NEC Storage

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NEC Storage Manager

Configuration Setting Tool User's Manual (GUI)

IS007-10E

Preface

This manual describes how to perform the following by using the GUI (Graphical User Interface) on NEC Storage Manager clients:

- Configure the NEC Storage series disk array subsystem.
- Refer to the disk array configuration information.

Remarks: The LD Administrator (ReallocationControl) and CachePartitioning are described in the "NEC Storage Manager LD Administrator User's Manual (IS037)" and "NEC Storage Manager Cache Partitioning User's Manual (IS038)", respectively, from the NEC Storage Manager Ver3.3.

It is also possible to use the CLI (Command Line Interface) to configure the disk array subsystem or refer to the configuration information. For details, refer to the "NEC Storage Manager Configuration Setting Tool User's Manual" (IS002).
As its readers, this manual is aimed at those who have professional knowledge of the disk array subsystem. For information on the disk array subsystem functions, refer to the "NEC Storage Manager User's Manual" (IS004) or "NEC Storage Manager User's Manual (UNIX)" (IS001) in accordance with your OS.
Refer to the "NEC Storage Manager Manual Guide" (IS901) for the overview of NEC Storage and the related manuals.

Remarks 1. This manual explains functions implemented by the following program products:
- NEC Storage Manager and NEC Storage BaseProduct
- NEC Storage AccessControl
- NEC Storage DynamicDataReplication
- NEC Storage ReallocationControl
- NEC Storage RemoteDataReplication

2. This manual is applicable to the program products of the following versions:
- NEC Storage Manager Ver3.3
- NEC Storage BaseProduct Ver3.3

3. The NEC Storage Manager is referred to as iSM or Storage Manager in the text of this manual. Also, the NEC Storage series disk array subsystem is referred to as a disk array.
4. The following descriptions in the text of this manual refer to the corresponding products.

Description	Corresponding Product
Storage Manager	NEC Storage Manager
AccessControl	NEC Storage AccessControl
DynamicDataReplication	NEC Storage DynamicDataReplication
ReallocationControl	NEC Storage ReallocationControl
RemoteDataReplication	NEC Storage RemoteDataReplication

5. The following descriptions in the text of this manual refer to the corresponding manuals.

Description	Corresponding Manual
User's Manual (UNIX)	NEC Storage Manager User's Manual (UNIX) (IS001)
User's Manual	NEC Storage Manager User's Manual (IS004)
Data Replication User's Manual (Function Guide)	NEC Storage Manager Data Replication User's Manual (Function Guide) (IS015)
Snapshot User's Manual (Function Guide)	NEC Storage Manager Snapshot User's Manual (Function Guide) (IS030)

6. Trademarks and registered trademarks

7. In this document, matters to which careful attention needs to be paid will be described as follows:

   Be sure to observe the contents.

   If the indications are ignored and the system is improperly operated, settings which have been already made might be affected.

Type of Indication	
Type	Description
	Describes contents which require special attention during operation.
	Describes limitations to operation and similar information.

The First Edition in October 2001

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Contents

Part I Overview

Chapter 1 Storage Overview

This chapter describes the overview of a disk array, which is the object of the iSM management.
iSM is the software for operating and maintaining the disk arrays. To understand the iSM functions and to use the iSM efficiently, first read through this chapter, then proceed to Chapter 2.

1.1 Disk Array

The outline of the disk array which is the object of the iSM management is explained below.

(1) 4000 series

The 4000 series, high-end disk array, realizes **high scalability** (up to 10 extended cabinets can be connected to a basic cabinet) and **high availability** (all components have redundancy) and displays **stable performance**. Furthermore, it provides **the function to replicate logical disks** (DynamicDataReplication and RemoteDataReplication) in and between disk arrays, which enables backup and batch processing to be performed in parallel with the main function.

(2) 3000 series

The 3000 series, mid-range disk array that can handle key business, realizes **high scalability** (up to 2 extended cabinets can be connected to a basic cabinet) and **high availability** (all components have redundancy) and displays **stable performance**. Furthermore, it supports functions equivalent to all of the solutions (DynamicDataReplication, RemoteDataReplication, etc.) provided by the 4000 series, the high-end disk array, thereby efficiently performing business.

(3) 2800 series

The 2800 series, mid-range disk array, realizes **high scalability** (up to 16 disk enclosures can be added) and **high availability** (main components have redundancy).
In addition, it provides a **function to replicate logical disks** (DynamicDataReplication) in the disk array, which enables effective backup and batch processing.
Furthermore, the 2800 series can supports an additional parity disk for the **high reliability RAID (RAID6)** to secure the redundancy against an error in one physical disk.

(4) 2000 series

- S2100/S2200/S2300

S2100/S2200/S2300, mid-range disk array, realizes high scalability (up to 14 disk enclosures can be extended) and high availability (main components have redundancy). Furthermore, it provides a function to replicate logical disks (DynamicDataReplication) in the disk array, which enables effective backup and batch processing.

- S2400

S2400, mid-range disk array, realizes high scalability (up to 8 disk enclosures can be added) and high availability (main components have redundancy). In addition, it provides a function to replicate logical disks (DynamicDataReplication, RemoteDataReplication) in and between disk arrays, which enables effective backup and batch processing.

