being moved by the data allocation optimization.
assign(cache)	Logical disks in the pool have been assigned to the cache segment.

Logical Disk Unbind

Select the logical disk you want to unbind. You can select more than one logical disk.
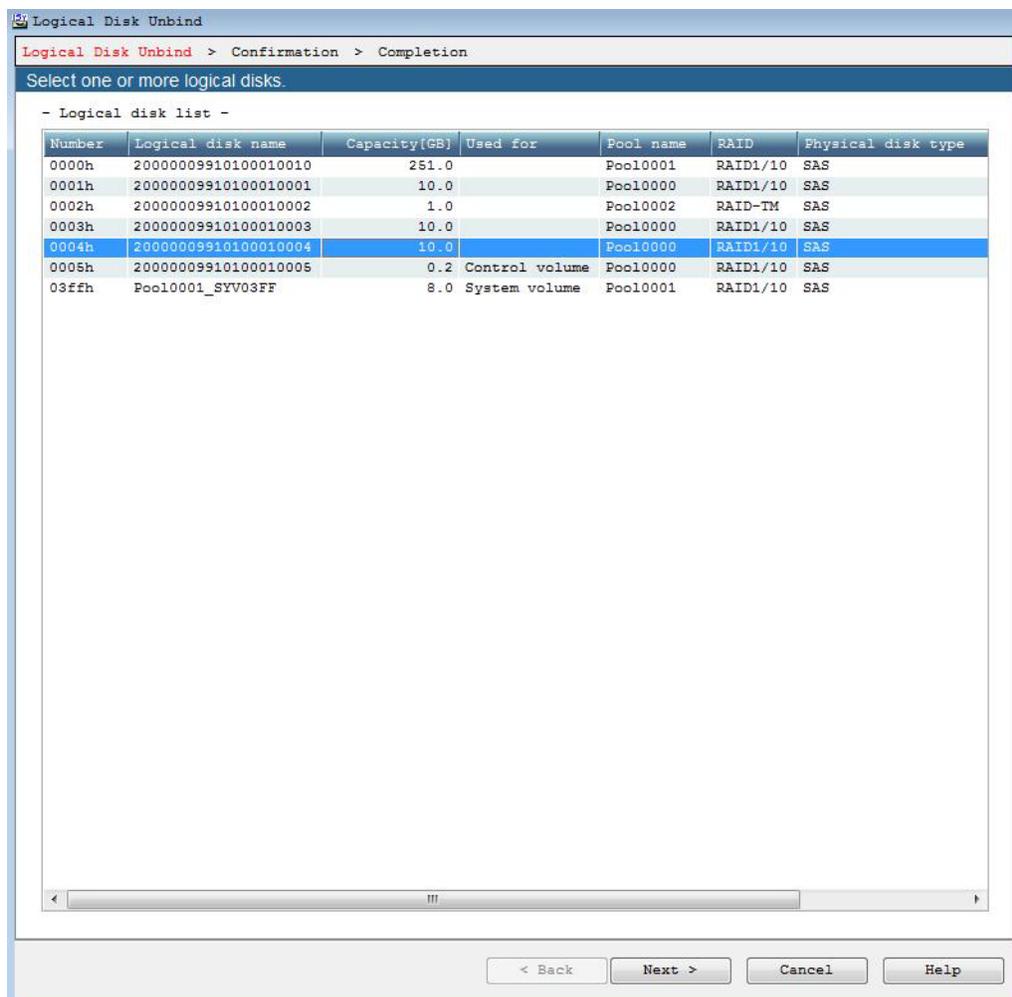
Figure 9-11: Logical Disk Unbind

Navigation button(s)

[Next]

> The Confirmation screen is displayed.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Confirmation

The settings for unbinding the logical disk are displayed.
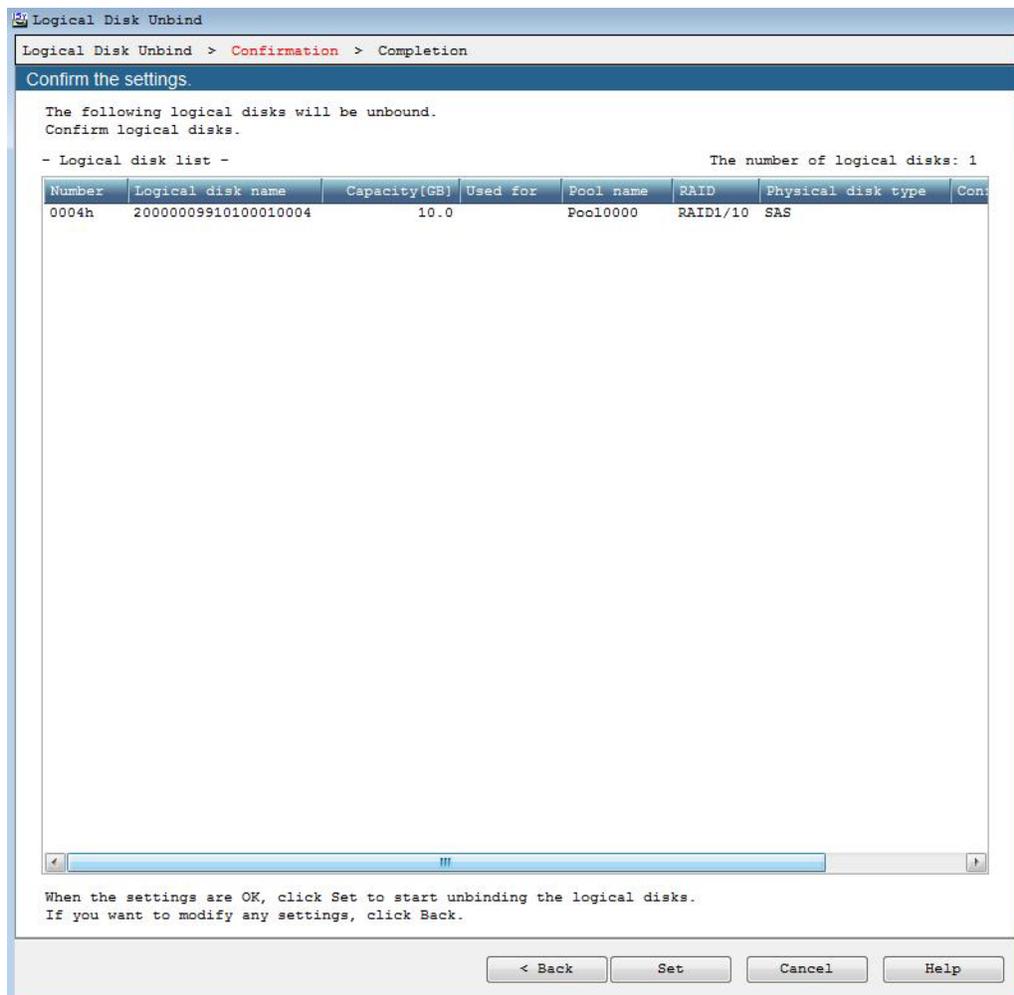
Figure 9-12: Confirmation

The settings of the logical disk you are unbinding are listed. Check the settings to see whether they are correct.

Navigation button(s)

[Set]

> The following confirmation dialog box is displayed.
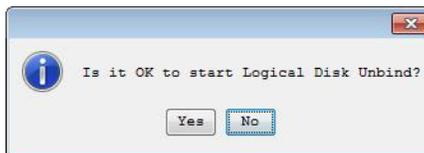
Figure 9-13: Confirmation - Logical Disk Unbind

If you click [Yes], the logical disk unbinding operation is executed and then the Completion screen is displayed.

[Back]

> The Logical Disk Unbind screen is displayed again.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Completion

The result for unbinding the logical disk is displayed.
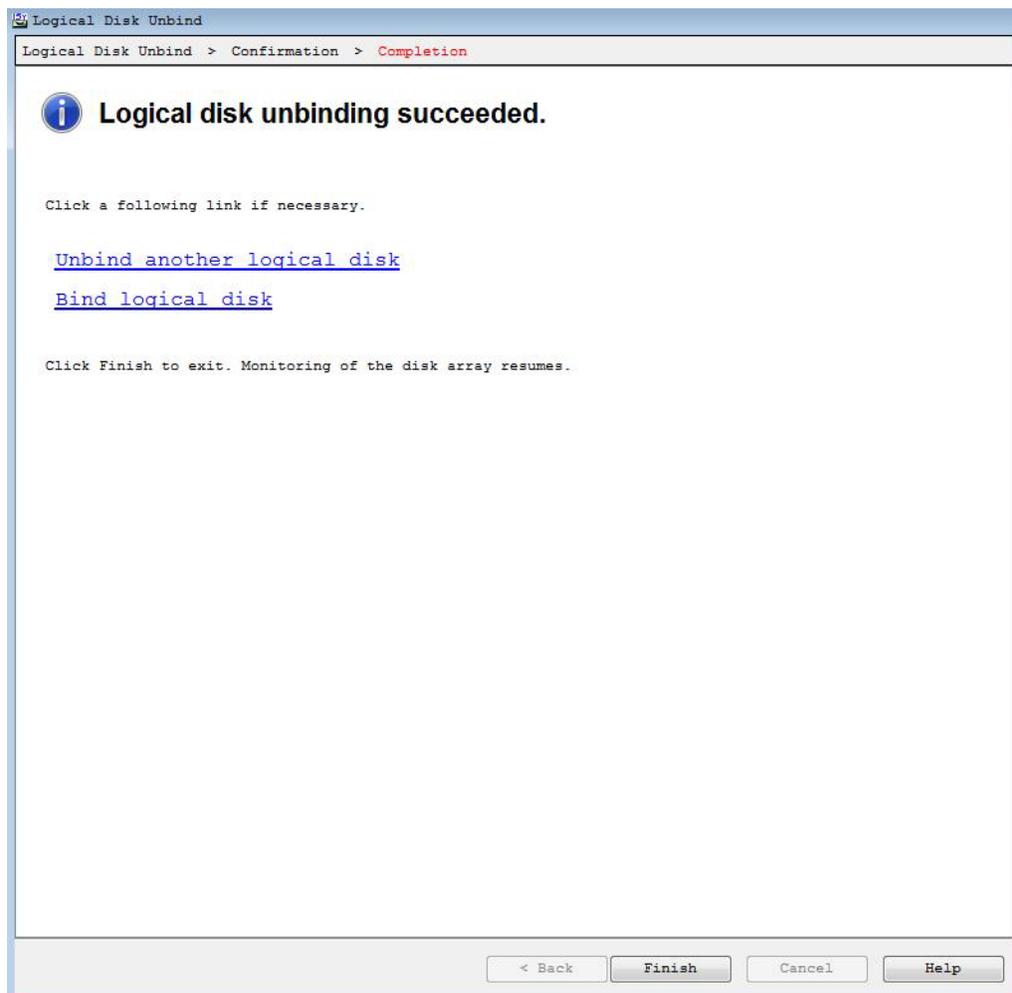
Figure 9-14: Confirmation

When this operation is successful, the following links are displayed.

Unbind another logical disk

> The Logical Disk Unbind screen is displayed again for unbinding another logical disk.

Bind logical disk

> The Logical Disk Bind screen is displayed for binding a new logical disk.

Navigation button(s)

[Finish]

> The [Monitor] - [Screen Display] screen is displayed.

Logical Disk Management

Assignment To Host

You can assign a logical disk to the host.

Unassignment To Host

You can unassign a logical disk that is assigned to the host.

Capacity Expansion

Expand the capacity of a logical disk.

The Capacity Expansion screen consists of the following screen:

Logical Disk Capacity Expansion
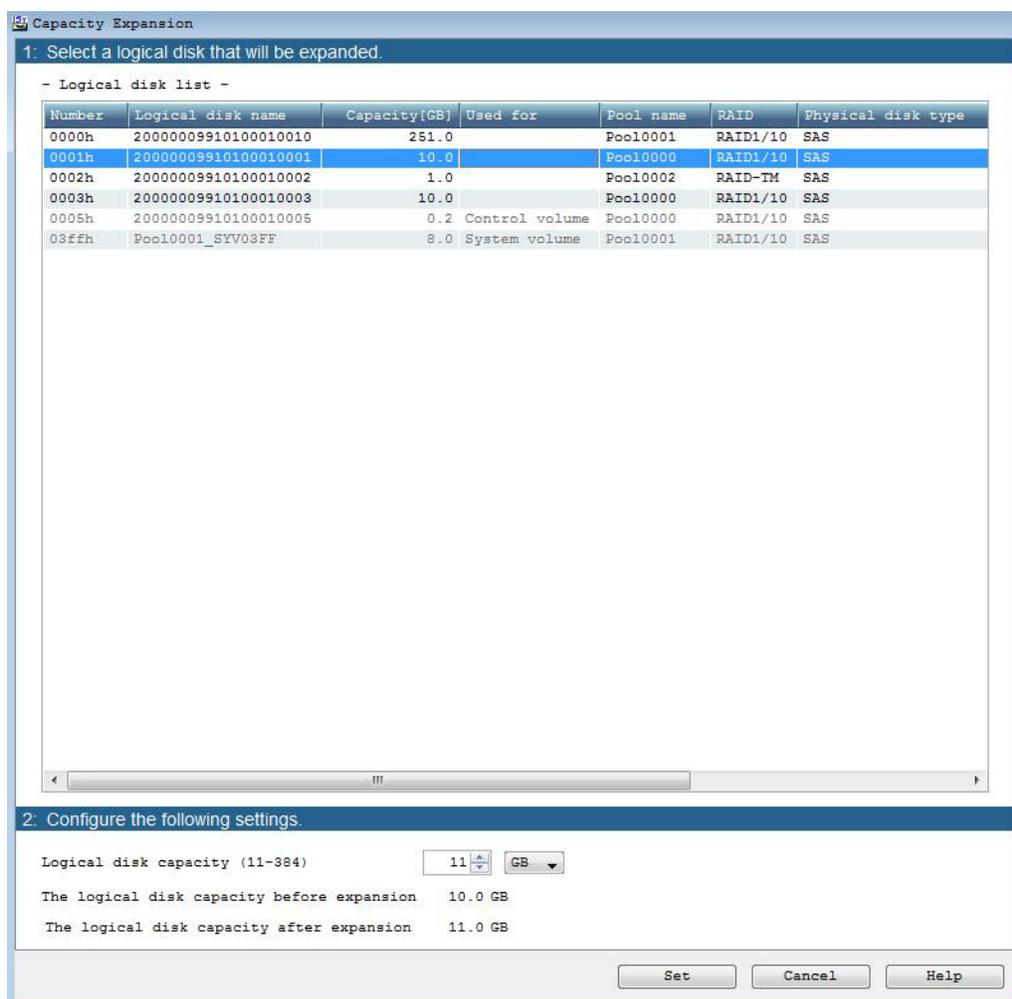
Figure 9-15: Capacity Expansion - Logical Disk

Select a logical disk that will be expanded.

From the list, select the logical disk whose capacity you want to expand.

Logical disks that fit any of the following conditions cannot be unbound.

Condition	Description
lack capacity	The free capacity of the pool to which the logical disk belongs is insufficient to expand the logical disk.
pairing(repli)	The logical disk is paired for replication.
snap shot	The logical disk is a base-volume (BV), snapshot-volume (SV), or snapshot data volume (SDV).
LV	The logical disk is a link-volume.
CV	The logical disk is a control volume.
SYV	The logical disk is a system volume.
RSV	The logical disk is a replication reserved volume.
reserved	The logical disk belongs to the reserve group.
data protection	The logical disk is secured by the data retention.
during reinit	The logical disk is being re-initialized by the data retention.
locked	Operation guard is set to the logical disk.
PD rotation stop	Rotation of the pool is stopped by the power saving function.

Configure the following settings.

Specify the logical disk capacity after expansion.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.
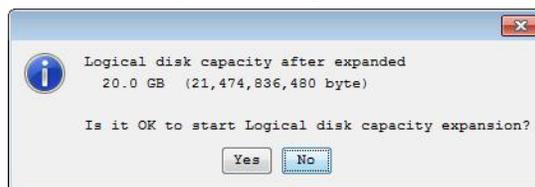
Figure 9-16: Confirmation

If you select [Yes], the logical disk capacity expansion operation is executed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen without expanding the logical disk.

• You cannot expand the capacity of a control volume.

• The capacity can be expanded up to either the free pool capacity or the maximum logical disk capacity* (whichever is the smaller).

* The maximum logical disk capacity is 256 TB.

Group Setting

Group Setting allows you to manage groups of logical disks that are not assigned to the application server.

You can also initialize logical disks.

Figure 9-17: Group Setting

Selection combo box

You can select the logical disks to be displayed in the possible logical disk list using the following keywords.

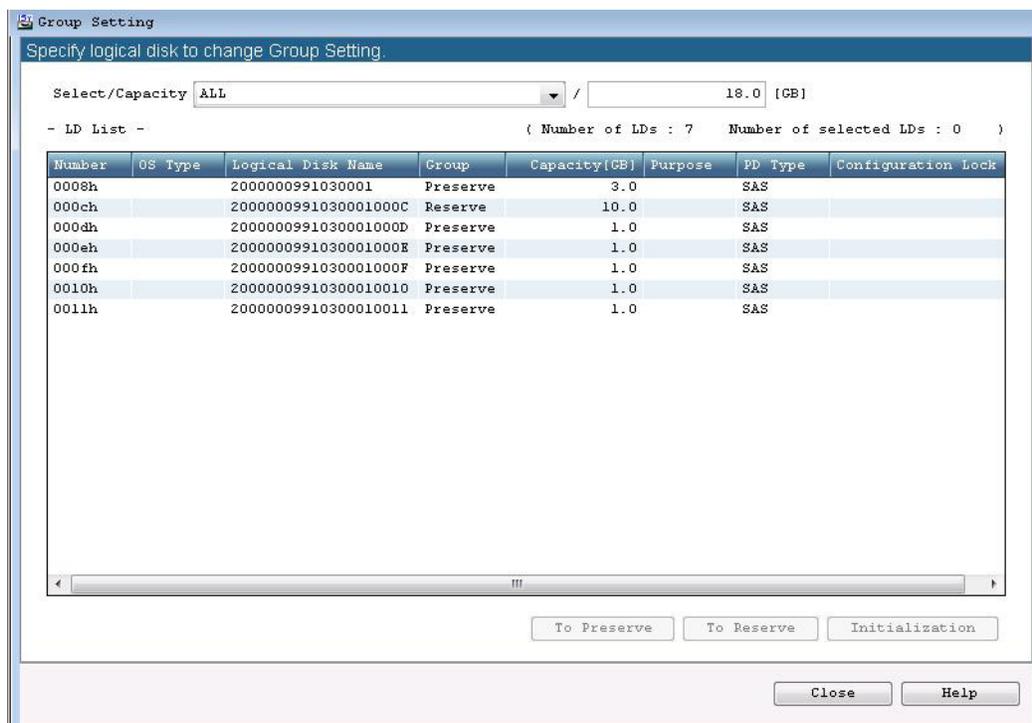| Selection information	Logical disk display
Preserve Group	Displays the logical disks in the preserve group.
	The logical disks to be displayed are logical disks without special purpose, logical disks paired for replication, logical disks for snapshot (Only BVs are displayed. SVs and SDVs are not displayed), link volume logical disks, logical disks secured by the data retention function, and control volume logical disks.
Preserve - Purpose ( )	Displays the logical disks without special purpose.
	This keyword only applies to the preserve group.
Preserve - Purpose (Replication)	Displays the logical disks paired for replication.
	This keyword only applies to the preserve group.
Preserve - Purpose (snapshot)	Displays the logical disks for which only snapshot is set (Only BVs are displayed. SVs and SDVs are not displayed). This keyword only applies to the preserve group.
Preserve - Purpose (Link-volume)	Display the link volume logical disks. This keyword only applies to the preserve group.
Preserve - Purpose (RPL/snapshot)	Displays the logical disks paired for replication for which snapshot is set. This keyword only applies to the preserve group.
Preserve - Purpose (Data Protection)	Displays the logical disks secured by the data retention function.
	This keyword only applies to the preserve group.

Selection information	Logical disk display
Preserve - Purpose (RPL/Data Protection)	Displays the logical disks paired for replication and secured by the data retention function. This keyword only applies to the preserve group.
Preserve - Purpose (Control Volume)	Displays the control volume logical disks. This keyword only applies to the preserve group.
Reserve Group	Displays the logical disks in the reserve group. The logical disks to be displayed are general disks without special purpose.
ALL	Displays all unassigned logical disks (default value).

The total capacity of the selected logical disks displayed in the LD list is displayed at the right of the selection combo box.

When a link-volume is displayed in the LD list, the total capacity excluding the link-volume capacity and the total capacity including the link-volume capacity are displayed as follows:

Total capacity excluding the link-volume capacity (Total capacity including the link-volume capacity)

> The total capacity of the selected logical disks displayed in the LD list is
>
> displayed at the right of the selection combo box.
>
> When a link-volume is displayed in the LD list, the total capacity excluding the
>
> link-volume capacity and the total capacity including the link-volume capacity
>
> are displayed as follows:

Total capacity excluding the link-volume capacity (*Total capacity including the link-volume capacity*)

Group	Description
Preserve group	Area in which inaccessible logical disks hidden from the application server exist. The data of the logical disks is retained. The logical disks that exist are general disks for which no special purpose is set, volumes for replication (MV/RV), volumes for snapshot (BV), link-volumes (LV), logical disks protected by the data retention function, and control volumes (CV).
Reserve group	Area in which inaccessible logical disks hidden from the application server exist but the data of the logical disks is not retained. The logical disks that exist are general disks for which no special purpose is set.

The buttons are described below.

[To Preserve] button

This button allows you to change the logical disks of a reserve group to a preserve group.

From the list view, select the logical disk of the reserve group you want to change, and then click the [To Preserve] button.

The logical disks that you can change are as follows.

> Logical disk not being initialized

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[To Reserve] button

> This button allows you to change the logical disks of a preserve group to a reserve group.

From the list view, select the logical disk of the preserve group you want to change, and then click the [To Reserve] button.

The logical disks that you can change are as follows.

- Logical disk for which no purpose is set
- Logical disk not being initialized by the data retention function
- Logical disk not in the update prevention state
- Logical disk not in the rotation stop state
- Logical disk that is not a control-volume
- You cannot perform group setting for logical disks that are locked by.
- You cannot perform group setting for logical disks of a preserve group if the configuration lock function confirms that any target application server is in operation when access control is stopped. Stop all the target application servers before performing this operation.
- If you select many logical disks, it takes time to check whether the change can be made, possibly leaving you unable to perform operation for a prolonged period of time.
- When a logical disk is being initialized, you can make the change only after its initialization is complete.

[Initialization] button

This button allows you to initialize the logical disks of a reserve group.

To initialize logical disks, select the logical disks you want to initialize from the list view, and then click the [Initialization] button.

You cannot initialize logical disks that are locked.

The logical disks that you can initialize are as follows.

- Logical disk not being initialized
- Logical disk not in the rotation stop state

If you click this button, the following dialog box is displayed to confirm your intention to execute the operation.
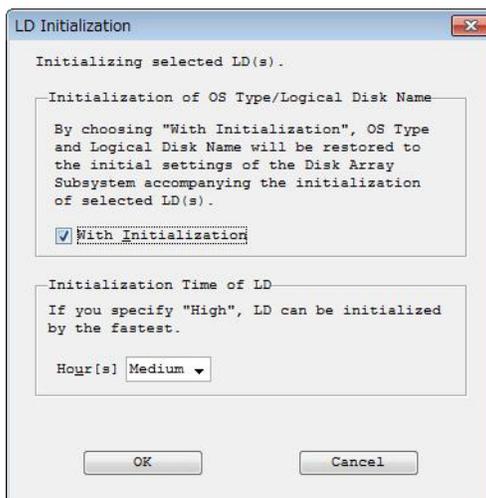

Figure 9-18: LD (Logical Disk) Initialization

Initialization of OS Type/Logical Disk Name

When you initialize a logical disk, you can also initialize its OS type and logical disk name at the same time.

If you select the [With Initialization] check box, the OS type and logical disk name are initialized at the same time the logical disk is initialized.

If you do not select this check box, the logical disk is initialized but the OS type and logical disk name are not initialized.

Initialization Time of LD

You can change the standard logical disk initialization time.

The standard initialization time can be set to [High], [Medium] or [Low].

High: The logical disk is initialized in the shortest possible time.

Medium: The logical disk is initialized so as the performance of the data transfer in 24 hours per 1 TB with the application server.

Low: The logical disk is initialized so as not to affect the performance of the data transfer with the application server.

The actual initialization time differs depending on the load of the disk array. Note also that initialization may affect the access from the application server to logical disks of the same pool.

Logical Disk Configuration Lock/Unlock

You can lock or unlock a logical disk that is not assigned to the host.
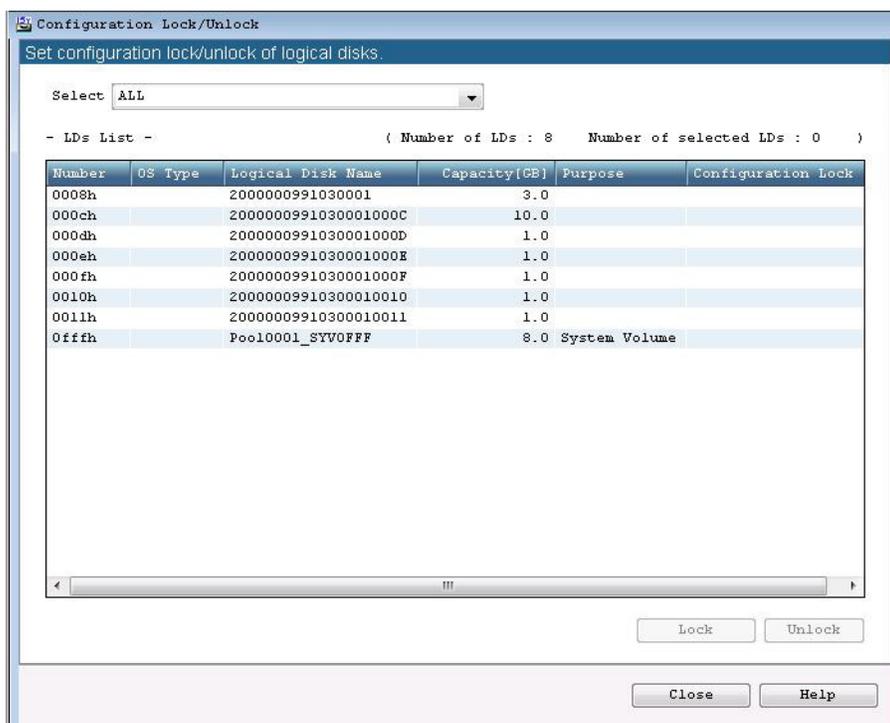
©2013 Overland Storage, Inc.

Figure 9-19: Configuration Lock/Unlock

Selection combo box

You can select the logical disks to be displayed in the possible logical disk list using the following keywords.

Selection information	Logical disk display
Preserve Group	Displays the logical disks in the preserve group.
	The logical disks to be displayed are logical disks without special purpose, logical disks paired for replication, logical disks for snapshot (Only BVs are displayed. SVs and SDVs are not displayed), link volume logical disks, logical disks secured by the data retention function, and control volume logical disks.
Preserve - Purpose ( )	Displays the logical disks without special purpose.
	This keyword only applies to the preserve group.
Preserve - Purpose (Replication)	Displays the logical disks paired for replication.
	This keyword only applies to the preserve group.
Preserve - Purpose (snapshot)	Displays the logical disks for which only snapshot is set (Only BVs are displayed. SVs and SDVs are not displayed). This keyword only applies to the preserve group.
Preserve - Purpose (Link-volume)	Display the link volume logical disks. This keyword only applies to the preserve group.
Preserve - Purpose (RPL/snapshot)	Displays the logical disks paired for replication for which snapshot is set. This keyword only applies to the preserve group.
Preserve - Purpose (Data Protection)	Displays the logical disks secured by the data retention function.
	This keyword only applies to the preserve group.

Selection information	Logical disk display
Preserve - Purpose (RPL/Data Protection)	Displays the logical disks paired for replication and secured by the data retention function. This keyword only applies to the preserve group.
Preserve - Purpose (Control Volume)	Displays the control volume logical disks. This keyword only applies to the preserve group.
Reserve Group	Displays the logical disks in the reserve group. The logical disks to be displayed are general disks without special purpose.
ALL	Displays all of unassigned logical disks (default value).

LDs List view

The logical disk list view lets you check the information about the logical disks that are not assigned to the host.

The following items are displayed.

Number

OS Type

Logical Disk Name

Capacity[GB]

Purpose

RPL: Logical disks for which only replication pairs are set

Snapshot: Logical disks for which only snapshot is set (BV)

Link-volume: Logical disks that are link-volumes (LV)

RPL/Snapshot: Logical disks for which replication pairs and snapshot
are set

Data protection: Logical disks protected by the data retention function

RPL/Data protection: Logical disks for which replication pairs are set
and which are protected by the data retention
function

Control volume: Logical disk for control-volume

System volume: Volume to save storage system information

Replication reserved volume:

Volume to retain management information for the
data replication function

Data migration reserved volume:

Volume to retain management information for the
data migration function

(Empty): General logical disk for which no special purpose is set

Configuration lock

Lock: Locked logical disk

: Logical disk not locked

The following items are hidden by default.

Pool number

Pool name

RAID

PD type

To display any of these items, right-click the item name and set [Display] to the relevant item.

[Lock] and [Unlock] buttons
You can lock or unlock the logical disk.
From the list view, select the logical disk you want to lock or unlock, and then click the [Lock] or [Unlock] button.

When you lock the logical disk, the following operations are locked.

Function	Locked operation
Pool	Pool unbinding
Logical disk	Logical disk unbinding, logical disk type/name setting, logical disk capacity expansion, logical disk storage, logical disk reservation, logical disk initialization
Host	Logical disk assignment
Snapshot	Generation addition, link volume binding, SRA expansion, threshold value change, SRA unbinding
Batch setting	Batch nickname setting, batch pairing
Replication	Pairing, unpairing, forced unpairing
Data protection	Initialization of OS type/logical disk name

Format Time Change

Change the I/O priority of current logical disk binding (format).

The Format Time Change screen consists of the following screens:
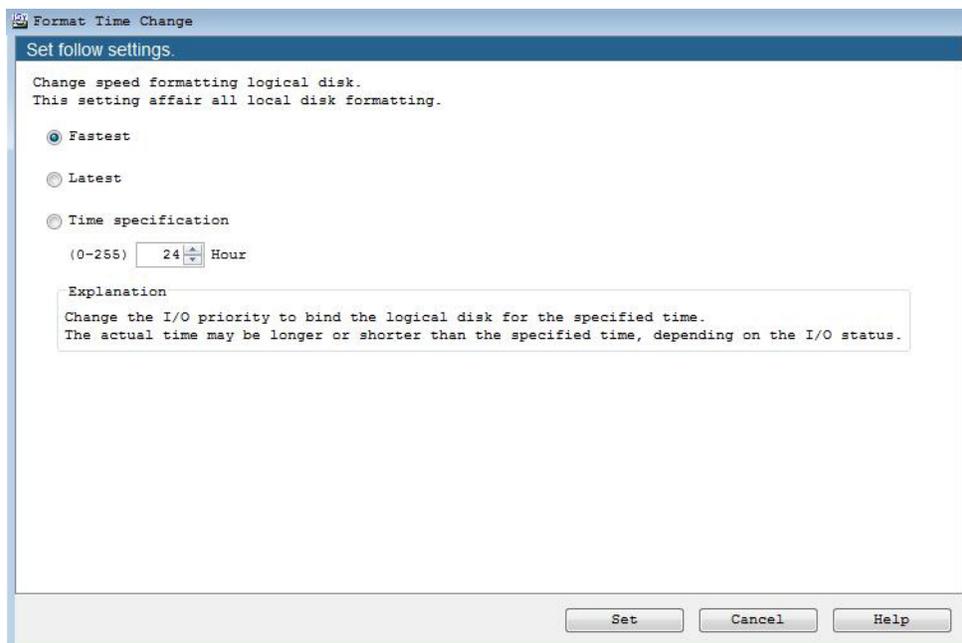
Format Time Change

Figure 9-20: Format Time Change

Fastest Change the I/O priority to bind the logical disk as fast as possible.

Latest Change the I/O priority to minimize the effects of logical disk binding on application I/O.

Time specification

Change the I/O priority to bind the logical disk for the specified time.

(The actual time may be longer or shorter than the specified time, depending on the I/O status.)

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.

Figure 9-21: Confirmation

If you click [Yes], the setting is changed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen without changing the binding time.

Change of Settings

Change the settings of a logical disk.

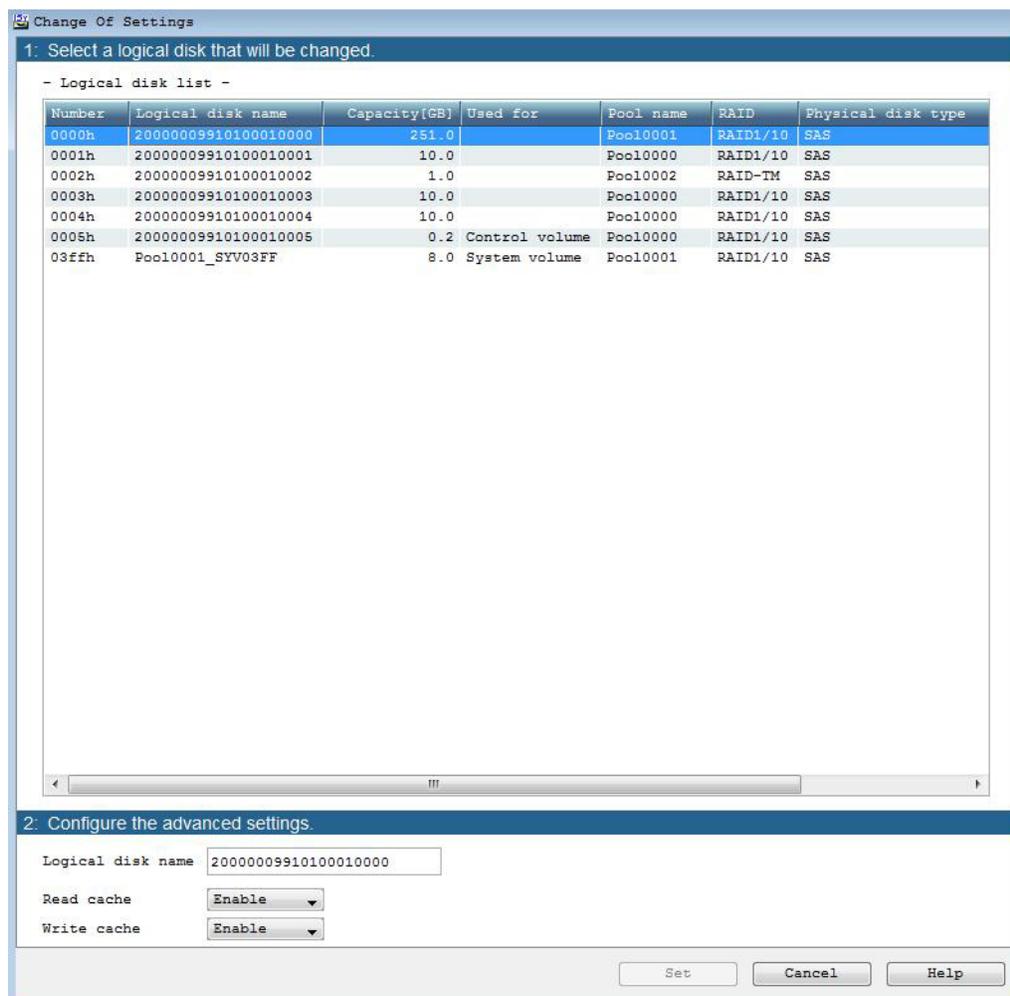The Change of Settings screen consists of the following screen:

Figure 9-22: Change of Settings - Logical Disk

Select a logical disk that will be changed.

From the list, select the logical disk whose settings you want to change.

Configure the advanced settings.

Change the setting items as necessary.

Logical disk name: Name to be assigned to the logical disk

Logical disk type: Type of OS that uses the logical disk.
The logical disk type can be specified when the license for data replication or snapshot is unlocked

Read cache: Disabling the cache of a logical disk that is no longer in much use increases the read performance of the other logical disks.

Write cache: Disabling the cache of a logical disk that is no longer in much use increases the write performance of the other logical disks.

The name of logical disks that fit the following condition cannot be changed.

Condition: Locked

Description: The logical disk is locked

Condition	Description
pairing(repli)	The logical disk is paired for replication.
SYV	The logical disk is a system volume.
RSV	The logical disk is a replication reserved volume.
MSV	The logical disk is a migration reserved volume.
snap shot	The logical disk is a base-volume (BV), snapshot-volume (SV), or snapshot data volume (SDV).
LV	The logical disk is a link-volume.

The cache setting of logical disks that fit the following condition cannot be changed.

Condition	Description
SYV	The logical disk is a system volume.
RSV	The logical disk is a replication reserved volume.
MSV	The logical disk is a migration reserved volume.
snap shot	The logical disk is a snapshot-volume (SV).
LV	The logical disk is a link-volume.

Navigation button(s)

[Set]

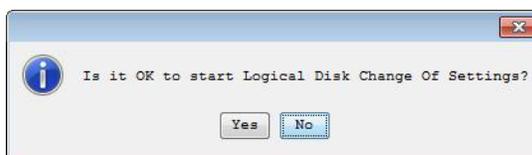   The following confirmation dialog box is displayed.

Figure 9-23: Confirmation - LD Change of Settings

If you select [Yes], the logical disk setting changes are made.

[Cancel]

    A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen without changing the logical disk settings.

Host Settings

Assignment of Logical Disk
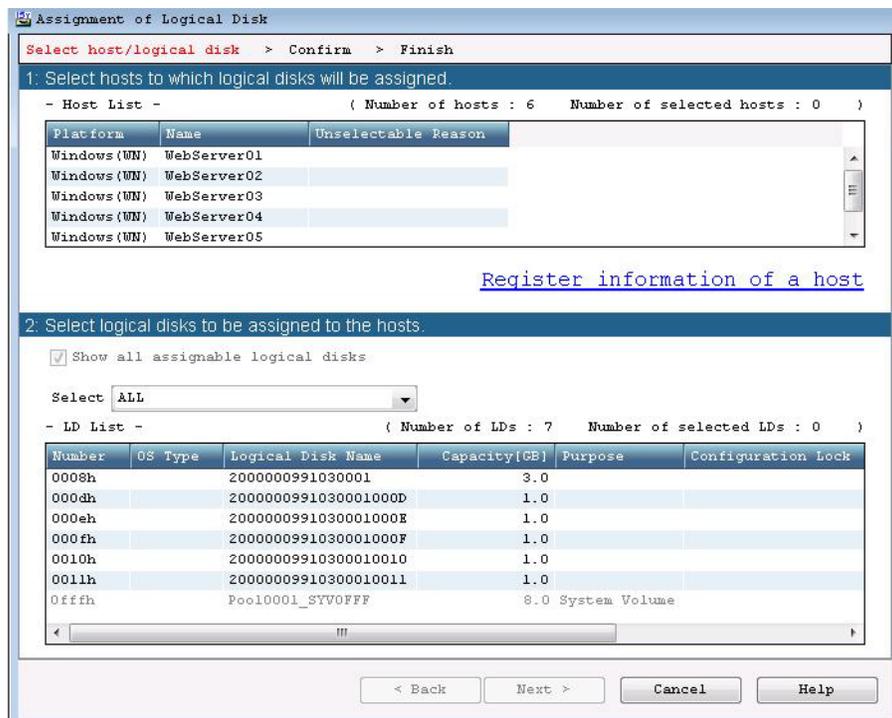
You can assign a logical disk to the host.

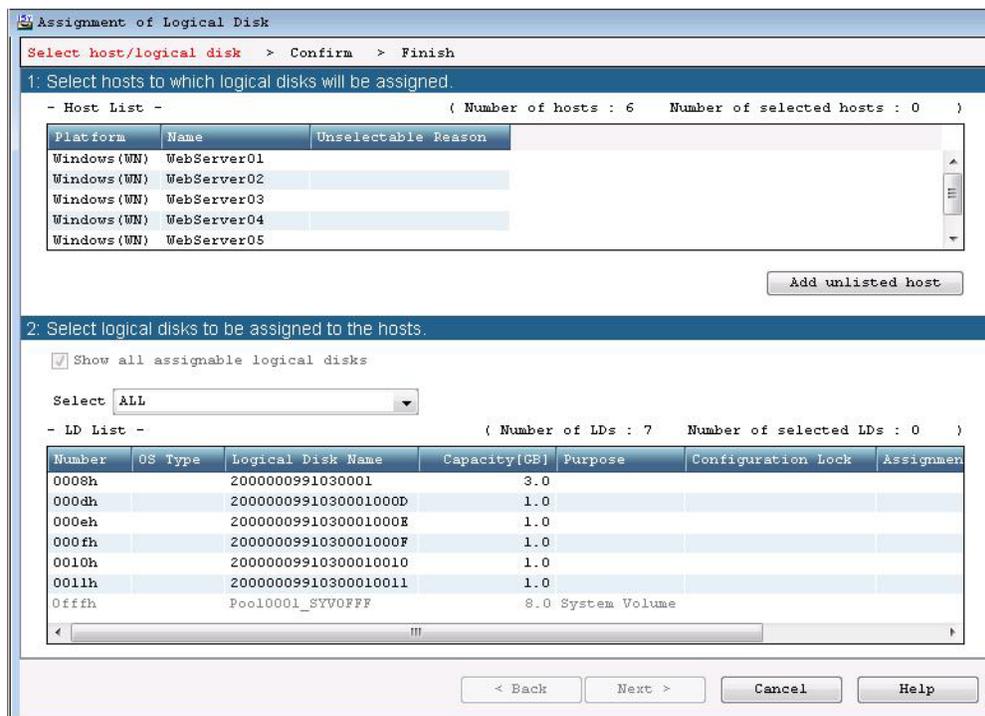**Figure 10-1: Logical Disk (Disk Array-FC/SAS)**

Figure 10-2: Logical Disk (Disk Array-iSCSI)

Host List View

The host List view lets you check the information about the hosts registered to the disk array.

The following items are displayed.

Platform

Name

Unselectable Reason

Click the host you want to assign.

The following items are hidden by default.

Pattern

Action mode

Configuration lock

Interface

To display any of these items, right-click the item name to display the relevant item.

Host Properties

By right-clicking a host in the Host List view and then clicking [Properties], you can check the properties of the host.
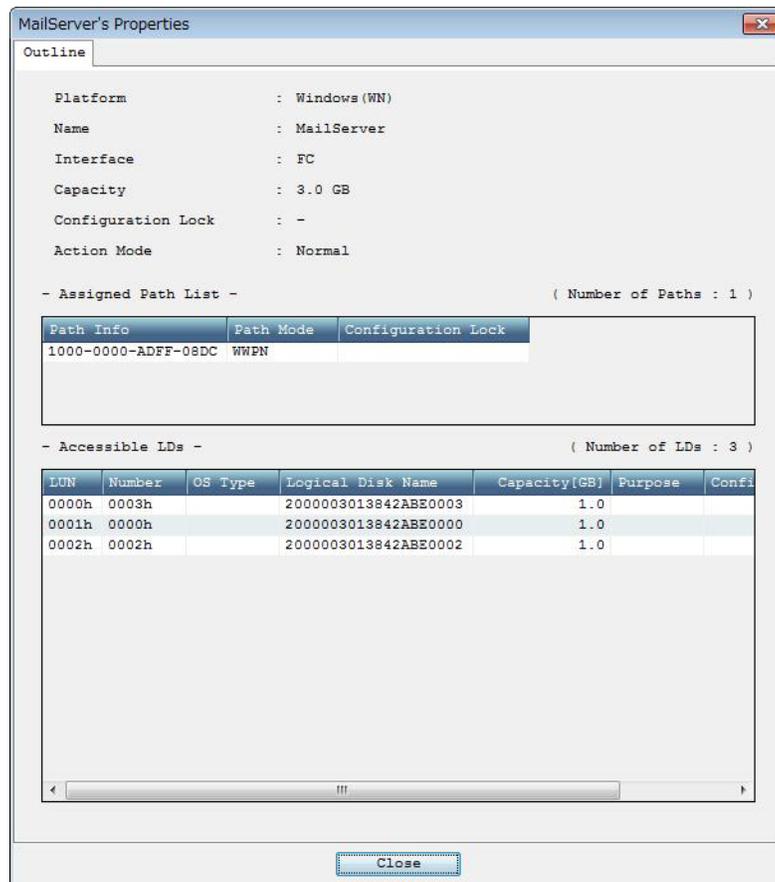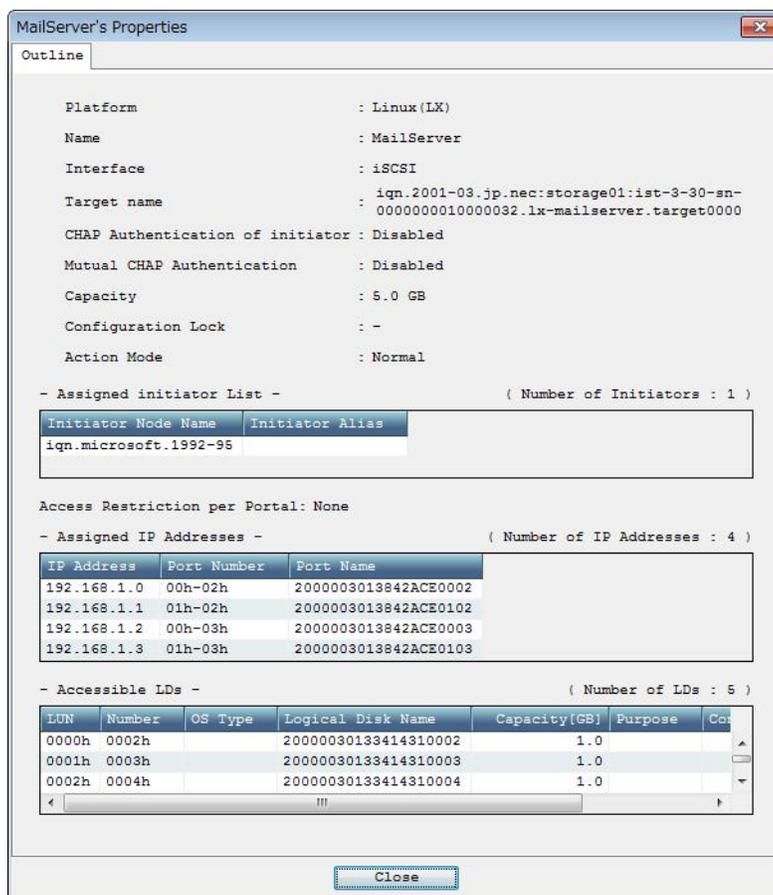
Figure 10-3: Properties - FC
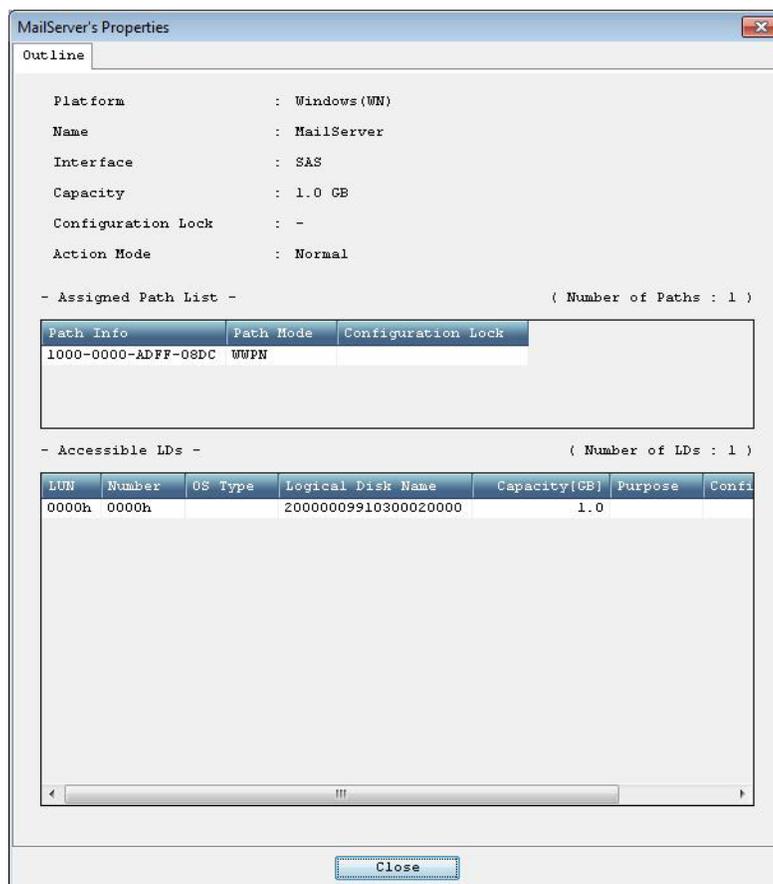
Figure 10-4: Properties - iSCSI

Figure 10-5: Properties - SAS

[Register information of a host]

If you click the [Register information of a host] link, the Host Information Collection screen is displayed that allows you to add a new host.