Furthermore, this version can support an additional parity disk for the high reliability RAID (RAID6) to secure the redundancy against an error in one physical disk.

(5) 1000 series

- S1100/S1200/S1300

S1100/S1200/S1300, a low-end model disk array, realizes the little space consuming (one controller and maximum of 15 PDs may be loaded per 3U) and high availability (main components have redundancy).

- S1400

S1400, a low-end model disk array, realizes space saving (one controller and a maximum of 15 PDs may be installed per 3U) and high availability (main components have redundancy). In addition, it provides a function to replicate logical disks (DynamicDataReplication) in the disk array, which enables effective backup and batch processing.

Furthermore, this version can support an additional parity disk for the high reliability RAID (RAID6) to secure the redundancy against an error in one physical disk.

(6) 100 series

- S100

The 100 series, entry model disk array designed for Windows/Linux, realizes **space saving** (one controller and a maximum of 15 PDs may be installed per 3U) and **high availability** (main components have redundancy).

- S400

S400, entry model disk array designed for Windows/Linux, realizes space saving (one controller and a maximum of 15 PDs may be installed per 3U) and high availability (main components have redundancy).

Furthermore, this version can support an additional parity disk for the high reliability RAID (RAID6) to secure the redundancy against an error in one physical disk.

1.2 Disk Array Configuration

(1) Components

The disk array is composed of Disk Array Controller (DAC), which carries the component of control systems, such as host director, disk director and cache, and Disk Enclosure (DE) that carries two or more Physical Disks controlled by DAC.

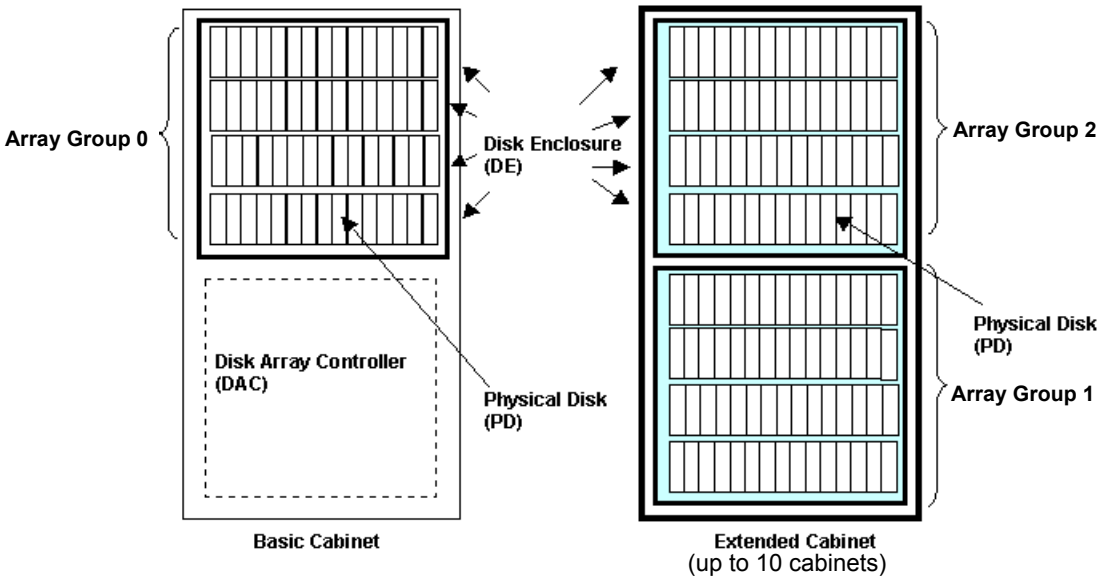


Figure 1-1 Disk Array Composition (4000 Series)

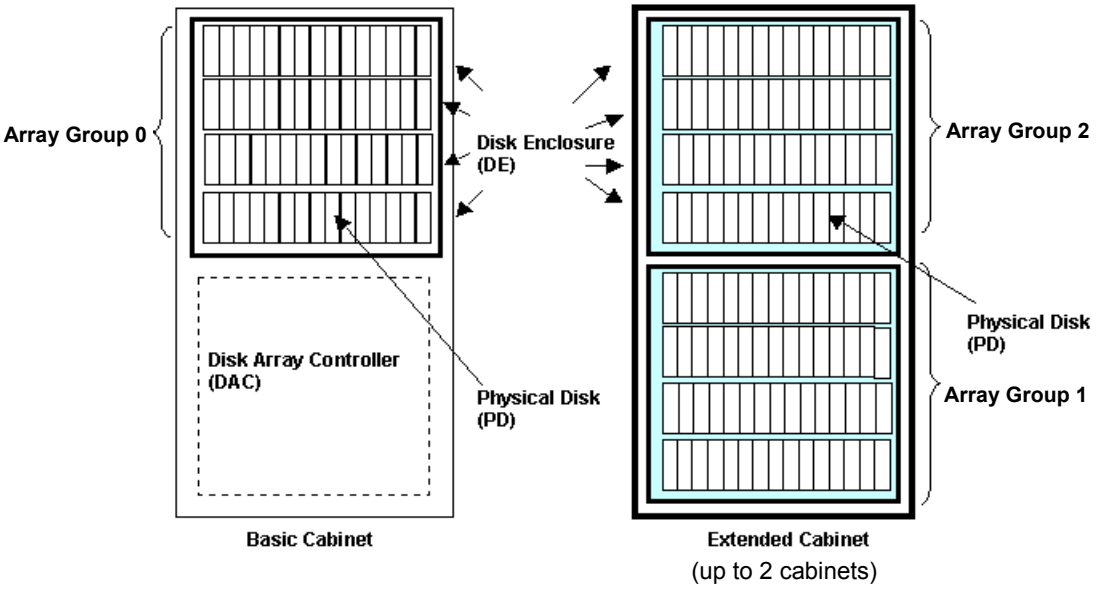


Figure 1-2 Disk Array Composition (3000 Series)

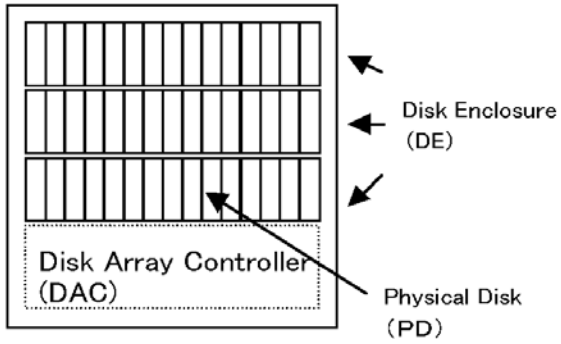


Figure 1-3 Disk Array Composition (2000/2800 Series)

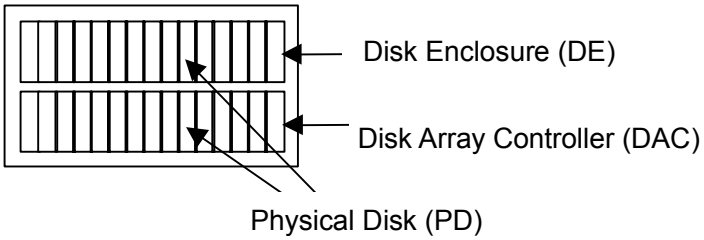


Figure 1-4 Disk Array Composition (100/1000 Series)

<Components identification>

In the 3000/4000 series disk array, the cabinet composed of Disk Array Controller and two or more disk enclosures is called as “Basic Cabinet (BC)” and the cabinet that is composed of multiple disk enclosures to be connected to basic cabinet is called as “Extended Cabinet (EC)”. The 3000/4000 series disk array can mount 10 or 15 Physical Disks (PDs) per disk enclosure, and 4 disk enclosures are managed as 1 group (array group). Individual PD has identification number per PD management group (PD group) that includes the above 4 array groups. Thus the combination of PD group number and PD position number enables identifying of the physical mounting place of the PDs.

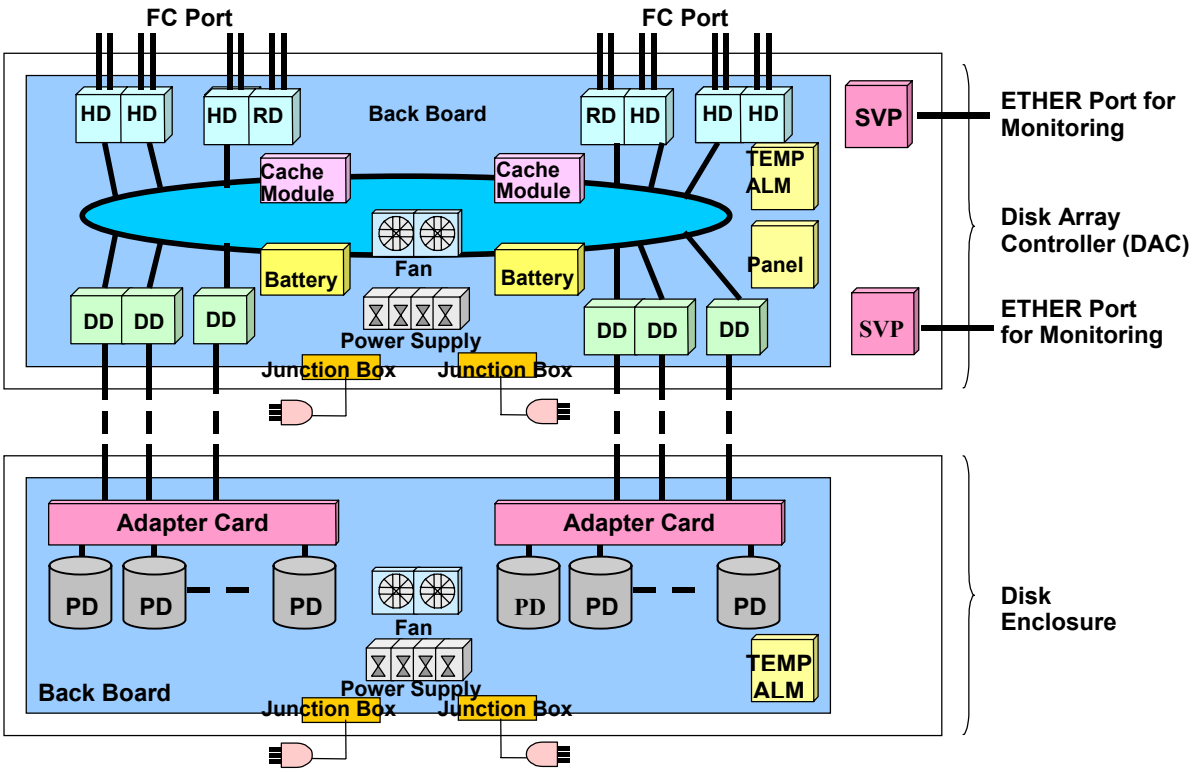
In the same way, unique identification number is assigned to other components in disk enclosure (shown below), per controller unit, and this identification number enables components in the same disk enclosure to be specified. But assignment of identification number depends on number of component in disk enclosure.