The [Add unlisted host] button is displayed instead of [Register information of a host] for the disk array supporting iSCSI. When you click this button, the Host Information Collection screen is displayed that allows you to add a new host. For the disk array with multiple types of ports (such as the disk array with FC and iSCSI), only [Register information of a host] is displayed. Use [Create host information manually.] on the Host Information Collection screen to add the iSCSI host information.

[Show all assignable logical disks] check box

If you select the [Show all assignable logical disks] check box, all the created logical disks that can be assigned to host are displayed. This check box can be selected or cleared when you assign the logical disk from the link on the logical disk binding completion screen.

Selection combo box

You can select the logical disks to be displayed in the possible logical disk list using the following keywords.

Selection Information	Logical Disk Display
"Host (LD set) name" (Example: "WN:Server01")	Displays the logical disks already assigned to the specified host (LD set).
"Format: *"(Example: "WN: *")	Displays the logical disks in the specified format.
" : *"	Displays the logical disks of which format is not specified.
Unassigned-PD type (PD type) (Example: No assignment-PD type (SAS))	Displays the logical disks not yet assigned and of (PD type).
Unassigned	Displays the logical disks not yet assigned.
ALL	Displays all logical disks.

LD List View

The LD List view lets you check the information about the logical disks configured on the disk array.

The following items are displayed.

Number

OS Type

Logical Disk Name

Capacity[GB]

Purpose

RPL: Logical disks for which only replication pairs are set

Snapshot: Logical disks for which only snapshot is set (BV)

Link-volume: Logical disks that are link-volumes (LV)

RPL/Snapshot: Logical disks for which replication pairs and snapshot are set

Data protection: Logical disks protected by the data retention function

RPL/Data protection: Logical disks for which replication pairs are set and which are protected by the data retention function

Control volume: Logical disk for control-volume

System volume: Volume to save storage system information

Replication reserved volume:

Volume to retain management information for the data replication function

Data migration reserved volume:

Volume to retain management information for the data migration function

L2 cache: L2 cache volume

(Empty): General logical disk for which no special purpose is set

Configuration lock

Lock: Locked logical disk

:Logical disk not locked

Unselectable Reason

The following items are hidden by default.

Group

Pool number

Pool name

RAID

PD type

To display any of these items, right-click the item name and set [Display] to the relevant item.

- You can sort the displayed items but cannot change their order.
- The logical disks assigned to the host are also displayed.
- You can select two or more logical disks simultaneously.

Select the host and logical disk to be assigned and then click [Next], and you can check the settings you have made.
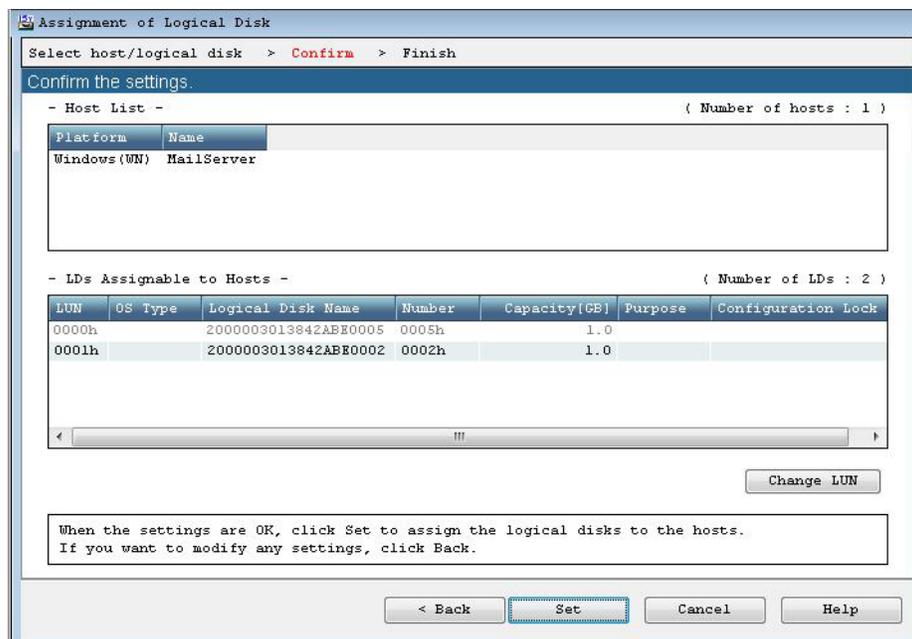

Figure 10-6: LD Assignment Confirmation

Host List View

The Host List view lets you check the information about the hosts to which to assign a logical disk.

LDs Assignable to Hosts View

The LDs Assignable to Hosts view lets you check the logical disks to be assigned to the host.

[Change LUN] Button

When you click this button, the LUN setting screen is displayed that allows you to specify a new host.

If you click the [Set] button after confirming the settings, the logical disk assignment operation is executed and the result is displayed.
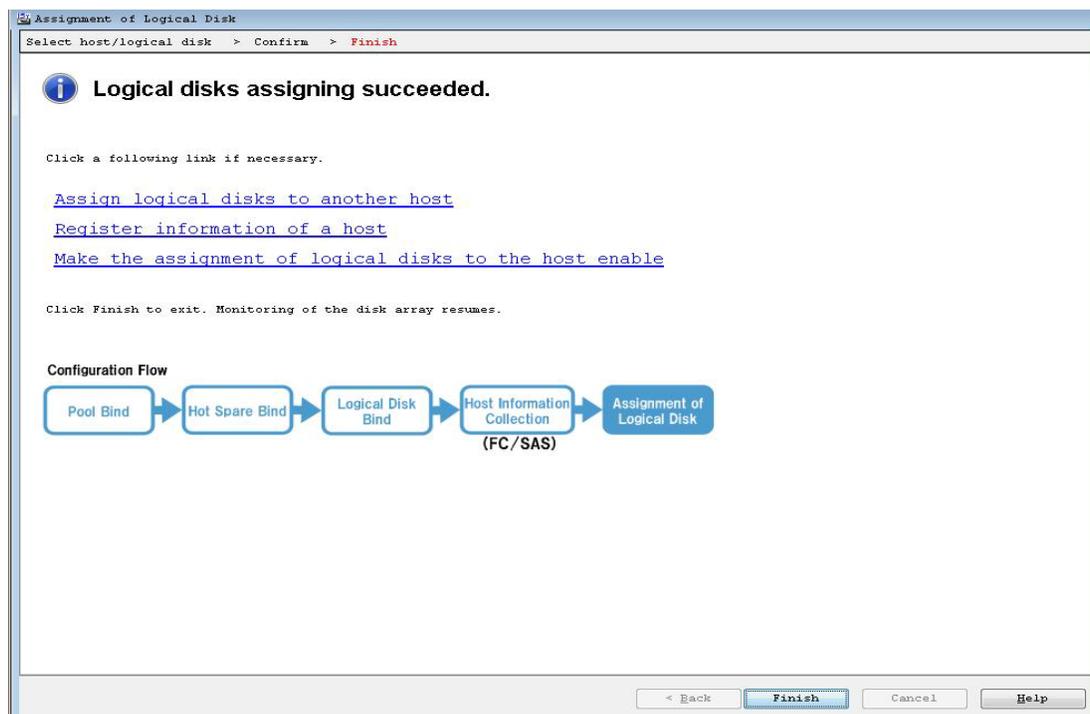

Figure 10-7: Finish Screen

Here, the following operations are possible:

Assign logical disks to another host

When you click this, you can assign another logical disk to the host.

Register information to a host

When you click the button, the Host Information Collection screen is displayed that allows you to set up a new host.

Note that this link is not displayed for the disk array supporting iSCSI.

Make the assignment of logical disks to the host enable

Clicking this item enables the logical disk assignment to the host via FC or SAS. When you are using iSCSI, this is not necessary.

[Finish] button

If you click this button, the logical disk assignment ends and the State Display screen is displayed again.
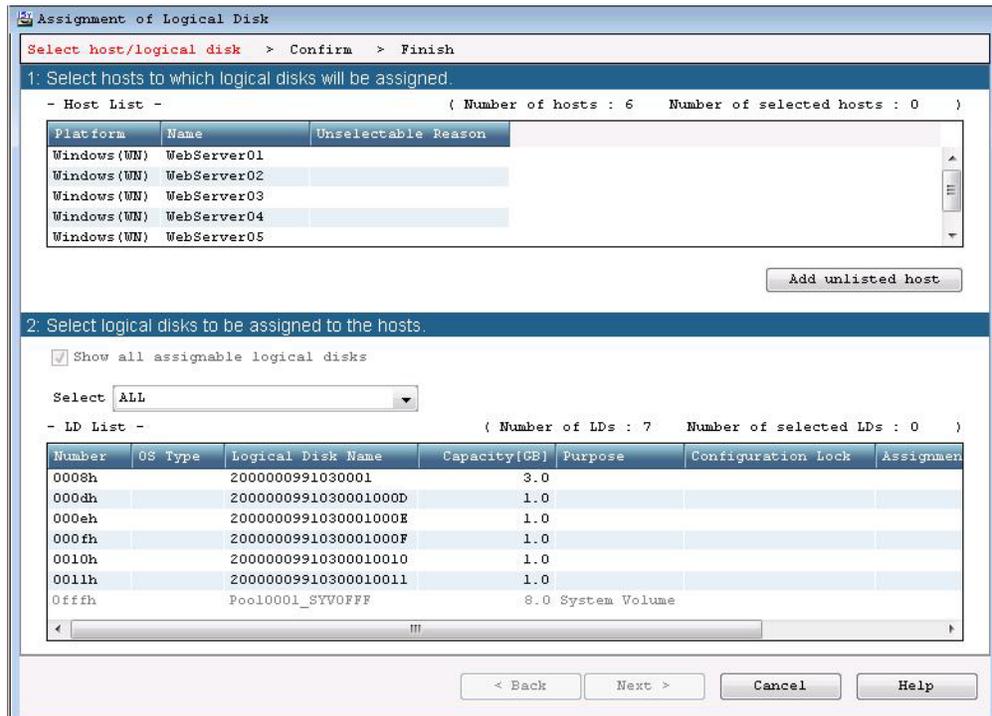
Host Information Collection (iSCSI)

Figure 10-8: Logical Disk - iSCSI

If you click the [Add unlisted host] button on the Assignment of Logical Disk screen, the Host Information Collection screen is displayed that allows you to add a new host.
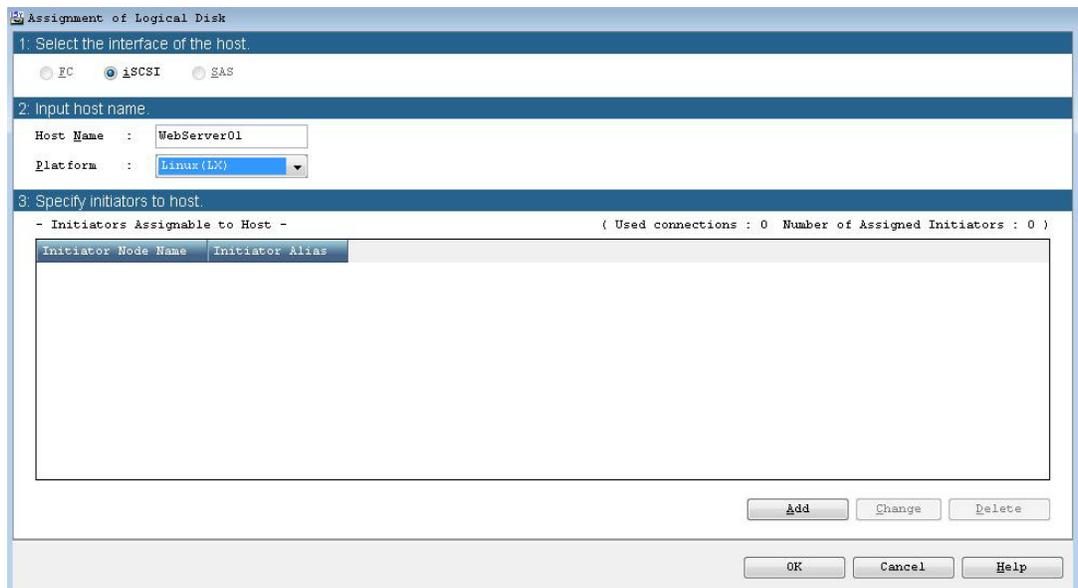

Figure 10-9: Host Information - iSCSI

Host Name

Specify a host name.

A host name consists of 1 to 16 characters that may be any desired single-byte alphanumeric characters and "-".

You cannot set a host name that is already set for an existing FC, SAS or iSCSI host.

The host name you set becomes a part of the target name.

The target name is automatically set in the format shown below, with all uppercase letters replaced with lowercase letters.

"(Unique disk array value).(Platform)-(LD set name).target(Unique LD set value)"

Platform

Specify the platform of the host.

The following platforms can be specified. However, if "VMware(LX)" is selected, the platform is set as "Linux(LX)". If "Hyper-V(WN)" is selected, the platform is set as "Windows(WN)".

Platform	Description
Linux(LX)	Linux system
Windows(WN)	Windows system
VMware(LX)	VMware system
Hyper-V(WN)	Hyper-V system

Assignable Initiators to LD Set (Host) view

This list view lets you check the specified initiator information.

[Add] button

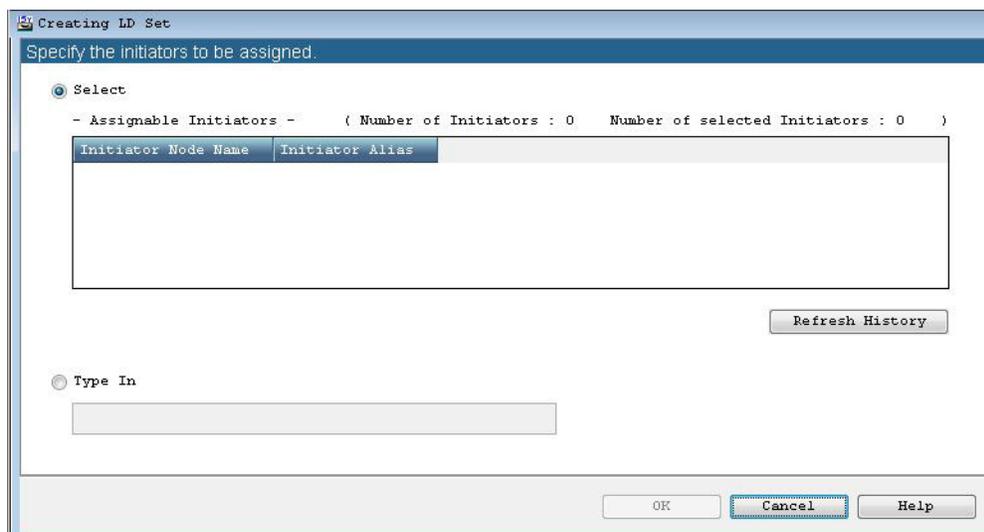Specify the initiator for the host to add.

Figure 10-10: Initiator Addition

When setting an initiator, select one of the following methods.

[Select]

> The initiator information of the host connected to the disk array is displayed. Click the initiator you want to add to the host.
>
> To display the information on the initiator, perform the discovery operation from the initiator (host) to the target (disk array) in advance.
>
> Also, clicking the [Refresh History] button displays the initiator information of the newly connected hosts in the Assignable Initiators to LD Set (Host) view.
>
> Some initiators may not be displayed in the Assignable Initiators list because the initiator information that can be saved is limited. If the initiator is not displayed, perform the discovery operation again.

[Type In]

> You can enter the initiator information directly.

If you click the [OK] button after selecting or entering the initiator information, the information is applied on the initiator list view of the Add unlisted host screen.

[Change] button

By selecting the added initiator from the initiator list view, and then clicking the [Change] button, the initiator change screen appears. You can change the selected initiator information on this screen.

[Delete] button

By selecting the added initiator from the initiator list view and then clicking the [Delete] button, you can delete the selected initiator from the host.

Set a host name, platform, and initiator, and then click the [OK] button to add a new host. If you click the [Set] button after confirming the settings, the host information collection operation is executed and the result is displayed.

Up to 16 initiators can be set per host.

Change LUN

If you click the [Change LUN] button on the Assignment of Logical Disk screen, the Change LUN screen is displayed.

[Change LUN] allows you to change the order of LUNs (Logical Unit Numbers) of logical disks to be assigned to the host.

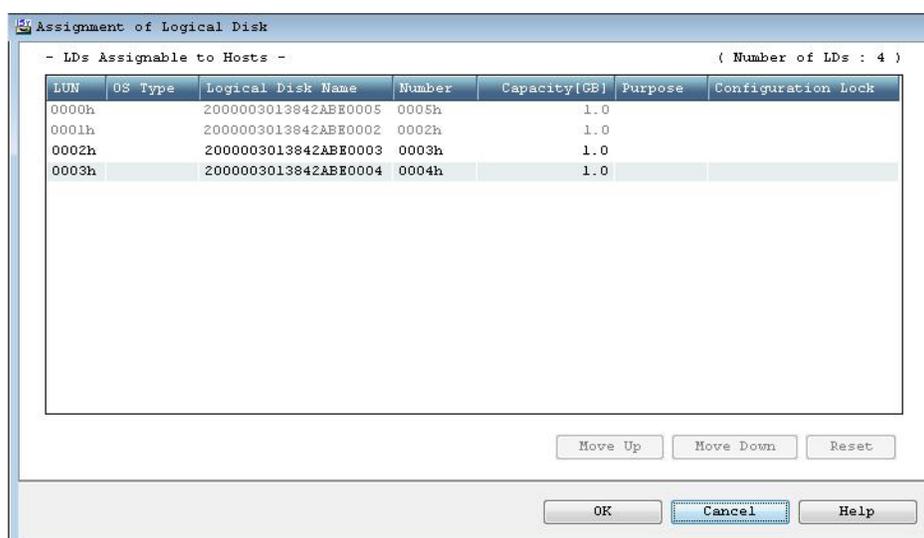You cannot change the LUN of an already assigned logical disk.

Figure 10-11: LUN Setting

LDs Assignable to Hosts view

The LDs Assignable to Hosts view lets you check the logical disk information to be assigned to the host.

Click the logical disk whose LUN you want to change.

[Move Up] button

One logical disk you select is moved one line up in the newly added logical disks.

[Move Down] button

One logical disk you select is moved one line down in the newly added logical disks.

[Reset] button

The LUN is reset to the state it was in before the change.

If you click the [OK] button, the LUN change is made and the Assignment of Logical Disk screen is displayed again.

If you click the [Cancel] button, the LUN change is made and the Assignment of Logical Disk screen is displayed again.

Unassignment of Logical Disk

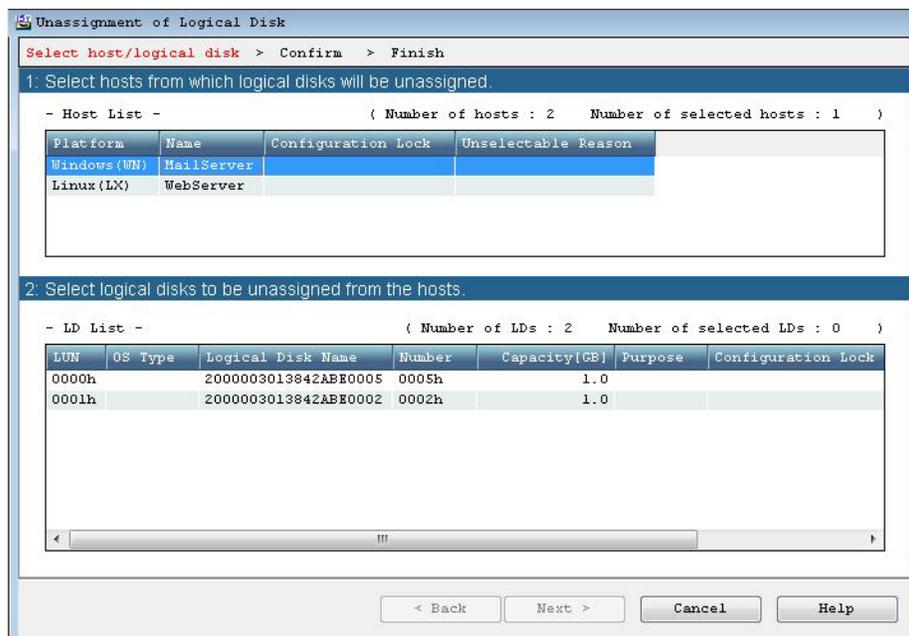You can unassign a logical disk that is assigned to the host

Figure 10-12: Unassignment LD

Host List view

The Host List view lets you check the information about the hosts registered to the disk array.

The following items are displayed.

Platform

Name

Configuration lock

Lock: Locked host

: Host not locked

Unselectable Reason

Click the host for which you want to unassign a logical disk.

The following items are hidden by default.

Action mode

Interface

To display any of these items, right-click the item name to display the relevant item.

Host properties

By right-clicking a host in the Host List view and then clicking [Properties], you can check the properties of the host.
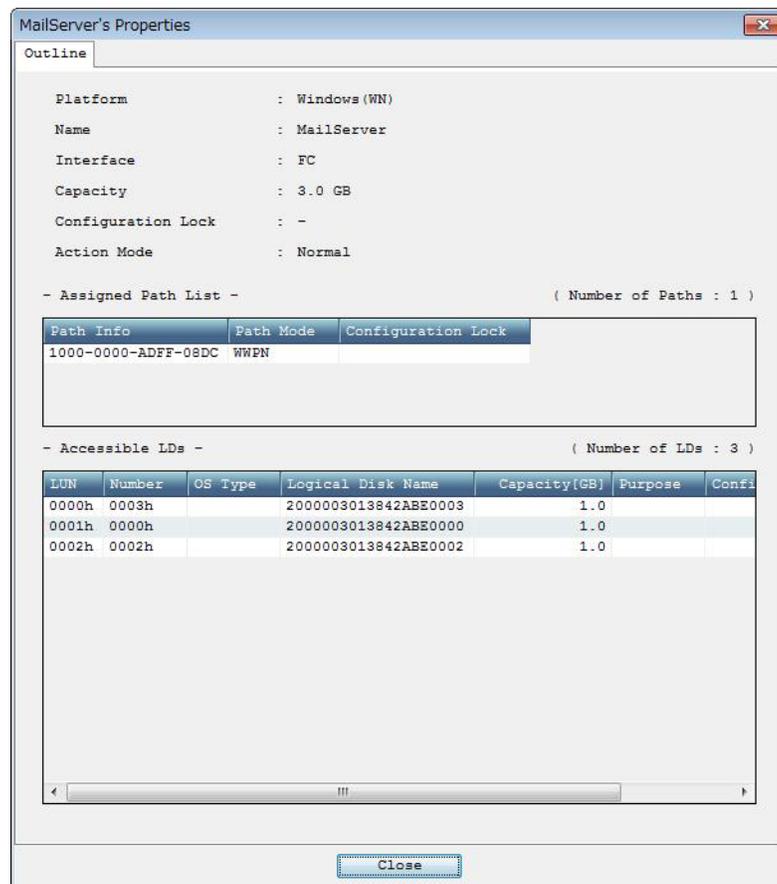
Figure 10-13: Properties - FC
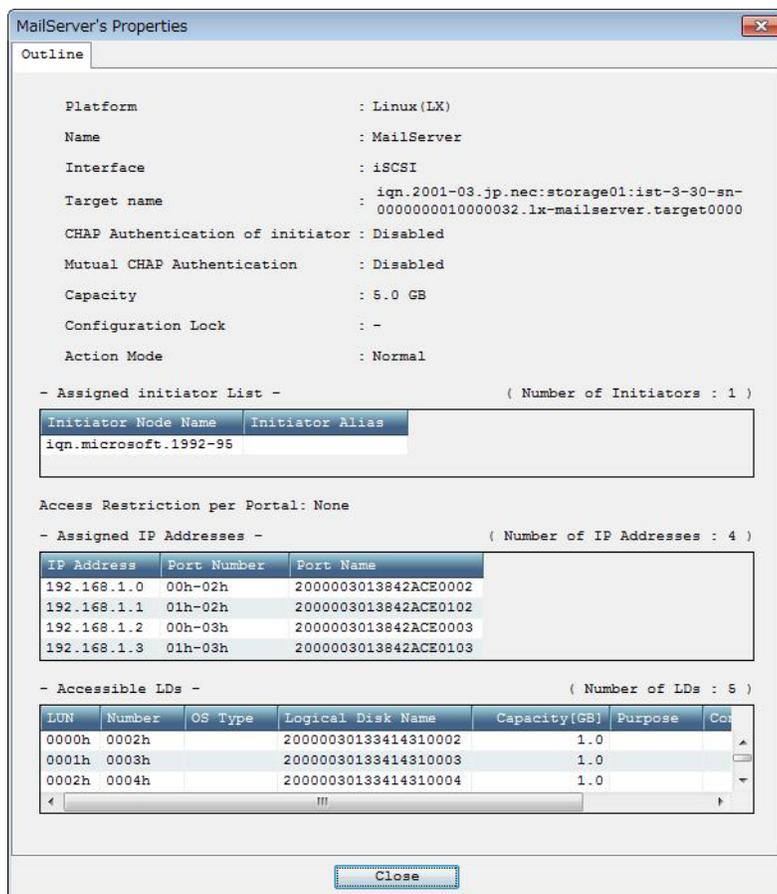
Figure 10-14: Properties - iSCSI
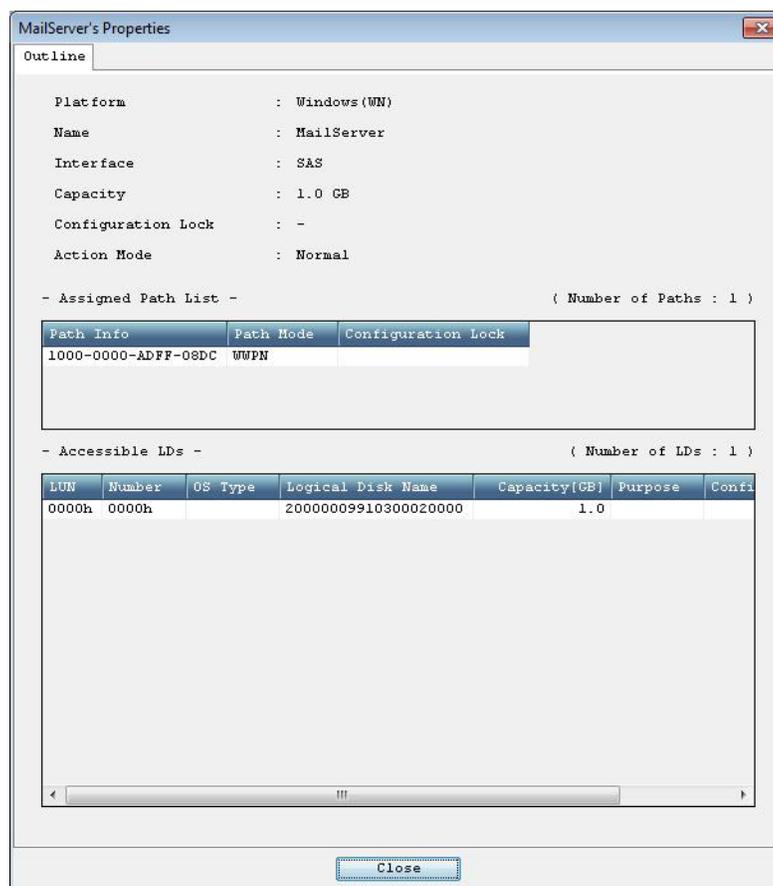
Figure 10-15: Properties - SAS

LD List view

This list view lets you check the information about the logical disks that are assigned to the host selected in the Host List view.

The following items are displayed.

LUN

Number

OS Type

Logical Disk Name

Capacity[GB]

Purpose

RPL: Logical disks for which only replication pairs are set

Snapshot: Logical disks for which only snapshot is set (BV)

Link volume: Logical disks that are link-volumes (LV)

RPL/Snapshot:Logical disks for which replication pairs and snapshot are set

Data protection: Logical disks protected by the data retention function

RPL/Data protection: Logical disks for which replication pairs are set and which are protected by the data retention function

Control volume: Logical disk for control-volume

(Empty): General logical disk for which no special purpose is set

Configuration lock

Lock:Locked logical disk

    :Logical disk not locked

Unselectable Reason

The following items are hidden by default.

Pool number

Pool name

RAID

PD type

To display any of these items, right-click the item name and set [Display] to the relevant item.

- You can sort the displayed items but cannot change their order.
- The logical disks assigned to the host are also displayed.
- You can select two or more logical disks simultaneously.

Select the logical disk you want to delete in the logical disk list view and then click [Next], and a screen is displayed that lets you check the settings.
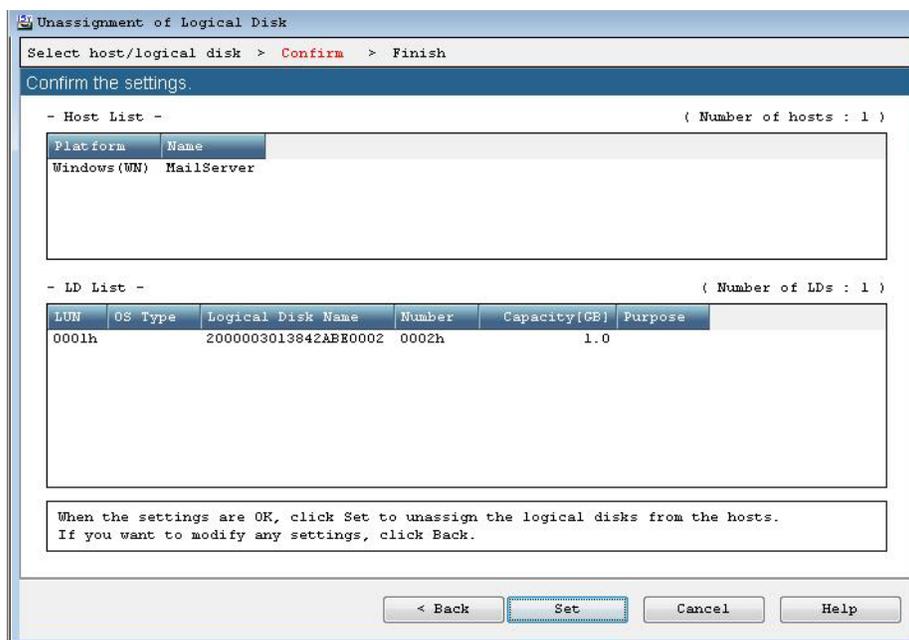
Figure 10-16: LD Unassign Confirmation

If you check the settings and click the [Set] button, the following warning dialog box is displayed.
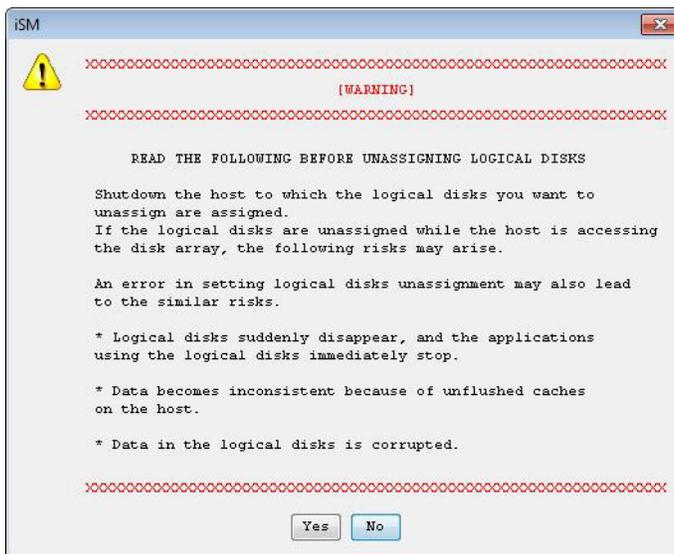
Figure 10-17: LD Unassign Warning

Clicking the [Yes] button unassigns the logical disk.

Stop access to the disk array by stopping the application server or by other means before performing this operation.

If the logical disks you are unassigning include the logical disk of LUN 0000h, the following warning dialog box is displayed.
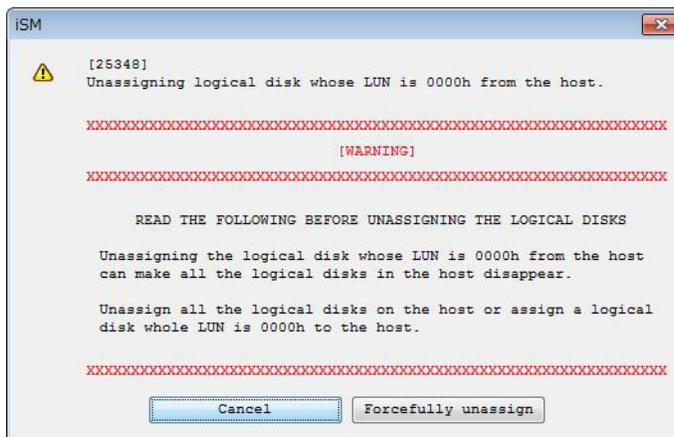
Figure 10-18: LUN 0000h LD Unassign Warning

Clicking the [Forcefully unassign] button unassigns the logical disk.

Check the dialog box message carefully before performing this operation.

You cannot unassign logical disks if a host or logical disk locked by the host configuration lock/unlock function is included.

You cannot unassign logical disks if the configuration lock function confirms that any target application server is in operation. Stop all the target application servers before performing this operation.

Host Operations

You can collect host information, lock host operations, and manage LD sets.

Host Information Collection

Collect host information.

The Host Information Collection screen consists of the following:

Host Information Setting Method

Select the method of information collection.

Host Information Registration

Register host information.

Completion

The setting execution result is displayed.

Host Information Setting Method

Select the method of information collection.
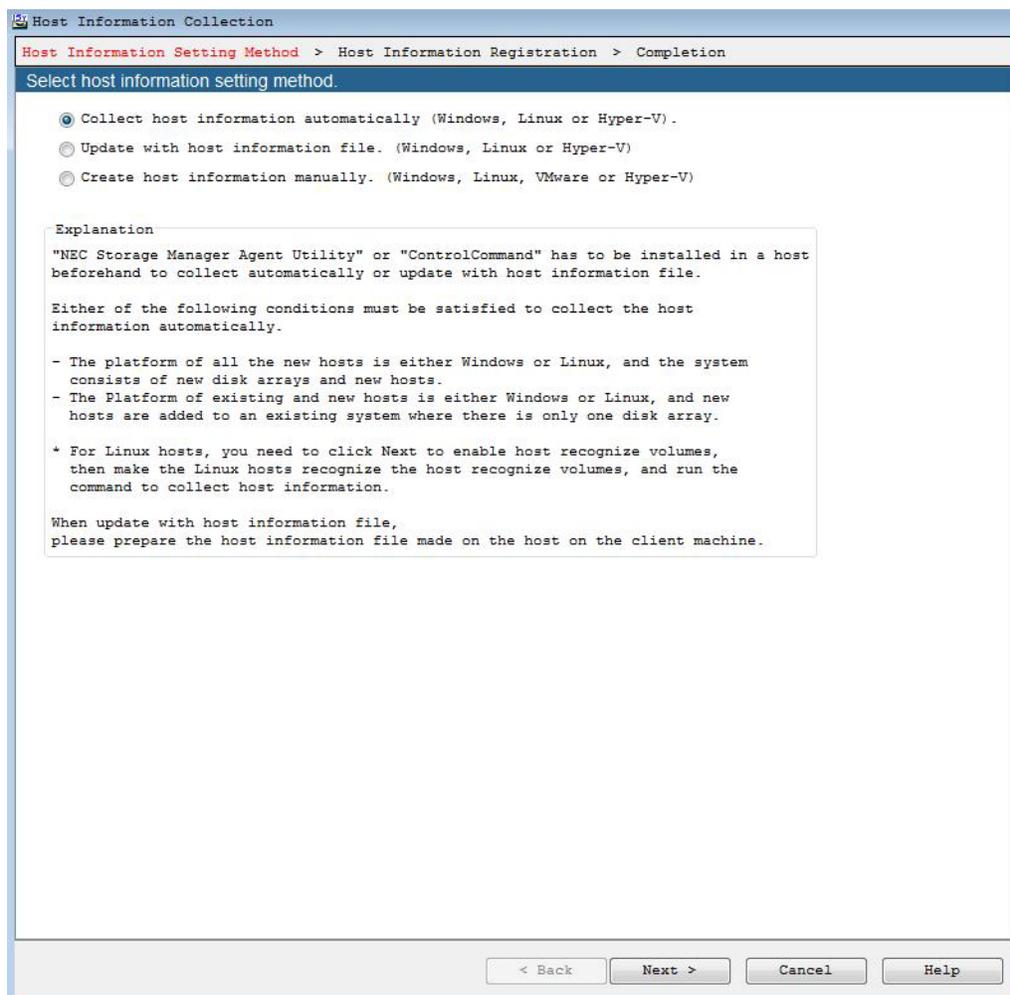
Figure 10-19: Host Information Setting Method

Specify the method of collecting host information.

[Collect host information automatically.]

Information is collected from the host physically connected to the disk array via the switch.

[Update with host information file.]

Host information is uploaded from the specified file.

[Create host information manually.]

You manually add host information settings.

Navigation button(s)

[Next]

If you select the method of setting host information and then click [Next], the Host Information Registration screen is displayed.

If [Collect host information automatically] is selected, a confirmation dialog box is displayed.
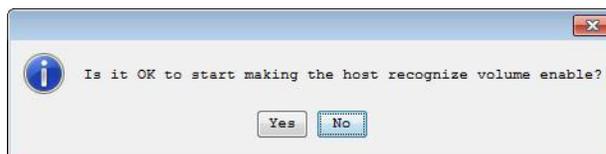
Figure 10-20: Confirmation

If you click [Yes], the Host Information Registration screen is displayed.

[Cancel]

The Configuration and State Display screen is displayed again.

Host Information Registration

What is displayed on this screen differs depending on the host information collection method selected on the previous screen.

Completion
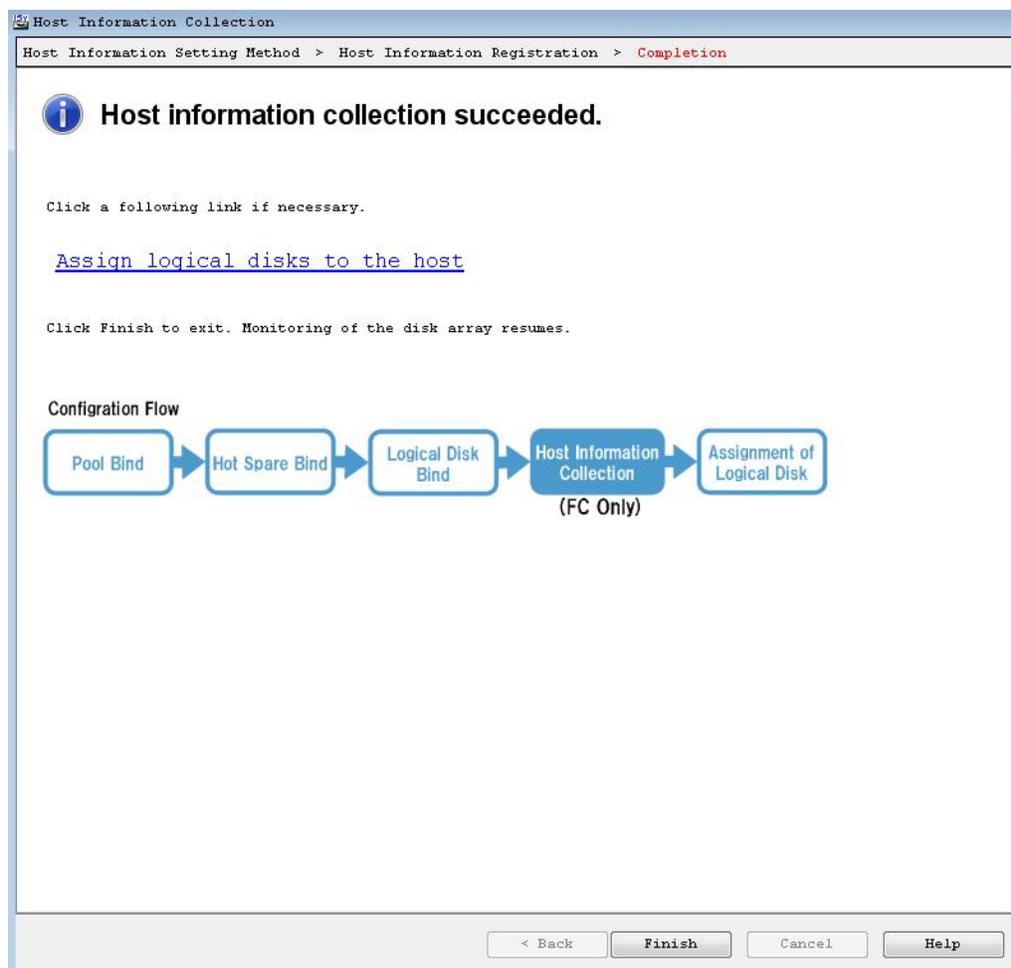
Figure 10-21: Automatically Collecting Host Information

When this operation is successful, the following link is displayed.

Assign logical disks to the host

The Assignment of Logical Disk screen is displayed.

Navigation button(s)

[Finish]

The [Monitor] - [Screen Display] screen is displayed.

Host Information Automatic Collection

Obtain information from the host physically connected to the disk array.
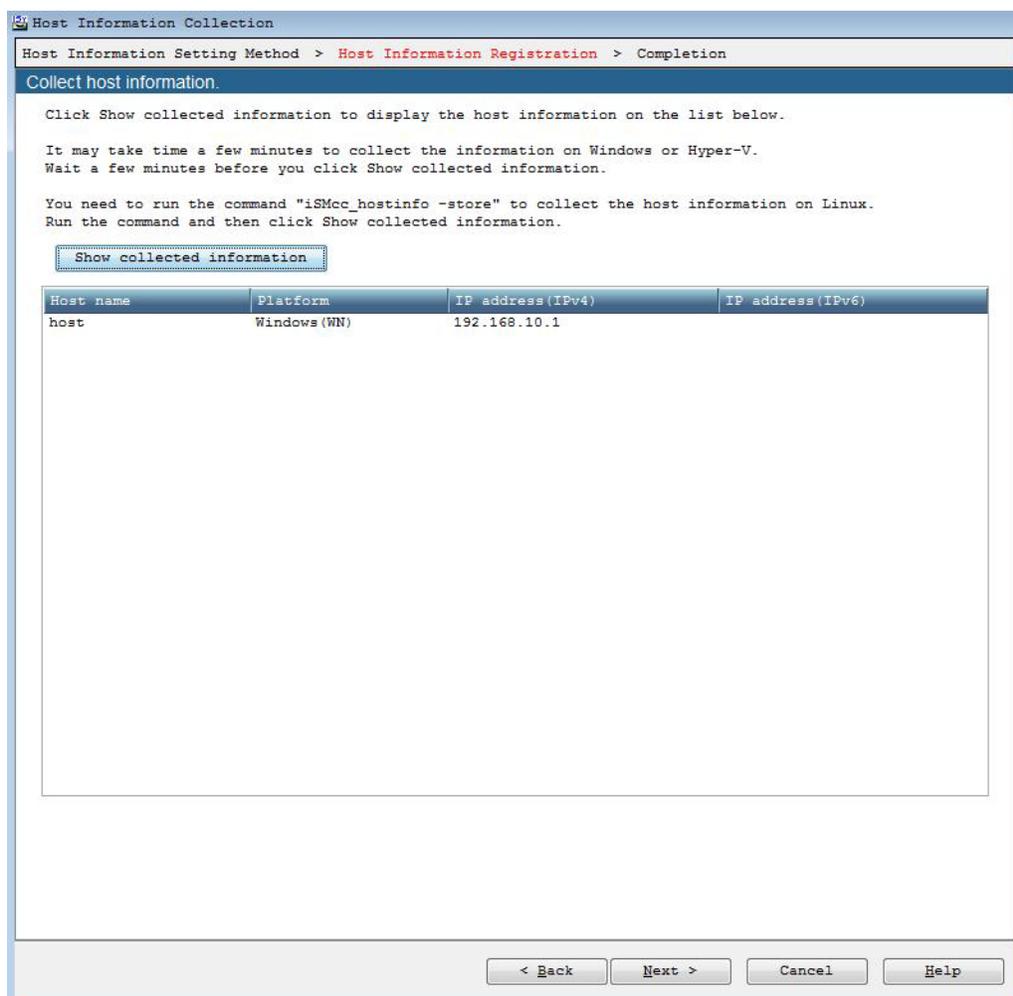
Figure 10-22: Automatic Collection

The table displays the collected host information.

[Show collected information] button

The host information collected by the disk array is updated.

- In the case of Windows and Hyper-V, it may take several minutes to acquire information. Wait a while before clicking the [Show collected information] button.
- In the case of Linux, execute the command to register host information on the host side before clicking the [Show collected information] button.

Navigation button(s)

[Next]

The Completion screen is displayed.

[Back]

The Host Information Setting Method screen is displayed again.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

The following conditions must be met to use this function.

- The host linked with the switch to which the disk array is connected is not executing any operation or, the host to which the disk array is directly connected is not executing any operation.
- The host to be connected to uses the Windows, Hyper-V or Linux platform.
- Storage Manager Agent Utility or ControlCommand is installed on the host to be connected to.