The 2800 series disk array is composed of Disk Array Controller (DAC) and one or more disk enclosures. (There has no concept of basic cabinet and extended cabinet as in the 4000 series). It can mount 15 physical disks (PDs) per disk enclosure. Only one PD management group (PD group) is defined in it (i.e., all physical disks belong to one PD group). There is no concept of array group.

The 2000 series disk array is composed of Disk Array Controller (DAC) and one or more disk enclosures. (There has no concept of basic cabinet and extended cabinet as in the 4000 series). It can mount 10 or 15 Physical Disks (PDs) per disk enclosure. PD management group (PD group) is defined depending on the connection relation to disk array controller. (PDs connected to the same group are defined as one PD group) There is no concept of array group.

In the 100/1000 series disk array, Disk Array Controller (DAC) and DE which are in different cabinets in the 2000 series are put in the same cabinet. 15 Physical Disks (PDs) can be carried in Disk Array Controller (DAC). Because there is not the concept of array group, the Physical Disks connected to the same group are managed as one group (PD group).

<4000 series>



<3000 series>

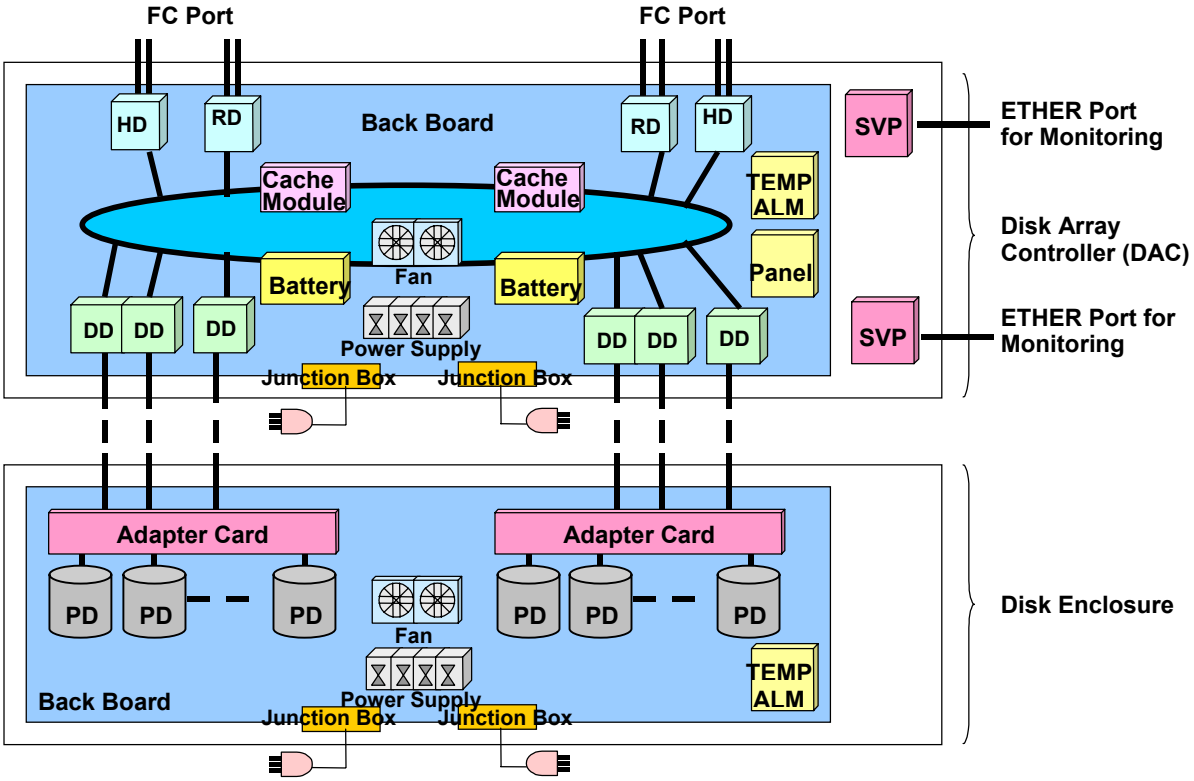


Figure 1-5 3000/4000 Series Disk Array Components

<2800 series>

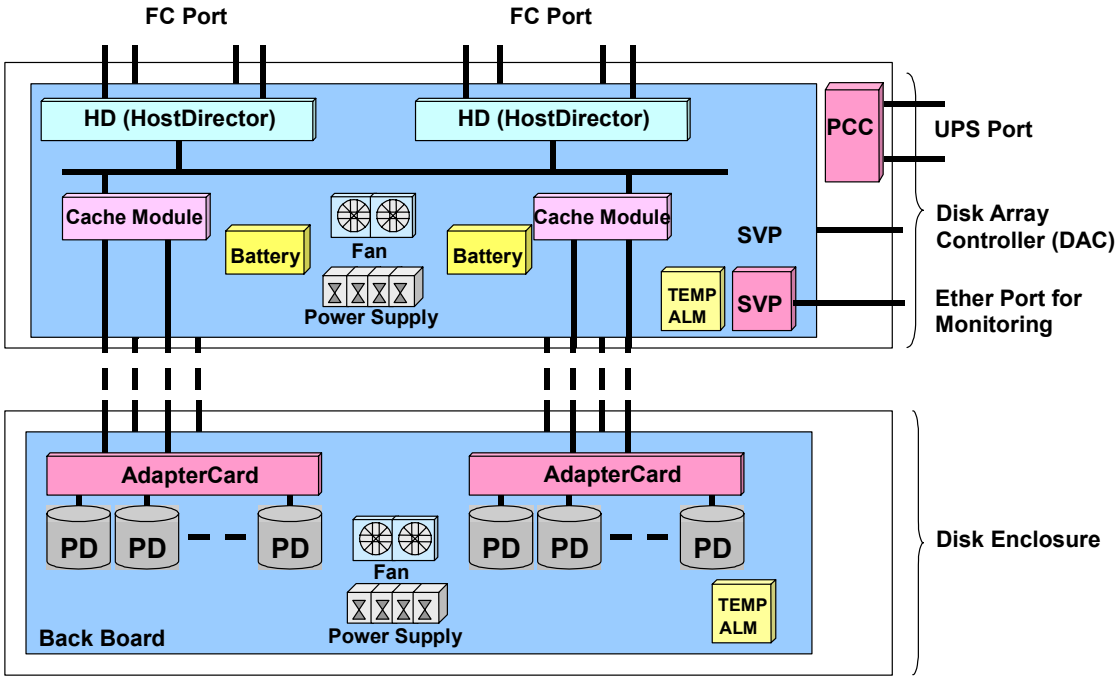
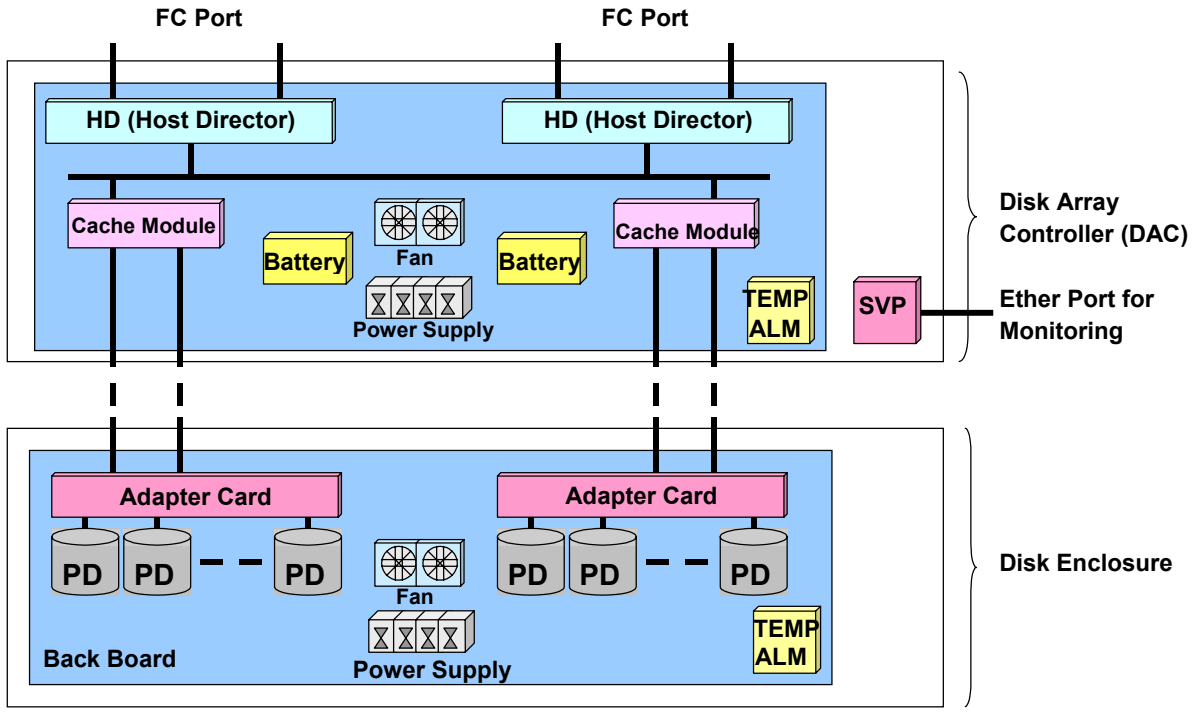


Figure 1-6 2800 Series Disk Array Components

<2000 series>

- S2100/S2200/S2300



- S2400

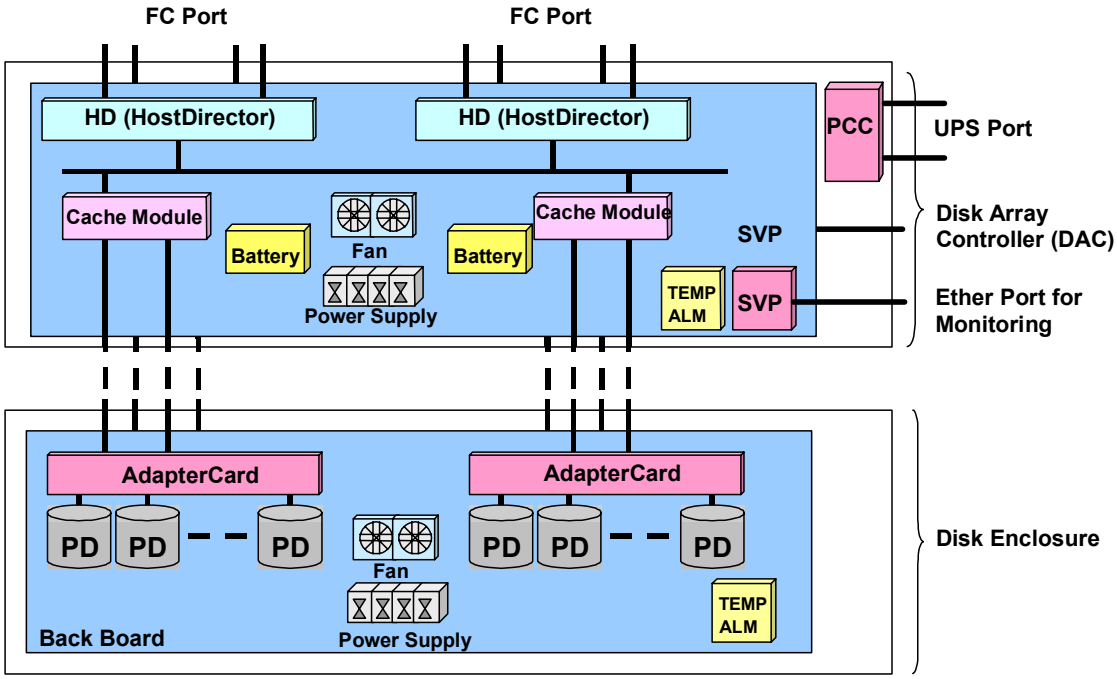
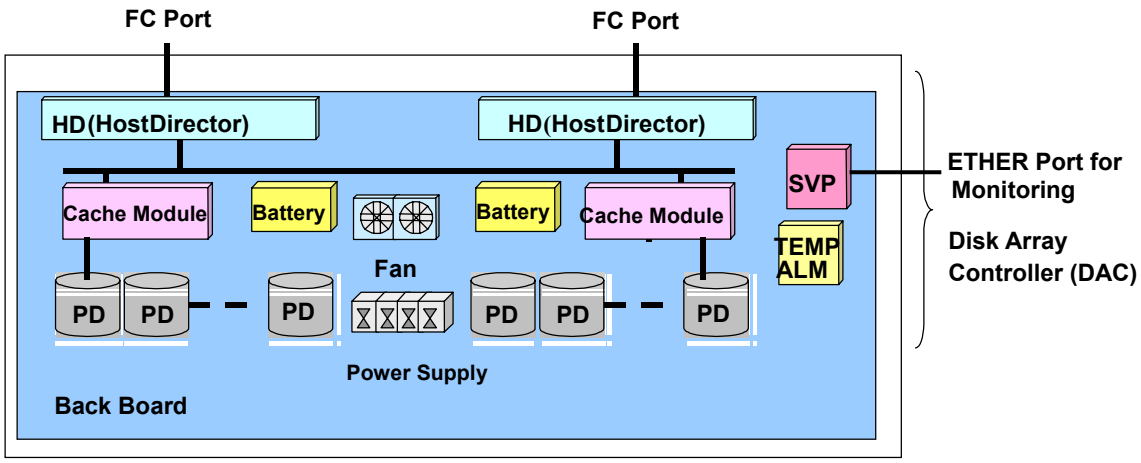