Host Information File Loading

Load host information from the specified file.
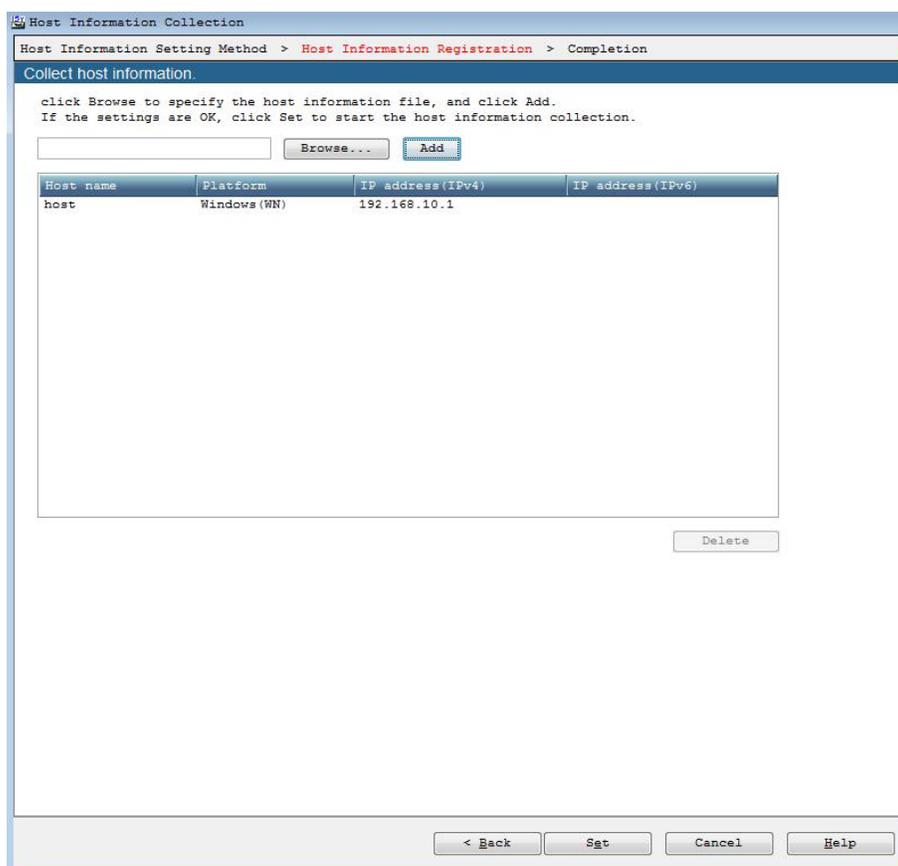
Figure 10-23: File Loading

1. Click the [Browse] button, specify the file in which host information is recorded, and then click the [Add] button.

2. Check that all host information has been collected, and then click the [Set] button.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.
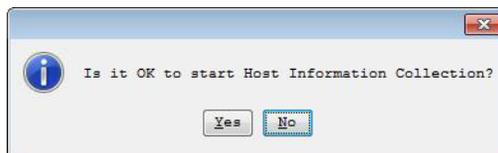
Figure 10-24: Confirmation

If you click [Yes], the host information creation operation is executed and then the Completion screen is displayed.

[Back]

The Host Information Setting Method screen is displayed again.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

- The host information file is generated by the host information collection command (SnapSAN Manager cc_hostinfo).
- If host information is loaded from a file, that information is not displayed on the "Connection Host Information Display" screen. To add the host information to this screen, use the host information registration command (SnapSAN Manager hoststore).

Host Information Registration (Manual)

If you select [Create host information manually.] and click the [Next] button on the Host Information Setting Method screen, the Host Information Collection screen is displayed that allows you to add a new host.
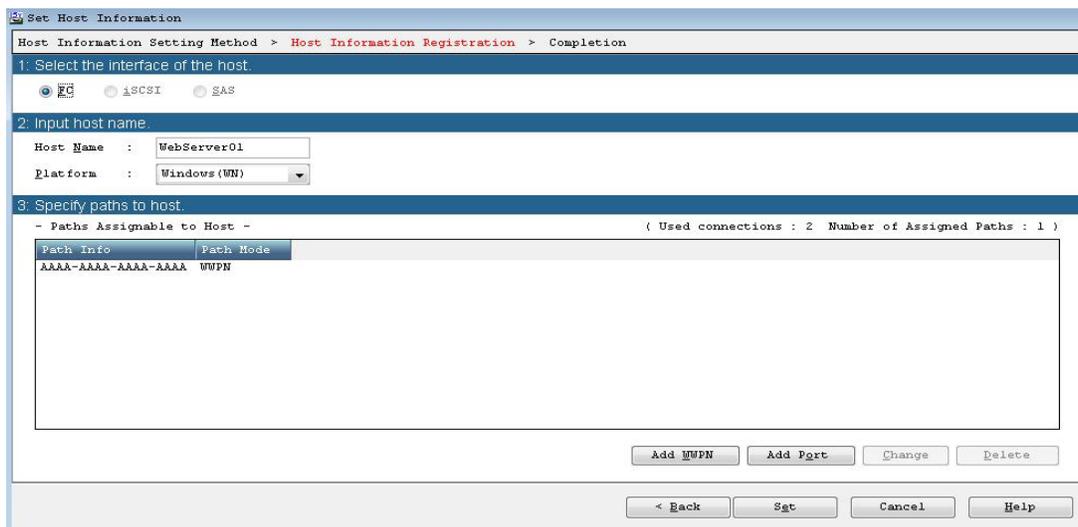
Figure 10-25: Host Setting - FC
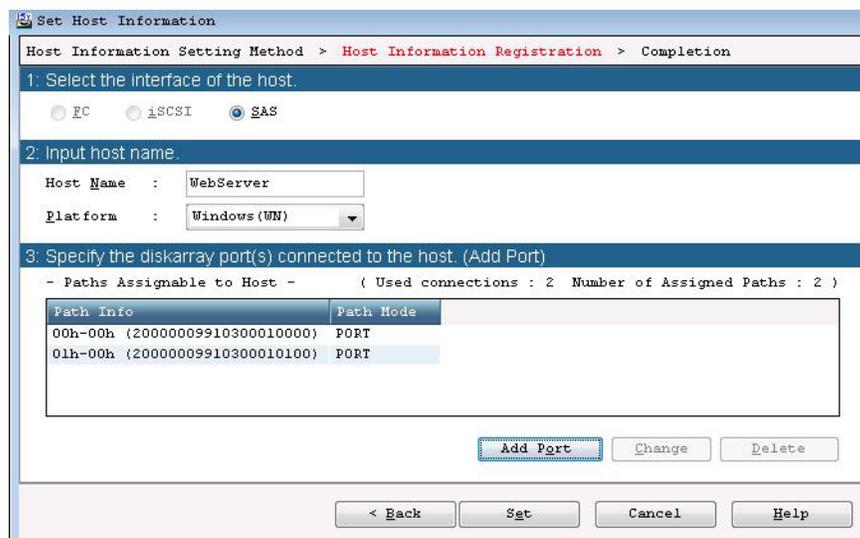
Figure 10-26: Host Setting - SAS

Host Name

Specify a host name.

A host name consists of 16 characters that may be any desired single-byte alphanumeric characters, "/", "_", and "-".

You cannot set a host name that is already set for an existing FC, SAS, or iSCSI host.

Platform

Specify the platform.

The following platforms can be specified.

Platform	Description
Linux(LX)	Linux System
Windows(WN)	Windows System
VMware(LX)	Vmware System
Hyper-V(WN)	Hyper-v System
A2	Acos-2 System
CX	Solaris System
AX	Aix System
NX	Hp-ux System
SX	Super-ux System

However, if "VMware(LX)" is selected, the platform is set as "Linux(LX)". If "Hyper-V(WN)" is selected, the platform is set as "Windows(WN)".

Path List view

This list view lets you check the specified path information.

There are two path types: WWPN and PORT. Set the WWPN of the HBA of the application server that will actually access the logical disk, or the port in Port mode of the disk array to which the application server is connected.

To set the WWN mode accessibility, you need the WWPN (World Wide Port Name) that is set for the HBA of the application server.

A WWN (World Wide Name) consists of a WWNN (World Wide Node Name) and a WWPN (World Wide Port Name) and is also assigned to the HBA (Host Bus Adaptor or, in some cases, called the FC controller or SAS HBA controller) as unique ID code information. The value of the WWPN can be collected by using the host information collection function included in the SnapSAN Manager   volume display command.

[Add WWPN] button

Set a WWPN for the host you are adding.
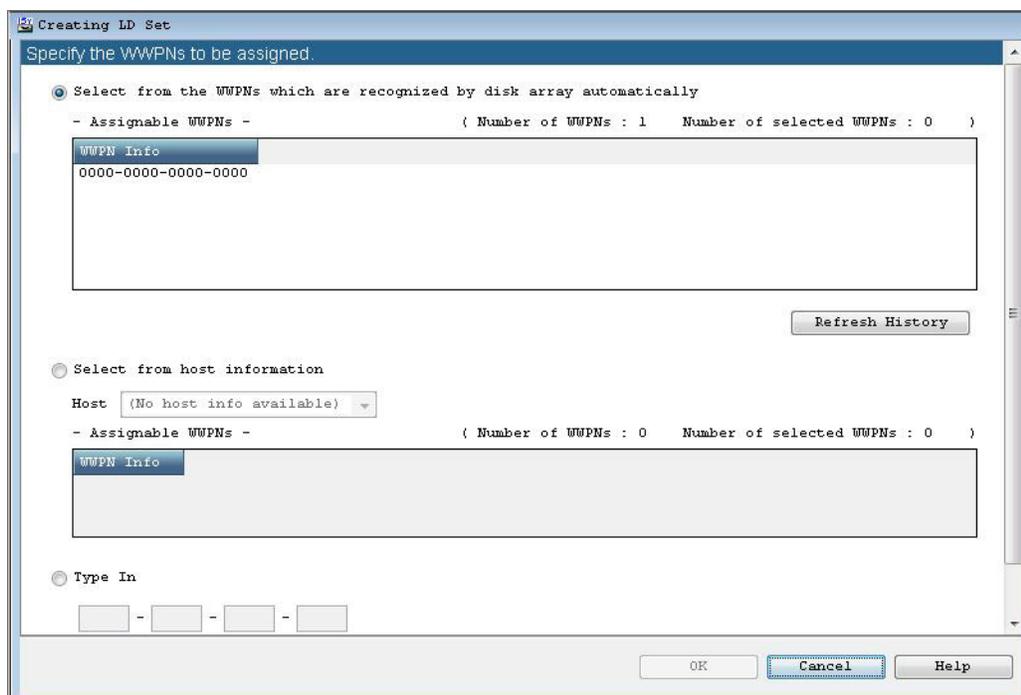
Figure 10-27: WWPN Addition

When setting a WWPN, select one of the following methods.

Select from the WWPNs which are recognized by disk array automatically]

When the host is connected to the disk array, the WWPN information of the automatically recognized host is displayed in the Assignable WWPNs list.

Clicking the [Refresh History] button displays the WWPN of the newly connected host in the Assignable WWPNs list.

[Select from host Information]

The WWPN information of the host that matches the host name selected in the host selection field is displayed.

The WWPN information cannot be displayed if no HBA information is registered for the host.

[Type In]

> You can enter the WWPN information directly. In this input field, you need to enter 16 single-byte characters (hexadecimal).

If you click the [OK] button after selecting or entering the WWPN information, the information is applied on the path list view of the Host Setting screen.

[Add Port] button

Set a port of the Port mode for the Host you are adding.

You cannot set a port of the WWN mode.

If you select the port you want to add from the assignable port list view and then click the [OK] button, the information is applied on the path list view of the Host Setting screen.

However, you cannot add a port locked by the port configuration lock/unlock function.

[Change] button

By selecting the added path from the path list view, and then clicking the [Change] button, the WWPN change screen or port change screen appears. You can change the selected path information on this screen.

[Delete] button

By selecting the added path from the path list view, and then clicking the [Delete] button, you can delete the selected path from the host.

Specify a host name, platform, and path, and then click the [Set] button to create a new host.

- Up to 64 sets of path information can be set per host.
- The path already assigned to the host cannot be newly assigned.

Path information can be set even if it contains a value other than the WWPN of the HBA of the application server that will actually access the logical disk. Therefore, take due care not to set the wrong value.

The change to the path information is immediately applied on the disk array. Be careful because the wrong information may disable access from an application server. Particularly, if you make an improper setting when deleting path information, the logical disk used by an application server will suddenly become unrecognizable. Therefore, you need to have a good grasp of the operation status before carrying out this operation. Also, if necessary, stop the operation and application servers based on a plan.

Set an LD set name, platform, action mode, and path information and then click [Next], and you can check the settings you have made.

Figure 10-28: LD Set (FC) Confirmation

If you click the [Set] button after confirming the settings, the LD set creation/setting change operation is executed and the result is displayed.

Changing the settings of an LD set while an application server is running may affect the operation.

If necessary, stop the operation and application servers based on a plan.

Creating a New LD Set/Changing Settings (iSCSI)

By clicking the [Create] button on the LD Set Management screen, you can create a new LD set.

Also, by clicking an LD set in the LD set list view on the LD Set Management screen and then clicking the [Edit] button, you can change the settings of the LD set.
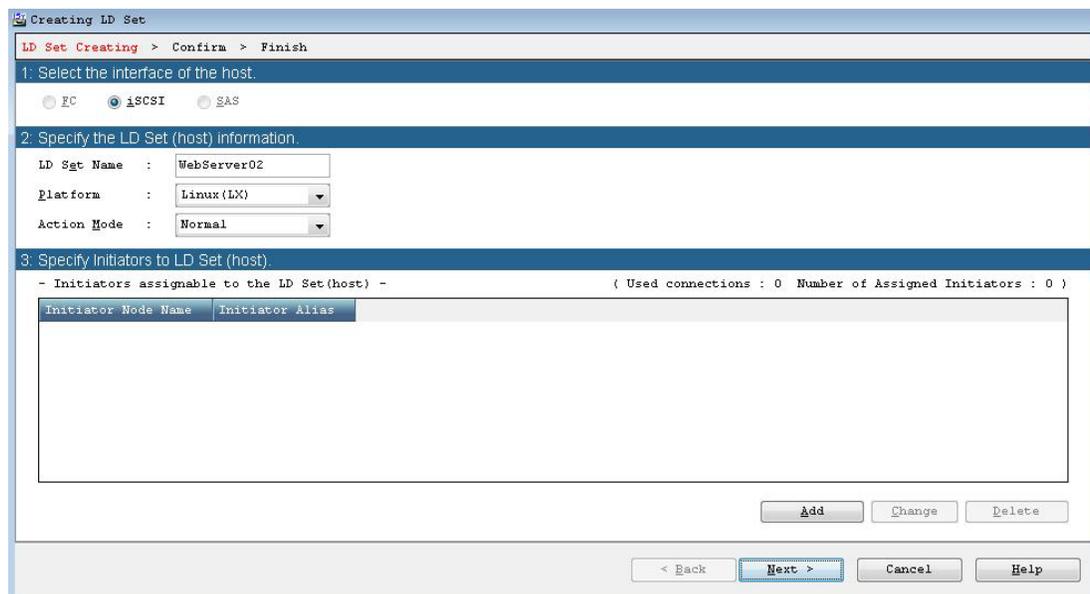
Figure 10-29: LD Set Creation - iSCSI

If you select [iSCSI] as the interface with the host, the above screen is displayed.

LD Set Name

Set an LD set name.

An LD set name consists of 1 to 16 characters that may be any desired single-byte alphanumeric characters and "-".

You cannot set an LD set name that is already set for an existing FC, SAS, or iSCSI LD set.

Platform

Specify the platform of the host.

The following platforms can be specified.

Platform	Description
Linux(LX)	Linux system
Windows(WN)	Windows system
VMware(LX)	VMware system
Hyper-V(WN)	Hyper-V system

However, if "VMware(LX)" is selected, the platform is set as "Linux(LX)". If "Hyper-V(WN)" is selected, the platform is set as "Windows(WN)".

Action Mode

As the action mode, you can select [Normal] or [Secure].

To ensure security for each individual server or restrict the change to the disk array configuration, select [Secure]. Otherwise, select [Normal].

If you select [Secure], ControlCommand takes effect only for the logical disks recognized by the OS and the logical disks paired with those logical disks.

Assignable Initiators to LD Set (Host) view

This list view lets you check the specified initiator information.

[Add] button

Specify the initiator for the LD set to add.
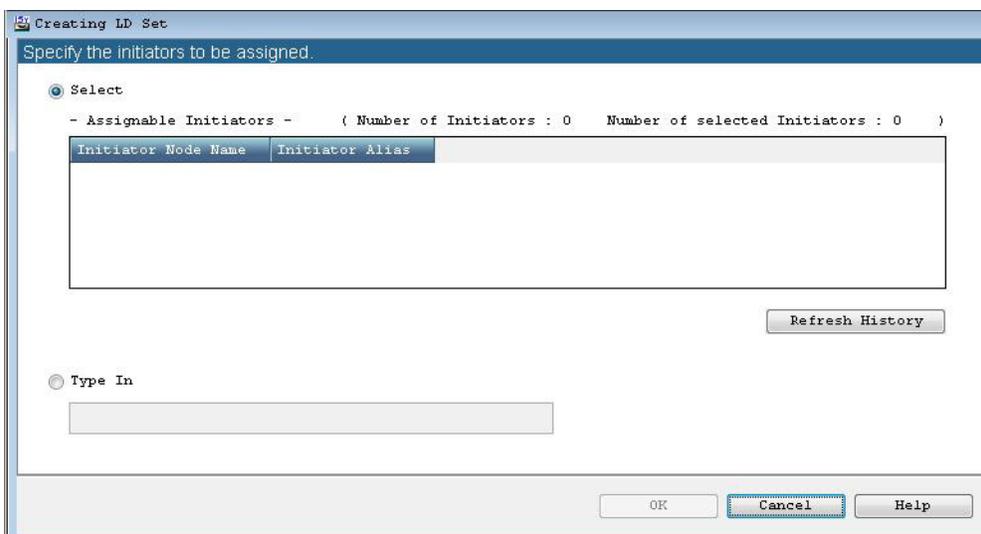
Figure 10-30: Initiator Addition

When setting an initiator, select one of the following methods.

[Select]

> The initiator information of the host connected to the disk array is displayed. Click the initiator you want to add to the LD set.
>
> To display the information on the initiator, perform the discovery operation from the initiator (host) to the target (disk array) in advance.
>
> Also, clicking the [Refresh History] button displays the initiator information of the newly connected hosts in the Assignable Initiators to LD Set (Host) view.
>
> The initiator may not be displayed in the Assignable Initiators list because the initiator information that can be saved is limited. If the initiator is not displayed, perform the discovery operation again.

[Type In]

> You can enter the initiator information directly.

If you click the [OK] button after selecting or entering the initiator information, the information is applied on the initiator list view of the New or Change Settings screen.

[Change] button

By selecting the added initiator from the initiator list view, and then clicking the [Change] button, the initiator change screen appears. You can change the selected initiator information on this screen.

[Delete] button

By selecting the added initiator from the initiator list view, and then clicking the [Delete] button, you can delete the selected initiator from the LD set.

Up to 16 initiators can be set per host.

If you delete an initiator, you will be disconnected from the target initiator.

Set an LD set name, platform, action mode, and initiator and then click [Next], and you can check the settings you have made.
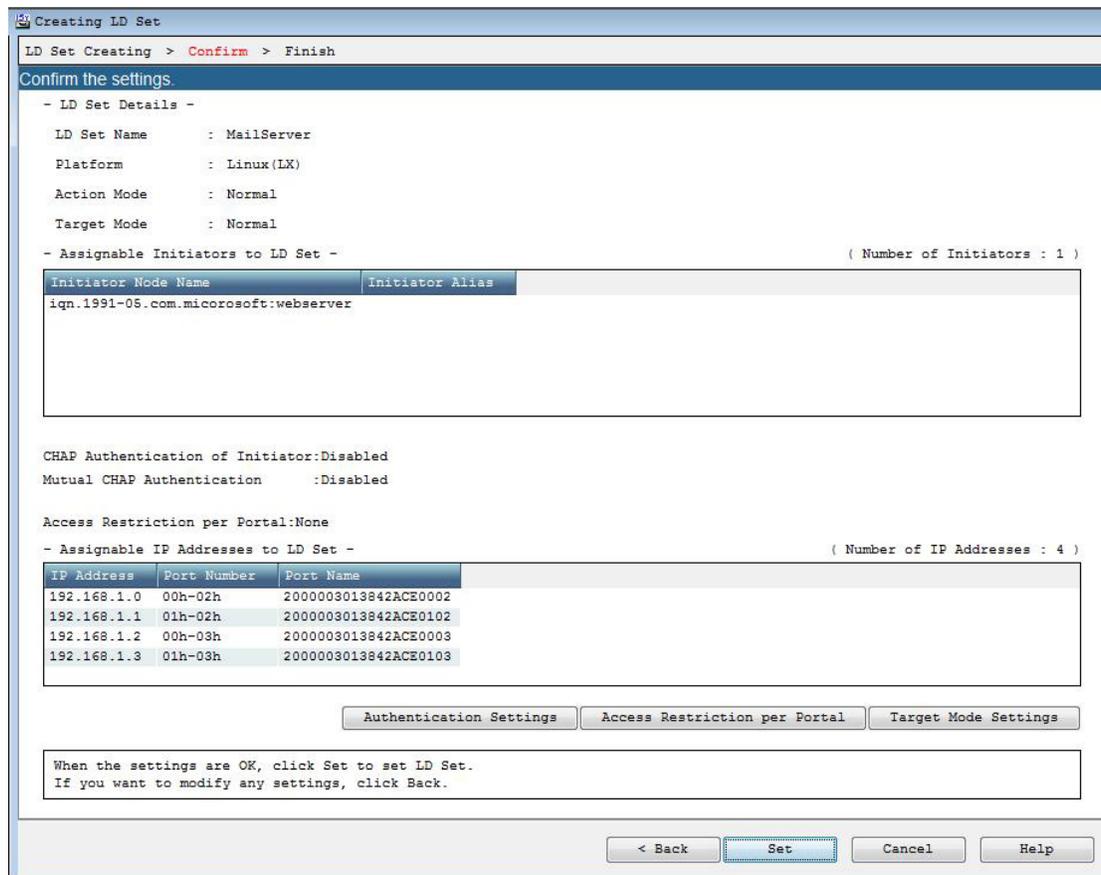

Figure 10-31: LD Set iSCSI

Here, the following settings are possible:

(a) [Authentication Settings] button

You can enable or disable the initiator CHAP authentication and mutual CHAP authentication.

CHAP authentication prevents initiator spoofing.

If security is a priority, make these settings.
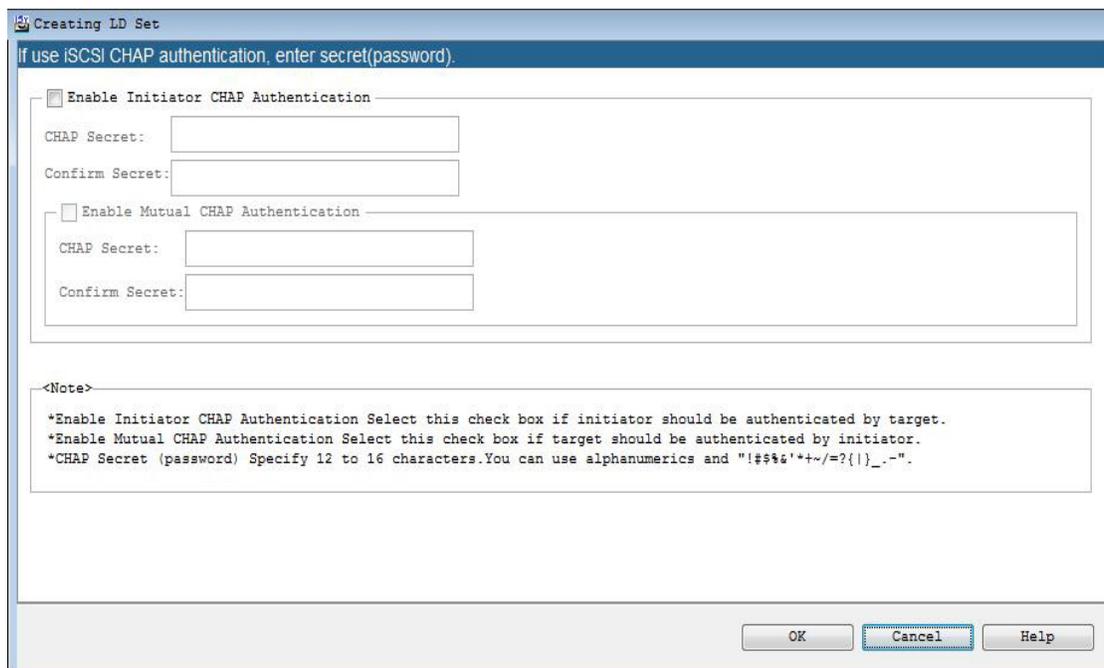
Figure 10-32: CHAP Authentication

[Enable Initiator CHAP Authentication] check box

To enable initiator CHAP authentication by the target, select this check box.

When the cluster configuration is made up of a single LD set, use the same secret for all the application servers that comprise the cluster.

[Enable Mutual CHAP Authentication] check box

To enable target CHAP authentication by the initiator, select this check box.

To use mutual CHAP authentication, you need to use initiator CHAP authentication as well.

CHAP Secret

Enter the password to be used for CHAP authentication.

A password consists of 12 to 16 characters that may be any desired alphanumeric characters and the following:!, #, $, %, &, ', *, +, ~, /, =, ?, {, |, }, _, ., -.

For security reasons, ? or some other symbol appears for every character you type for a password.

When changing the secret, enter the new secret again in [Confirm Secret].

Confirm Secret

For confirmation, enter the same secret as that you entered in [CHAP Secret].

For security reasons, ? or some other symbol appears for every character you type for a password.

[Access Restriction per Portal] button

A portal is a point of connection between the LD set (target) and the initiator.

This screen allows you to restrict access for each portal of the disk array.

A portal is specified by an IP address and a TCP port number, and the TCP port number is fixed to 3260.

The IP address of a portal corresponds to the IP address of the host port.

If access restriction per portal is unnecessary, you do not need to change the settings. Access is allowed from all portals.
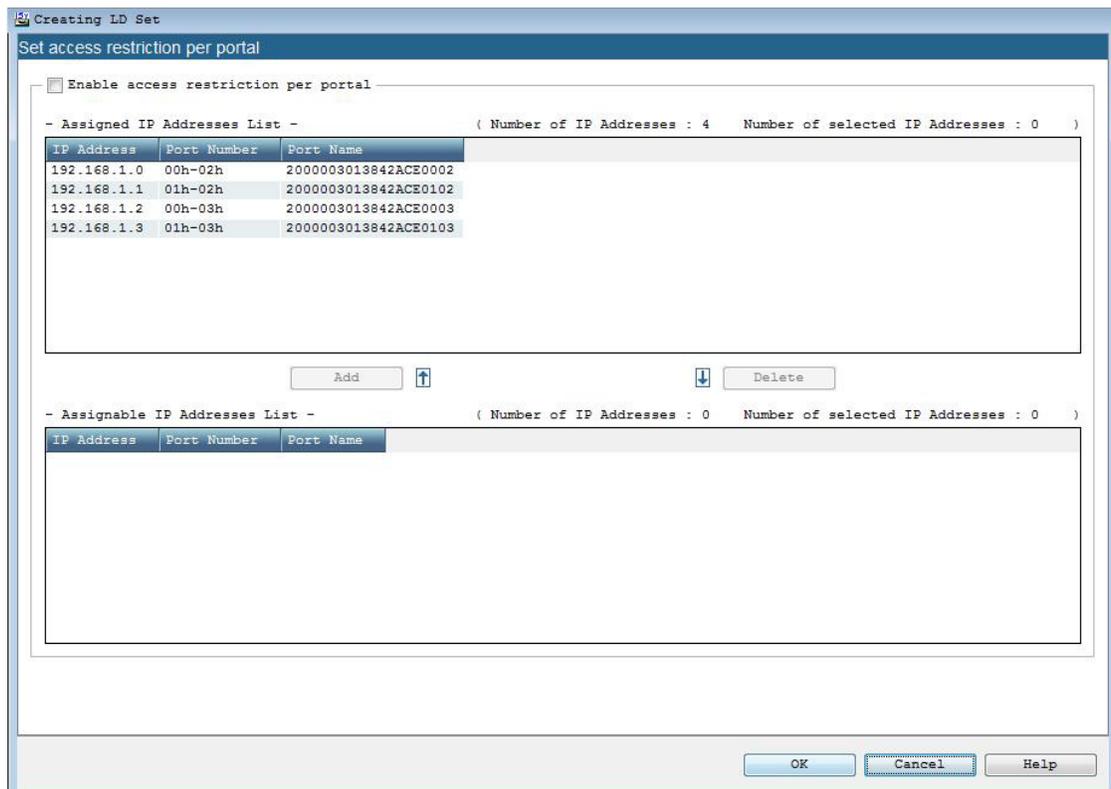
Figure 10-33: Per Portal Access Restriction

[Enable access restriction per portal] check box

1. Specify whether to enable access restriction per portal.
   "When the check box is selected

2. You can select the IP address of a portal that can access.
   "When the check box is not selected
   Access is allowed from all portals (default).

Assigned IP Addresses List view

The IP addresses of the portals that can access are listed.

Assignable IP Addresses List view

The IP addresses of the access-restricted portals are listed.
[Add] button

1. If you select an IP address from Assignable IP Addresses List and then click this button, the selected IP address is added to Assigned IP Addresses List.
   (5) [Delete] button

2. To delete the IP address of a portal assigned to an LD set, select that IP address from [Assigned IP Addresses] and then click this button.

[Target Mode Settings] button

Use this button to specify the target mode. The [Target Mode Settings] button is displayed only when you create a new LD set. This button is not displayed when you change the settings for the existing LD set.
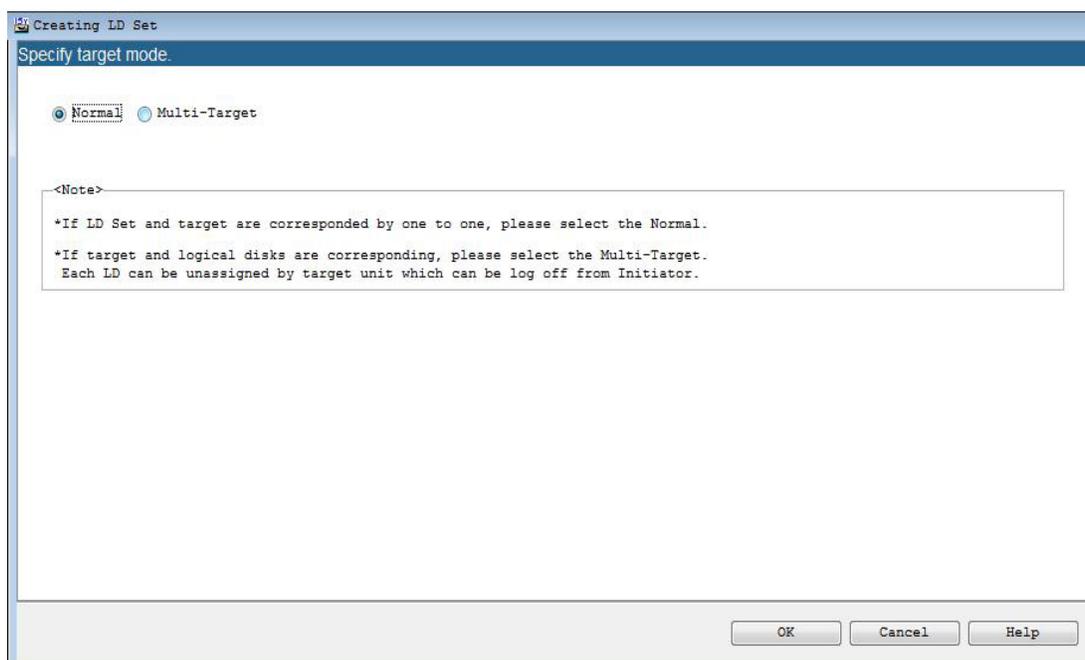
Figure 10-34: Target Mode Setting

You can select [Normal] or [Multi-Target] as the target mode.

[Normal]

Select the Normal mode when LD sets and targets correspond on a one-to-one basis.

The target name is automatically set in the format shown below, with all uppercase letters replaced with lowercase letters.

"(Unique disk array value).(Platform)-(LD set name).target(Unique LD set value)"

[Multi-Target]

Select this option to apply one-to-one relationship to the target and the logical disk.

You can unassign each logical disk (target) individually by logging off the target from the initiator side.

The target name is automatically set in the format shown below, with all uppercase letters replaced with lowercase letters.

"(Unique disk array value).(Platform)-(LD set name)-(Logical disk number).target(Unique LD set value)"

If you click the [Set] button after checking the LD set (iSCSI) setting confirmation screen, the LD set creation/setting change operation is executed and the result is displayed.

Changing the settings of an LD set while an application server is running may affect the operation.

If necessary, stop the operation and application servers based on a plan.

Creating a New LD Set/Changing Settings (SAS)

By clicking the [Create] button on the LD Set Management screen, you can create a new LD set.

Also, by clicking an LD set in the LD set list view on the LD Set Management screen and then clicking the [Edit] button, you can change the settings of the LD set.

Figure 10-35: LD Set Creation (SAS)

If you select [SAS(S)] as the interface with the host, the above screen is displayed.

You cannot select the interface of the host if you click the [Edit] button in LD Set Management.

LD Set Name

Set an LD set name.

An LD set name consists of 16 characters that may be any desired single-byte alphanumeric characters, "/", "_", and "-".

You cannot set an LD set name that is already set for an existing FC, SAS, or iSCSI LD set.

Platform

Specify the platform of the host.

The following platforms can be specified.

Platform	Description
Linux(LX)	Linux system

Platform	Description
Windows(WN)	Windows system
VMware(LX)	VMware system
Hyper-V(WN)	Hyper-V system
A2	ACOS-2 system
CX	Solaris system
AX	AIX system
NX	HP-UX system
SX	SUPER-UX system

However, if "VMware(LX)" is selected, the platform is set as "Linux(LX)". If "Hyper-V(WN)" is selected, the platform is set as "Windows(WN)".

Action Mode

As the action mode, you can select [Normal] or [Secure].

To ensure security for each individual server or restrict the change to the disk array configuration, select [Secure]. Otherwise, select [Normal].

If you select [Secure], ControlCommand takes effect only for the logical disks recognized by the OS and the logical disks paired with those logical disks.

Path List view

This list view lets you check the specified path information.

There are two path types; WWPN and PORT.

Set the WWPN of the HBA of the application server that will actually access the logical disk, or the port in Port mode of the disk array to which the application server is connected.

To set the WWN mode accessibility, you need the WWPN (World Wide Port Name) that is set for the HBA of the application server.

A WWN (World Wide Name) consists of a WWNN (World Wide Node Name) and a WWPN (World Wide Port Name) and is also assigned to the HBA (Host Bus Adaptor or, in some cases, called the FC controller or SAS HBA controller) as unique ID code information. The value of the WWPN can be collected by using the host information collection function included in the SnapSAN Manager   volume display command. For information about the collection method, refer to "Collecting Host Information" and "Host File Information" in "SnapSAN Manager   Command Reference".

[Add WWPN] button

Set a WWPN for the LD set you are adding.

Figure 10-36: WWPN Addition

When setting a WWPN, select one of the following methods.

[Select from the WWPNs which are recognized by disk array automatically]

> When the host is connected to the disk array, the WWPN information of the automatically recognized host is displayed in the Assignable WWPNs list.
>
> Clicking the [Refresh History] button displays the WWPN of the newly connected host in the Assignable WWPNs list.

[Select from host Information]

> The WWPN information of the host that matches the host name selected in the host selection field is displayed.
>
> The WWPN information cannot be displayed if no HBA information is registered for the host.

[Type In]

> You can enter the WWPN information directly. In this input field, you need to enter 16 single-byte characters (hexadecimal).

If you click the [OK] button after selecting or entering the WWPN information, the information is applied on the path list view of the New or Change Settings screen.

(f) [Add Port] button

Set a port of the Port mode for the LD set you are adding.

You cannot set a port of the WWN mode.

Figure 10-37: Port Addition

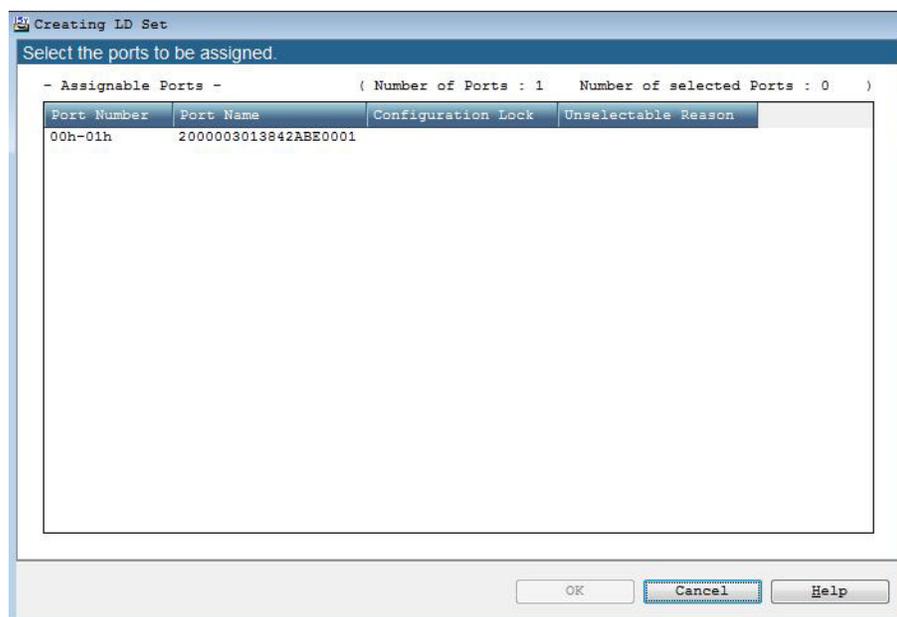If you select the port you want to add from the assignable port list view and then click the [OK] button, the information is applied on the path list view of the LD set addition screen.

However, you cannot add a port locked by the port configuration lock/unlock function.

[Change] button

By selecting the added path from the path list view, and then clicking the [Change] button, the WWPN change screen or the port change screen appears. You can change the selected path information on this screen.

(h) [Delete] button

By selecting the added path from the path list view, and then clicking the [Delete] button, you can delete the selected path from the LD set.

- Up to 64 sets of path information can be set per host.
- The path already assigned to the host cannot be newly assigned.
- Change the WWPN when replacing the HBA.

Path information can be set even if it contains a value other than the WWPN of the HBA of the application server that will actually access the logical disk. Therefore, take due care not to set the wrong value.

The change to the path information is immediately applied on the disk array. Be careful because the wrong information may disable access from an application server. Particularly, if you make an improper setting when deleting path information, the logical disk used by an application server will suddenly become unrecognizable. Therefore, you need to have a good grasp of the operation status before carrying out this operation. Also, if necessary, stop the operation and application servers based on a plan.

Set an LD set name, platform, action mode, and path information and then click [Next], and you can check the settings you have made.

Figure 10-38: LD Set - SAS

If you click the [Set] button after confirming the settings, the LD set creation/setting change operation is executed and the result is displayed.

Changing the settings of an LD set while an application server is running may affect the operation.

If necessary, stop the operation and application servers based on a plan.

Access Control Advanced Settings

By clicking the [Access Control Advanced Settings] button on the LD Set Management screen, you can start access control for the disk array and clear the WWPN history of the disk array.

Figure 10-39: Advanced Settings

[Start] button

Access Control is started.

Clicking this button enables logical disk assignment to the host via FC or SAS.

Note that you cannot start access control if the configuration lock function confirms that any target application server is in operation. Stop all the target application servers before performing this operation.

The start of access control is immediately applied on the disk array. If you start access control in an environment where access control is stopped, you need to create a corresponding LD set for every application ser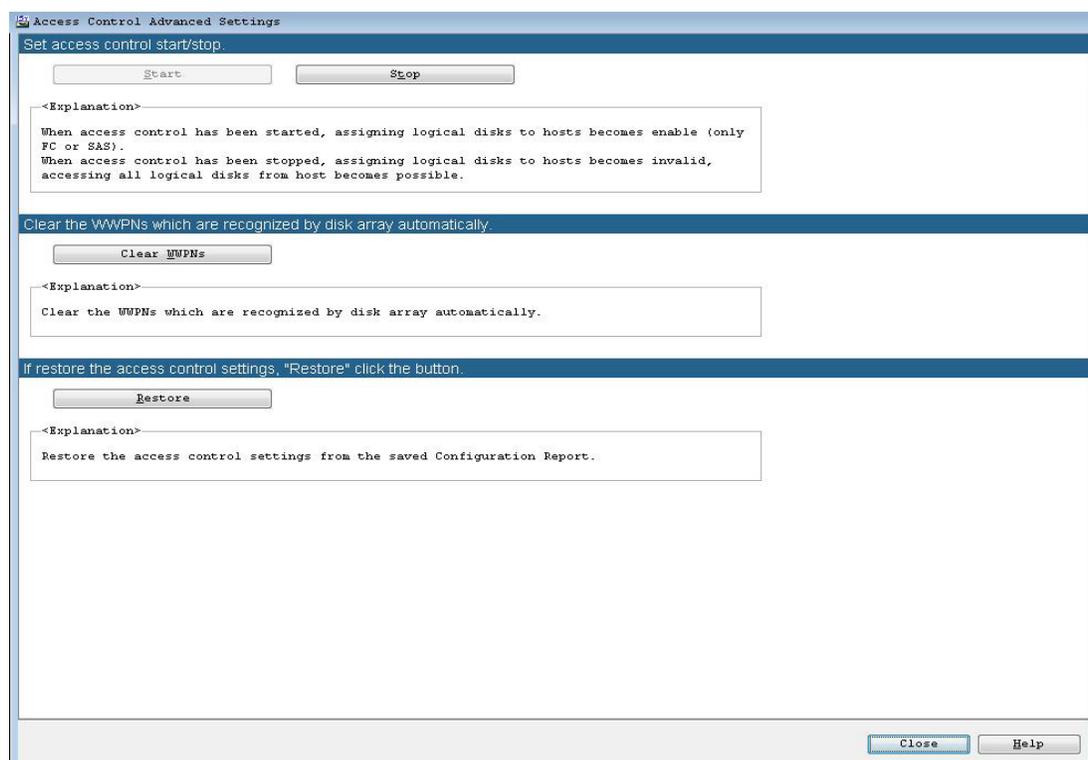ver in advance. If you improperly assign a logical disk to an LD set or make an invalid path information setting, an application server may become unable to access a logical disk. Therefore, if necessary, stop the operation and application servers based on a plan.

[Stop] button

Access control is stopped.

If you click this button, all logical disks are accessed from the host connected to the disk array.

Note that Access Control cannot be stopped if a logical disk is assigned to a host (LD set).

In such a case, unassign the logical disk, and then try again.

[Clear WWPNs] button

Clicking this button clears the WWPNs which are recognized by disk array automatically.

[Restore] button

Clicking this button restores the Access Control settings.

Restoring the Access Control Settings

To restores the Access Control settings, use the "Restore Setting" screen.
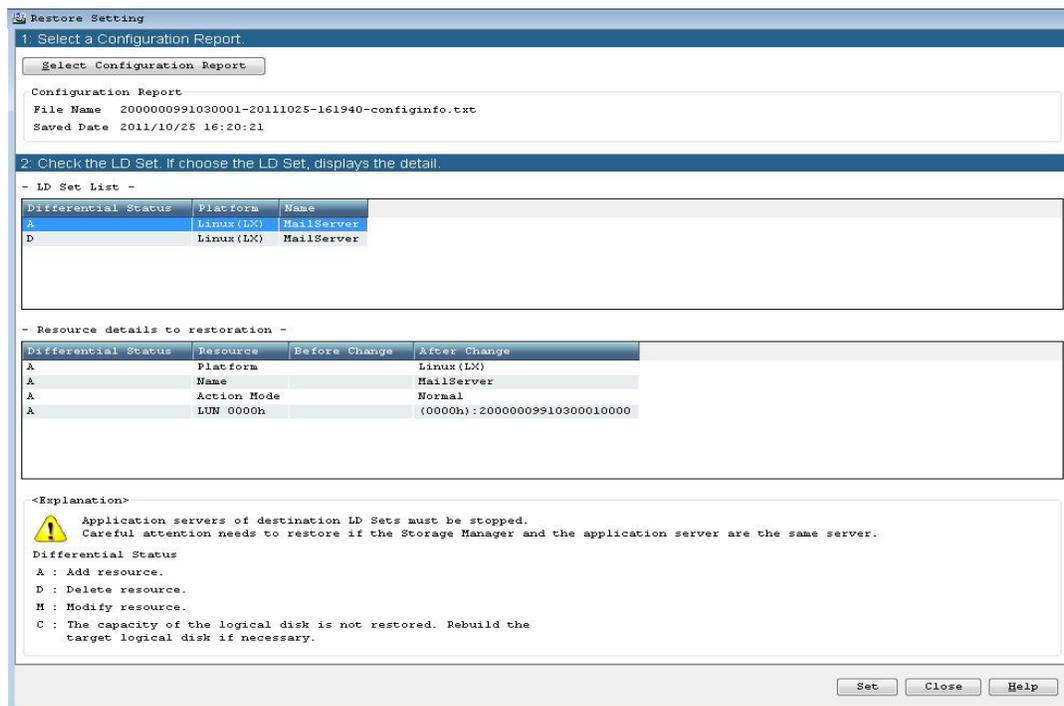
Figure 10-40: Restore Setting

[Select Configuration Report] button

> This button is used to select the configuration file from which settings are restored.
>
> Clicking this button displays the file selection dialog. Select the configuration file from which settings are restored.
>
> *The configuration files that do not include information about logical disks or LD Sets cannot be selected as a restoration resource.

Configuration Report

> The read configuration file name and the configuration information saving date/time are displayed.

LD Set List

> The LD set list view lets you check the information about the LD set to be restored. When you select the LD set to be restored, the information about the LD set before and after restoration is displayed in the change list view.
>
> The following items are displayed.

Differential Status

A:The LD set is added.

D:The LD set is deleted.

Math LD set resource is changed.

Platform

LD set name

Interface

Target Mode

Resource Details to Restoration

The restoration target details list view lets you check details of the LD set selected in the LD set list.

The following items are displayed.

Differential Status: Indicates whether each resource in the LD set is changed.

A:The resource is added.

D:The resource is deleted.

Math resource is changed.

C:The capacity is changed.

McCoy resource and the capacity are changed.

ACTH resource is added and the capacity is changed.

(Blanche resource and the capacity are not changed.

Erythrocytopoieses the resources of LD set.

Platform:The LD set setting (platform name) is displayed before and after change.

LD Set Name:The LD set setting (LD set name) is displayed before and after change.

Action Mouthed LD set setting (action mode) is displayed before and after change.

Paths LD set setting (WWPN or port number (four hexadecimal digits) and port name) is displayed before and after change.

Initiator Node Name:

The LD set setting (initiator node name) is displayed before and after change.

Portals LD set setting (IPv4 address ad IPv6 address) is displayed before and after change.

* The IPv6 address is displayed only for IPv6-enabled disk array.

Lynx (four hexadecimal digits):

The LD set LUNxxxxh settings (logical disk number (four hexadecimal digits),

format, and logical disk name) are displayed before and after change.

* 0000h is always displayed in LUN for the iSCSI LD set in the multi-target mode.

Before Change:The settings for each resource in the LD set before change are displayed.

After Change:The settings for each resource in the LD set after change are displayed.

By right-clicking a logical disk, and then clicking [Show LD Set of assigned logical disk.] on the displayed short-cut menu, the list of LD Sets, to which logical disks are assigned, before restoration is displayed as follows:
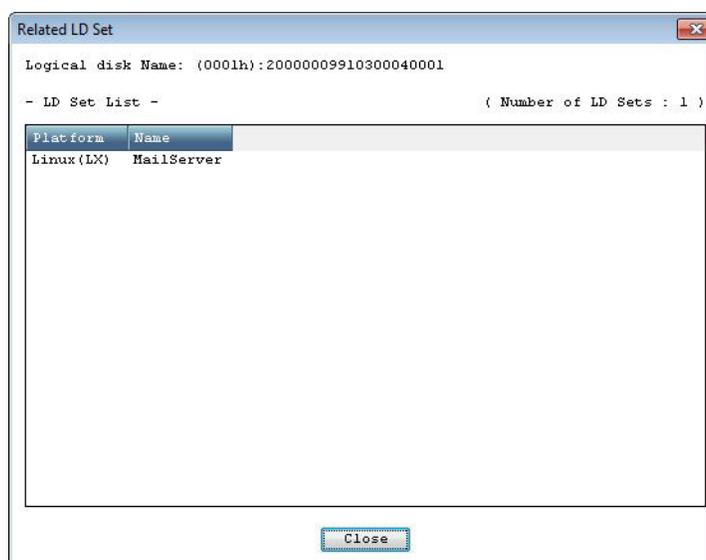
Figure 10-41: Related LD Set List

[Set] button

Clicking this button restores the Access Control settings.

[Cancel] button

Clicking this button closes the Restore Setting screen and displays the Access Control Advanced Settings screen.

[Help] button

Clicking this button displays the help screen on the Restore Setting screen.

Because setting restoration is immediately applied to the disk array, stop the application server for the LD set to be restored in advance. When the SnapSAN Manager server and the application server are the same server, stop the application server, disconnect the FC (or SAS) cable, and then restart the server before restoring the setting. For the disk array with iSCSI, first log off the target, and then restore the setting.

When Differential Status is A (the LD set is added), D (the LD set is deleted), or M (the LD set resource is changed), the LD set status has been changed from the configuration information before restoration. Check the settings before and after change.

The capacity of the logical disk of which Differential Status is C (the capacity is changed) has been changed from the configuration information before restoration. Rebind the logical disk as needed because the logical disk capacity is not restored.

- The data in the logical disk is not restored.
- The authentication settings are not restored. Specify them again as needed.
- The logical disk name is not restored. Specify them again as needed.

  After restoring the setting, lock the logical disk again if operation guard was set to it before restoration.

Setting restoration cannot be executed when the target application server is being used by the configuration change guard. Stop all the target servers before executing restoration.

Disk Array

A disk array consists of a basic cabinet combined with an extended cabinet that is controlled by the disk array controller contained in the basic cabinet.

You can perform the following operations in relation to a disk array.

- Network
- Management Port Settings
- SNMP Settings
- Monitoring Server Settings
- iSNS Server Settings
- AC Power Control Settings
- Host Connection Port
- Host Connection Port Settings (FC)
- Host Connection Port Settings (iSCSI)
- Host Connection Port Settings (SAS)
- Port Configuration Lock/Unlock (FC)
- Port Configuration Lock/Unlock (iSCSI)
- Port Configuration Lock/Unlock (SAS)
- Port Mode Switching
- Time Settings
- License Unlock
- Service Security
- Management Software Setting
- Batch Settings
- Nickname Settings
- Replication Settings
- Disk Array Management
- Extension Enclosure Incorporation
- Configuration Report
- Configuration Lock/Unlock
- Change of Settings
- Power Saving Settings

Network

You can perform the following operations in relation to the network.

- Network
- Management Port Settings
- SNMP Settings
- Monitoring Server Settings
- iSNS Server Settings
- AC Power Control Settings

Management Port Settings

Specify the settings concerning the management port of the disk array.

The Management Port Settings screen consists of the following screen:

Figure 11-1: Management Port Settings

Floating IP address settings

Set the floating IP address.

The floating IP address is an IP address used to connect to the disk array from the SnapSAN Manager   client or other device without being aware of the physical address of the controller.

The following IP addresses can be specified as the floating IP address.

IP address for the same segment as controllers 0 and 1 if they belong to the same segment

IP address for a segment different from controllers 0 and 1 if they belong to different segments

IPv4 and IPv6 can be set as the floating IP address. Select the [Enable IPv4 settings] check box to set IPv4. Select the [Enable IPv6 settings] check box to set IPv6.

If you set this item with this check box deselected, the current setting is cleared.

If a floating IP address is set to the same segment as controllers for an IPv4 address and IPv6 address, the IP address cannot be changed when the segment of the controller or floating IP address is changed.

To change the segment, perform the following procedure.

1. Cancel the floating IP address (clear the [Enable IPv4 settings] or [Enable IPv6 settings] check box), and then click the [Set] button.

2. Set an IP address for the controller, and then click the [Set] button.

3. Select the floating IP address check box that was cleared in step 1, set a new floating IP address, and then click the [Set] button.

Disk array IP address settings

You can set the IP address of IPv4 management port, IPv4 BMC IP address and the IP address of IPv6 management port for each controller.

Select the [Enable IPv4 settings] check box to set IPv4. Select the [Enable IPv6 settings] check box to set IPv6.

If you set this item with this check box deselected, the current setting is cleared.

Navigation button(s)

[Set]

> The following confirmation dialog box is displayed.


```
[25231]
Set the network information of the Disk Array.
If the setup fails, you may not be able to recognize the Disk Array.

Do you want to continue?

        Yes            No            Help
```
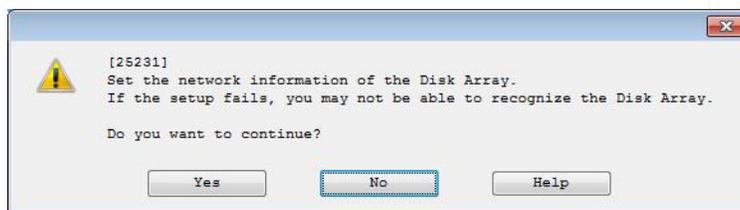
Figure 11-2: Confirmation

If you select [Yes], the management port setting operation is executed.

[Cancel]

> A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the monitor screen.

- If the specified IP address is wrong, specify the correct one with the network initialization tool.

- If you change the setting to the IP address on the network not accessible at the time of setting, check the physical network connection and switch and router settings before using the new IP address for connection. If you use an external SnapSAN Manager server, check whether the changed IP address was registered in the environment setting.

- Changing the floating IP address disconnects the connection with the SnapSAN Manager client when the floating IP address is used to connect SnapSAN Manager Embedded. Wait for a while before starting reconnection.

- If Storage Manager is in use, check that the new IP address is registered under the SnapSAN Manager server's environment settings.

- The IP address of management port, the BMC IP address, and the floating IP address must not be duplicated. In addition, the addresses of controllers 0 and 1 must be different.

- An IPv6 BMC IP address cannot be specified.

- An IPv6 link local address cannot be specified.

SNMP Settings

Reset the logical disk alarm generated due to insufficient capacity.

The SNMP setting involves the following screens:

- SNMP Settings
- Manager Settings
- SNMP User Settings

SNMP Settings

Figure 11-3: SNMP

SNMP information setting

SNMP function

>   Select whether to use the SNMP function.

Community name

>   Specify the SNMP community name.
>   A character string consisting of up to 255 ASCII characters can be specified.

Trap sense interval

>   Specify the SNMP trap sense interval.

SNMP Manager List

Specify the trap destination managers. Clicking [Add] or [Edit] changes the screen to the Manager Settings screen. Clicking [Delete] deletes the selected trap destination manager setting.

Notify the trap notification event that occurred in the disk array while working the maintenance.

If this check box is selected, the trap event that occurs in the disk array during maintenance is notified.

Accept all SNMP managers requests

If this check box is selected, requests from all SNMP managers are accepted.

If this check box is deselected, only requests from the SNMP managers set as the trap destination are accepted.

Trap Information

Contact

Specify the disk array manager, management department name, contact and other information.

A character string consisting of up to 79 ASCII characters can be specified.

Name

Specify the disk array nickname, used host and other information.

A character string consisting of up to 79 ASCII characters can be specified.

Location

Specify the location where the disk array is installed.

A character string consisting of up to 79 ASCII characters can be specified.

Information

Specify other information required for management.

A character string consisting of up to 79 ASCII characters can be specified.

Event Filter

Specify the threshold of the event level to be registered in the event table.

If you click the [Send SNMP test trap] button, a test trap is sent using the details set to the disk array.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.
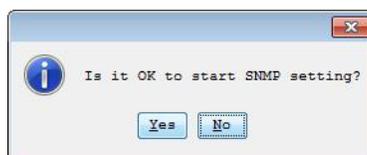
Figure 11-4: Confirmation

If you select [Yes], the SNMP setting operation is executed.

[Cancel]

A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the monitor screen.

If you change [Use SNMP] to [Not use], all the existing SNMP settings are deleted.

Manager Settings
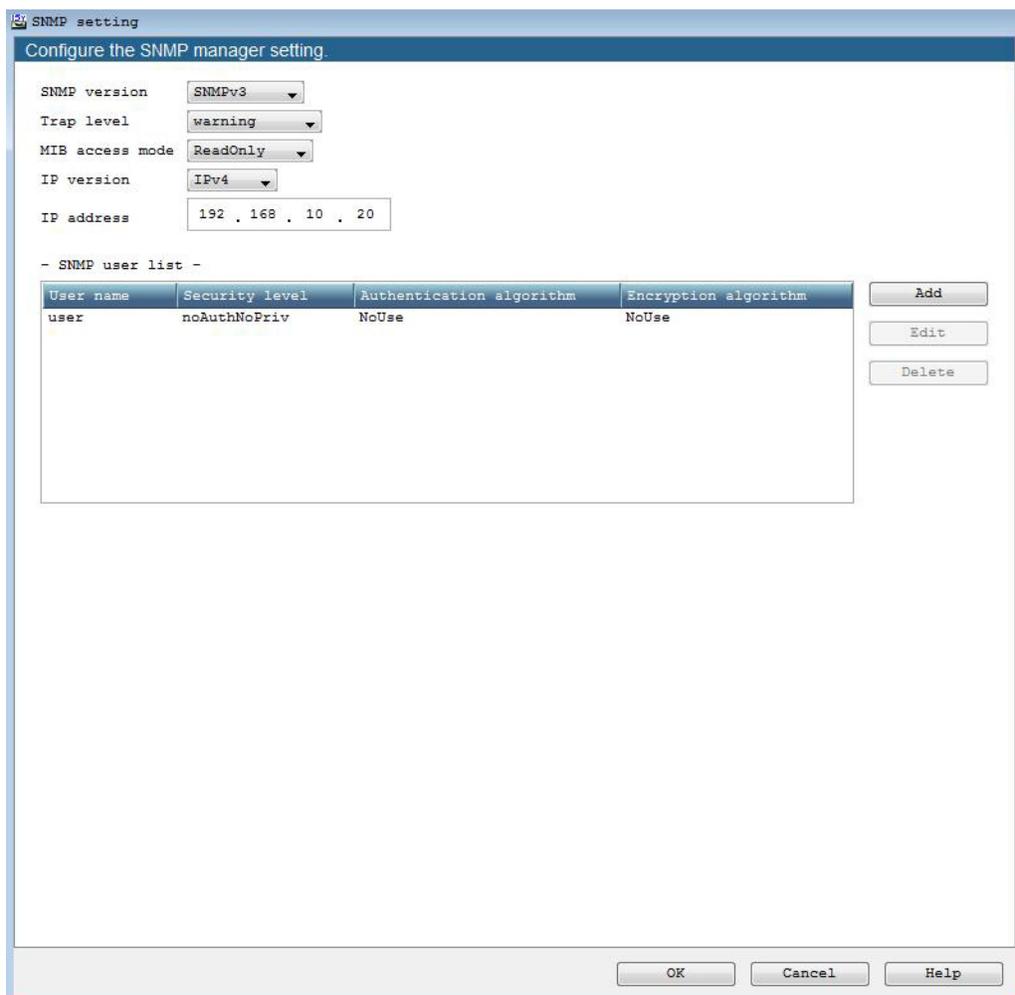
Figure 11-5: Manager Settings

SNMP version

Specify the SNMP version.

Trap level

Specify the report level.

MIB access mode

The MIB access mode cannot be changed.

IP version

This can be changed by selecting IPv4 or IPv6 from the drop-down list. Change the value according to your network environment.

IP address

Specify the manager's IP address.

SNMP user list

Set the SNMP user. Clicking [Add] or [Edit] displays the SNMP User Settings. Clicking [Delete] deletes the selected SNMP user setting. Up to eight SNMP users can be specified.

Clicking the [OK] button applies the change of settings to the list.

SNMP User Settings

\SNMP User Settings

Set the SNMP user.

User name

Specify the SNMP user name.

A character string consisting of up to 31 ASCII characters can be specified.

Security level

Specify the SNMP security level.

Authentication algorithm

Specify the authentication algorithm when performing authentication.

Authentication password

Specify the authentication password when performing authentication.
A character string consisting of 8 to 63 ASCII characters can be specified.

Encryption algorithm

The encryption algorithm cannot be changed.

Encryption password

Specify the encryption password when performing encryption.
A character string consisting of 8 to 63 ASCII characters can be specified.

Clicking the [OK] button applies the change of settings to the list.

Monitoring Server Settings

Set the server that is to accept monitoring.

You can avoid being monitored from an unexpected SnapSAN Manager server by specifying the IP addresses from which monitoring is accepted.

The monitoring server setting involves the following screens:

- Monitoring Server Settings
- IPv4 Address Setting
- IPv6 Address Setting

Monitoring Server Settings

Figure 11-6: Monitoring Server Settings

Allow servers to access from any IP addresses.

Monitoring is accepted from all IP addresses.

Allows servers to access from the registered IP addresses only.

Monitoring is accepted only from a specified IP address. Clicking [Add] or [Edit] displays IP Address Setting. Clicking [Delete] deletes the selected IP address setting.

Navigation button(s)

[Set]

> The following confirmation dialog box is displayed.
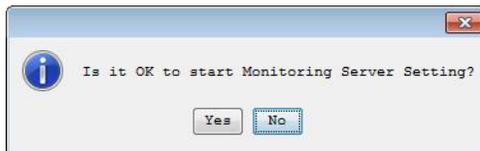
Figure 11-7: Confirmation

If you select [Yes], the monitoring server setting operation is executed.

[Cancel]

> A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the monitor screen.

IPv4 address setting
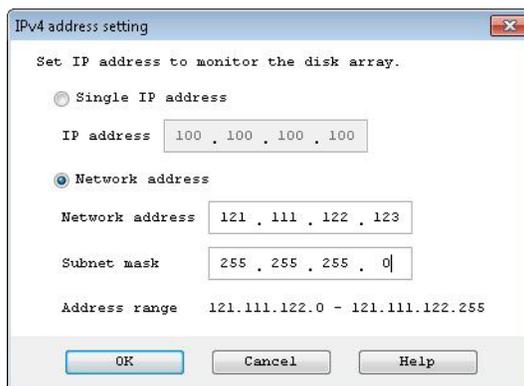
Figure 11-8: IPv4 Address

The single IP address format or network address format can be selected to set the IPv4 address. With the network address format, you can specify the address range by specifying the network address and subnet mask.

IP address: Specify the IPv4 address. This setting is enabled when a single IP address is selected.

Network address: Specify the network address. This setting is enabled when a network address is selected.

Subnet mask: Specify the subnet mask. This setting is enabled when a network address is selected.

Address range: The target address range is displayed with the specified network address and subnet mask.

Clicking the [OK] button applies the change of settings to the list.

IPv6 address setting
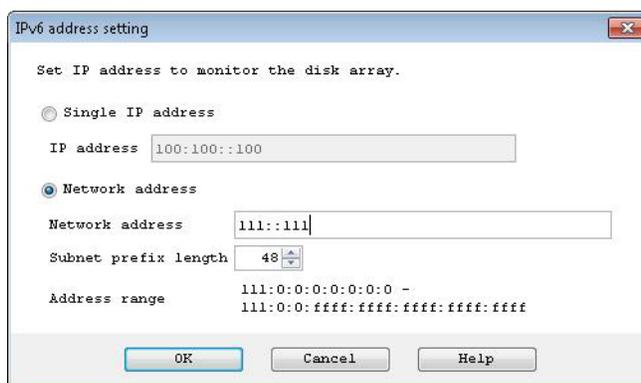
Figure 11-9: IPv6 Address Setting

The single IP address format or network address format can be selected to set the IPv6 address. With the network address format, you can specify the address range by specifying the network address and subnet mask.

IP address: Specify the IPv6 address. This setting is enabled when a single IP address is selected.

Network address: Specify the network address. This setting is enabled when a network address is selected.

Subnet prefix length: Specify the subnet prefix length. This setting is enabled when a network address is selected.

Address range: The target address range is displayed with the specified network address and subnet mask.

Clicking the [OK] button applies the change of settings to the list.

iSNS Server Settings

Specify the iSNS server with which the disk array registers the iSCSI target.

iSNS Server Settings
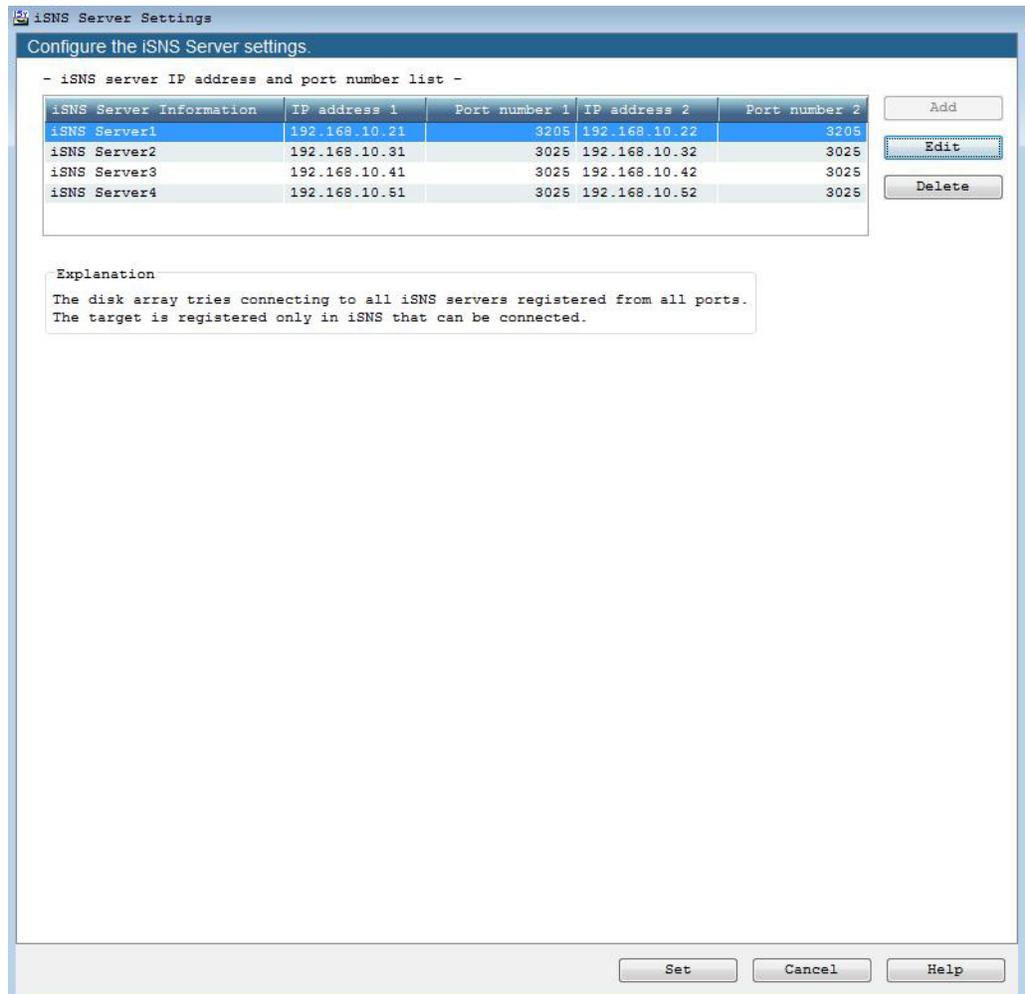
Figure 11-10: iSNS Server Settings

iSNS server IP address and port number list

Register the IP address and port number of the iSNS server. Clicking [Add] or [Edit] displays IP Address Setting. Clicking [Delete] deletes the IP address and port number settings of the selected iSNS server.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.

Figure 11-11: Confirmation

If you select [Yes], the iSNS server setting operation is executed.

[Cancel]

A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the monitor screen.

IP Address Setting
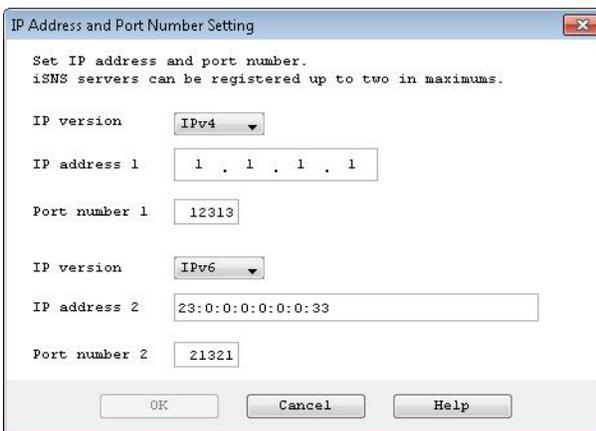
Figure 11-12: IP Address

Two pairs of IP address and port number the iSNS server can be specified.

IP version: This can be changed by selecting IPv4 or IPv6 from the drop-down list.

Select an appropriate value for your network environment.

IP address: Specify the IP address of NTP server with a 32-bit numerical value for IPv4 and a 128-bit numerical value for IPv6.

Port number: Specify the port number.

Clicking the [OK] button applies the change of settings to the list.

AC Power Control Settings

Set the power control server that links with AutomaticRunningController.

The AC power control server setting involves the following screens:

AC Power Control Settings

IP Address Setting

AC Power Control Settings
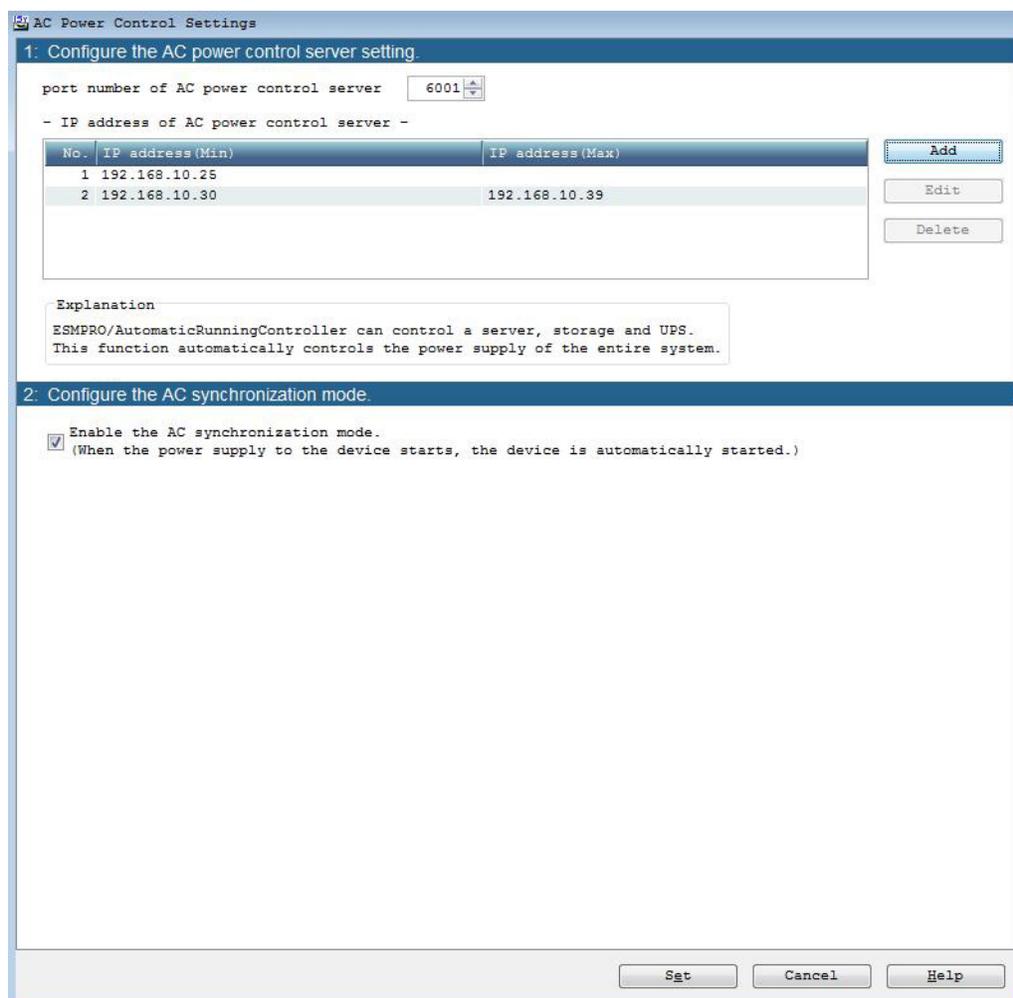
Figure 11-13: AC Power Control Settings

Configure the AC power control server setting

- port number of AC power control server

  Specify the number of the port to be used for the communication with the power control server.

- IP address of AC power control server

  Specify the IP address or the range of IP addresses of the AC power control server to be linked. Clicking [Add] or [Edit] displays IP Address Setting. Clicking [Delete] deletes the IP address setting of the selected AC power control server.

Configure the AC synchronization mode

Specify whether to start the disk array automatically when the power supply to it begins.

Navigation button(s)

[Set]

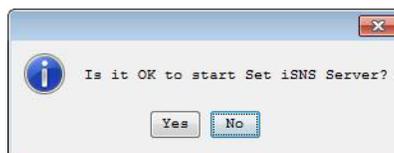The following confirmation dialog box is displayed.

Figure 11-14: Confirmation

If you select [Yes], the AC power control server setting operation is executed.

[Cancel]

> A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the monitor screen.
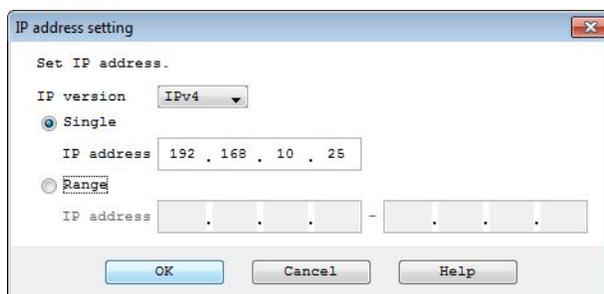
IP Address Setting

Figure 11-15: IP Address

Specify IP settings.

IP version: Specify the IP version.

IP address: Specify a single IP address or a range of IP addresses.

Clicking the [OK] button applies the change of settings to the list.

Host Connection Port

You can perform the following operations in relation to the host connection port.

- Host Connection Port
- Host Connection Port Settings (FC)
- Host Connection Port Settings (iSCSI)
- Host Connection Port Settings (SAS)
- Port Configuration Lock/Unlock (FC)
- Port Configuration Lock/Unlock (iSCSI)
- Port Configuration Lock/Unlock (SAS)
- Port Mode Switching

Host Connection Port Settings (FC)

Set the host connection port for the disk array supporting FC.

The Host Connection Port Settings (FC) screen consists of the following:

Host Connection Port Settings

Set the host connection port for the disk array supporting FC.

Confirmation

A list of ports to be set is displayed. Check the settings to see whether they are correct.

Completion

The setting execution result is displayed.
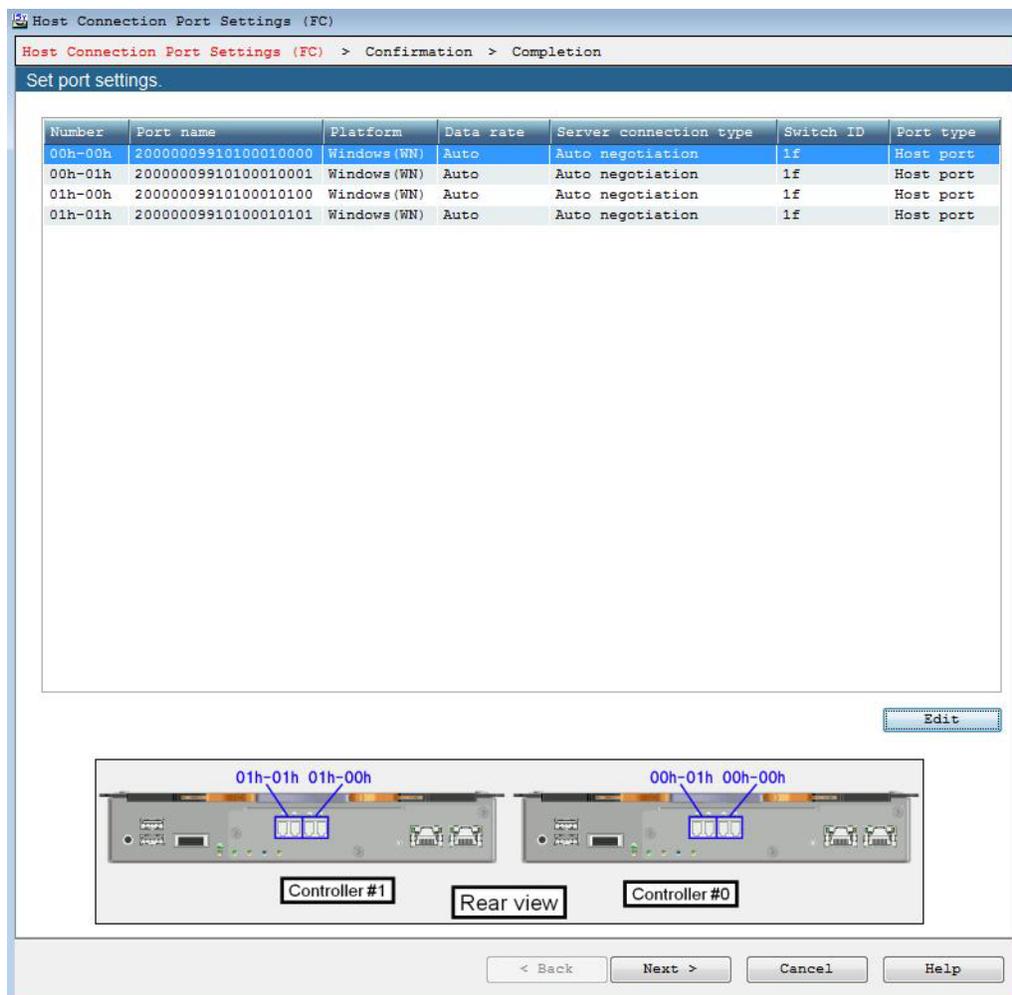
Figure 11-16: Host Connection Port Settings

Port list

Select the port you want to set.

Ports that fit to the following condition cannot be selected.

Condition: locked

Description: Operation guard is set to the port.

[Edit] button

A dialog box is displayed that lets you edit the settings of the selected port.

Navigation button(s)

[Next]

> The Confirmation screen is displayed.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Edit Dialog

Figure 11-17: Edit

Port number: Unique port number.

Port name: Specify the name to be assigned to the port.

Platform: Specify the platform of the host to be connected.

Data rate: Specify the value corresponding to the data transfer rate of the HBA or HUB.

Server connection type:

Specify the connection topology between the disk array and the host.

Automatic negotiation:

The connection type is automatically negotiated.

FC-AL: Select this when connecting the host connection port and the application server directly over an FC cable or when using a loop topology FC switch.

FC switch connection (Fabric):

Select this when using an FC switch other than a loop topology FC switch.

Switch ID: Specify the value of the switch for the port. The specifiable value range is 00h to 7dh.

When connecting multiple disk arrays in a loop topology FC switch configuration, make sure that the value of each switch is unique.

Port type: Select the port type.

Host port: Select this when connecting to the host.

Data migration port: Select this when using the data migration function.

Replication port: Select this when using the remote data replication function.

This setting is displayed only when the data migration function and/or remote data replication function is usable.

Clicking the [OK] button applies the change of settings to the list.

When [Replication port] is selected for [Port type], [Platform] cannot be specified.

Confirmation
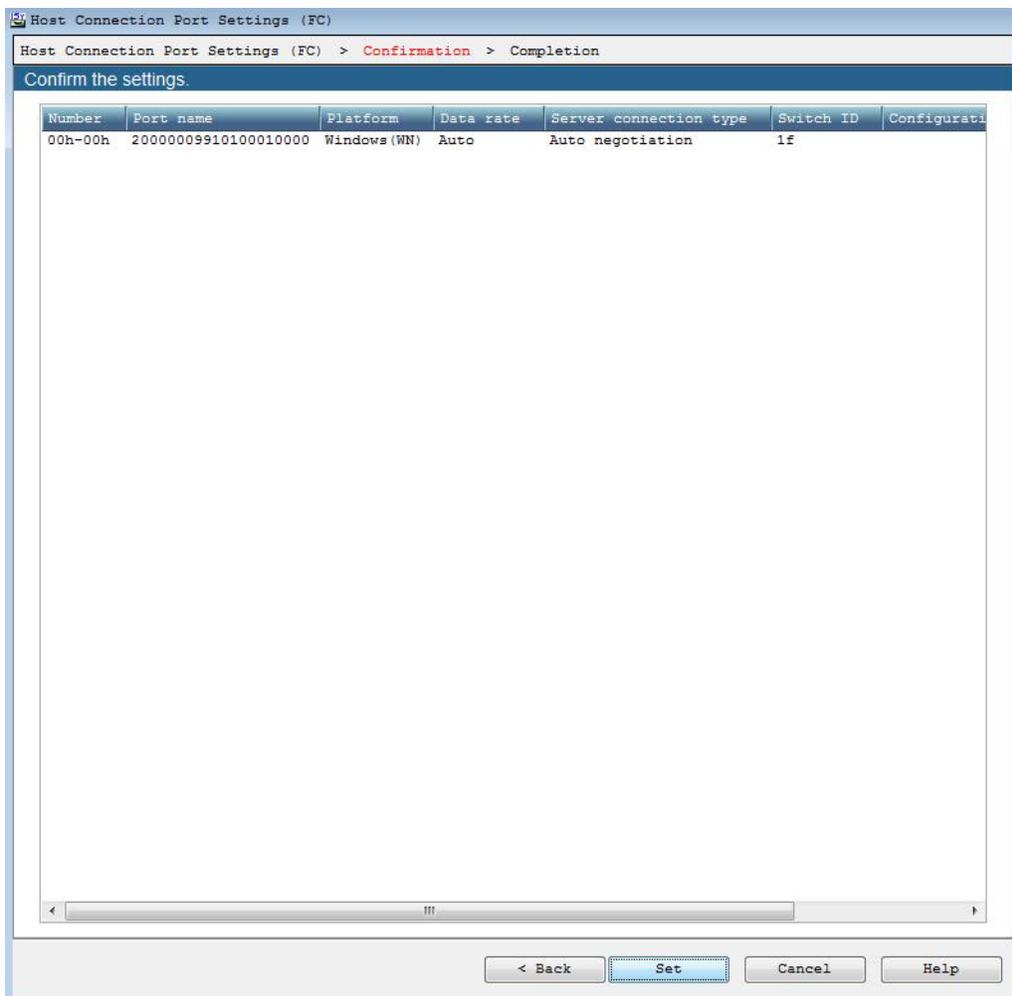
Figure 11-18: Confirmation

This is the confirmation screen for the host connection port settings.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.
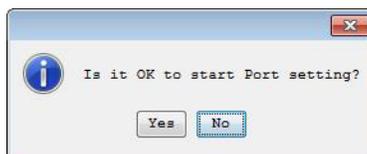
Figure 11-19: Confirmation

If you click [Yes], the port setting operation is executed and then the Completion screen is displayed.

[Back]

The Host Connection Port Settings screen is displayed again.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.
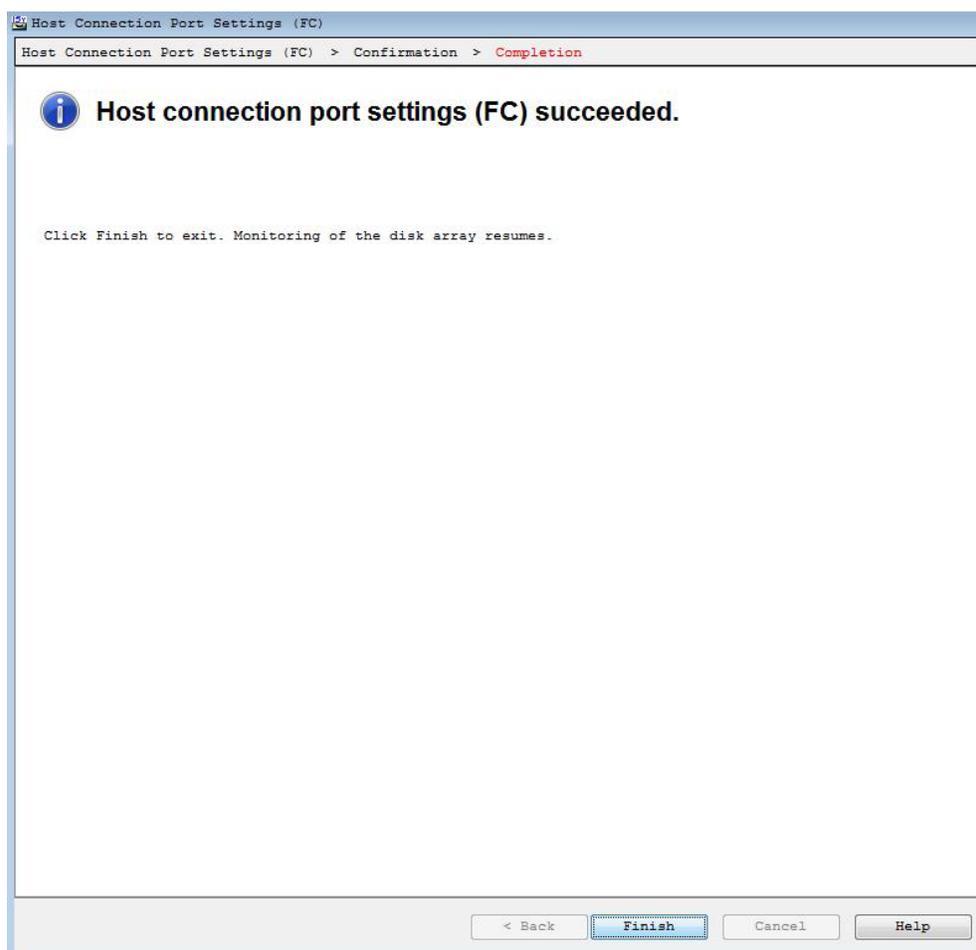
Completion

Figure 11-20: Completion - FC

The result of the host connection port setting is displayed.

Navigation button(s)

[Finish]

The [Monitor] - [Screen Display] screen is displayed.

Host Connection Port Settings (iSCSI)

Set the host connection port for the disk array supporting iSCSI.

The Host Connection Port Settings (iSCSI) screen consists of the following:

Host Connection Port Settings

Set the host connection port for the disk array supporting iSCSI.
- Edit dialog
- Connection Test dialog

.Confirmation

A list of ports to be set is displayed. Check the settings to see whether they are correct.

Completion

The setting execution result is displayed.
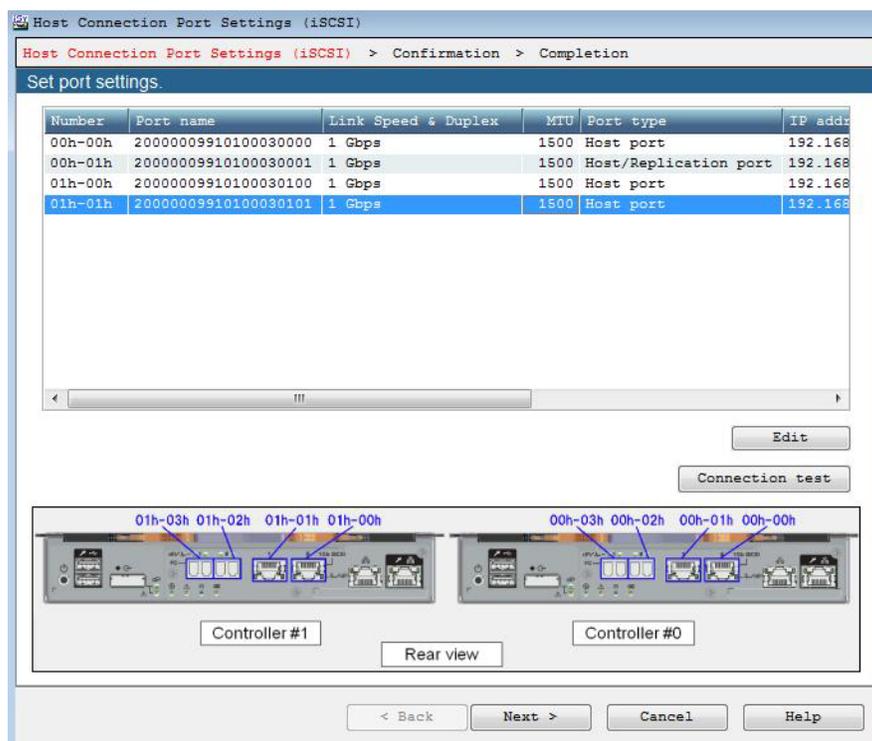
Figure 11-21: Host Connection Port Settings

Port list

Select the port you want to set.
Ports that fit to the following condition cannot be selected.

Condition: locked

Description: Operation guard is set to the port.

[Edit] button

A dialog box is displayed that lets you edit the settings of the selected port.

[Connection test] button

A dialog box is displayed that lets you perform a ping connection test from the selected port.

Navigation button(s)

[Next]

The Confirmation screen is displayed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Edit dialog
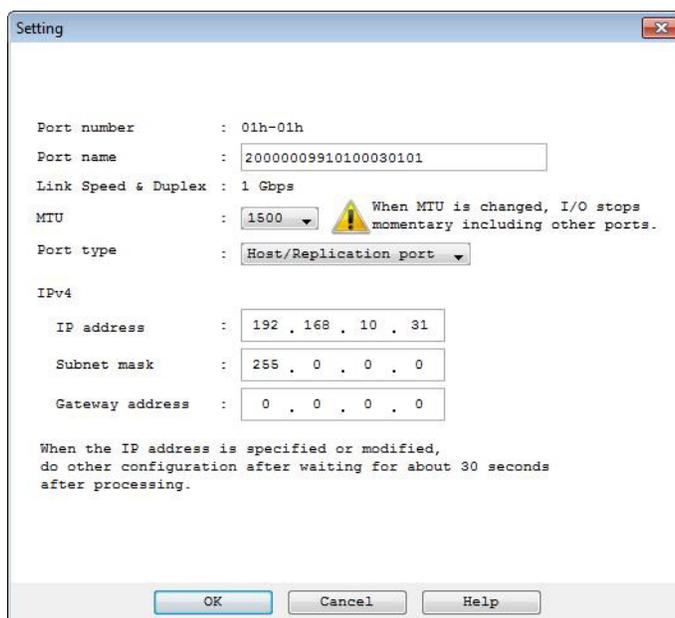
Figure 11-22: Edit

Port number: Unique port number.

Port name: Specify the name to be assigned to the port.

Port name: Specify the name to be assigned to the port.

Single-byte alphanumeric characters, "_", and "/" can be used to specify the port name. Up to 32 characters can be entered.

MTU: You can change the MTU (Maximum Transmission Unit) size by selecting a desired one from a drop-down list.

Select an appropriate value for your network environment. The default value is 1500.

Port type: Select the port type.

Host port: Select this when connecting to the host.

Host/Replication port: Select this when using the remote data replication function.

This setting is displayed only when the remote data replication function is usable.

IP address (IPv4): Specify the IP address to be set for the port.

Subnet mask (IPv4): Specify the subnet mask to be set for the port.

Gateway address (IPv4):

Specify the gateway address to be set for the port.

IP address (IPv6): Specify the IP address to be set for the port.

Gateway address (IPv6):

Specify the gateway address to be set for the port.

Clicking the [OK] button applies the change of settings to the list.

Perform another setup after waiting about 30 seconds after processing, when a setup or change of an IP address is made for the port settings (iSCSI).

When MTU is changed, communication with other ports in addition to the iSCSI port may temporarily be interrupted.

Connection Test Dialog
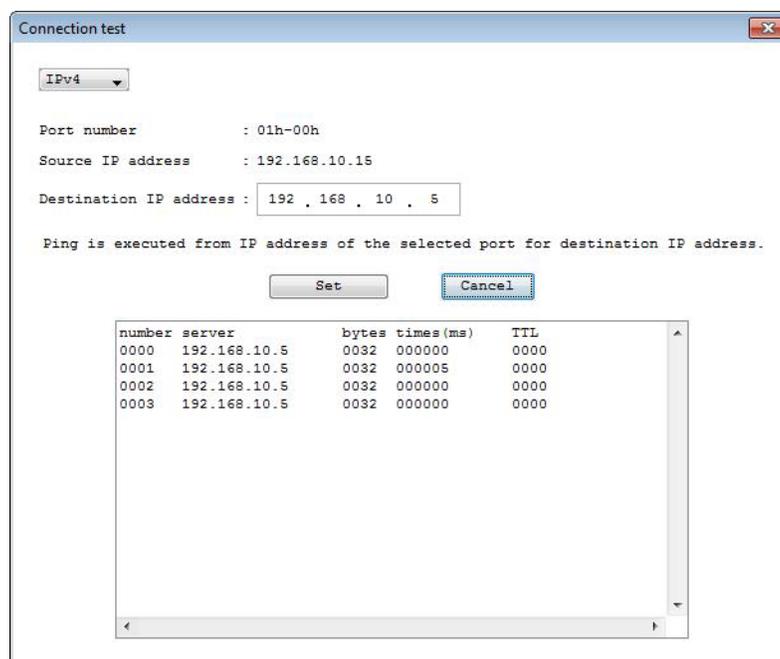
Figure 11-23: Connection Test

Port number: Unique port number

Source IP address: IP address from which the ping is to be sent. This is the IP address of the selected port.

Destination IP address:

Specify the IP address to which the ping is to be sent.

Clicking the [Set] button starts the connection test.

Confirmation
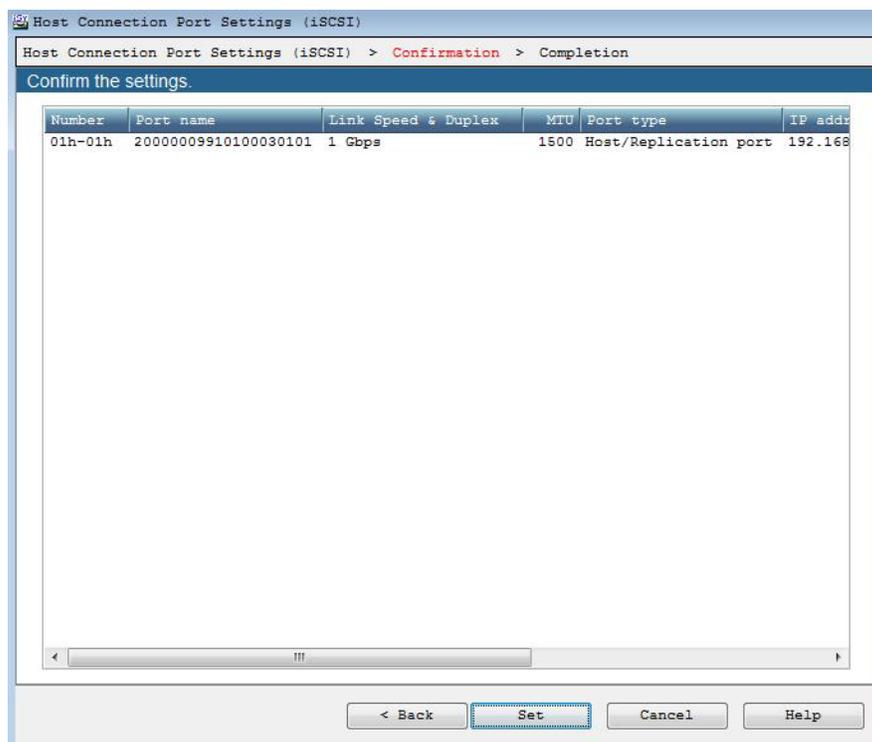
Figure 11-24: Confirmation - Connection Port

This is the confirmation screen for the host connection port settings. Check the settings to see whether they are correct.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.

Figure 11-25: Confirmation

If you click [Yes], the port setting operation is executed and then the Completion screen is displayed.