Figure 1-7 2000 Series Disk Array Components

<100/1000 series>

- S100/S1100/S1200/S1300



- S400/S1400

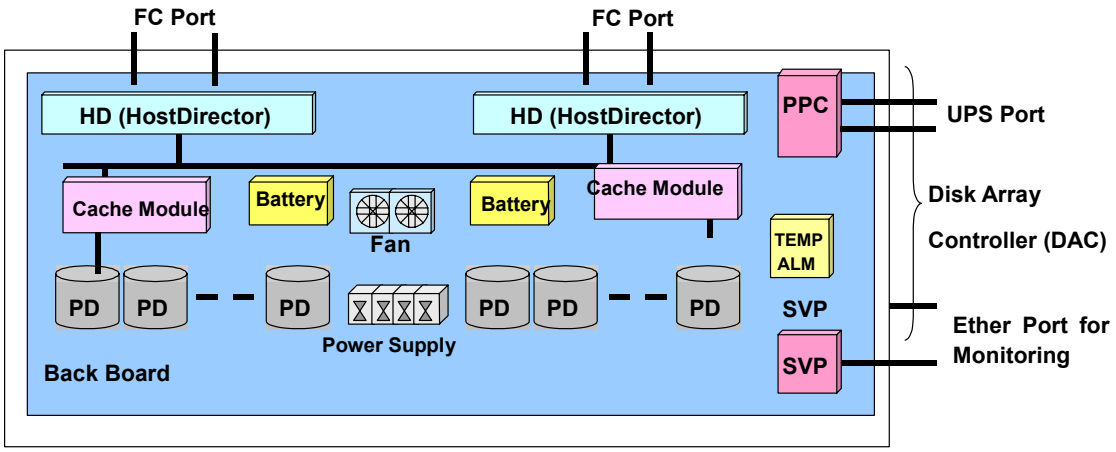
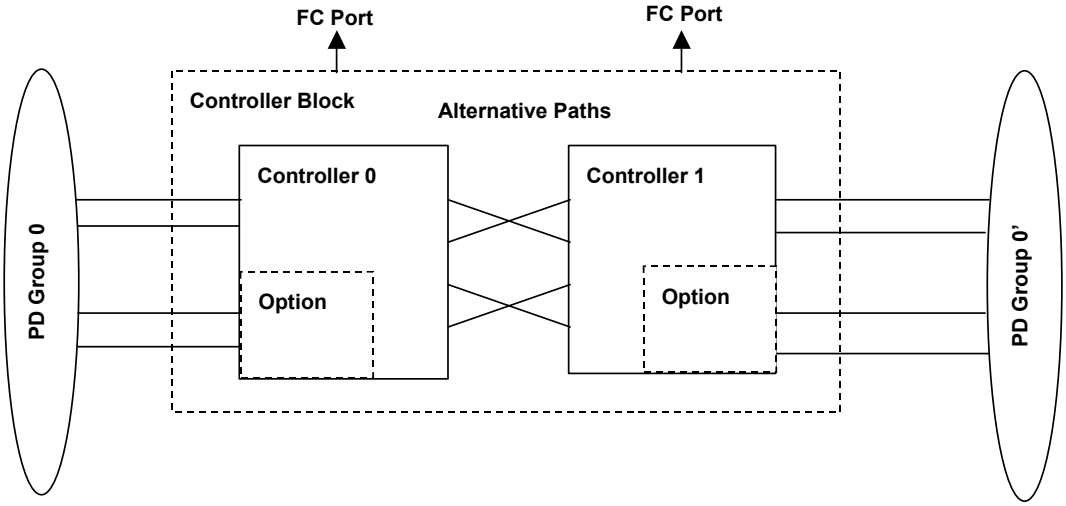


Figure 1-8 100/1000 Series Disk Array Components

[2800 series logical block diagram (with alternative paths and options)]



PD group 0

DE#0[00 - 0E]
DE#1[10 - 1E]
:
:
:
DE#E[E0 - EE]
DE#F[F0 - FE]

*1 The 2800 series disk array has one PD group.

*2 Hexadecimal digits in the brackets are PD numbers.

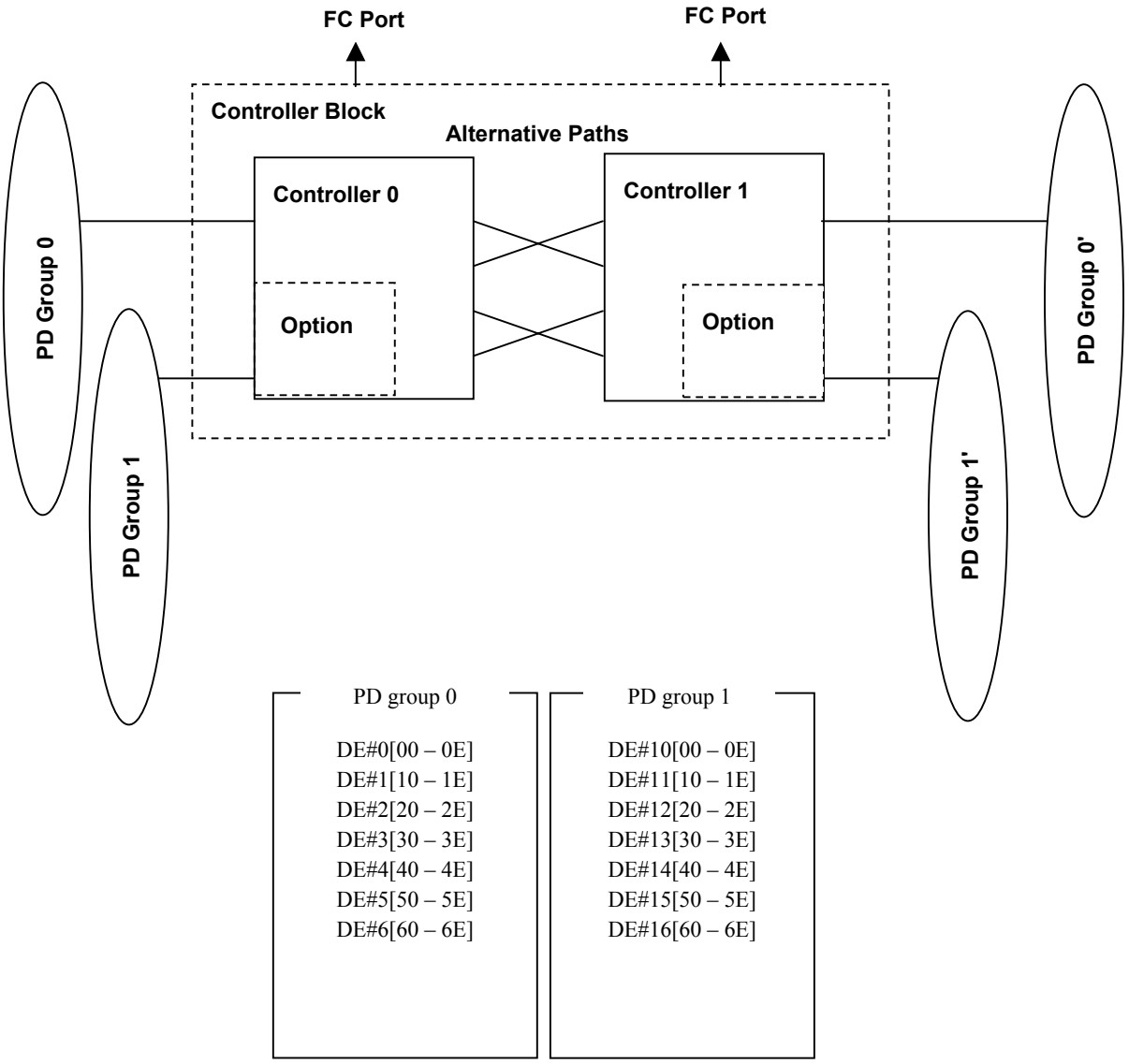
*3 DE denotes a disk enclosure.