[Back]

The Host Connection Port Settings screen is displayed again.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Completion
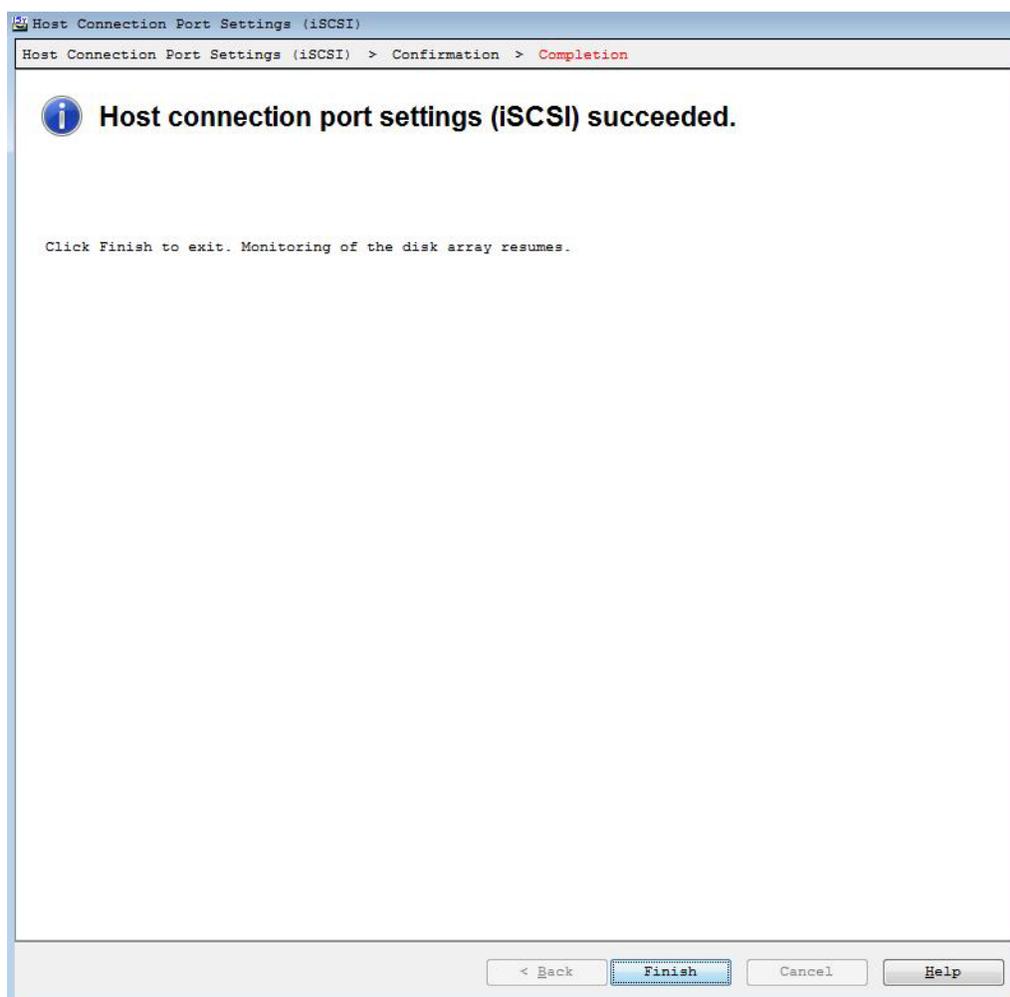
Figure 11-26: Confirmation

The result of the host connection port setting is displayed.

Navigation button(s)

[Finish]

The [Monitor] - [Screen Display] screen is displayed.

Perform another setup after waiting about 30 seconds after processing, when a setup or change of an IP address is made.

Host Connection Port Settings (SAS)

Set the host connection port for the disk array supporting SAS.

The Host Connection Port Settings (SAS) screen consists of the following:

Host Connection Port Settings

Set the host connection port for the disk array supporting SAS.

Confirmation

A list of ports to be set is displayed. Check the settings to see whether they are correct.

Completion

> The setting execution result is displayed.

Host Connection Port Settings
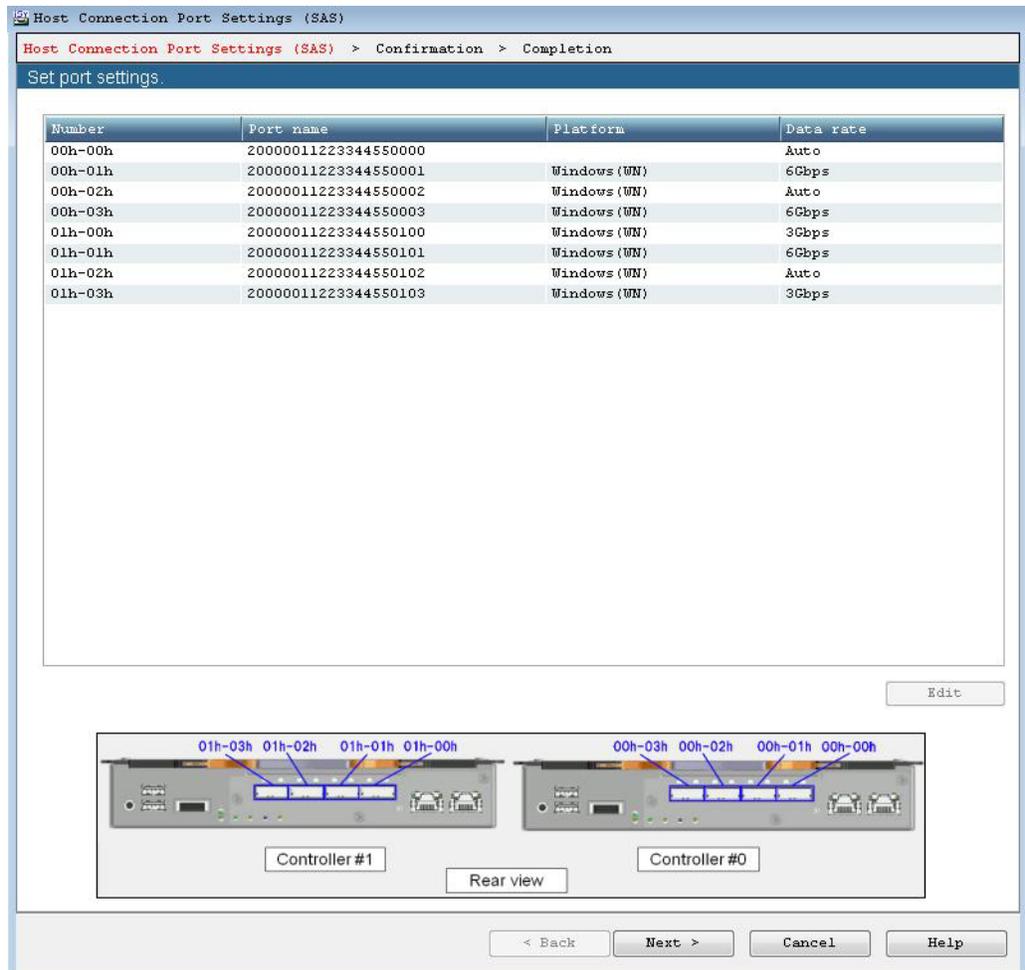
Figure 11-27: Host Connection Port Settings

Port list

Select the port you want to set.

Ports that fit to the following condition cannot be selected.

Condition: locked

Description: Operation guard is set to the port.

[Edit] button

A dialog box is displayed that lets you edit the settings of the selected port.

Navigation button(s)

[Next]

> The Confirmation screen is displayed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Edit Dialog
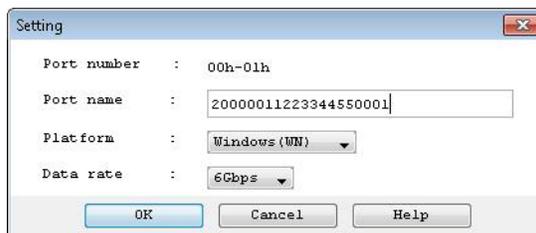
Figure 11-28: Edit Setting

Port number: Unique port number.

Port name: Specify the name to be assigned to the port.

Platform: Specify the platform of the host to be connected.

Data rate: Specify the value corresponding to the data transfer rate of the HBA or HUB.

Clicking the [OK] button applies the change of settings to the list.

Confirmation
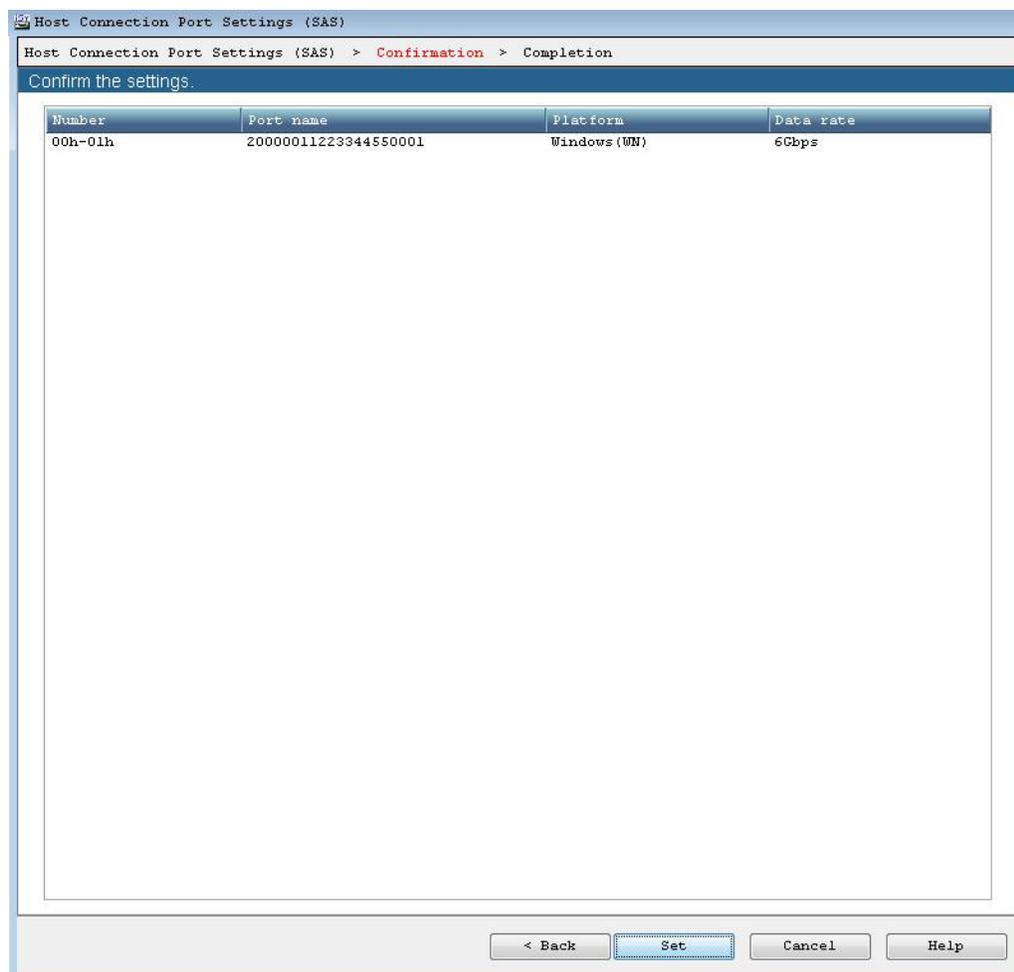
Figure 11-29: Confirmation

This is the confirmation screen for the host connection port settings.

Navigation button(s)

[Set]

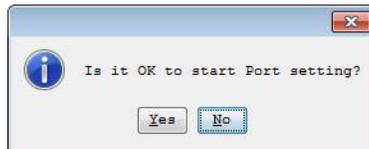The following confirmation dialog box is displayed.

Figure 11-30: Confirmation

If you click [Yes], the port setting operation is executed and then the Completion screen is displayed.

[Back]

The Host Connection Port Settings screen is displayed again.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.
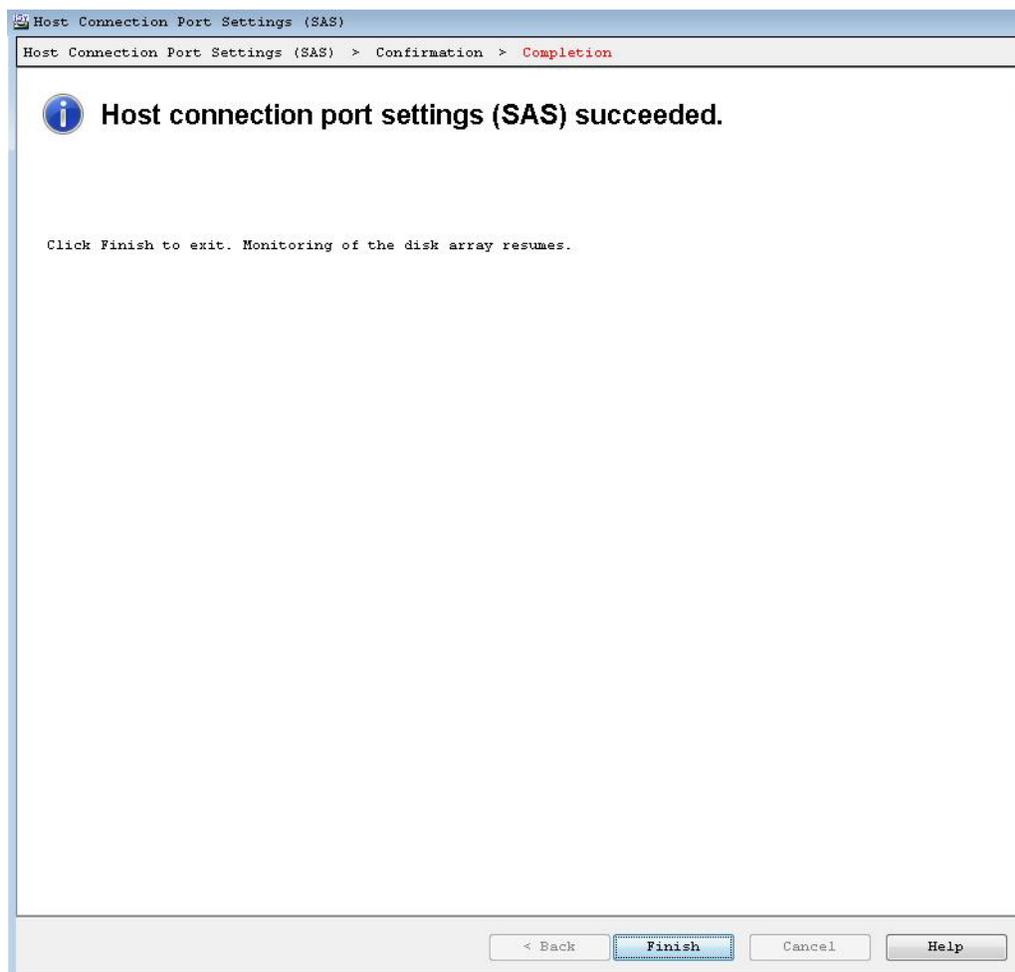
Completion

Figure 11-31: Completion

The result of the host connection port setting is displayed.

Navigation button(s)

[Finish]

> The [Monitor] - [Screen Display] screen is displayed.

Port Configuration Lock/Unlock (FC)

You can lock or unlock an FC port.
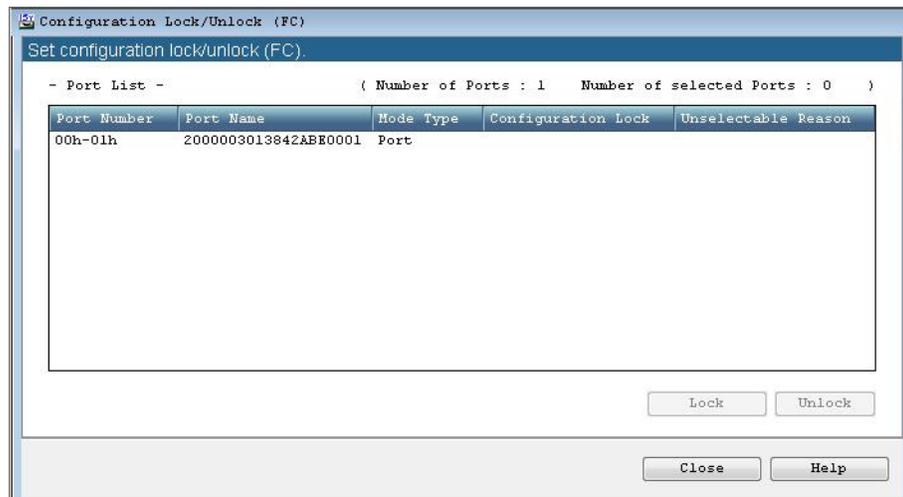
Figure 11-32: Port Configuration Lock/Unlock

(a) Port List view

The port list view lets you check the information about the FC ports.

The following items are displayed.
Port Number
Port Name
Mode
WWN: Port in the WWN mode
Port: Port in the Port mode.
Configuration lock
Lock: Locked port
(Empty): Port not locked
Unselectable Reason

The following items are hidden by default.
Host

To display this items, right-click the item name and set [Display] to the relevant item.

(b) [Lock] and [Unlock] buttons

Lock or unlock the port.

From the list view, select the port you want to lock or unlock, and then click the [Lock] or [Unlock] button.

When you lock the FC port, the following operations are locked.

Function	Locked operation
LD Set Management	LD set deletion, LD set renaming, LD set platform change, LD set action mode change, port deletion
Port	Port setting change, port mode change
Batch setting	Batch nickname setting

When a host is locked, you cannot unlock the ports assigned to that host individually.

Port Configuration Lock/Unlock (iSCSI)

You can lock or unlock an iSCSI port.
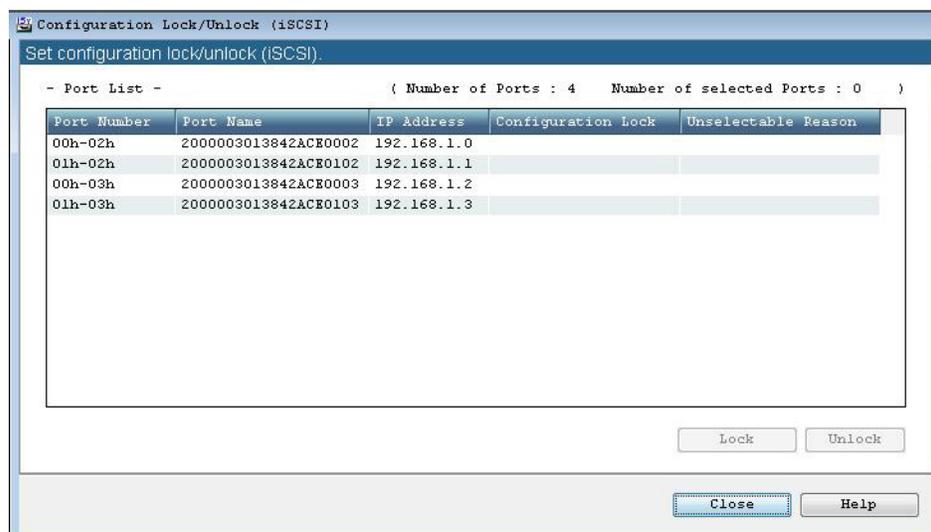
Figure 11-33: Configuration Lock/Unlock - iSCSI

(a) Port List view

The port list view lets you check the iSCSI port information.

The following items are displayed.

Port Number

Port Name

IP Address

Configuration lock

Lock: Locked port

(Empty): Port not locked

Unselectable Reason

(b) [Lock] and [Unlock] buttons

You can lock or unlock the port.

From the list view, select the port you want to lock or unlock, and then click the [Lock] or [Unlock] button.

When you lock the iSCSI port, the following operations are locked.

Function	Locked operation
Port	Port setting change
Batch setting	Batch nickname setting

Port Configuration Lock/Unlock (SAS)

You can lock or unlock a SAS port.
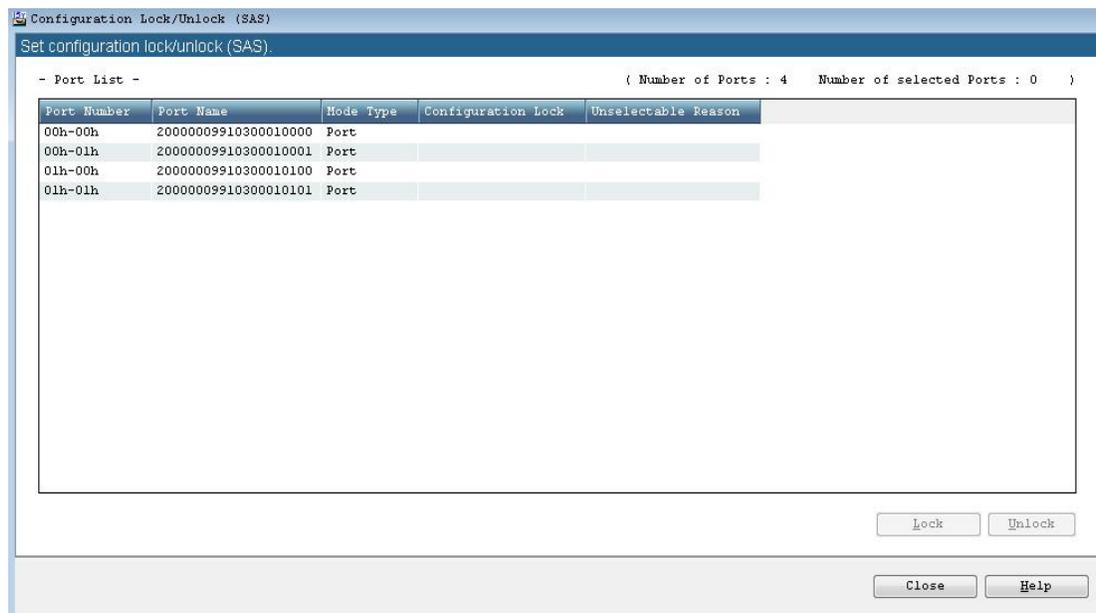
Figure 11-34: Port Configuration Lock/Unlock - FC

(a) Port List view

The port list view lets you check the information about the SAS ports.

The following items are displayed.

Port Number

Port Name

Mode

WWN: Port in the WWN mode

Port: Port in the Port mode.

Configuration lock

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Lock: Locked port

(Empty): Port not locked

Unselectable Reason

The following items are hidden by default.

Host

To display this items, right-click the item name and set [Display] to the relevant item.

(b)   [Lock] and [Unlock] buttons

You can lock or unlock the port.

From the list view, select the port you want to lock or unlock, and then click the [Lock] or [Unlock] button.

  If locking a port locks all the logical disks and ports assigned to the host, the dialog is displayed to ask you to confirm locking the host. So, you can select whether to lock the host at that time.

When you lock the SAS port, the following operations are locked.

Function	Locked operation
LD Set Management	LD set deletion, LD set renaming, LD set platform change, LD set action mode change, port deletion
Port	Port setting change, port mode change
Batch setting	Batch nickname setting

When a host is locked, you cannot unlock the ports assigned to that host individually.

Port Mode Switching

You can change the FC or SAS port mode of the disk array.
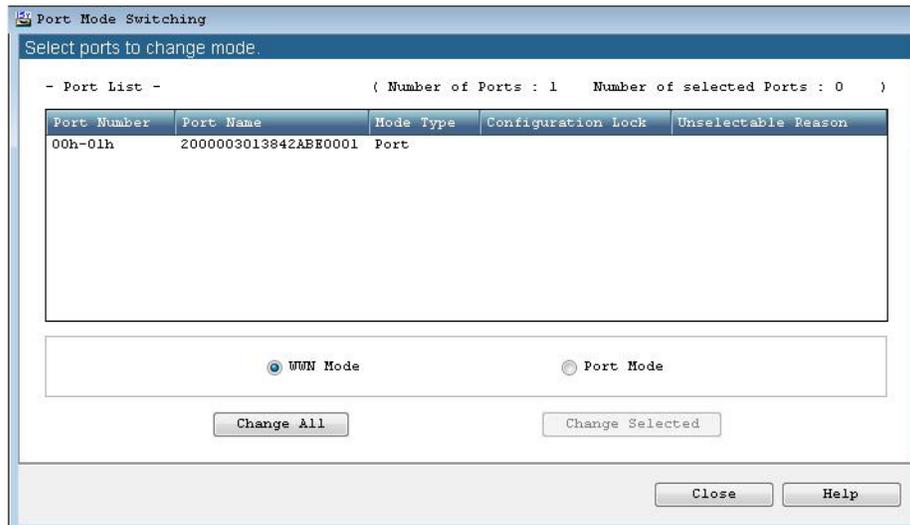
Figure 11-35: Port Mode Switching

(a)   Port List view

The Port List view lets you check the information about the disk array ports.

A port number is expressed in the format of "director number-port number".

The following items are displayed.

Port Number

Port Name

Mode

WWN: Port in the WWN mode

Port: Port in the Port mode.

Configuration lock

Lock: Locked port

(Empty): Port not locked

Unselectable Reason

The following items are hidden by default.

Host

Interface

To display any of these items, right-click the item name and set [Display] to the relevant item.

(b)   [WWN Mode] and [Port Mode] radio buttons

WWN Mode: Changes the mode of the port to the WWN mode.

Port Mode: Changes the mode of the port to the port mode.

(c)   [Change All] button

If you click this button, all the ports are changed to the mode selected with [WWN Mode] or [Port Mode]. In this case, you do not need to select a port from the port list. However, you cannot change the mode by using this button if there are any ports locked by the port configuration lock/unlock function. You cannot change to the port mode if the configuration lock function confirms that any target application server is in operation. Stop all the target application servers before performing this operation.

(d)   [Change Selected] button

If you select a port and then click this button, the selected port is changed to the mode selected with [WWN Mode] or [Port Mode]. You can select multiple ports in the port list if they are in the same mode. When a confirmation screen is displayed for checking the settings in advance, check the current mode of the port and the mode you are changing to. However, you cannot change the mode of a port locked by the port configuration lock/unlock function. You cannot change to the port mode if the configuration lock function confirms that any target application server is in operation. Stop all the target application servers before performing this operation.

The change to the mode of the port is immediately applied on the disk array. An invalid setting may make an application server unable to access a logical disk. Therefore, if necessary, stop the operation and application servers based on a plan.

Time Settings

Set the time of the disk array.

The time setting operation involves the screens mentioned below.

For SnapSAN Manager

> Manual Time Settings

For SnapSAN Manager Embedded

> Time Setting Method Selection

NTP Setting

> Manual Time Setting
> Manual Time Settings (SnapSAN Manager):

Figure 11-36: Time Settings

Date: Specify the date to be set for the disk array.

Time: Specify the time to be set for the disk array.

Server date and time setting:

Set the date of the disk array as that of the server currently monitoring it.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.

Figure 11-37: Confirmation

If you select [Yes], the time setting operation is executed.

[Cancel]

A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box ends the settings and displays the [Monitor] - [Screen Display] screen.

• If time synchronization with the SnapSAN Manager   server is set, you cannot set the time.

• If SnapSAN Manager Embedded is synchronized with the NTP server, manually setting the time cancels this synchronization setting with the NTP server.

Time Setting Method Selection (SnapSAN Manager Embedded)
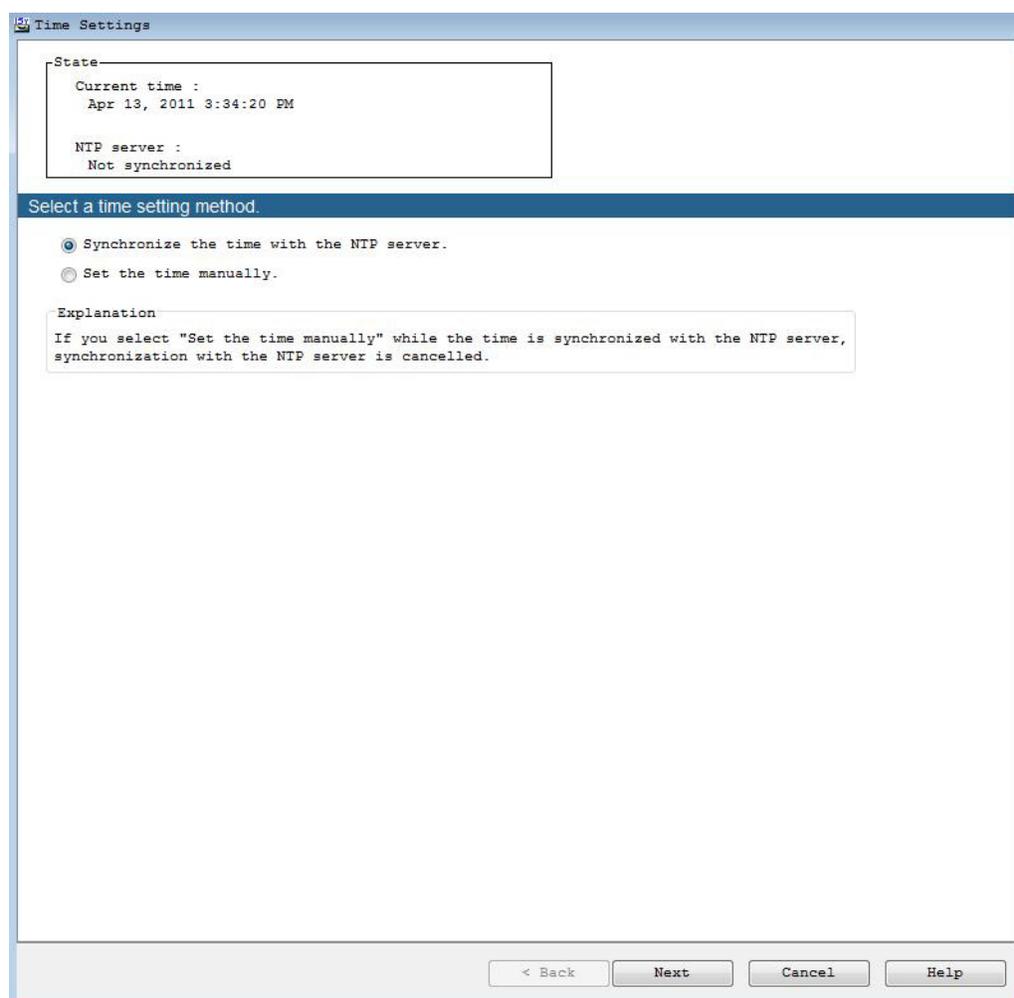
Figure 11-38: Time Setting Method Selection

State

The date and time currently set for the disk array and the state of synchronization with the NTP server are displayed.

Select a time setting method

Select the method of setting the time for the disk array.

Synchronize the time with NTP server.

Select this method when you want to synchronize the time with an external NTP server.

Set the time manually.

Select this method when you want to use the clock built in the disk array independently and set the time manually.

Navigation button(s)

[Next]

> When [Synchronize the time with the NTP server] is selected, the NTP Setting screen is displayed.
>
> When [Set the time manually] is selected, the Manual Time Setting screen is displayed.

[Cancel]

> A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box ends the settings and displays the [Monitor] - [Screen Display] screen.

NTP Setting (SnapSAN Manager Embedded)

Figure 11-39: NTP Setting

Make the settings for synchronizing the time with the NTP server. You can specify up to three IP addresses of the NTP server.

IP version: This can be changed by selecting IPv4 or IPv6 from the drop-down list.

Change the value according to your network environment.

IP address: Specify the IP address of NTP server with a 32-bit numerical value for IPv4 and a 128-bit numerical value for IPv6.

Navigation button(s)

[Back]

> The Time Setting Method Selection screen is displayed again.

[Set]

> The following confirmation dialog box is displayed.
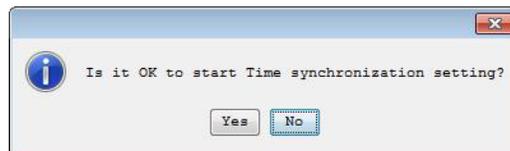
Figure 11-40: Confirmation

If you select [Yes], the time setting operation is executed.

[Cancel]

> A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box ends the settings and displays the [Monitor] - [Screen Display] screen.
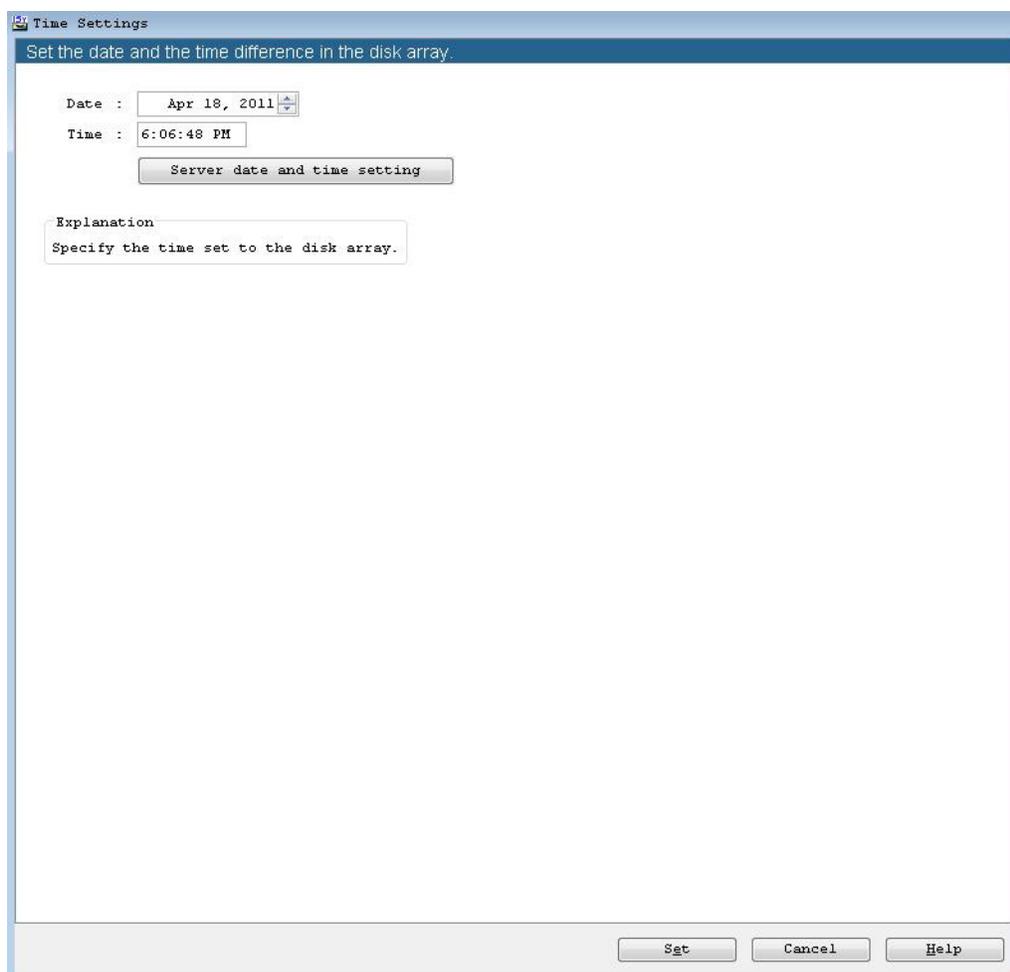
Manual Time Setting (SnapSAN Manager Embedded)
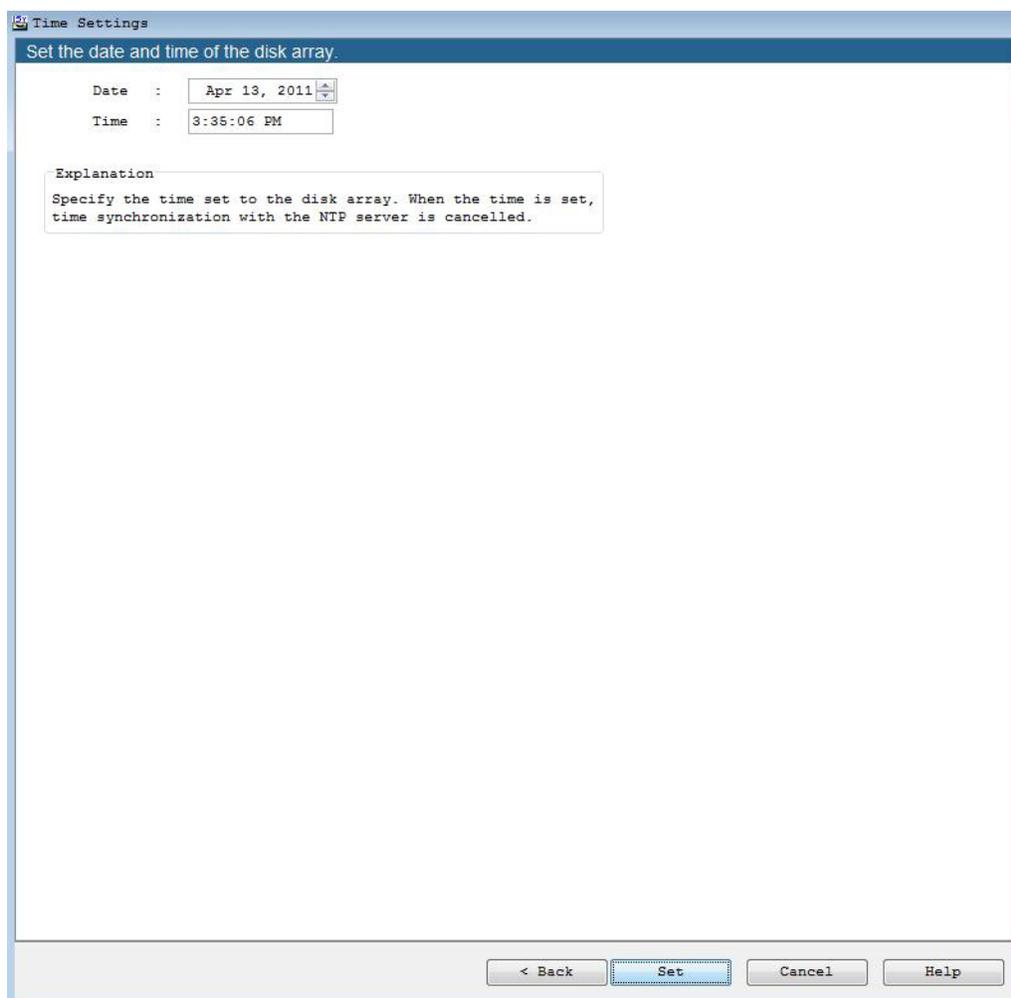
Figure 11-41: Manual Time Setting

Date: Specify the date to be set for the disk array.

Time: Specify the time to be set for the disk array.

Navigation button(s)

[Back]

The Time Setting Method Selection screen is displayed again.

[Set]

The following confirmation dialog box is displayed.

If you select [Yes], the time setting operation is executed.

[Cancel]

A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box ends the settings and displays the [Monitor] - [Screen Display] screen.

If you set the time manually when [Synchronize the time with the NTP Server] is selected, the setting for synchronizing the time with the NTP server is canceled.

License Unlock

Unlock the license of the disk array.

If you unlock the license using the license key for the program product, the functions of the program product become available.

The license unlock operation involves the following screens:

License Unlock
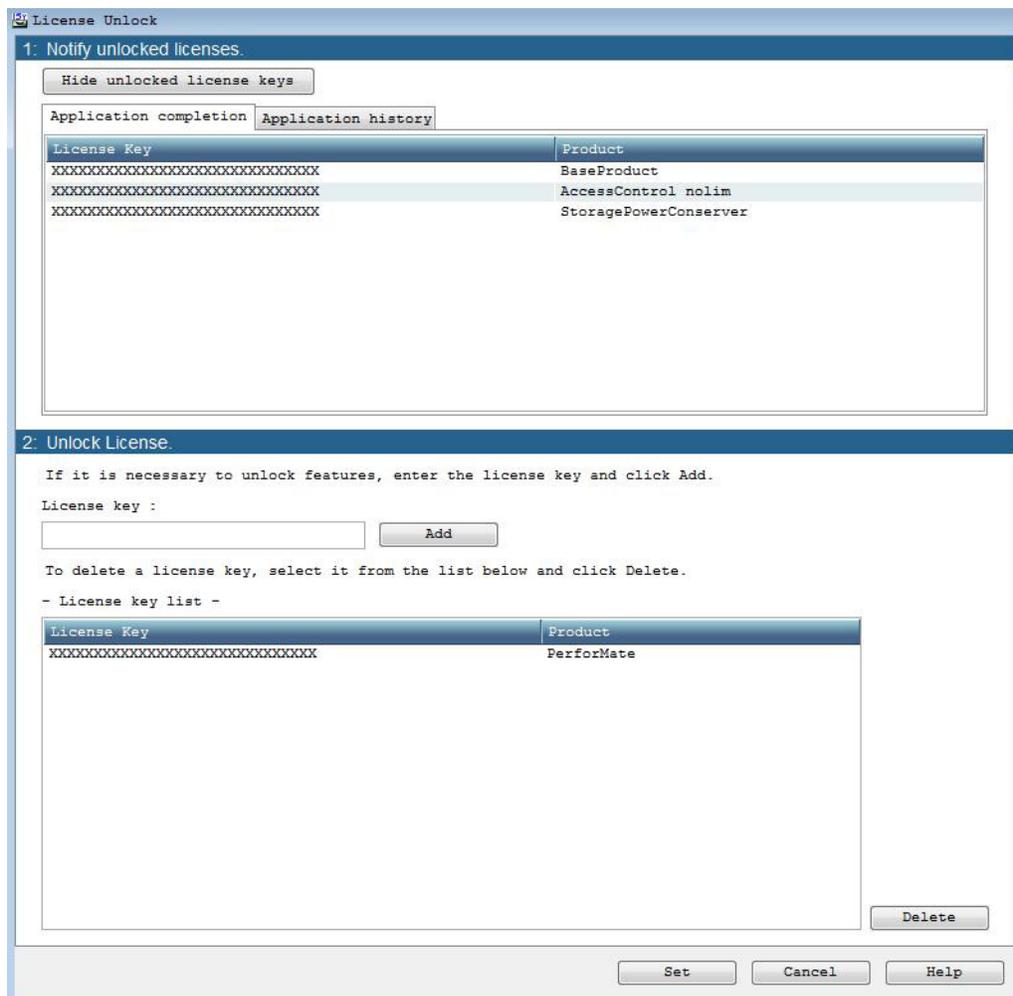
Figure 11-42: License Unlock

Hide unlocked license keys:

The list of licenses already unlocked and the history list are hidden.

License key: When you enter a license key and click [Add], the license key is registered in the license key list.

License key list: The input license keys are listed. Clicking [Delete] deletes the selected license from the list.

Navigation button(s)

[Set]

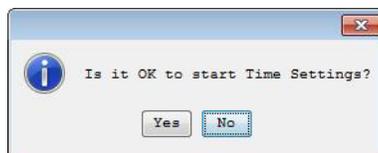The following confirmation dialog box is displayed.
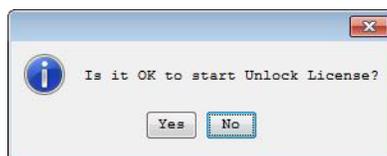
Figure 11-43: Confirmation

If you select [Yes], the license unlock operation is executed.

[Cancel]

A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen.

Service Security

By using the screen shown below (Configuration menu -> Disk Array -> Service Security), you can display the [Service Security] screen. The displayed information is the connection setting of the service security of the current disk array. The [Service Security] screen lets you specify the settings of network management service.
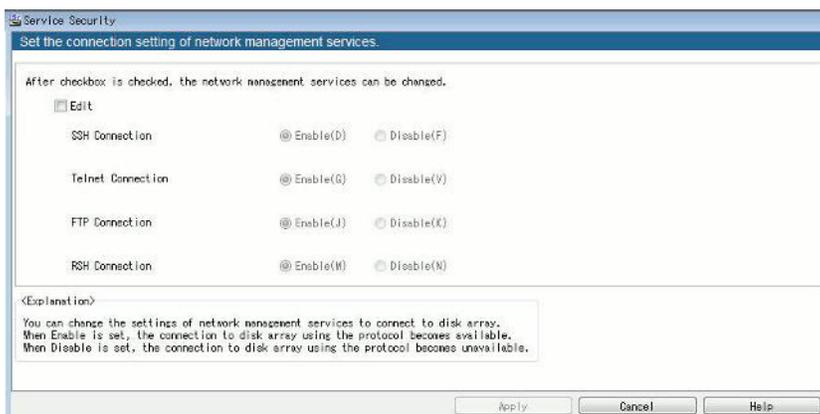
Figure 11-44: Service Security

[Edit] check box: Before changing the service security settings, you need to place the setting in the edit state. Selecting [Edit] on this screen places the setting in the edit state. If another user is already editing the setting, the following message is displayed.
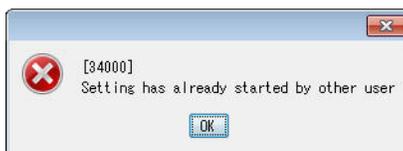
Figure 11-45: Other User Message

When in the edit state, the setting is displayed on the screen shown below. This screen lets you enable or disable the connections to each network management service in the disk array. Two options are available:

- [Enable]: A connection to the disk array can be established by using the protocol.
- [Disable]: A connection to the disk array cannot be established by using the protocol.
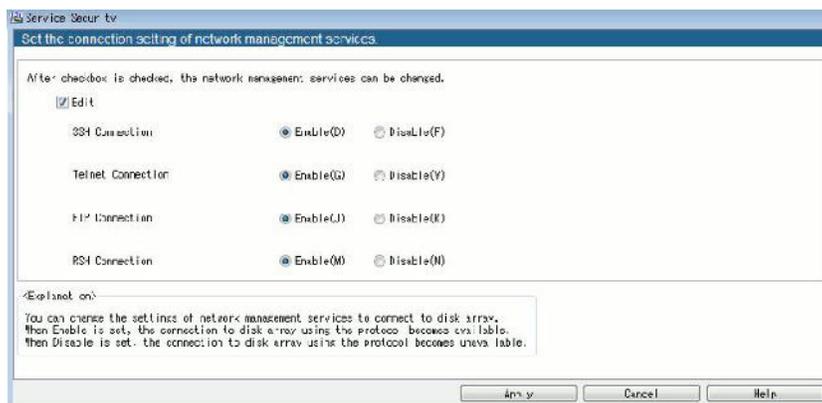
Figure 11-46: Service Security Editing Status

[Apply] button: Clicking the button displays the following confirmation message. If you select [Yes], service security settings are changed and the result is displayed.
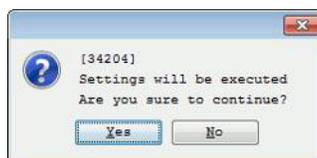
Figure 11-47: Execution

[Cancel] button: Clicking this button displays the following query message confirming your intention to cancel. If you select [Yes], the monitoring is resumed and the State Display screen is displayed again.
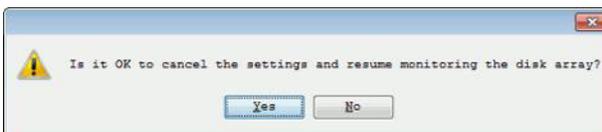
Figure 11-48: Cancel Settings

Help] button: Clicking this button displays the Help screen related to the [Service Security] screen.

You cannot make the setting when the environment setting is being performed by another user.

Management Software Settings

By using the screen shown below ([Configuration] menu [Disk Array] [Management Software Settings]), you can perform the management software setting for the disk array.
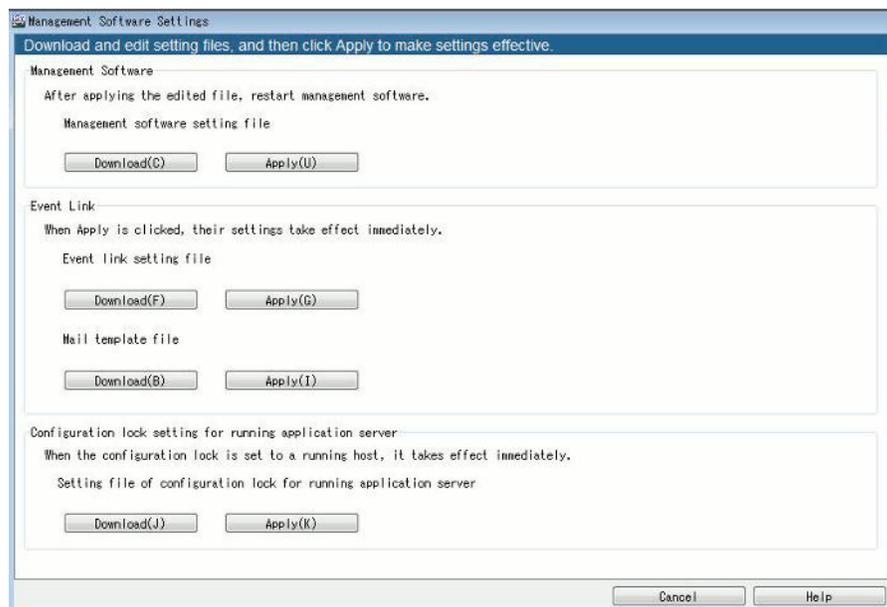
Figure 11-49: Management Software Settings

[Cancel] button: Clicking this button displays the following message confirming your intention to cancel. If you select [Yes], the monitoring is resumed and the State Display screen is displayed again.

Figure 11-50: Confirmation

[Help] button: Clicking this button displays the Help screen related to the [Management Software Settings] screen.

Management Software Server

You can change the settings of the management software server.

[Save] button: Clicking the button displays the following dialog.

Select the folder to which you want to save the management software setting environment file.
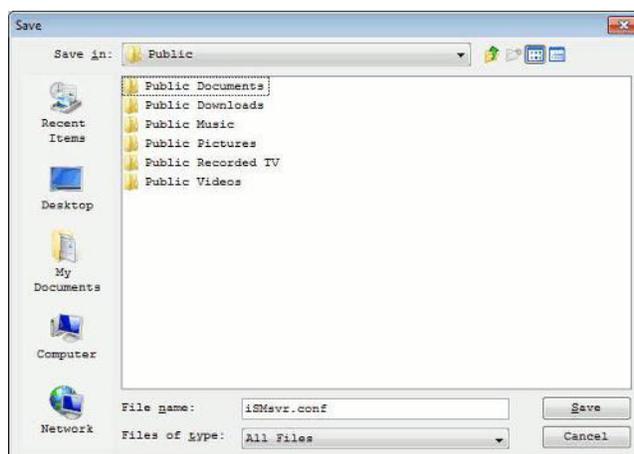
Figure 11-51: Save

When data is saved in the file, the following message is displayed indicating the successful saving of the file. Now the user can edit the saved file.

Figure 11-52: File Saving Completion

[Apply] button: Clicking this button displays the following query screen.
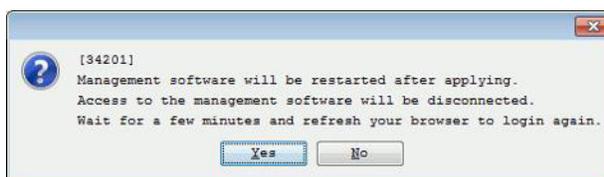
Figure 11-53: Before Registration

If you click [Yes], a dialog box is displayed for selecting the file to be registered. Select the management software setting environment file you want to apply.
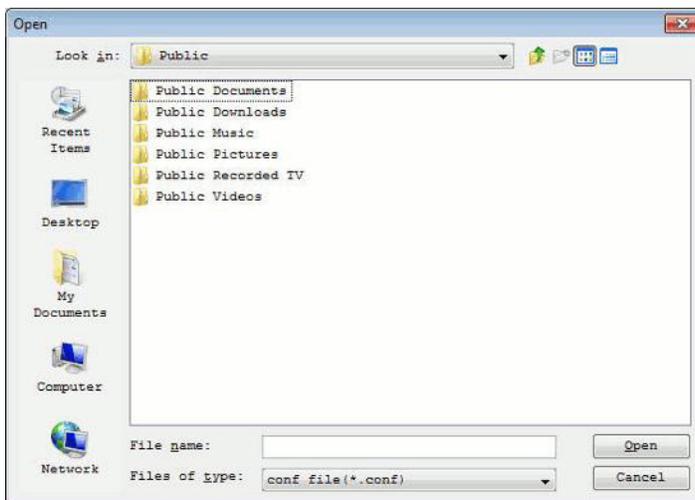
Figure 11-54: Registration File Selection

When registration is successful, the following completion message is displayed.

Figure 11-55: Registration Completion Message

If another user has already starting setup, the following message is displayed.

Figure 11-56: Setting Started

You cannot make the setting when the environment setting is being performed by another user.

Event Link Setting

You can change the settings related to event links.

(1) Event link setting file

[Save] button: Clicking the button displays the file save dialog box.

Select the folder to which you want to save the event link setting file.

When data is saved in a specific file, the file saving completion message is displayed.

Now the user can edit the saved file. For specific setting items, refer to Appendix G.1.

[Apply] button: Clicking the button displays the file selection dialog box. Select the event link setting file you want to apply. When registration is successful, the following completion message is displayed.
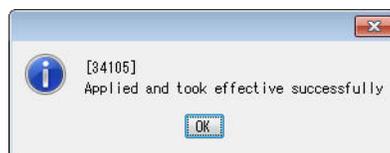
Figure 11-57: Registration Completion

If other users have been already set up the setting, the message of [Setting has already started by other user] is displayed.

(1) Mail template file

[Save] button: Clicking the button displays the dialog box.

Select the folder to which you want to save the mail template file.

When the file is saved, file saving completion message is displayed.

Now the user can edit the saved file. For specific setting items, refer to Appendix G.2.

[Apply] button: Clicking the button displays the file selection dialog box. Select the mail template file you want to apply.

If other users have been already set up the setting, the message of [Setting has already started by other user] is displayed.

Configuration Lock Setting for Running Application Server

You can change the configuration lock setting file for running application server.

[Save] button: Clicking the button displays the dialog box.

Select the folder to which you want to save the setting file of configuration lock for running application server. For specific setting items, refer to Appendix H.

When the file is saved, the message indicating the successful saving of the file. Now the user can edit the saved file.

[Apply] button: Clicking the button displays the file selection dialog box. Select the configuration lock setting for running application server that you want to apply.

When registration is successful, the completion message is displayed.

If other users have been already set up the setting, the message of [Setting has already started by other user] is displayed.

Registration is not allowed in the following cases:

1.The size of registration file has exceeded the upper limit. The following message is displayed.
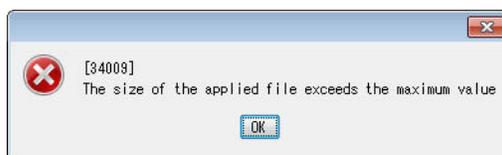
Figure 11-58: Upper Limit Exceeded

2.The format of registration file is checked. If the registration file contains an error, the following message is displayed.

Figure 11-59: Error

Batch Settings

You can perform the following operations in relation to batch setting.

Batch Settings

- Nickname Settings
- Replication Settings

Nickname Settings

Perform the nickname batch setting.

The nickname setting involves the following screen:

Nickname Settings
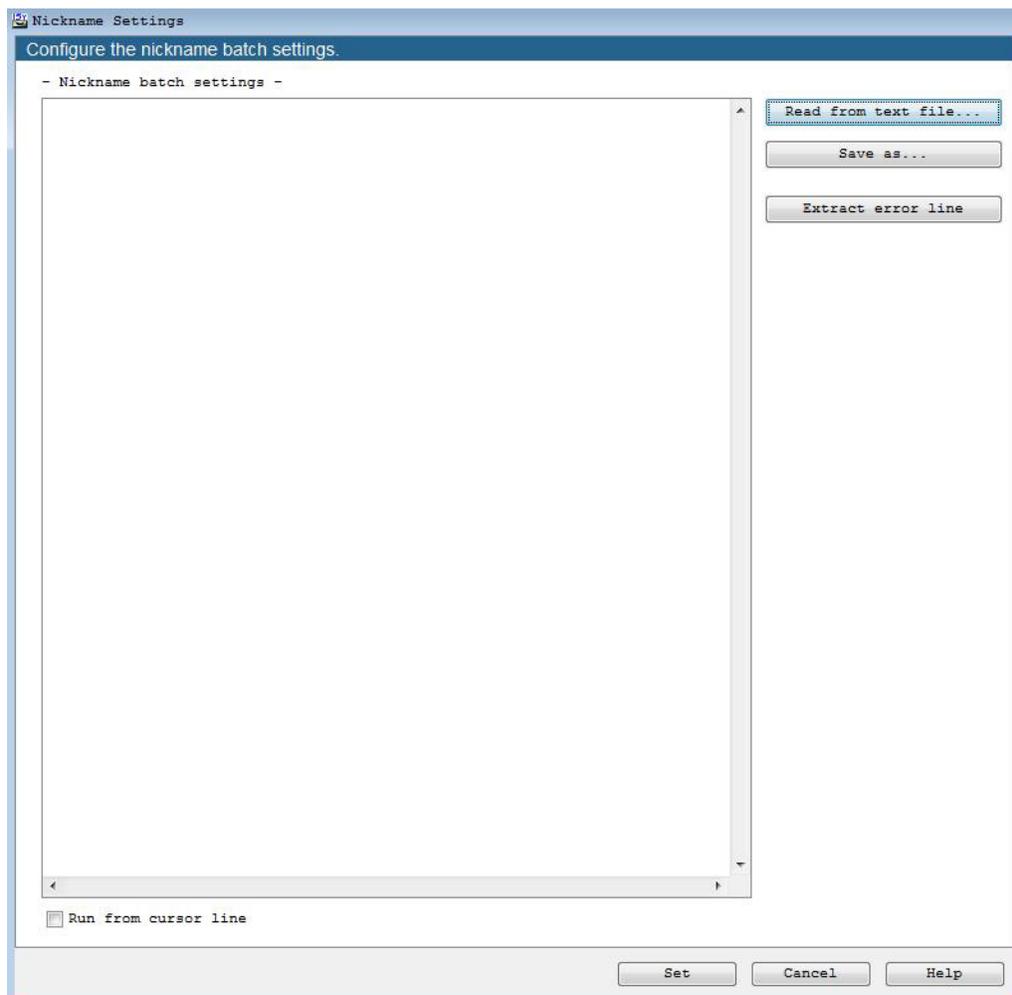
Figure 11-60: Nickname Settings

The nickname batch setting refers to the batch setting of names (disk array name, port name, and OS type/logical disk name) using a defined file. To perform the setting, follow the procedure described below.

1. To use a user-defined file for the setting, select [Read from text file] and read a desired file from the input dialog.

2. After the file is read, the read information is displayed on the edit screen. If any changes are necessary, make those changes on this screen. If you input all the information manually, you need to put "," at the beginning of each line.

3. If you select the [Run from cursor line] check box, it is executed from the cursor line inside the edit box.

4. Check the content, and then click [Set].

5. The results of the individual settings (see below) are displayed.

    success: The execution result is successful.

success(already): The execution result is successful (already executed).

failure(invalid): Parameter error

failure(i/o error): Access error

failure(same name): The same name exists.

failure (RPL pair):S etting to the replication disk

failure(busy): Another operation is in progress.

failure(communication): Communication error

failure(protected): Execution right error

failure(not monitoring): Setting for a disk array not being monitored

failure(SDV): OS type setting for a snapshot data volume

failure(SYV): OS type setting for a system volume

failure(BV/SV/LV):OS type setting for BV, SV, or LV

failure (RPL Port): Setting to the replication port

failure(Conf.Chg Lock): Setting for a disk array, logical disk, or port for which configuration change is locked

failure(QuickFormatted): OS type setting for a quick formatted logical disk

failure(not supported): Setting for a disk array not supported by SnapSAN Manager

failure(nnh): Other error (nnh: internal error code)

The following types of execution right error may occur:

- ACOS-4 resource protection error
- Setting error made by the partition user in relation to the resource not managed
- Renaming error made by the partition user in relation to the system volume

6. If you click the [Extract error line] button after the operation is completed, only those settings that ended abnormally are displayed on the edit screen.

7. To save the defined file, select [Save as] in the dialog box and specify a desired file name.

Navigation button(s)

[Set]
The following confirmation dialog box is displayed.
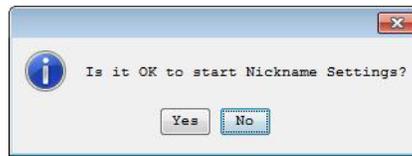
Figure 11-61: Confirmation

If you select [Yes], the nickname setting operation is executed.

[Cancel]

A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen.

Replication Settings

Perform the batch setting of replication information.

The Replication Settings involves the following screen:

Replication Settings
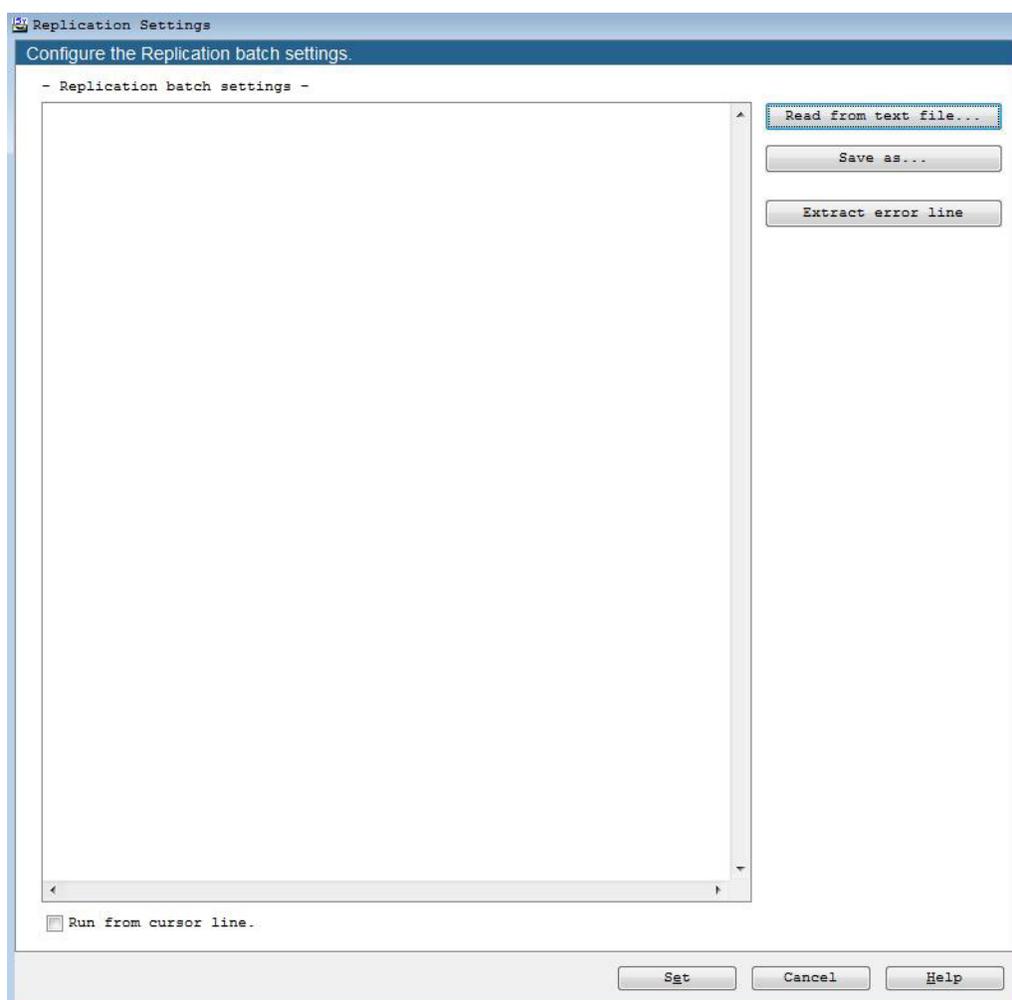
Figure 11-62: Replication Settings

Read from text file

The setting file is read.

Edit screen

This screen allows you to edit the setting items directly.

To edit the items directly, you need a comma (,) at the beginning of each line of the area for displaying the execution results, in addition to the format described in the pair setting file.

Clicking the [Set] button displays the execution results at the beginning of each line.

When a file is saved, any line longer than 127 characters is truncated. (The execution result display field at the beginning of the line is excluded.)

Extract error line.

Only those lines for which an error occurred after the disk array setting are displayed.

If there is no error after the disk array setting, or if this function is executed before the setting, all the currently displayed information is cleared.

Save as

The currently displayed information is saved to a file.

Run from cursor line

The setting is executed from the current cursor line position.

Execution results

successSuccessful

failure(invalid) Failed because the batch setting file contained an invalid description.

failure(LINK path) Failed because all link paths between disk arrays were faulty.

success(already) Already set

failure(ATgroup over) Failed because no more AT group could be created.

failure(Vol to ATgroup over) Failed because no more AT group could be registered in the AT group.

failure(ATgroup not exist) Failed because the AT group did not exist.

failure(same name) Failed because the same AT group name existed.

failure(already) Failed because the volume was already registered in another AT group.

failure(not managed) Failed because the disk array was outside management.

failure(MV not managed) Failed because the MV was outside management.

failure(Monitoring stop) Failed because the monitoring was stopped for the disk array.

failure(MV is monitoring stop) Failed because the monitoring was stopped for the MV.

failure (RV is monitoring stop) Failed because the monitoring was stopped for the RV.

failure(Freeze) Failed because the disk array froze.

failure (MV is freeze) Failed because the MV froze.

failure (RV is freeze) Failed because the RV froze.

failure (DDR not supported) Failed because Volume Cloning was not supported.

failure (Remote Replication not supported) Failed because Replication and Mirroring was not supported.

failure (DDR/Remote Replication not supported) Failed because Volume Cloning/Replication and Mirroring was not supported.

failure (DDR license locked) Failed because the Volume Cloning license was not unlocked.

failure (Remote Replication license locked) Failed because the Replication and Mirroring license was not unlocked.

failure (DDR/Remote Replication license locked) Failed because the Volume

Cloning/Replication and Mirroring license was not unlocked.

failure (DR not supported) Failed because Replication and Mirroring /DisasterRecovery was not supported.

failure (DR license locked) Failed because the Replication and Mirroring /DisasterRecovery license was not unlocked.

failure(Pair over when limit Remote Replication Asyn license) Failed because the upper limit of the number of pairs was reached for the low-cost version Remote Replication license.

failure (RPL not supported Vol when Remote Replication Asyn license) The pair setting failed because the capacity of the volume was not supported by the low-cost version Remote Replication license.

failure(Pair over) Failed because no more pair could be set for the MV or the upper limit of the number of pairs was reached.

failure (MV remainder capacity is insufficient without RSV) No pair can be created because the replication reserved volume is not yet bound and the remaining capacity is not sufficient to create a pair.

failure (RV remainder capacity is insufficient without RSV) No pair can be created because the replication reserved volume is not yet bound and the remaining capacity is not sufficient to create a pair.

failure (MV maximum capacity exceed.)No pair can be created because the remaining capacity is not sufficient to create a pair.

failure (RV maximum capacity exceed.)No pair can be created because the remaining capacity is not sufficient to create a pair.

failure(Vol not exist) Failed because the volume did not exist.

failure (MV not exist) Failed because the volume (MV) did not exist.

failure (RV not exist) Failed because the volume (RV) did not exist.

failure (MV Conf.Chg Lock) Failed because the volume (MV) was locked.

failure (RV Conf.Chg Lock) Failed because the volume (RV) was locked.

failure (MV is protected) Failed because the volume (MV) was protected.

failure (RV is protected) Failed because the volume (RV) was protected.

failure (MV is System Volume) Failed because the volume (MV) was a system volume.

failure (RV is System Volume) Failed because the volume (RV) was a system volume.

failure (MV is not accessible) Failed because the MV was outside partition management.

failure (RV is not accessible) Failed because the RV was outside partition

management.

failure (Disk array not exist) Failed because the disk array did not exist.

failure(several same ATgroups) Failed because more than one AT group existed.

failure(Vol not pair) Failed because the pair was forcibly deleted.

failure (MV not pair) Failed because the volume was not paired.

failure (Different disk array(RV)) Failed because the pair was not an Remote Replication pair that could be registered to the AT group.

failure (RV registered ATgroup) Failed because the RV was already registered in the AT group.

failure(ATgroup over[distributor]) Failed because the number of AT groups allowed to be set for the connected disk array exceeded the limit.

failure(not separated) Failed because the state was other than Separated Complete.

failure (MV not Remote Replication) Failed because the specified MV was not an Remote Replication pair.

failure(several Remote Replication pairs) Failed because a new disk array pair could not be set for a volume registered in the AT group. Or, the operation failed because a volume having multiple Remote Replication pairs could not be registered in the AT group.

failure (MV not primary vol) Failed because the specified MV was not a PV (MV).

failure(ATgroup invalid) Failed because the AT group name was invalid.

failure(ATgroup is not accessible) Failed because an attempt was made to register a volume outside partition management to an AT group.

failure(ATgroup not separated) Failed because the AT group was in a state other than Separated Complete.

failure(Vol OS type unmatch) Failed because the volume OS type did not match.

failure(Vol capacity unmatch) Failed because the volume capacity did not match.

failure(Pair loop) Failed because the pair hierarchy was a loop.

failure (RV is Volume Cloning MV) Failed because the RV was already a Volume Cloning MV.

failure (MV is reserved vol) Failed because the MV was a reserved group.

failure (RV is reserved vol) Failed because the RV was a reserved group.

failure (MV is dRV)The Volume Cloning pair setting failed because the MV was already an RV of the Volume Cloning.

failure(already RV) Failed because the RV was already paired with another MV.

failure (MV is SV) Failed because the MV had the SV attribute.

failure (RV is SV) Failed because the RV had the SV attribute.

failure (MV is SDV) Failed because the MV had the SDV attribute.

failure (RV is SDV) Failed because the RV had the SDV attribute.

failure (MV is LV) Failed because the MV had the LV attribute.

failure (RV is LV) Failed because the RV had the LV attribute.

failure (MV is BV) Failed because the MV had the BV attribute.

failure (RV is BV) Failed because the RV had the BV attribute.

failure(not linked) Failed because the specified disk array was not linked.

failure (RPL not supported Vol)The pair setting failed because the capacity of the volume was not supported by the replication function.

failure (MV:RPL not supported Vol)The pair setting failed because the volume (MV) capacity was not supported by the replication function.

failure (RV:RPL not supported Vol)The pair setting failed because the volume (RV) capacity was not supported by the replication function.

failure(link disk array name not specified)

Failed because the name of the disk array to be linked was not specified.

failure (RV is CV) Failed because the RV had the CV attribute.

failure (MV is swapping) Failed because the MV was swapping.

failure (RV is swapping) Failed because the RV was swapping.

failure(Thin Provisioning function is only support IV(MV))

Since ThinProvisioning only supports IV, the volume cannot be changed to MV.

failure(Thin Provisioning function is only support IV(RV))

Since ThinProvisioning only supports IV, the volume cannot be changed to RV.

failure (MV is L2 Cache Volume) Since this is the logical disk for L2 cache, the volume cannot be changed to MV.

failure (RV is L2 Cache Volume) Since this is the logical disk for L2 cache, the volume cannot be changed to RV.

failure (DDR license version error) Failed because the version requiring the Volume Cloning license was not installed.

failure (Remote Replication license version error) Failed because the version requiring the Replication and Mirroring license was not installed.

failure (DSV license version error) Failed because the version requiring the Snapshots license was not installed.

failure (Me (DV is rotation stopped) Failed because the MV stopped operating.

failure (Re (MV is rotation stopped) Fe (Railed because the RV stopped operating.

failure(communication) Indicates a communication error between the server and the client.

failure(nnh) Other error (nnh: internal error code)

Execution conditions for pairing and unpairing

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.

Figure 11-63: Confirmation

If you select [Yes], the replication setting operation is executed.

[Cancel]

A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen.

Disk Array Management

You can perform the following operations in relation to a disk array.

Disk Array Operation

- Extension Enclosure Incorporation
- Configuration Report
- Configuration Import
- Configuration Lock/Unlock
- Update
- Change of Settings

Extension Enclosure Incorporation

Incorporate an extension disk enclosure (DE) into the disk array.

1. Extension Enclosure Incorporation

   Check the connection of the extension enclosure.

2. Confirmation

   The scanned extension enclosures are displayed. Check the settings to see whether they are correct.

3. Completion

   The execution result is displayed.

Remarks

- A disk enclosure (DE) is not recognized just by being connected to the disk array. It is therefore necessary to use this function in order to make the disk array recognize the connected DE.

- An extended disk enclosure (DE) can be added and incorporated with the disk array in operation.
- Multiple extension enclosures can be incorporated at a time.

Incorporation procedure

4. To incorporate an extension disk enclosure, follow the procedure described below.

5. Install an extension disk enclosure (DE) in the disk array and connect it.

6. From the menu, select [Extension enclosure incorporation].

7. The extension enclosure is scanned.

8. If properly connected, the extension enclosure is detected.

9. Check that the operation has ended normally, the number of incorporated extension enclosures, and the DE number of each of those enclosures. Then, end the extension enclosure incorporation.

10. Check the main screen to see whether the incorporated extension enclosures are normally monitored.

Extension Enclosure Incorporation
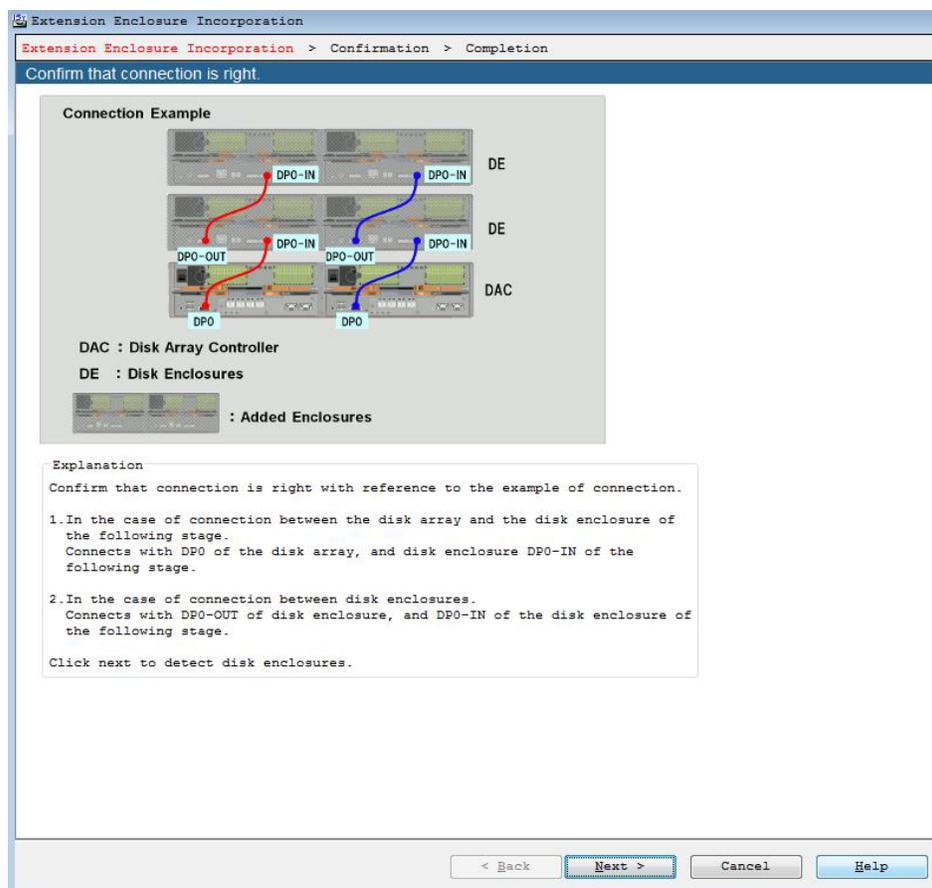
Figure 11-64: Extension Enclosure Incorporation
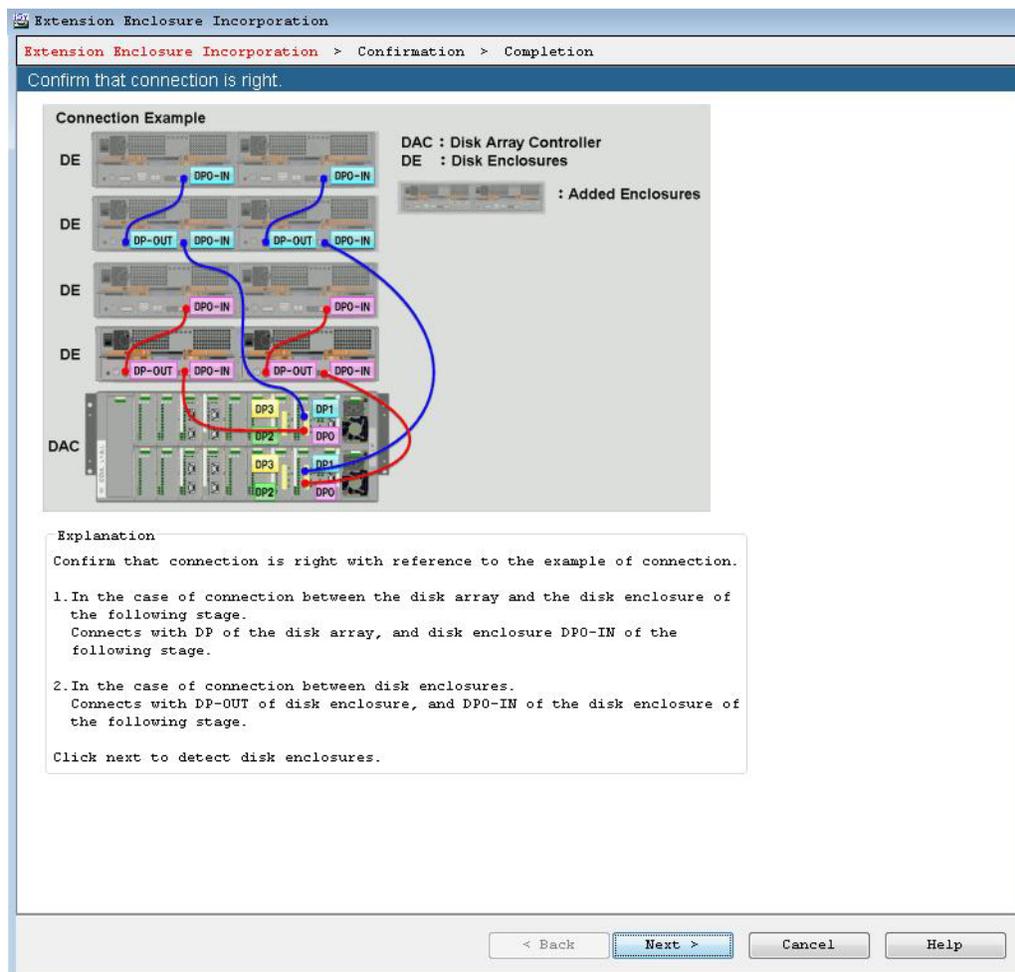
Figure 11-65: Extension Enclosure

Based on the connection example on the screen, check the connection of the extension disk enclosure (DE).

Navigation button(s)

[Next]

The following confirmation dialog box is displayed.
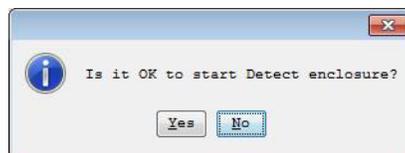
Figure 11-66: Confirmation

If you click [Yes], the extension enclosure scan operation is executed and then the Confirmation screen is displayed.

[Cancel]

> A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.
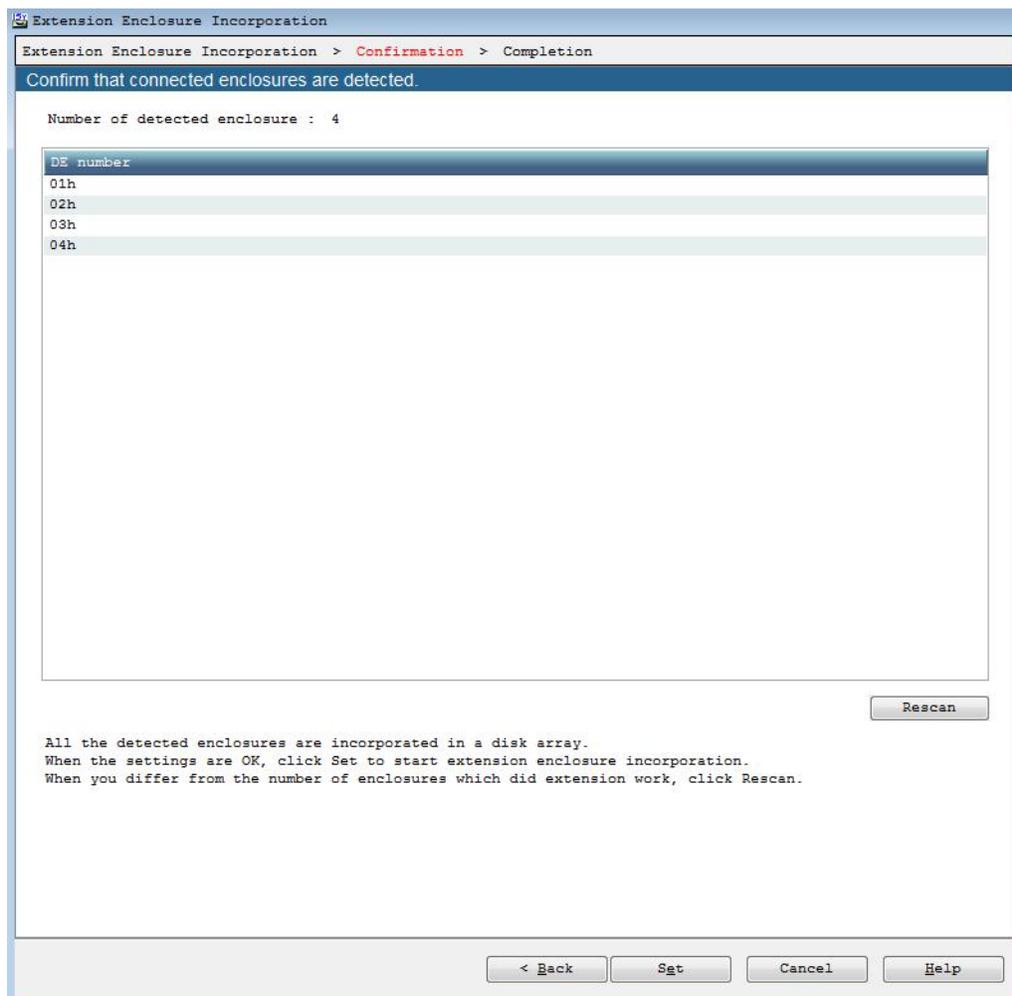
Confirmation

Figure 11-67: Confirmation

The scanned extension enclosures are displayed on the screen. Compare the extension disk enclosures (DEs) actually installed against the information displayed on the screen (number of installed extension enclosures and individual DE numbers).

If you have changed a connection or any other setting, click [Rescan]. The enclosure are rescanned.

Once you incorporate an extension disk enclosure, you cannot separate it from the disk array; therefore, take due care when incorporating an extension disk enclosure.

Navigation button(s)

[Set]

> The following confirmation dialog box is displayed.

Figure 11-68: Confirmation
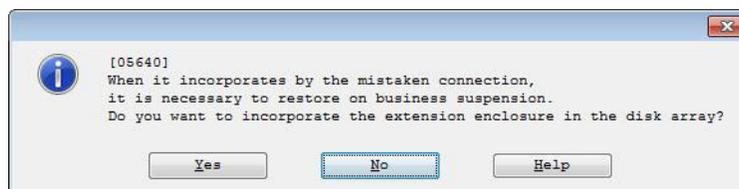
Figure 11-69: Incorporate Extension

If you click [Yes], the extension enclosure incorporation operation is executed and then the Completion screen is displayed.

[Back]

The Extension Enclosure Incorporation screen is displayed again.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Completion
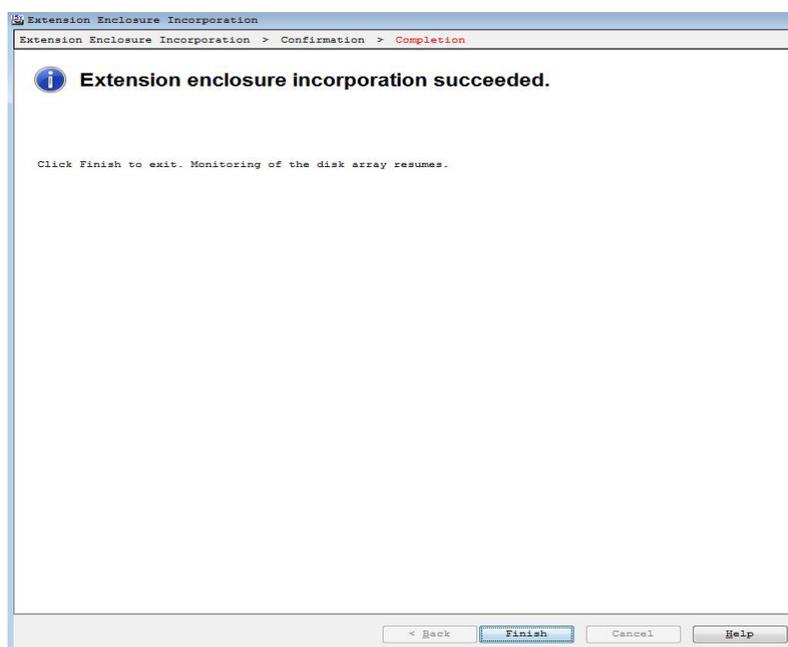
Figure 11-70: Incorporation Successful

The processing result of the extension enclosure incorporation is displayed.

Navigation button(s)

[Finish]

The [Monitor] - [Screen Display] screen is displayed.

Configuration Report

Collect the configuration information of the disk array and save it to the client as a file.
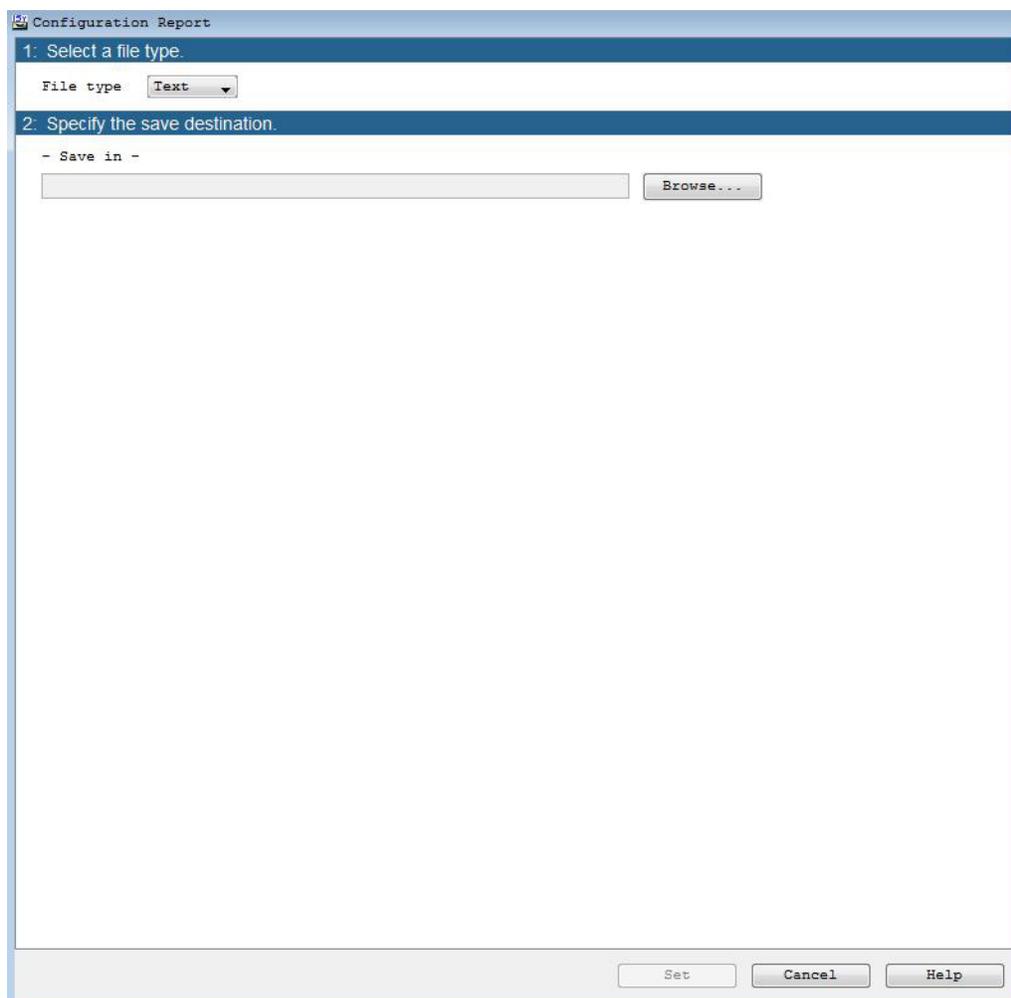
Figure 11-71: Configuration Report

File type

Specify the file type of the configuration information you want to acquire.

The following types are available:

- Text type
- CSV type
- configuration file format

Save in

This field displays the folder to which the file is to be saved.

Browse

Clicking this button displays a dialog box that lets you specify the destination file or folder (or a directory in the case of Linux).

When you have selected the text type, specify a file.

- A text file is saved with the specified file name.

When you have selected the CSV type, specify a folder to which to save the file.

- In the specified folder, a folder is created with a folder name consisting of 12 numbers that represent the date and time when the saving of the file is completed.
- The CSV file is saved in the created folder.

When you have selected the configuration file format, specify a file.

- The configuration file is saved under the specified file name.

If you specify the destination in the dialog, the [Save in] field displays its path.
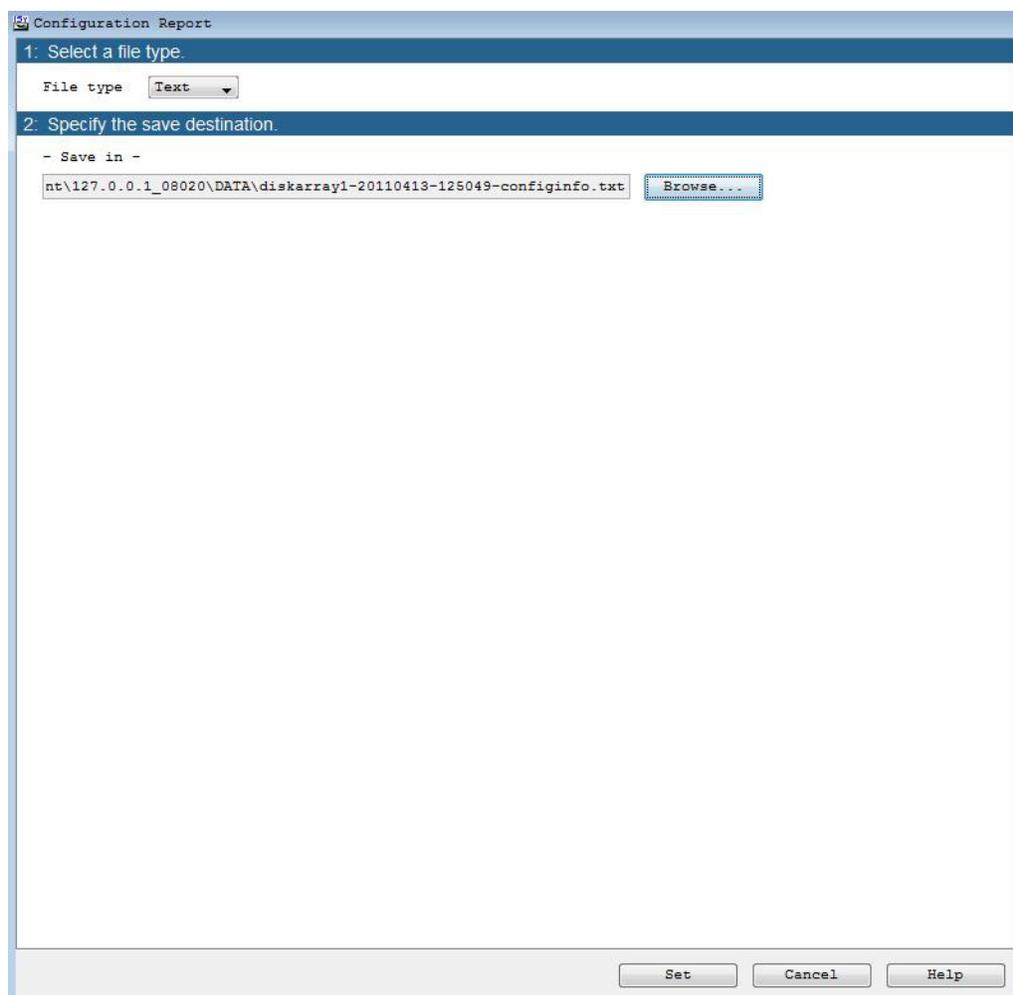
Figure 11-72: Configuration Report

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.
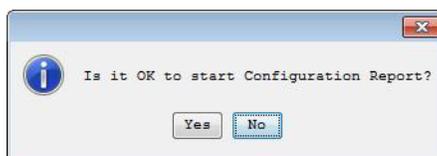
Figure 11-73: Start

If you select [Yes], the configuration report operation is executed.

[Cancel]

> A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen.

Configuration Import

Import configuration information into the disk array using the configuration file.
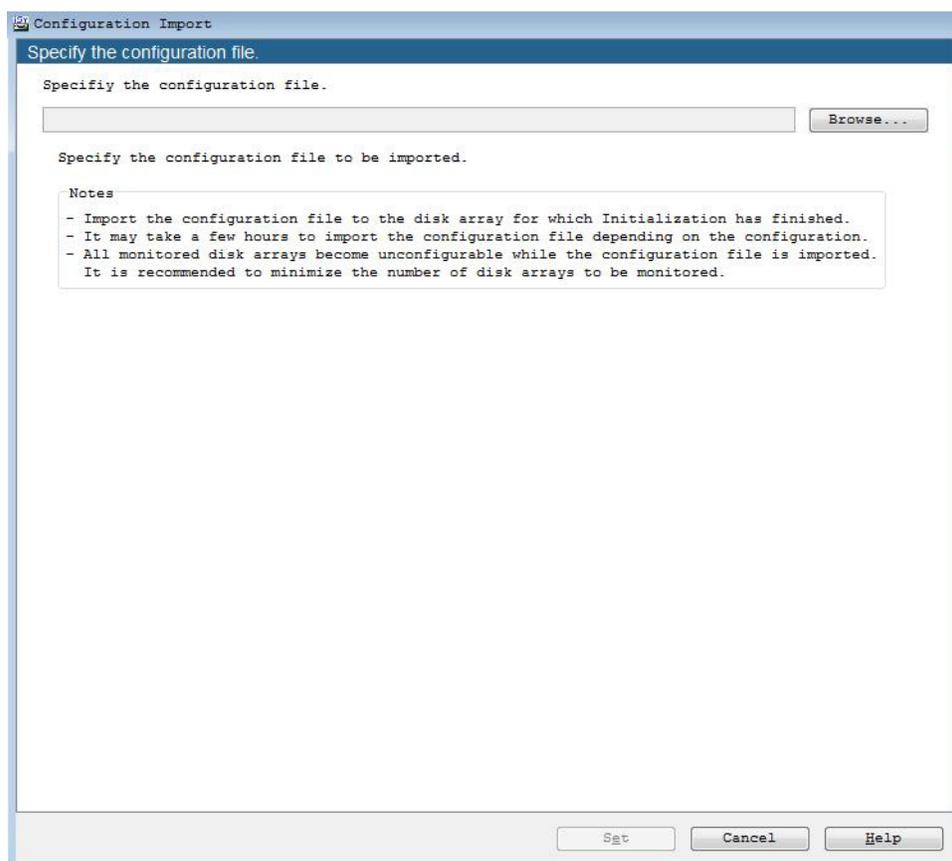
Figure 11-74: Configuration Information Import

[Browse] button

Use this button to read the configuration file.

Specify the configuration file saved by selecting [Configuration file] in [File type] on the Configuration Report screen.

Navigation button(s)

[Set]

The Confirmation screen is displayed.

Figure 11-75: Confirmation

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

• Import the configuration file to the disk array for which Initialization has finished.

• It may take a few hours to import the configuration file depending on the configuration.

• All monitored disk arrays become unconfigurable while the configuration file is imported. It is recommended to minimize the number of disk arrays to be monitored

• Configuration copy cannot be executed when the hardware configuration of the destination disk array differs from that of the source disk array.

• Configuration copy can be executed when the destination disk array has the same unlocked product licenses that the source disk array has.

• Configuration cannot be copied if the copy source contains a pool bound using 60 or more physical disks.

Disk Array Configuration Lock/Unlock

You can lock or unlock the disk array.
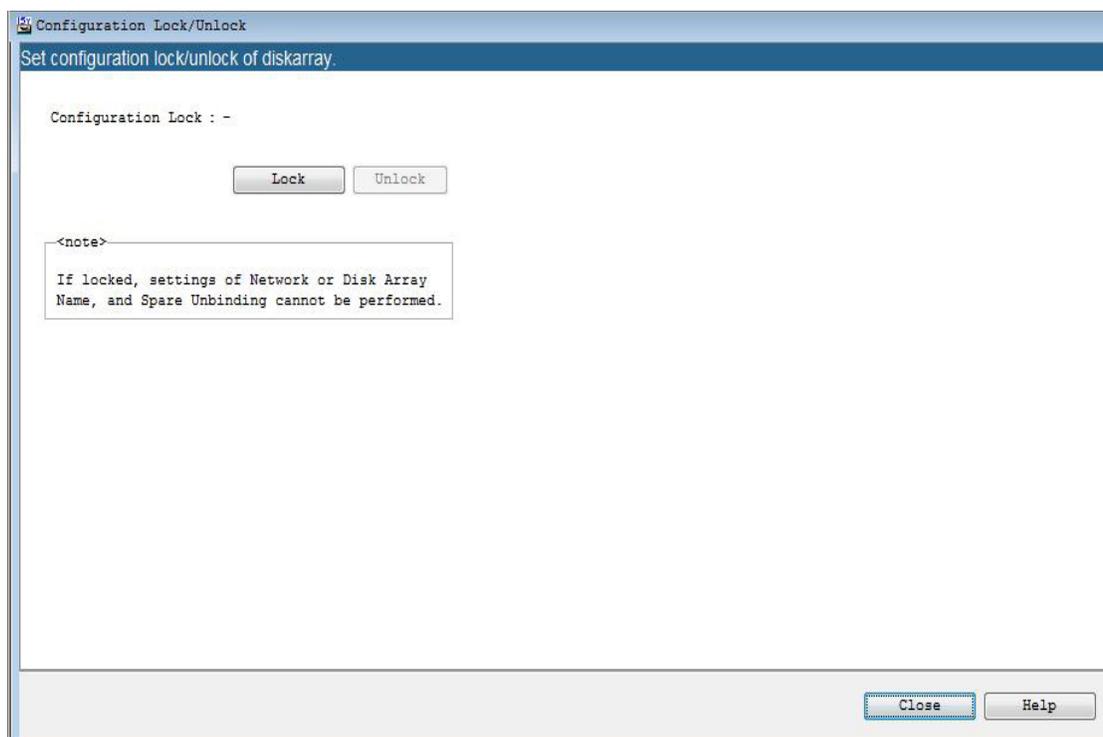
Figure 11-76: Configuration Lock Unlock

(a) Configuration Lock

The lock state of the disk array is displayed.

If the disk array is locked, [Lock] is displayed for configuration lock. If the disk array is unlocked, [-] is displayed for configuration lock.

(b) [Lock] and [Unlock] buttons

When you click this button, the disk array you can lock or unlock the disk array.

If you lock the disk array, the following operations are locked:

- Disk array subsystem name setting
- Network setting
- Spare disk unbinding

Update

Update the disk array.

The Update screen consists of the following screens:

1. Update screen

    Select the update package and the update type.

2. Confirmation

    The information on update to be executed is displayed. Check the settings to see whether they are correct.

3. Completion

    The execution result of update is displayed.
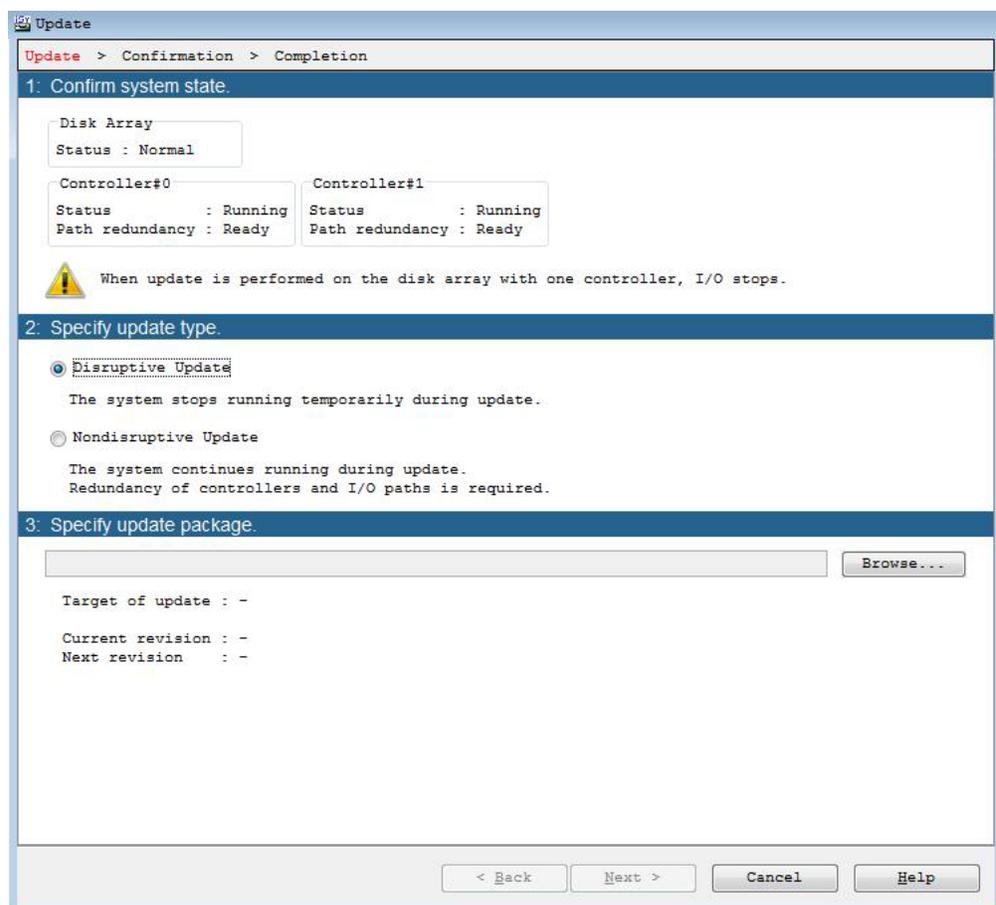
Figure 11-77: Update

Confirm system state

Check that the disk array to be updated is in the following state:

"The state of disk array is "Normal".

"The state of controller is "Running".

Specify update type

Specify disruptive or nondisruptive update as the update type.

Nondisruptive update can be executed only when Path redundancy is "Ready".

Specify update package

Specify the path for the update package from the client. Obtain the update package on the client in advance.

Navigation button(s)

[Next]

　　　The Confirmation screen is displayed.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.

Confirmation
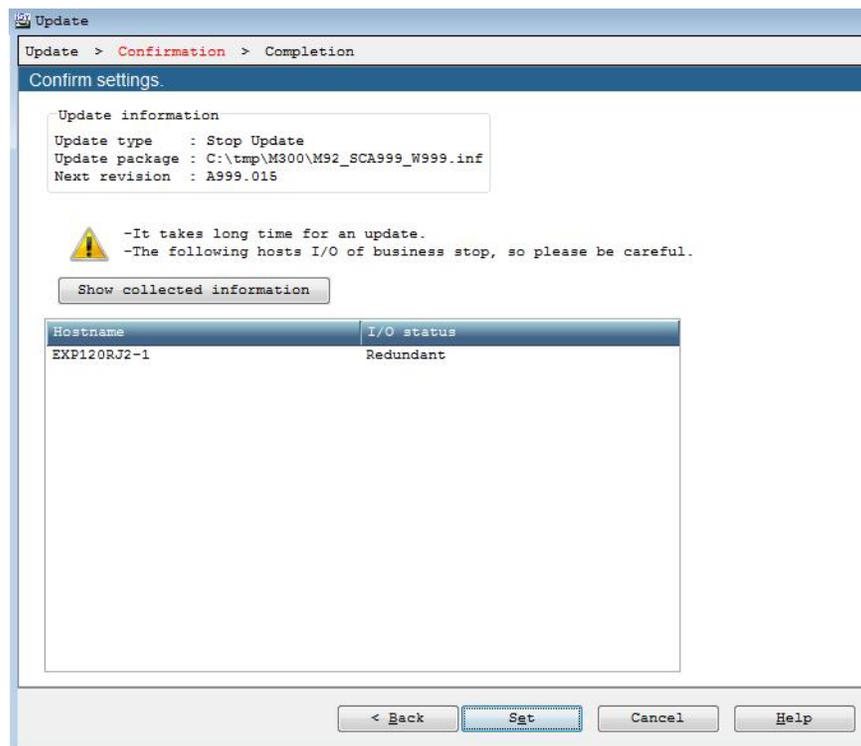
Figure 11-78: Execute

The screen displays the information about the update to be executed. Host information is displayed when nondisruptive update is executed.

[Show collected information] button

The host information collected by the disk array is updated.

Never abort the update during execution though this process takes time. The reference time is different depending on the operation form and configuration of disk array.

Navigation button(s)

[Show collected information]

Collect the host information again to update it.

[Set]

The following confirmation dialog box is displayed.
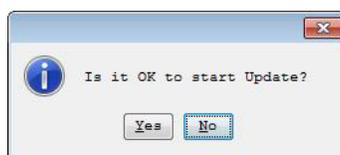
Figure 11-79: Confirmation

If you click [Yes], the update operation is executed and then the Completion screen is displayed.

[Back]

The Update screen is displayed again.

[Cancel]

A dialog box is displayed that asks if you want to end the wizard. Clicking the [OK] button in the dialog box ends the wizard and displays the [Monitor] - [Screen Display] screen.
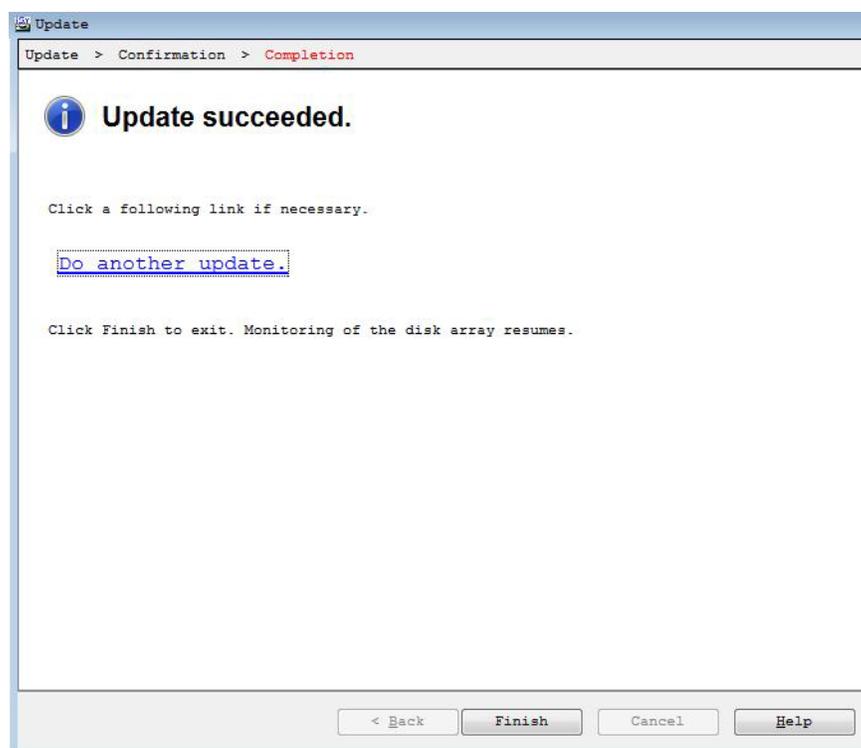
Completion

Figure 11-80: Completion

When update is complete, the following link is displayed.

[Do another update.]

Opens the Update screen again to execute another update.

Navigation button(s)

[Finish]

> The [Monitor] - [Screen Display] screen is displayed.

Change of Settings

Change the settings of a disk array.

The Change of Settings screen consists of the following screen:

Change of Settings (Disk Array)
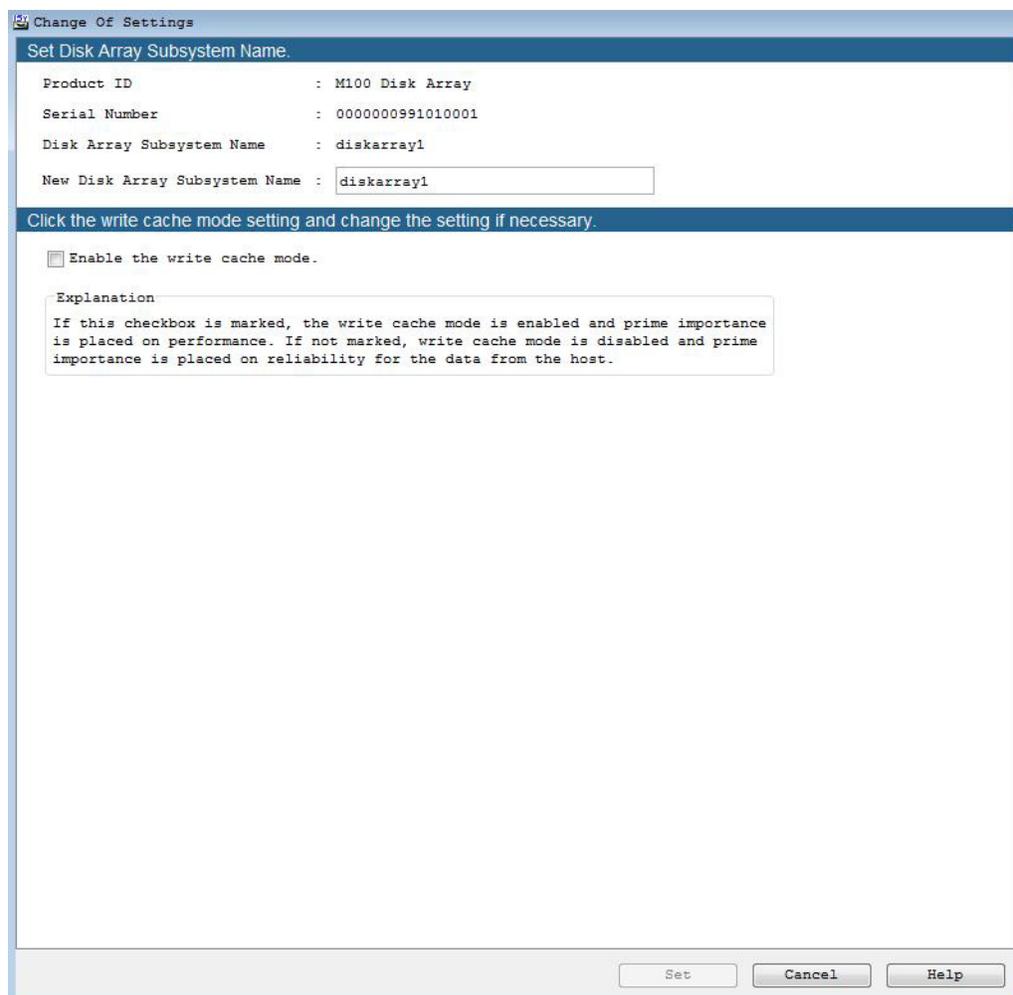
Figure 11-81: Chang of Settings (Disk Array)

Changing the disk array name

To change the disk array name, enter a name in [New Disk Array Subsystem Name].

If the disk array configuration change is locked, you cannot change the name.

Write Cache Setting

Select this check box to enable the write cache setting.

If you select the check box, the write cache operation is enabled and priority is given to performance when processing the data from the host. Otherwise, the write cache operation is disabled and priority is given to reliability.

The write cache setting can only be specified for the single controller model.

Navigation button(s)

[Set]

The following confirmation dialog box is displayed.
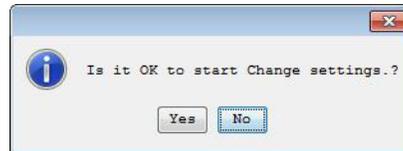
Figure 11-82: Confirmation

If you select [Yes], the disk array setting changes are made.

[Cancel]

A dialog box is displayed that asks if you want to end the settings. Clicking the [OK] button in the dialog box displays the [Monitor] - [Screen Display] screen.

Power Saving Settings

Specify the power saving settings for the disk array.

The Power Saving Settings consists of the following screen:
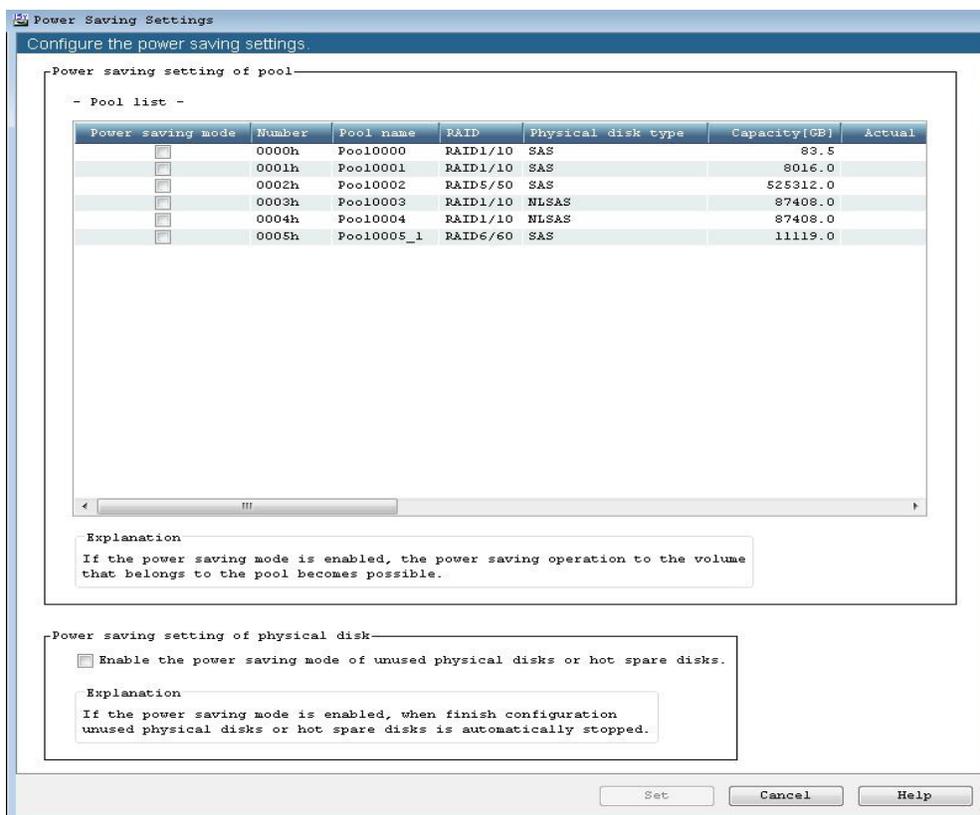
Figure 11-83: Power Saving Settings

Power saving setting of pools

The power saving mode setting can be changed on a pool-by-pool basis.

Select the [Power saving mode] check box to enable the power saving mode.

The power saving mode cannot be disabled in the stopped pool.

Power saving mode for Pools

Specify whether to enable or disable the power saving mode for the pool. The power saving mode can be specified as follows.

Check box	Description
Selected	The power saving mode is enabled.
	It is permitted to stop and start the operation of the pool as well as to stop and start the use of the volume.
Not selected (default)	The power saving mode is disabled.
	It is not permitted to stop the operation of the pool as well as to stop the use of the volume.
	It is not permitted to set OFF to the pool stopped.

Power save setting of physical disk

You can enable the power saving mode for unused physical disks and hot spares.

If this function is enabled, it automatically stops those unused physical disks and hot spares that are operating when the configuration setting ends. Enabling this function keeps unused physical disks and hot spares stopped.

If you disable the function, the automatic stop feature mentioned above does not work. In this mode, all physical disks are regarded as being in the operating state. Therefore, the currently stopped unused physical disks and hot spares start to operate at the same time the mode is changed.

The physical disks having the following numbers cannot be stopped because the configuration information of the disk array is saved:

00h-0000h to 00h-0003h

Navigation button(s)

[Set]

> The following confirmation dialog box is displayed.

Figure 11-84: Start

If you select [Yes], the power saving setting operation is executed.

[Cancel]

> A dialog box is displayed that asks if you want to end the settings. Clicking the [Yes] button in the dialog box displays the [Monitor] - [Screen Display] screen.

Configuration Change Guard

This chapter describes how to guard against configuration changes during application server operation. The configuration change guard for application server running (referred to as configuration change guard below) is used during application server operation to prevent operations related to accessing logical disks used by application servers, such as unbinding disks or deleting disk assignments, in order to prevent the corruption of data in storage due to mistaken operations or procedures.

An overview of this function follows.

1. The correspondences between application server addresses and LD Sets/devices are specified in a setting file.

2. When an operation to be prevented is executed, a ping signal is sent to the application server to check the operating state.

3. If there is a ping response, the application server is in the operating state, so the operation to be prevented is stopped.

If there is no response, the server is stopped, so the operation is executed.
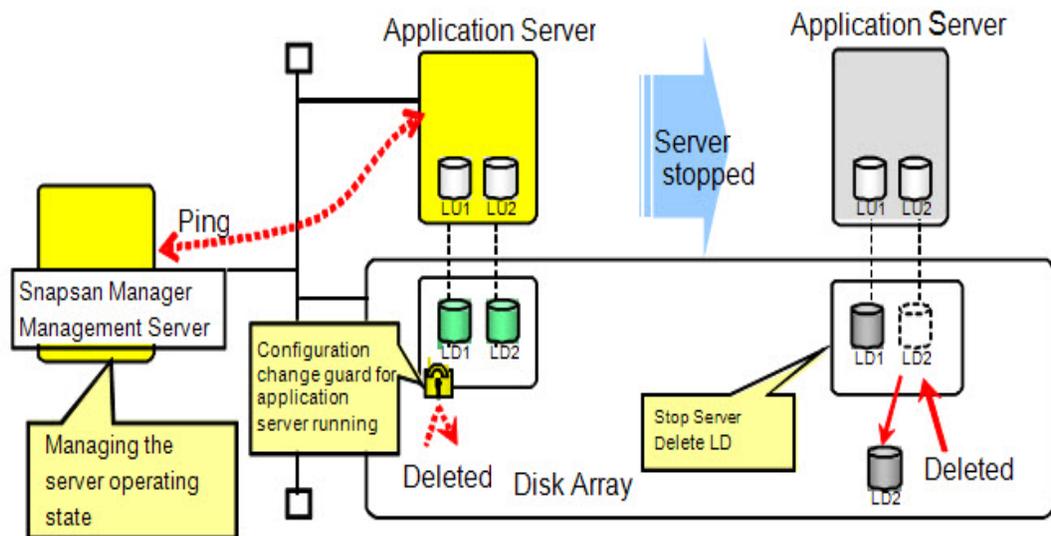
Figure 12-1: Change Guard Overview

This function can be used to prevent the corruption of data by accidental operations and procedures, but the function also has the following effects:

• The application server operation is checked, so operations to be prevented have longer wait times.

- A network environment in which Ping can be executed from the SnapSAN Manager management server on application servers is required.
- If using a DNS name for an application server, the SnapSAN Manager   management server must be able to resolve the name.
- The SnapSAN Manager   management server must be able to resolve its own name
- Ping is used to check the operation, so the operation cannot be checked when there is a network failure

Operations to Be Prevented

The operations prevented by configuration change guard differ depending on whether Access Control has been started or is stopped. This is because the method used to control access to logical disks differs depending on whether Access Control has been started or is stopped.

The operations to be prevented according to whether Access Control has been started or is stopped are as follows:

Operations to Be Prevented When Access Control Has Been Started:

- Deleting logical disks
- Deleting hosts (LD Sets)
- Deleting paths
- Changing the names of hosts (LD Sets)
- Changing the port mode (from the WWN mode to the Port mode)
- Setting up iSCSI authentication
- Deleting assigned iSCSI initiators
- Deleting iSCSI portals

Operations to Be Prevented When Access Control Is Stopped:

- Unbinding pools (*1)
- Unbinding logical disks
- Starting Access Control

*1: This operation is prevented if there are logical disks in the pool to be unbound.

Preparations

This section describes how to create the setting file of configuration change guard for application server running (referred to as the setting file below) and specify the address of the application server for which to check the operation.

1.Create the setting file on the path below as a text file.

If the SnapSAN Manager   manager server uses Windows

<SnapSAN Manager   Server Installation Path>/conf/SnapSAN Manager svr/SnapSAN Manager chGrd.conf

If the SnapSAN Manager   manager server uses Linux or HP-UX

/etc/SnapSAN Manager svr/SnapSAN Manager chGrd.conf

2.Specify the address of the application server for which to check the operation in the setting file.

For a disk array using Access Control

Create a section whose name consists of the name of the disk array for which the application server path is specified and the LD Set, and then specify the application server address under this section.

Example: Specifying the application server address "10.0.0.1, www.hostname2.com" for the disk array "StorageA" and LD Set "WN:ldset1"

[StorageA, WN:ldset1]

10.0.0.1

www.hostname2.com

For a disk array not using Access Control

The system must be in a state in which logical disks are visible from all application servers connected to the disk array. Create a section whose name consists of the disk array name, and then specify the application server address under this section.

Example: Specifying the application server address "192.168.3.3" for the disk array "StorageB"

[StorageB]

192.168.3.3

www.hostname2.com

1. Ping is executed to check the operation for each address in the setting file. If many addresses are specified, checking the operation takes a while, so specify no more than about ten addresses per section.

2. In an environment in which a logical disk is assigned to VMware ESX Server, addresses cannot be specified on a guest OS basis. Specify VMware ESX Server addresses in the setting file.

3. Checking ping execution

To check the operation of application servers for which configuration changes are prevented, execute ping on the addresses specified in 2. For the addresses specified in the setting file, make sure that ping can be executed from the SnapSAN Manager   management server.

Reading the Configuration File

The setting file specified in the previous section is read when starting the configuration setting. If the contents of this file are changed, restart the configuration setting.

If there is no problem reading the setting file, no dialog box is displayed. If there is a problem, the error dialog box below is displayed. Even if this dialog box is displayed, configuration setting operations are possible, but all specified operations are prevented, so resolve the indicated error.

[25662]
Reading the setting file of configuration change guard for application server running failed.
Please restart configuration setting after checking the setting file of configuration change guard for application server running.

OK   Help
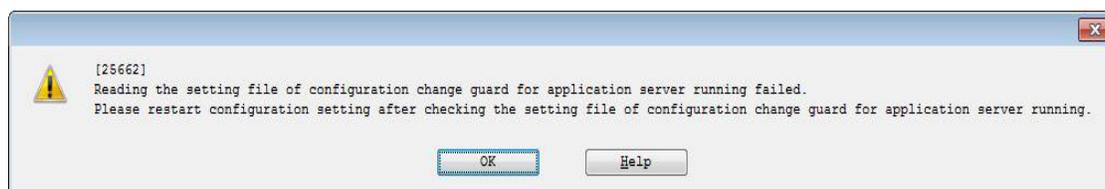
Figure 12-2: Management File Reading Error

If this dialog box is displayed, there was a problem accessing the setting file. Check the setting file access permissions and whether the file is locked.
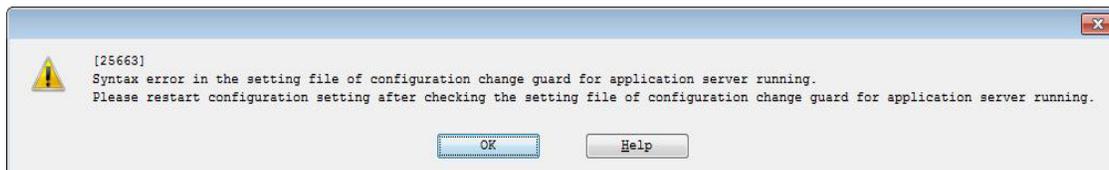
Figure 12-3: Management File Syntax Error

If this dialog box is displayed, there was a problem with the setting file syntax. Note that the line number of the syntax error is output to the SnapSAN Manager 14544 operation log output when this dialog box is displayed.

Configuration Change Guard

After the preparations are complete, whether the application server is operating is checked when an operation subject to prevention is executed. The following dialog box is displayed while checking for the application server status.
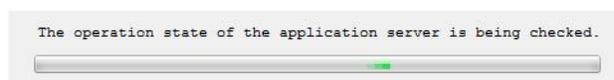
Figure 12-4: Application Server Status

If there is no application server that is operating, the operation subject to prevention is executed. If the server is operating, the dialog boxes below are displayed, and the operation is not executed. To execute the operation, take the action indicated in each dialog box.
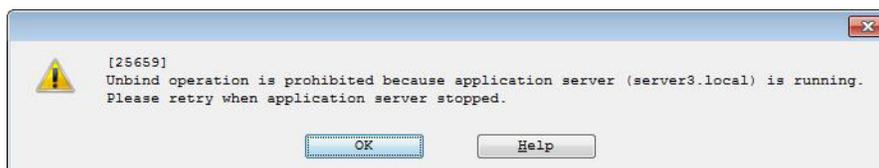
Figure 12-5: Application Server Operating
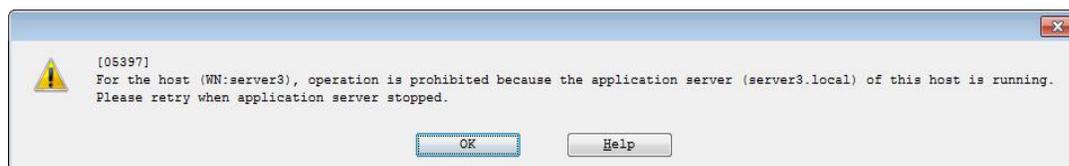
Figure 12-6: Application Server Status

There was a ping response from the address specified in the setting file, indicating that the application server is operating. Stop the application server that has the address displayed in the dialog box, and then retry the operation.

Figure 12-7: Same Address

The above dialog box is displayed if the address of the SnapSAN Manager management server is specified in the setting file. Because the SnapSAN Manager management server is necessary to perform operations on disk arrays and cannot be stopped, do not specify its address in the setting file. Delete the address displayed in the dialog box from the setting file, restart the configuration setting, and then execute the operation.
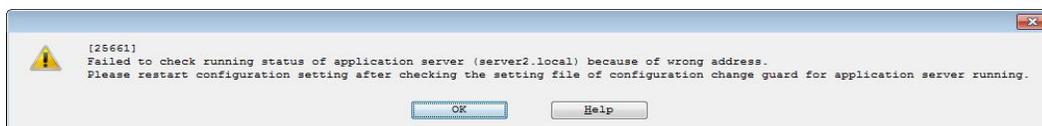
Figure 12-8: Address Is Invalid

The above dialog box is displayed if the address specified in the setting file is an invalid address for which ping cannot be executed. Revise the address in the setting file to an application server address for which ping can be executed from the SnapSAN Manager management server, restart the configuration setting, and then execute the operation
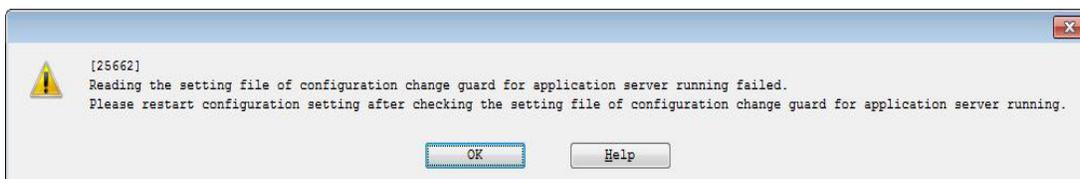
Figure 12-9: Reading Error Message

The above dialog box is displayed if the address specified in the setting file is an invalid address for which ping cannot be executed. Revise the address in the setting file to an application server address for which ping can be executed from the SnapSAN Manager management server, restart the configuration setting, and then execute the operation
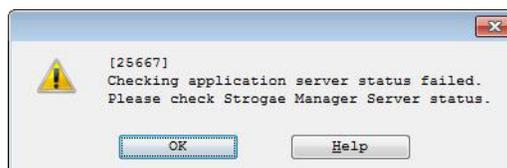
Figure 12-10: Checking Failure

The above dialog box is displayed if an error occurs during communication with the SnapSAN Manager management server while performing an operation check. Check the status of the network and SnapSAN Manager management server.

Specifications

Number of Disk Arrays to Be Set. At most one disk array can be set from the SnapSAN Manager   client at a time (not including LD Batch Binding and Pair Batch Setting).

Maximum number of LD Sets that can be set in one disk array.

SnapSAN S3000/S5000
Max. No. of LD Sets*
256
1024

*For FC or SAS models, you can find how many new LD Sets can be created by subtracting the number of LD Sets with no path specified and the number of paths linked with LD Sets from the maximum number of LD Sets.

For iSCSI models, you can find the number of new LD Sets that can be created by subtracting the number of LD Sets in Normal mode, the number of logical disks assigned to the LD Set in Multi-Target mode, and the number of LD Sets, in Multi-Target mode, to which no logical disks are assigned from the maximum number of LD Sets.

*When using the remote data replication function via iSCSI, the number of LD.

Specified Number of Paths to Be Set for Disk Array

Up to 256 iSCSI initiators can be set in one disk array.

*When using the remote data replication function via iSCSI, the number of iSCSI initiators that can be set in one disk array is 256 - "number of destination disk arrays".

Number of Logical Disks that Can Be Set in One LD Set.

SnapSAN S3000/S5000			
License Required	Access Mode	Maximum Number of Logical Disks That Can Be Set	Specifiable LUNs
AccessControl	WWN mode, Port mode	512	0000h to 01ffh
		512	0000h to 01ffh
		512	0000h to 01ffh
		512	0000h to 01ffh
	iSCSI (*)	512	0000h to 03ffh
		512	0000h to 0fffh
		512	0000h to 01ffh
		512	0000h to 01ffh

Note: The number of logical disks you can actually use depends on the operating system on the application server.

*The number of logical disks you can set in an LD Set in multi-target mode is calculated as follows:

Maximum number of LD Sets -

    (number of LD Sets in standard mode

      + number of logical disks assigned to the LD Set in multi-target mode

      + number of LD Sets in multi-target mode to which logical disks are not assigned)

Specification for Number of Logical Disks and LUN

Bound logical disks are recognized by all the hosts connected to the disk array when the Access Control is OFF for the disk array.

SnapSAN S3000/S5000		
Maximum Number of Logical Disks	Logical Disk Numbers That Can Be Set	Specifiable LUNs
1024	0000h to 03ffh	0000h to 03ffh
1024	0000h to 03ffh	0000h to 03ffh
4096	0000h to 0fffh	0000h to 0fffh
4096	0000h to 0fffh	0000h to 0fffh

iSCSI.

SnapSAN S3000/S5000			
Number of Sessions per Disk Array	Number of Sessions per Port	Number of Portals per LD Set	Number of Logon Records per Port
256	64	4	64
256	64	4	64
1024	256	4	64
2048	256	8	64

The word RAID was first introduced in the thesis "A Case for Redundant Arrays of Inexpensive Disks" published by professors of the University of California at Berkeley in 1987.

Although RAID is the acronym for "Redundant Arrays of Inexpensive Disks", meaning "a set of redundant and inexpensive disks", "Inexpensive" is generally replaced by "Independent" in these days. Large-capacity hard disks were very expensive at that time, but I/O performance was not high enough for the costs. Disk access was a bottleneck in system performance. RAID was created for the following purposes:

- Reducing costs by using inexpensive small-capacity disks
- Improving performance by concurrently accessing multiple disks
- Increasing reliability by adding redundant data

RAID levels 1 to 5 are defined in the thesis mentioned above. However, the table below shows the features of RAID0 (striping), RAID1, RAID3, RAID5, RAID10, RAID50, RAID6, RAID3DP, and RAID-TM. RAID0 (striping) has no redundancy and does not satisfy all requirements for RAID, but it is in wide use. RAID10 is a combination of RAID0 and RAID1. RAID50 is a combination of RAID0 and RAID5. RAID6, RAID60, and RAID3DP can maintain redundancy by its double-parity feature even if one physical disk fails. RAID-TM is an extension of RAID1 and hard disks are in triple configuration.

Each RAID number is used simply to sort out data division methods or repair methods, and the RAID numbers do not indicate any priority.

RAID Level	Redundancy	Required Number of PDs	Decrease in Capacity	Advantage	Disadvantage
RAID0	None	1 or more	None	Quick access	Inaccessible when even a single disk fails
RAID	Dual configuration	2	50%	High reliability	Costly
RAID3	Parity	5 or 9	Equivalent to capacity of 1 disk	Quick sequential access	Slow random access. Accessibility deteriorates at reduced operation.
RAID5	Parity	3 or more	Equivalent to capacity of 1/3, 1/5, or 1/9 disk	Concurrent processing for multiple read/write commands	Required to read parity data for writing. Accessibility deteriorates at degradation.

RAID Level	Redundancy	Required Number of PDs	Decrease in Capacity	Advantage	Disadvantage
RAID3DP	Double parity	6 or 10	Equivalent to capacity of 2 disks	Quick sequential access The highest reliability (redundancy secured on a failure of one physical disk)	Slow random access. Accessibility deteriorates at degradation.
RAID6[*]	Double parity	6 or more	Equivalent to capacity of 2/6 or 2/10 disk	The highest reliability (redundancy secured on a failure of one physical disk)	Required to read parity data for writing. Accessibility deteriorates at degradation.
RAID10	Dual configuration	4 or more	50%	Quick access High reliability	Costly
RAID50	Parity	6 or more	Equivalent to capacity of 1/3, 1/5, or 1/9 disk	Concurrent processing for multiple read/write commands Quick access	Required to read parity data for writing. Accessibility deteriorates at degradation.
RAID60	Double parity	12 or more	Equivalent to capacity of 2/6 or 2/10 disk	The highest reliability (redundancy secured on a failure of one physical disk) Quick access	Required to read parity data for writing. Accessibility deteriorates at degradation.
RAID-TM	Triple configuration	3	Equivalent to capacity of 2/3 disk	Very high reliability	Most expensive

RAID0.
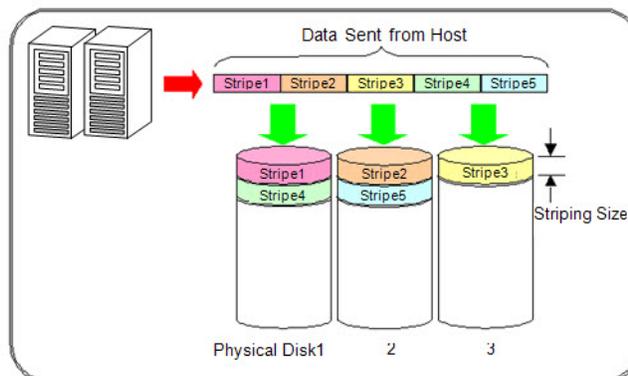
Figure B-1: Data Distribution

This method slices data (send from the host) in a striping size and distributes the data to the physical disks of the RAID.

If processing is performed concurrently for the physical disks of the RAID, the data transfer time is reduced to 1/(number of PDs) and data can be accessed quickly. Since RAID0 has no redundant data, 100% of the disk capacity is available. However, a failure of a single disk stops access to data.

Advantages

- Quick access
- Highest availability of the disk capacity

Disadvantages

- RAID0 has no redundant data. Thus, it is inaccessible when even a single disk fails.
- Since more than one physical disk is used, reliability becomes 1/number of PDs.

Since RAID0 has no redundancy, all the data is lost when even a single disk fails.

RAID1.
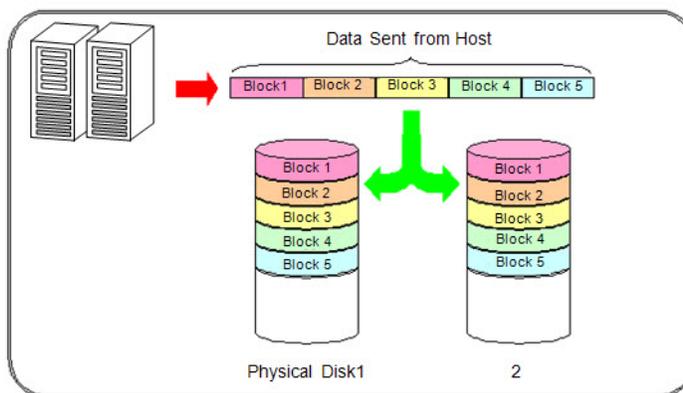
Figure B-2: Write Operation

This method writes data (sent from the host) into two disks (or into 2 disk groups). (Mirroring)

RAID1 has the same data in dual configuration. Thus, even if one disk fails, the other disk enables access to the data.

When compared with a single disk configuration, RAID1 achieves the equivalent performance in write operation, and up to the double throughput as reading performance by accessing two disks containing the same data.

RAID1 offers data reliability higher than any other RAIDs do, but redundant data takes up 50 % of the disk capacity.

Advantages

- High reliability
- Performance in read operation can be up to twice as high as the throughput of a single disk.

Disadvantages

- Redundant data takes up a half of the disk capacity.

RAID3.
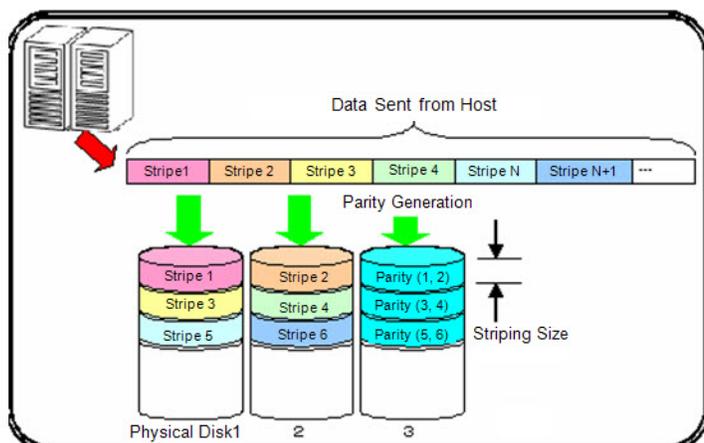
Figure B-3: Sectors

This method stripes data sent from the host on a sector basis, and reads and writes data in all physical disks of the RAID concurrently. It also stores parity data in a single disk.

Since RAID3 stripes data on a sector basis, sequential access performance of a large file is improved. Random access performance is degraded instead.

Thus, RAID3 is suitable for special purposes, such as video servers and super computers. In addition, even if one of the disks fails, access can be made to the parity data. However, reading performance lowers in this case.

Advantages

• High sequential access performance
• Availability for video servers

Disadvantages

• Low random access performance
• If one of the physical disks constituting logical disks fails, reading performance lowers.

RAID5.
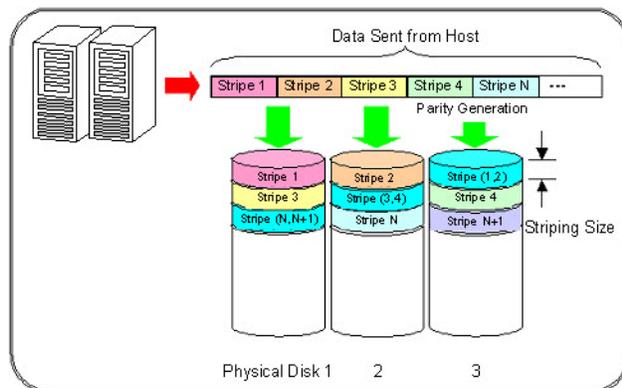
Figure B-4: Distribution

This method slices data sent from the host in certain striping size and distributes the data to the physical disks of the RAID. It also distributes the parity data to the disks.

Since RAID5 distributes parity data to multiple disks, it enables parallel processing at disk access. Thus, RAID5 is suitable for processing which often makes random access to small files in size of several kilobytes.

Even if one of the disks fails, access can be made to the parity data. However, reading performance lowers in this case.

Advantages

- Parallel processing by using distributed parity data
- Availability of processing which often makes random access

Disadvantages

- If one of the physical disks constituting logical disks fails, reading performance lowers.

RAID3DP.
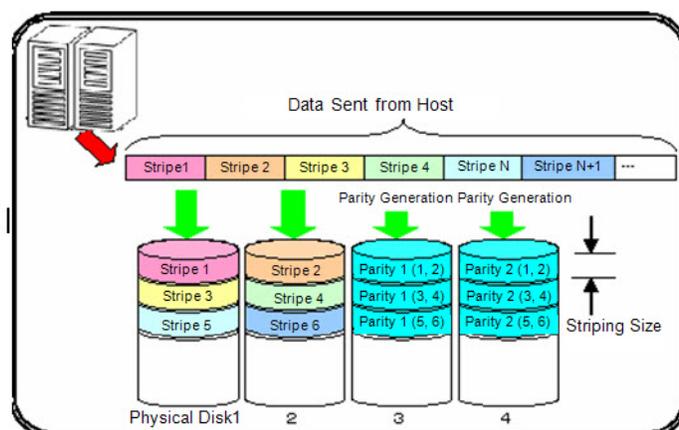
Figure B-5: Duality

This method stripes data sent from the host on a sector basis, and reads and writes data in all physical disks of the RAID concurrently. While doing that, it generates two parity data per block and stores the respective parities to two disks.

Because of duality of RAID3DP parity data, redundancy is maintained even if a disk fails. Even two disks fail together, accessibility is ensured. However, the capability for reading data degrades if a disk fails.

Since RAID3DP stripes data on a sector basis, sequential access performance of a large file is improved. Random access performance is degraded instead.

Thus, RAID3DP is suitable for special purposes, such as video servers and super computers. In addition, even if one of the disks fails, access can be made to the parity data. However, reading performance lowers in this case.

Advantages

- Redundancy secured if one of physical disks configuring logical disks fails, and high reliability and availability if two disks fail at the same time.
- High sequential access performance
- Availability for video servers

Disadvantages

- Low random access performance
- If one of the physical disks configuring logical disks fails, reading performance lowers, and if two disks fail, performance is further lowered.

RAID6.
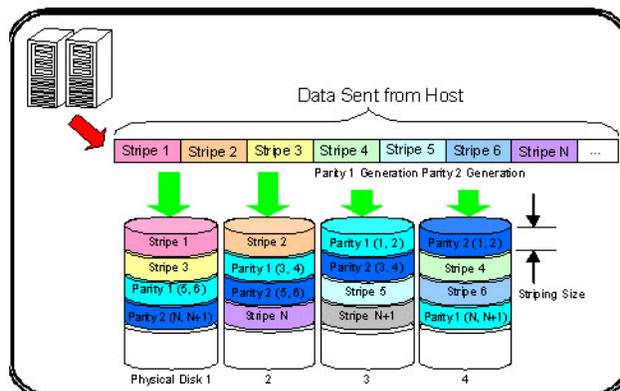
Figure B-6: Slicing

This method slices data sent from the host in certain striping size and distributes the slices into the physical disks of the RAID. At the same time, two pieces of parity data is generated per block and they are distributed to and saved in disks.

RAID6 supports double parity, therefore it secures redundancy even if one disk becomes faulty and also ensures accessibility even if two disks become faulty. However, the capability for reading data degrades if a disk fails.

Because the parity data is distributed to multiple disks in RAID6, parallel processing is possible while disks are being accessed. Thus, RAID6 is suitable for random access to small files in size of several kilobytes.

Advantages

- Redundancy secured if one physical disk configuring logical disks fails, and high reliability and availability if two disks fail at the same time.
- Parallel processing by using distributed parities
- Suitable for random access

Disadvantages

- If two physical disks configuring the logical disks fail, reading performance lowers.

RAID10.
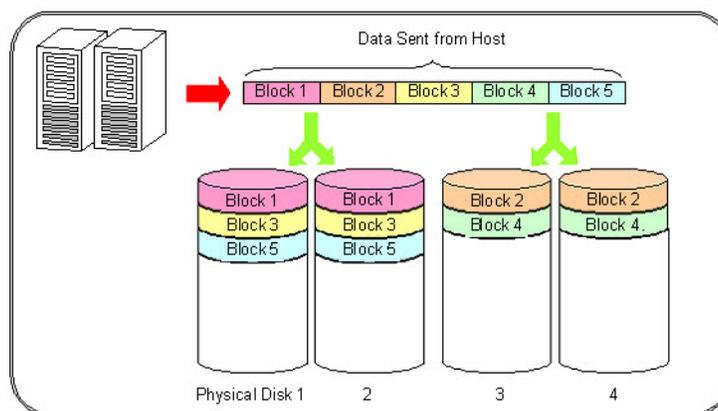
Figure B-7: Pair Distribution

This method slices data sent from the host and distributes (RAID0) the data to pairs of mirrored disks (RAID1).

* Since RAID10 is the combination of RAID1 and RAID0, it is called "RAID one-zero".

Since RAID10 distributes data to multiple disks, it allows for parallel processing and quick access. In addition, it has the same data in dual configuration. Even if one of the disks fails, the other disk enables access to the data.

Reliability is about 1/n (n: the number of RAID1 pairs) of RAID1 consisting of two disks. Reliability is lower than that of a single RAID1, but it is still high enough.

Advantages

- High reliability
- Quick access

Disadvantages

- Redundant data takes up a half of the disk capacity.

RAID50/RAID60.
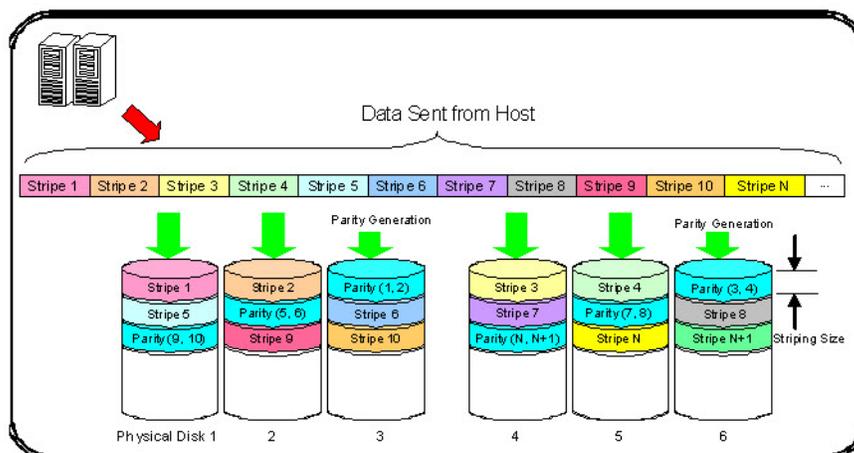
Figure B-8: RAID50/RAID60

This method, based on RAID0, slices data sent from the host and distributes the slices into multiple sets of RAID5/RAID6 physical disks. (The above figure is the example of RAID50.)

* Since RAID50 is the combination of RAID5 and RAID0, it is called "RAID five-zero".

* Since RAID60 is the combination of RAID6 and RAID0, it is called "RAID six-zero".

Since RAID50 distributes data to multiple sets of RAID5/RAID6 disks, it allows for further parallel processing and quicker access.

Advantages

- Parallel processing for multiple R/W commands
- Quick access

Disadvantages

- If one of the physical disks configuring logical disks fails, reading performance lowers.

RAID-TM.
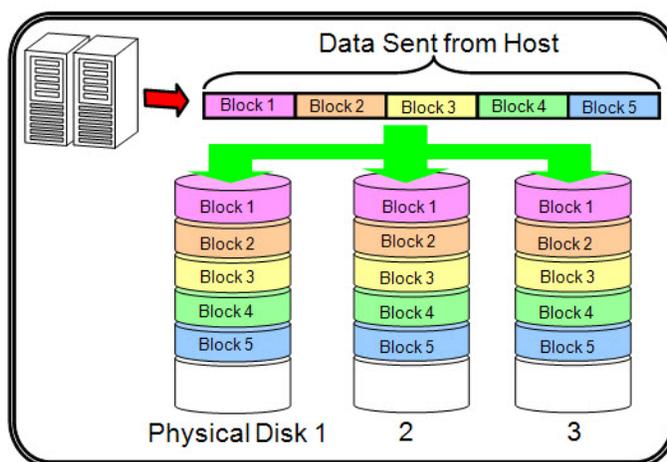
Figure B-9: RAID-TM

This method records data sent from the host to all of the three disks (or three disk groups) (triple mirror). The identical data is in triple configuration. Therefore, even if one of the disks fails, redundancy is maintained. In addition, if two disks fail concurrently, the last surviving disk enables access to the data. However, reading performance lowers in this case. When compared with single disk configuration, RAID-TM is equivalent to a single configuration in writing while showing three times greater throughput in reading, which is achieved by dividing the data into three parts and accessing three disks. RAID-TM offers high data reliability, but redundant data takes up 66 % of the disk capacity.

Advantages

- High reliability
- Quick access

Disadvantages

- Redundant data takes up 66 % of the disk capacity.

Configurable RAID Types

The table below shows the RAID types and the number of physical disks that can be configured on a disk array.

RAID Type	Number of Physical Disks	
	Minimum	When striping
RAID1/10	2	4 or more
RAID5/50 (2+P)	3	6 or more
RAID5/50(4+P)	5	10 or more
RAID5/50(8+P)	9	18 or more
RAID6/60 (4+PQ)	6	12 or more
RAID6/60(8+PQ)	10	20 or more
RAID-TM	3	6 or more

RAID1/10, RAID5/50, and RAID6/60 can automatically operate as RAID10, RAID50, and RAID60 respectively, by selecting physical disks as much as the number of physical disks selected for striping operation.

Binding Logical Disks

Logical Disk Capacity

Basic Concept of Logical Disk Capacity

The pool capacity used when binding a logical disk in the pool (Capacity logical disks consume) is calculated by adding the disk management area of 2MB per logical disk to the user-specified capacity (logical disk capacity).
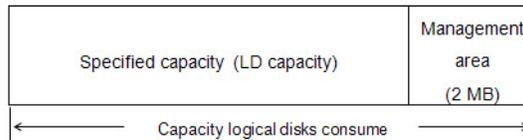
Figure D-1: Capacity

1 GB is regarded as 1024 MB in SnapSAN Manager . A logical disk is bounded by converting the specified capacity in GB units to an LD capacity by 1024 MB.

Specification	Ld Capacity	Capacity Logical Disks Consume (Including Management Area [2 Mb])
2 GB	2048 MB	2050 MB

Relationship between Pool and Logical Disk Capacity

Management areas are assigned to a different area from LD capacity in a dynamic pool. The management area is managed in units of 256 MB.

When the number of logical disks is 128 or less, control region (256 MB) 1 is consumed.

When the number of logical disks is 129 to 256, control region (256 MB) 2 is consumed.

As described above, a management area is added in increments of 128 logical disks.

The occupied capacity in the pool is the sum of the logical disk capacity and the management area capacity.

When the number of logical disks is 128
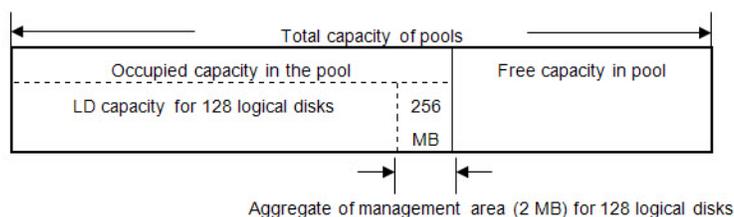
Figure D-2: 128 Logical Disks
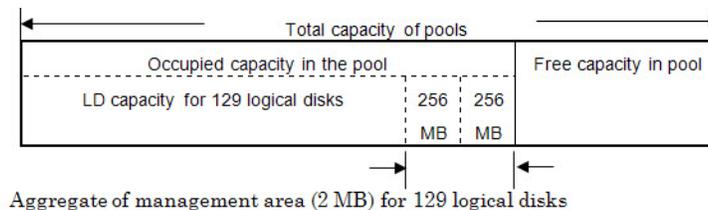
Figure D-3: 129 Logical Disks

Because the formula assumes that a pool does not include any logical disks, note the following:

(1) If you attempt to create logical disks on a disk array where there is any logical disk, you may or may not be able to achieve your attempt depending on the number and capacity of disks you are intending to create.

Example: The number of bounded logical disks 127

Free pool capacity 2.0 GB

- You can bind one logical disk with 2.0 GB disk capacity.
- You cannot bind two logical disks with 1.0 GB disk capacity.

*In both cases, the specified logical disk capacity is 2.0 GB in total. In the case where you cannot bind logical disks, the total number of logical disks will be 129, not allowing you to reserve a new management area. This is why you cannot configure logical disks.

(2) When you unbind a logical disk that has been bound, how much free space is increased is not definite.

Example: The number of bound logical disks129 (512 MB is used for management areas.)

Logical disk capacity1.0 GB

- When you unbind the 129th logical disk, 2MB management area is freed up and the free capacity is increased approximately by 1.2 GB (1.0 GB+256 MB).

- When you unbind a logical disk from the 1st to 128th logical disk, the management area is not freed and the free capacity is increased by 1.0 GB.

(1) Example of calculation

When you bind 128 logical disks of 2.0 GB:

X = 2.0 GB = 2048 MB (converted by 1024 bytes)

Y = 128

([(2048 - 1)/256] + 1) × 256 × 128 + ([(128 - 1)/128] + 1) × 256 = 212144 + 256 = 262400 MB

When you bind 129 logical disks of 2.0 GB:
([(2048 - 1)/256] + 1) × 256 × 129 + ([(129 - 1)/128] + 1) × 256 = 264192 + 512 = 264704 MB

The management area is added to the capacity used in the pool according to the number of logical disks to be bound.

LD capacity	Number of logical disks	Occupied capacity in the pool		
		Calculated result	[GB] conversion	Display on SnapSAN Manager
2.0 GB	128	262,400 MB	256.25 GB	256.2 GB
	129	264,704 MB	258.50 GB	258.5 GB

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Nickname Setting File

You can set nicknames at once by using the nickname setting file. The following shows the format of the nickname setting file and a setting sample. To describe this sample directly to an edit box on the nickname batch setting screen, you must append a comma (,) to all the lines as the area that displays the execution result.

(a)   Formatting the user definition file

The following describes the format for batch setting the disk array name, LD type/name and the port name by using the user definition file

[User definition file format for batch setup]

```
rmon name list    (i)
[array]           (ii)
Target disk array name and new disk array name    (iii), (iv)
[ld]              (v)
nnnnh, new LD type and new LD name        (vi)
                  :
[port]            (vii)
mmh-ssh, and new port name    (viii)
# next array data listing   (ix)
                  :
[array]           (ii)
                  :
```

(i) Key information (File identification info)

Describes "rmon name list" as the key information indicating that the following parameters are setting files.

(ii) Key information (Disk array)

Describes key information for specifying the name of the target disk array. The information following an [array] key is valid for the disk array name specified by the [array] key until the next [array] key appears.

Only one disk array name can be set by using one [array] key. To set multiple disk array names, an [array] key is required for each disk array name. If multiple disk array names are specified by using one [array] key, the [array] key is valid only for the first disk array name.

When an invalid disk array name is specified, the settings are invalid until the next [array] key.

(iii) Target disk array Name

Describes the disk array name (up to 32 alphanumeric characters) targeted by the following parameter, to continue from the key information [array].

(iv) New disk array Name

Describes the disk array name to be set, which follows the target disk array + ', (comma)', when the disk array name setting is configured. It is unnecessary to specify this when the disk array name is not set (i.e., when changing only the LD type/name or the port name).

Using more than 32 alphanumeric characters for a disk name will result in error.

(v) Key information (LD)

Describes [ld] as the key information indicating that the following parameter is the setup information for logical disks. (The information following [ld] is valid until the next key information "[...]" appears.)

(vi) New LD Type/Name

Sets the format and LD names for the logical disks in the target disk array ((iii) above) described before describing this parameter. Describes "nnnnh (nnnn: LD number in four hexadecimal digits)" as the ID information of the target logical disks. Describes the newly set format (refer to Table 7-2),

", (comma)" and LD name to continue from ", (comma)".

Using more than 24 alphanumeric characters for a LD name will result in error.

When you configure other logical disks on the same disk array, use the same format to set the information in the following lines.

On the ACOS-4 system, make sure that the LD identifier name matches the LD name on the host.

(vii) Key information (port)

Describes [port] as the key information indicating that the following parameter is the setup information related to ports. (The information following [port] is valid until the next key information "[...]" appears.)

(viii) New Port Name

Sets the names for the ports in the target disk array ((iii) above) described before describing this parameter. Describes "mmh-ssh (mm: director number in two hexadecimal digits; ss: port number in two hexadecimal digits)" as the ID information of the ports. Describes the newly set port name to continue from ", (comma)".

Describing a name in excess of 32 alphanumeric characters for the new port name will end in error.

When making settings for other ports in the same disk array, describe the information to be set in the same format on the succeeding line.

(ix) Comment line

A line starting with "#" or ";" is regarded as a comment line in the user definition file.

[Example of user definition file for batch setting when a storage device is installed for the first time]

```
rmon name list
[array]
3000000000000003,Array001          The disk array name of 3000000000000003
                                   is set to Array001.
                                   All the following parameters are the name
                                   settings for this disk array.
[ld]
0000h,WN,DBmaster001               The format and the name of the LD whose
                                   number is 0000h are set to WN and
                                   DBmaster001 respectively.
                                   The same applies to the following.
0001h,WN,DBmaster002
0002h,NX,DBmaster003
0003h,NX,DBmaster004
0004h,NX,DBmaster005
0005h,WN,DBmaster006
0006h,WN,DBmaster007
0007h,NX,DBmaster008
[port]
04h-00h,DBServer01                 The name of the port whose number is 04-00
                                   is set to DBServer01.
04h-01h,DBServer02                 The same applies to the following.
06h-00h,DBServer03
06h-01h,DBServer04
```

[Example of the user definition file for batch setting after start of operation]

```
rmon name list
[array]
Array001                    Indicates that the disk array to be set is
Array001.                   Array001.
[ld]
0000h,WN,DBtest001          Set the format of the LD number to 0000h to
WN,
                            and the LD name to DBtest001.
                            The same applies to the following.
0011h,NX,DBtest002
```

A pair setting file enables you to pair logical disks collectively and register ATgroups collectively. The following shows the format of the pair setting file and a setting sample. To describe this sample directly to an edit box, you must prepend a comma (",") to all the lines.

(1) Pair setting file format

(i)A pair setting file is a text file (*.txt, *.csv) in ASCII character format.

(ii)Data from a semicolon (;) or pound (#) to the end of the line is processed as comments.

(iii)Note that descriptions in the setting is case sensitive.

(iv)Enter "Pair Name List" in the first line except comment lines.

(v)Enter "[pair]" to perform pair setting. In the lines following "[pair]", specify the items for pair setting in the format below.

"MV DiskArrayName","MV OSType","MV LDName",["RV DiskArrayName"],"RV OSType","RV LDName"[,]

(Items enclosed in brackets [] can be omitted.)

<SYNTAX>

MV DiskArrayName

Specify the name of the disk array to which Master Volume (MV) belongs.

The disk array name can be specified with up to 32 characters.

     MV OSType

Specify the type of Master Volume.

     MV LDName

Specify the logical disk name of Master Volume.

The logical disk name can be specified with up to 24 characters.

RV DiskArrayName

Specify the name of the disk array to which Replication Volume (RV) belongs.

The disk array name can be specified with up to 32 characters.

If RV Disk Array Name is omitted, the system assumes that RV belongs to the disk array of MV.

     RV OSType

Specify the type of Replication Volume.

     RV LDName

Specify the logical disk name of Replication Volume.

The logical disk name can be specified with up to 24 characters.

     (vi)To create an ATgroup, describe "[atcreate]".

     (vii)Specify the [atcreate] items in the following format:
     "ATgroupName","DiskArrayName"[,LinkDiskArrayName"]
     <SYNTAX>
     ATgroupName

Specify the name of the ATgroup to be created.

The ATgroup name can be specified with up to 32 characters.

     DiskArrayName

Specify the name of the disk array in which the ATgroup is created.

The disk array name can be specified with up to 32 characters.

     LinkDiskArrayName

Specify the name of the link disk array.

The disk array name can be specified with up to 32 characters.

This is required when the link disk array name specification function is ON for the disk array specified by the disk array name. Otherwise, it is ignored (can be omitted).

     (viii)To register volumes to the ATgroup created, describe "[atadd]".
     (ix)Specify the [atadd] items in the following format:
     "ATgroupName", "MV OSType", "MV LDName"
     <SYNTAX>
     ATgroupName

Specify the name of the ATgroup to which the volume is created.

The ATgroup name can be specified with up to 32 characters.

> MV OSType

Specify the format of the master volume to be registered.

> MV LDName

Specify the logical disk name of the master volume to be registered.

The logical disk name can be specified with up to 24 characters.

(x)To delete volumes already registered to an ATgroup, describe "[atremove]".

(xi)Use the same format for the description from [atremove] and after.

> "ATgroupName", "MV OSType", "MV LDName"
> (xii)To delete an ATgroup, write "[atdelete]".
> (xiii)Specify the [atdelete] items in the following format:
> "ATgroupName"
> <SYNTAX>
> ATgroupName

Specify the name of the ATgroup be deleted.

The ATgroup name can be specified with up to 32 characters.

Pair Setting Sample

```
Pair Name List                                                    ...(a)
[pair]
;MV DiskArrayName,MV OSType,MV ExVolName,
RV DiskArrayName,RV OSType,RV ExVolName                           ...(b)
#MV DiskArrayName,MV OSType,MV ExVolName,
RV DiskArrayName,RV OSType,RV ExVolName                           ...(b)
DiskArrayName1,NX,DEV001,  DiskArrayName1,NX,DEV101              ...(c)
DiskArrayName1,NX,DEV001,  DiskArrayName2,NX,DEV202              ...(c)
DiskArrayName1,NX,DEV002,  DiskArrayName2,NX,DEV203
DiskArrayName1,NX,DEV003,  DiskArrayName3,NX,DEV301
DiskArrayName1,NX,DEV004,  DiskArrayName3,NX,DEV302
DiskArrayName1,NX,DEV011,,NX,DEV021                              ...(d)
[atcreate]                                                       ...(e)
#ATgroupName,DiskArrayName,LinkDiskArrayName                     ...(b)
DB_atg1,DiskArrayName1,DiskArrayName2                            ...(f)
[atadd]                                                          ...(g)
#ATgroupName,OSType,ExVolName                                    ...(b)
DB_atg1,NX,DEV001                                                ...(h)
DB_atg1,NX,DEV002                                                ...(h)
[atcreate]                                                       ...(e)
#ATgroupName,DiskArrayName,LinkDiskArrayName                     ...(b)
DB_atg2,DiskArrayName1,DiskArrayName3                            ...(f)
[atadd]                                                          ...(g)
#ATgroupName,OSType,ExVolName                                    ...(b)
DB_atg2,NX,DEV003                                                ...(h)
DB_atg2,NX,DEV004                                                ...(h)
Pair Name List                                                   ...(a)
[atremove]                                                       ...(i)
#ATgroupName,OSType,ExVolName                                    ...(b)
DB_atg1,NX,DEV001                                                ...(j)
DB_atg1,NX,DEV002                                                ...(j)
[atdelete]                                                       ...(k)
#ATgroupName                                                     ...(b)
DB_atg1                                                          ...(l)
[atremove]                                                       ...(i)
#ATgroupName,OSType,ExVolName                                    ...(b)
DB_atg2,NX,DEV003                                                ...(j)
DB_atg2,NX,DEV004                                                ...(j)
[atdelete]                                                       ...(k)
#ATgroupName                                                     ...(b)
DB_atg2                                                          ...(l)
```

<Explanation>

(a) If the first line except the comment line does not contain this character string, an error ("[05254] It is not a file for Batch Setting.") is displayed.

(b) A line starting with a semicolon (;) or pound (#) in a CSV-format text file is processed as a comment line. Use a comment line mainly as the title of an item.

(c) To create pairs for a single MV, describe a line for each pair.

(d) If the disk array name of RV is omitted, the system assumes that the RV belongs to the disk array of the MV.

(e) Declare creation of an ATgroup.

(f) Create an ATgroup on the specified disk array.

At this time, specify the link disk array name.

(g) Declare registration of volumes to the ATgroup.

(h) Each specified volume must be a PV (Primary Volume) and set for one Remote Replication pair. In addition, when you register multiple volumes to an ATgroup, the volumes need to be located on the same disk array. Remote Replication pair volumes (RVs) set for registered volumes need to be located on the same disk array as well.

(i) Declare deletion of a volume from an ATgroup.

(j) Specify a volume registered with a specified ATgroup.

(k) Declare deletion of an ATgroup.

(l) Delete all volumes registered with the ATgroup you are going to delete.

(1) Do not enter a space preceding or following a character string.

(2) If the file does not begin with "Pair Name List", except for comment lines, an error ("[05254] It is not a file for Batch Setting.") occurs.

(3) If a character string is preceded by a space or followed by a space, an error ("[05254] It is not a file for Batch Setting.") is posted.

(4) Any ATgroup name that does not conform to the following rules is invalid:

- Number of characters:1 to 32 characters
- Usable characters:alphanumeric characters, underscore (_) and slash (/)
- The setting file is case sensitive.

Environment Definition File

Environment Definition File

(1) Setting information of environment definition file (SnapSAN Manager svr.conf)

The following explains the information that can be specified in the environment definition file (SnapSAN Manager svr.conf).

If the environment definition file is changed while the server is activating, restart the SnapSAN Manager server.

(i) agent section: Define information about the agent management.

[agent]

[remonitoring_interval = remonitoring-check-interval]

[lan_path_check_interval = monitoring-path-check-interval]

Section Name/ Parameter	Value	Description
[agent]	Agent management section	Indicates the start of the agent management section.
remonitoring_interval	remonitoring-check-interval (Numeric: 1 to 60)	Specify an interval for checking whether monitoring a disk array can be restarted automatically after monitoring a disk array is stopped due to a trouble Unit: minute Default value: 5 (minutes)
lan_path_check_interval	monitoring-path-check-interval (Numeric: 3 to 60)	Specify an interval for checking the status of the switching path when monitoring by using an IP connection. Unit: minute Default value: 60 (minutes)

(ii) server section: Define information about SnapSAN Manager   server name

[server]

[SnapSAN Manager svr_name = SnapSAN Manager -server-name]

Section name/ parameter	Value	Description
[server]	server section	Indicates the start of the server section.
SnapSAN Manager svr_name	SnapSAN Manager server name(Character string: up to 20 characters)	Specify an SnapSAN Manager server name to be displayed in the Title Bar of SnapSAN Manager client (Web GUI). An SnapSAN Manager server name is case-sensitive. To modify the display of the Title Bar, set here. When multiple SnapSAN Manager servers are used, you can identify each of them from the Title Bar. Note that this parameter is available only for [permitted connection type of SnapSAN Manager client] in client section is set [web]. 2-byte character, half-size character, control character, the characters (\/:,;*?"<>|) that cannot be used for a file name, and space cannot be used for an SnapSAN Manager server name.

(iii) resource section: Define information about the state monitoring.

[resource]

```
[watch_interval = state-monitoring-interval]
[capacity_watch_interval = capacity-monitoring-interval]
[nickname_check]
[scheduled_report = no]
[scheduled_report_time = hour:minute]
```

Section name/ parameter	Value	Description
[resource]	State monitoring section	Indicates the start of the state monitoring section.
watch_interval	state-monitoring-interval (Numeric: 3 to 60)	Specify an interval for monitoring the state of disk arrays. Unit: second Default value: 15
capacity_watch_interval	capacity-monitoring-interval (Numeric: 5 to 1440)	Specify an interval for monitoring the following information. The thin provisioning function Actual used capacity of the pool and logical disk Actual capacity threshold of the pool Actual capacity threshold (pre) of the pool LD capacity threshold of the logical disk Snapshot function Snapshot used capacity Threshold of the snapshot used capacity For the thin provisioning function, the state monitoring interval (watch_interval) is used to monitor the pool and logical disk for memory shortages and the LD capacity quota of the logical disk. However, if the capacity monitoring interval is shorter than the state monitoring interval, * the capacity monitoring interval can also be used to perform this monitoring. * By default, the capacity monitoring interval is longer than the state monitoring interval. Unit: minute Default value: 5 (minutes)

Section name/ parameter	Value	Description
nickname_check	None	Specify this parameter to make a duplication check on identifiers that are assigned to components in the disk arrays to be managed by SnapSAN Manager .
		If this parameter is not specified, a duplication check is not performed.
		Components to be checked in a duplicated manner are as follows:
		Disk Array Name
		Logical Disk Name
		Port Name
		If you specify this parameter, all components are checked in a duplicated manner when the SnapSAN Manager server starts and when the disk array monitoring is resumed. Duplicating check is not performed if this parameter is not set.
scheduled_report	yes no	Specify whether to report the fault information about the monitored disk array at the fixed interval. By default, reporting is not set.
		Unit: yes, no
		Default value: no
scheduled_report_time	hour : minute	Specify the time to report the fault information about the monitored disk array at the fixed interval. Be sure to specify this parameter (scheduled_report=yes) to report the fault information.
		Default value is "None (blank)".
		Unit: hour, minute
		Default value: None (blank)

(iv) Log Section: Define information about log management.

[log]

[modify_no_measures_msg_to_info]

Section name/ parameter	Value	Description
[log]	Log section	Indicates the start of the log section.
modify_no_measures_msg_to_info	None	Specify this parameter to switch the classification to INFO for messages with WARNING classification that do not require operational attention. Classification change target messages are SnapSAN Manager 04040 and SnapSAN Manager 01006. If this parameter is not specified, classification is not switched.

When you specify the modify_no_measures_msg_to_info parameter, link may not be available when the target messages (SnapSAN Manager 04040 and SnapSAN Manager 01006) are defined by the event link function, because the message classification is changed.

(v) config section: Define information about the configuration setting.

[config]

[no_clock_correction]

[allow_virtual_capacity_over_max_pd]

Section name/ parameter	Value	Description
[config]	Device configuration section	Indicates the start of the device configuration section.
no_clock_correction	None	Specify this parameter so that the timer of the disk array is not automatically corrected by the server. If this parameter is not specified, the timer of the disk array is automatically corrected.
allow_virtual_capaci ty_over_max_pd	None	Specify this parameter to allow the virtual capacity pool to exceed the maximum physical capacity. If you do not specify this parameter, the virtual capacity pool is limited to the maximum physical capacity. This setting is only enabled if the thin provisioning function is used.

(vi) Replication Section: Define information about the replication.

[replication]

[no_state_monitor]

[no_replication_info_refresh]

Section name/ parameter	Value	Description
[replication]	Replication section	Indicates the start of the replication section.
no_state_monitor	None	Controls the status change messages issued by the ReplicationControl and SnapControl command operation.
no_replication_info _refresh	None	Specify this parameter to refresh the replication management window and connection window of the SnapSAN Manager client by pressing the F5 key, not by refreshing the windows periodically. If you do not specify this parameter (the default value), these windows are refreshed periodically. If the Remote Replication links between disk arrays are via the best-effort line, specify this parameter to avoid periodic refreshing..

(vii) data_retention section: Define information about the data retention function of the SnapSAN Manager   server.

[data_retention]

```
[protection_check_time = hour:minute ]
[expiration_period = period-to-output-expiration-message ]
[premonition_period = retention-date-approached-period ]
```

Section name/ parameter	Value	Description
[data_retention]	Data retention section	Indicates the start of data retention section
protection_check_time	hour:minute	Specify the time to check the protection state of the data-protected volume. hour:Specify a value from 00 to 23. You can specify one digit. minute:Specify a value from 00 to 59. Always specify two digits. Default value: 00:10
expiration_period	period-to-output-expiration-message (Numeric: 0 to 255)	Specify an output period of the expiration notification message when the retention is expired for the data-protected volume. When 0 is specified for the parameter, an expiration message is not output. Unit: day Default value: 1 Example: When "three days" is specified, the message is output every checking time of the data protection state for three days.
premonition_period	retention-date-approached-period (Numeric: 0 to 255)	Specify the retention date approached period which notifies you that the retention date of the data-protected volume is approaching. The first day of retention date approached period is the day of previous notification of retention date approached. When 0 is specified for the parameter, notification of retention date approached is not performed. Unit: day Default value: 0 Example: When "three days" is specified, retention date approached message is output three days before the expiration at the checking time of the data protection state.

Environment definition file setting example

The following is an example of the environment definition file created based on the sample file for the next generation disk arrays in which minimum settings are possible.

```
################################################################################
#########
# This file is a sample to create the iSM server environment definition file.
# All the parameters of the iSM server are described here.
# All the settings of the iSM server are accessible by customizing and using
# this file.
# A line starting with "#" is a comment line.
# Remove "#" and use the line if necessary.
################################################################################
#########

############################### Explanation of Terms
###############################
# There are 2 types of GUI supplied by iSM client.
# 1) GUI based on Web
# 2) GUI based on Windows
# If it is necessary to distinguish between the two types of the client in
# this file, iSM client(Web GUI) is used for former one. Or, iSM client
# (Win GUI) is used for latter one.
################################################################################
#########

############################### agent section
###############################
# Set the environment of the agent function of the iSM server.
# As the default value is recommended for these information, it is
# unnecessary to set this section in common use.
################################################################################
#########
[agent]

## remonitoring_interval:
##          Specify an interval for checking whether monitoring a
##          disk array can be restarted automatically after
##          monitoring a disk array is stopped due to a trouble.
##          Unit: minute
##          Default value: 5 (minutes)
##          (Numeric: 1 to 60)

#   remonitoring_interval = 5

## lan_path_check_interval:
##          Specify an interval for checking status of switching path
##          when using IP connection to monitor.
##          Unit: minute
##          Default value: 60 (minutes)
##          (Numeric: 3 to 60)

#   lan_path_check_interval = 60

############################### server section
###############################
# Set the iSM server name to be displayed in the Title Bar of iSM
```

```
# client(Web GUI).
##########################################################################
########
[server]

## iSMsvr_name:   Specify an iSM server name to be displayed in the
##           Title Bar of iSM client(Web GUI). An iSM server name is
##           case-sensitive. To modify the display of the Title Bar,
##           please set here. When multiple iSM servers are used, you
##           can identify each of them from the Title Bar.
##           (Character string: up to 20 characters)

#  iSMsvr_name = iSMsvr


##################################### resource section
#################################
# Set the environment of the state monitoring function of the iSM server.
# As the default value is recommended for these information, it is
# unnecessary to set this section in common use.
##########################################################################
########
[resource]

## watch_interval: Specify an interval for monitoring state of disk arrays.
##           Unit: second
##           Default value: 15
##           (Numeric: 3 to 60)

#  watch_interval = 15

## capacity_watch_interval:
##           Specify an interval for monitoring information as follows:
##           1)Thin Provisioning function
##            (1)Actual Used Capacity of the Pool and Logical Disk
##            (2)Actual Capacity Threshold of the Pool
##            (3)Actual Capacity Threshold (pre) of the Pool
##            (4)LD Capacity Threshold of the Logical Disk
##           2)Snapshot function
##            (1)Snapshot Used Capacity
##            (2)Snapshot Used Capacity Threshold
##           For Thin Provisioning function, capacity insufficient of
##           pool and logical disk, and LD capacity quota of logical
##           disk are monitored by state watch interval (watch_interval).
##           However, when capacity watch interval (this parameter) is
##           shorter than state watch interval (*), it can be monitored
##           even by capacity watch interval.
##           (*)As the default, capacity watch interval is longer than
##           state watch interval.
##           Unit: minute
##           Default value: 5
##           (Numeric: 5 to 1440)
```

```
#  capacity_watch_interval= 5

## nickname_check: Specify this parameter to make a duplication check on
##          identifiers that are assigned to components in the disk
##          arrays to be managed by the iSM server.
##          Components to be checked in a duplicated manner are as
##          follows:
##          1)Disk Array Name
##          2)Logical Disk Name
##          3)Port Name
##          If you specify this parameter, all components are checked
##          in a duplicated manner when the iSM server starts and
##          when the disk array monitoring is resumed. Duplicating
##          check is not performed if this parameter is not set.

#  nickname_check

## scheduled_report:
##          Specify whether to do the scheduled report of the
##          monitoring disk array's disaster information.
##          Default value: no
##          yes    Do the scheduled report of the monitoring disk
##              array's disater information.
##          no     Do not do the scheduled report of the the
##              monitoring disk array's disater information.

#  scheduled_report = no

## scheduled_report_time:
##          Specify the scheduled report time of the monitoring disk
##          array's disaster information.
##          If [yes] is specified for the parameter scheduled_report,
##          the parameter scheduled_report_time is valid. Otherwise, the
##          parameter scheduled_report_time is invalid.
##          hour    Specify a value from 00 to 23.
##              You can specify only one digit.
##          minute  Specify a value from 00 to 59.
##              Always specify two digits.

#  scheduled_report_time = 00:00

######################################## log section
########################################
# Set the information about the operation log of the iSM server.
# The messages of the iSM server are output into the operation log. The
# default value is recommended for these information, so it is unnecessary
# to specify this section in common use.
##############################################################################
#########
[log]

## modify_no_measures_msg_to_info:
##          Specify this parameter to switch the classification to
```

```
##            INFO for the messages with WARNING classification that do
##            not require operational attention. The object messages of
##            Classification change are iSM04040 and iSM01006. If this
##            parameter is not specified, the classification is not
##            switched.

#   modify_no_measures_msg_to_info

################################# config section
#################################
# Set the information about the configuration setting.
# The default value is recommended for this information, so it is
# unnecessary to set this section in common use.
#######################################################################################
#########
[config]

## no_clock_correction:
##            Specify this parameter so that the timer of the disk
##            array is not automatically corrected by the server.
##            If this parameter is not specified, the timer of the disk
##            array is automatically corrected.

#   no_clock_correction

## allow_virtual_capacity_over_max_pd:
##            Specify this parameter if the capacity of virtual capacity
##            pool is allowed over maximum physical capacity. If it is
##            not specified, the capacity of virtual capacity pool is
##            limited to the maximum physical capacity. This parameter
##            is available only for Thin Provisioning function.

#   allow_virtual_capacity_over_max_pd

################################# replication section
#################################
# Set the environment of the replication function of the iSM server.
# It is unnecessary to set this section if the replication function is not
# used. And unnecessary to set it in common use too, for the reason that
# the default value has been recommended for use.
#######################################################################################
#########
[replication]

## no_state_monitor:
##            Specify the parameter when the state change messages,
##            which are issued by the ReplicationControl and
##            SnapControl command operation, are not output.

#   no_state_monitor

## no_replication_info_refresh:
##            Specify the parameter so that the Replication Screen and
```

```
##           the Connection Screen of iSM client are not periodically
##           refreshed. If this parameter is not specified, the two
##           Screens will be periodically refreshed. If the link of
##           RDR between the disk equipments is Low Speed, please
##           specify this parameter.
##           About Low Speed, please refer to [Data Replication User's
##           Manual (Function Guide)].

#   no_replication_info_refresh

############################### data_retention section
###############################
# Set the environment of the data retention function of the iSM server.
# It is unnecessary to set this section if the data retention function is
# not used. And unnecessary to set it in common use too, for the reason that
# the default value has been recommended for use.
##########################################################################################
#########
[data_retention]

## protection_check_time:
##           Specify the time when the protection status of the volume
##           in which data is protected is checked.
##           hour    Specify a value from 00 to 23.
##                You can specify only one digit.
##           minute  Specify a value from 00 to 59.
##                Always specify two digits.
##           Default value: 00:10

#   protection_check_time = 00:10

## expiration_period:
##           Specify the output period of the message that to notify
##           the expiration, when the retention time limit of the
##           volume in which data is protected is expired. If 0 is
##           specified for this parameter, the expiration message will
##           not be output.
##           Unit: day
##           Default value: 1
##           (Numeric: 0 to 255)
##           Example: The message is output every time checking the
##           data protection status for 3 days if 3 days is specified.

#   expiration_period = 1

## premonition_period:
##           Specify the day when to previously notify the expiration
##           of the volume in which data is protected. If 0 is
##           specified for this parameter, the previous notification
##           of expiration will not be performed.
##           Unit: day[s] before
##           Default value: 0
##           (Numeric: 0 to 255)
```

```
##           Example: The message of previous notice of expiration is
##           output at the time to check data protection status 3 days
##           before expiration if 3 days is specified.

#   premonition_period = 0
```

Event Link Definition File

This section describes the information that can be set in the link definition file (msgdrv.conf).

Link Definition File

```
[SERVER]
SMTP=192.168.0.1
SMTP_PORT=25
POP=192.168.0.1
POP_PORT=110
AUTH=POP_before_SMTP
USER=username
PASSWORD=password
[LIMIT]
MAIL=300
[LINK00]
MSGID=ALL
LEVEL=ERR
MAIL=a@xxx.com
```

Parameter details

[SERVER]Common definition

SMTPDefines the SMTP server that sends mails (specify only one server).

SMTP_PORTDefines the SMTP port number with a value from 1 to 65535.

This item can be omitted. (The default 25 is used when omitted.)

POPDefines the POP server used for the POP before SMTP authentication.

(You can specify no more than one server.)

This item can be omitted if AUTH=NONE or AUTH=SMTP-AUTH.

POP_PORTDefines the POP port number with a value from 1 to 65535.

This item can be omitted. (The default 110 is used when omitted.)

AUTHDefines the authentication method (NONE, POP_before_SMTP or SMTP_AUTH).

USERDefines the account for authentication.

This item can be omitted if AUTH=NONE.

PASSWORDDefines the password (encrypted) for authentication.

This item can be omitted if AUTH=NONE.

[LIMIT]Upper limit definition of the link processing

MAILSets the upper limit of the processing count per unit time (one minute) for mail transmission in the range of 15 to 1200. This parameter can be omitted. (If omitted, 300 is assumed by default.)

[LINKxx]Defines a link group (xx: 00 to 99).

MSGIDDefines a message to be linked.

LEVELDefines a message level to be linked.

MAILDefines a receiver's mail address for link actions.

1. One line must be 512 bytes or less (including blank / tab / carriage return).

2. A line starting with "#" is processed as a comment line.

3. Input the [SERVER] section on the first line.

4. Define a link group in the [LINKxx] section (xx: 00 to 99). Specify the message to be linked (MSGID), its level (LEVEL) and the link action (MAIL). A link action is executed if the received message has the message number specified for the message to be linked and the level specified in the message level.

5. Define the link target message in [MSGID] in [LINKxx]. You can specify message numbers (five-digit number such as 02040) or message number range (range linking message numbers with a hyphen such as 10000-10999) by function. The following can be specified by function.

Function Unit	Function Name	Link Target Messages
BASE	Basic control	iSM01000 - iSM04999
		iSM07000 - iSM07999
		iSM11000 - iSM11999
		iSM14000 - iSM17999
		iSM23000 - iSM23999
		iSM24000 - iSM24999
		iSM28000 - iSM28999
		iSM29000 - iSM29999
PERFORMANCE	Performance	iSM08000 - iSM09999
REPLICATION	Replication	iSM10000 - iSM10999
SNAPSHOT	Snapshot	iSM18000 - iSM18999
ALL	All functions	All messages
ALERT	Messages	Target messages for which ALIVE notification (including ALIVE notifications issued by the disk array device's fault notification mechanism) is performed. Keyword "[_ALERT_]" is added to the end of message body.

6.Define a level in [LEVEL] in [LINKxx] section. You can specify ERR, WARNING, NOTICE, INFO or ALL (all levels).

7.Define the mail receiver's mail address in case you receive a link target message in [MAIL] in the [LINKxx] section. You can define multiple mail addresses. The mail addresses can be defined on the same line or multiple lines. Write the complete mail address including the domain name.

8.You can define up to ten mail addresses and shell file names for link actions within the same link group.

9.When specifying multiple items on the right side of MSGID, LEVEL, and MAIL in the [LINKxx] section, delimit them with comma (,). You can define these items on multiple items. The lines do not have to be consecutive. However, the left side specification cannot be omitted even if the lines are consecutive.

10.If the same message is specified for multiple link groups, the link actions in the specified link groups are executed. However, if the same link action is defined for the same message multiple times, that action is executed only once.

11.ALL cannot be defined both for MSGID and LEVEL in the same link group to avoid linking all messages.

12.You do not have to create any definition file if you do not need linked operations.

13.You can define the [LEVEL] section and HEADER definition defined before V3.4 in the link control file. As this is the function to support the existing users, normally use the [LINKxx] section and MAIL_TEMPLATE definition.

Note the following points when they are used:

- The [LEVEL] section cannot be defined at the same time as the [LINKxx] section.

(3) Definition example

In the following example, ERR messages are mailed to Mr. a, starting the shell (err).

Maintenance messages are mailed to Mr. a and b, starting the shell (alert).

Client connection and disconnection messages (SnapSAN Manager 02040 and SnapSAN Manager   02041) are mailed to Mr. a.

Link definition example (msgdrv.conf)

  [SERVER]

  SMTP=192.168.0.1← IP address of SMTP server

  SMTP_PORT=25← Port number of SMTP server

  POP=192.168.0.1← IP address of POP server

  POP_PORT=110← Port number of POP server

  AUTH=POP_before_SMTP← Authentication method (NONE, POP_before_SMTP or

  SMTP-AUTH)

  USER=username← Account for authentication

  PASSWORD=password← Password for authentication

  [LIMIT]

  MAIL=300← Upper limit of mail transmissions (times/minute)

  [LINK00]← Definition for ERR

  MSGID=ALL

  LEVEL=ERR

  MAIL=a@xxx.com

  [LINK01]← Definition for maintenance message

  MSGID=ALERT

  LEVEL=ALL

  MAIL=a@xxx.com,b@xxx.com← Multiple addresses can be specified on multiple lines.

  [LINK02]← Definition for client connection and disconnection

  messages

  MSGID=02040,02041← You can specify this with "02040-02041".

  LEVEL=ALL

MAIL=a@xxx.com

Mail Template File

The mail template file is the template of the actual mail to transmit, and mainly describes the header part of the mail. Input "FROM:" on the first line, and write the sender's mail address. If mail transmission fails in SMTP server due to wrong target mail address, etc., an error message from SMTP server may be sent to a sender's mail address. The contents of the mail text after the second line are sent as it is, the part above the blank line is the header, and subsequent part is the body of the mail. A message including "$MSG" in body is replaced into a message that is output to an operation log, which triggered the event link.

```
FROM: iSMserver@xxx.com          } Describe sender's mail address.
SUBJECT: iSMserver error report.  } Header
                                      ← blank line
This is the iSMserver at XXXX (XXXX: domain name etc.)
Error Reporting.                                          } Body
$MSG  → A message output to operation log that triggered object linkage is described in
this line.
```

1. Mail address to input on the "FROM:" line must be a complete one that includes domain name.

2. Various header lines in accordance with RFC822 can be written in the header part.

3. Any contents can be described in the body part.

4. The size of the whole mail template file must be less than 1 KB. Also, one line must be less than 512 bytes (including blank / tab / carriage return).

5. When a part of "$MSG" of a certain line is replaced into the message content, a "$MSG" which appeared first can be replaced. So even if two or more "$MSG"s are described in one line, only the first "$MSG" is replaced. However, if the "$MSG"s are described in each line, they spread to each message.

Definition example

Mail template file (mail.tpl)

FROM: SnapSAN Manager msgdrv@xxx.com← Sender's mail address

SUBJECT: SnapSAN Manager server error report.← Title (any)

← Blank line

This is the SnapSAN Manager server at SnapSAN Manager system.xxx.com.← Mail text (any contents)

Error Reporting.← Mail text (any lines up to 1 KB in total.)

$MSG← The actual message is inserted in this line

and mailed.

Pay attention if you receive this mail.← Mail text

Setting File Change Guard

Setting file of configuration change guard for application server running

ISMCHGGRDVALID=on   ...(1)

[<Disk Array Name> (<Platform Name>:<LD Set Name>)]   ...(1)

<Server Address> (<IP or DNS Name>)   ...(3)

:

<Disk Array Name> (<Platform Name>:<LD Set Name>)]   ...(1)

<Server Address> (<IP or DNS Name>)   ...(3)

:

1. Specify whether to use the configuration change guard for application server running.

    When SnapSAN Manager Ver7.1 or later is used, you can specify whether to use the configuration change guard for application server running at the first line. Specify ISMCHGGRDVALID=on to use the configuration change guard. Otherwise, specify ISMCHGGRDVALID=off. Do not put spaces before and after an equal sign (=).

    When the ISMCHGGRDVALID parameter is not specified in this file, it is assumed that the configuration change guard for application server running is enabled.

2. Sections (target disk array name (<Platform Name>:<LD Set Name>))

    Specifications enclosed in brackets ([ ]) are handled as sections, so specify the target disk array names in brackets. For disk arrays using Access Control, it is possible to set up configuration change guard in LD Set units by specifying the LD Set name after the disk array name. Specify the LD Set name in the format <Platform Name>:<LD Set Name>.

3. Server addresses

    Specify the addresses or host names (domain names) of application servers connected to the disk array specified for each section. If there are multiple application servers, specify each on a separate line. Server address information specified before the next section appears is valid. At least one server address must be specified for each section.

    There is no limit on the number of sections or server addresses that can be specified, but, if many server addresses are specified, it might take a while to check the server operating state when performing operations on related volumes.

Example setting file of configuration change guard for application server running.

```
ISMCHGGRDVALID=on          Specify whether to use the configuration
change guard
                           for application server running.
[DiskArrayName1,WG:LDsetName1]  Specify a disk array name and LD Set
name.
192.168.1.xx
Hostname1                  Specify an IP address or host name (domain name).
[DiskArrayName1,LX:LDsetName2]  Specify a different LD Set name.
192.168.1.xy
[DiskArrayName2]               If not using Access Control, specify only a
                              disk array name.
192.168.1.yy
```

1. Specify only ASCII codes in the above file. Save line feed codes as CR+LF for Windows (including SnapSAN Manager Embedded) or as LF for other operating systems.

2. For the address or host name (domain name) specified as the server address, perform a Ping check to check the server operating state.

3. When SnapSAN Manager   Ver 6.3 is used, server addresses must be an IPv4 address.

4. For servers that have two-byte codes in their host names (domain names), specify an IP address.

5. In the above file, specify server host names (domain names) and host names (domain names) for machines on which the SnapSAN Manager   server runs for which name resolution is possible.

6. If the same [<Disk Array Name>(,<Platform Name>:LDSet)] section name is specified more than once, only the first section is valid.

7. When SnapSAN Manager   Ver 6.3 is used, delete the above file to stop preventing configuration changes while application servers are operating.

When SnapSAN Manager Embedded is used, a host name (domain name) cannot be specified for a server address.

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