*4 PD group 0 and PD group 0' are the same PD group.

Figure 1-9 2800 Series Logical Block Diagram

[2000 series logical block diagram]

- S2100/S2200/S2300 (with alternative paths and options)



*1 The 2000 series disk array has two PD groups.

*2 Hexadecimal digits in the brackets are PD numbers.

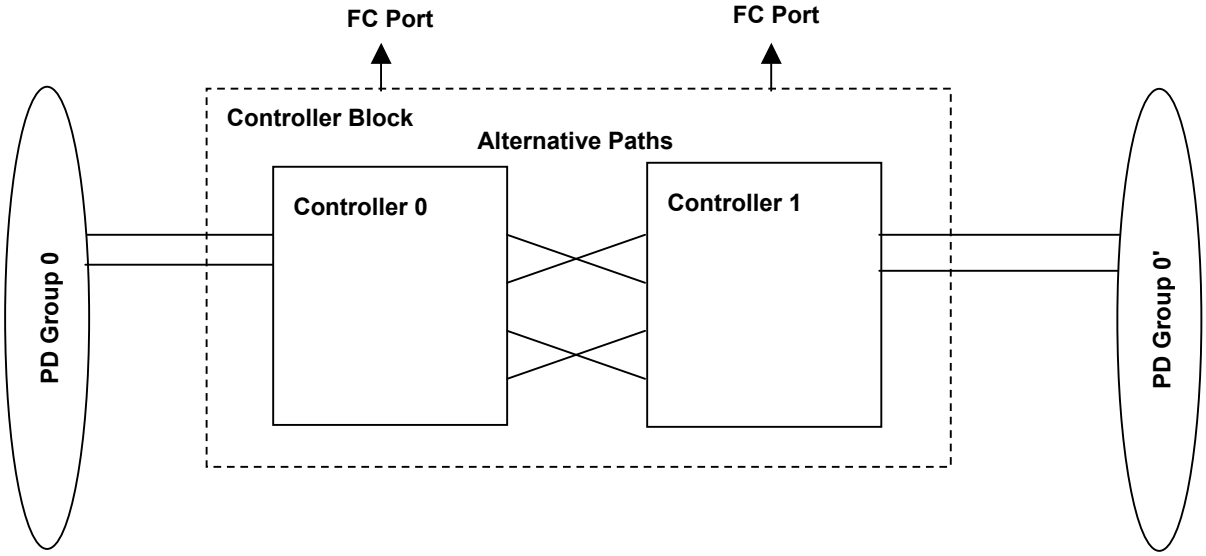
*3 “DE” denotes a disk enclosure.

*4 PD groups 0 and 0’ are the same PD group, and also PD groups 1 and 1’ are the same PD group.

Figure 1-10 2000 Series (S2100/S2200/S2300) Logical Block Diagram

[2000 series logical block diagram]

- S2400 (with alternative paths)



PD group 0

DE#0[00 – 0E]
DE#1[10 – 1E]
DE#4[40 – 4E]
DE#5[50 – 5E]
DE#8[80 – 8E]
DE#9[90 – 9E]
DE#C[C0 – CE]
DE#D[D0 – DE]

*1 S2400 has only one PD group.

*2 Hexadecimal digits in the brackets are PD numbers.

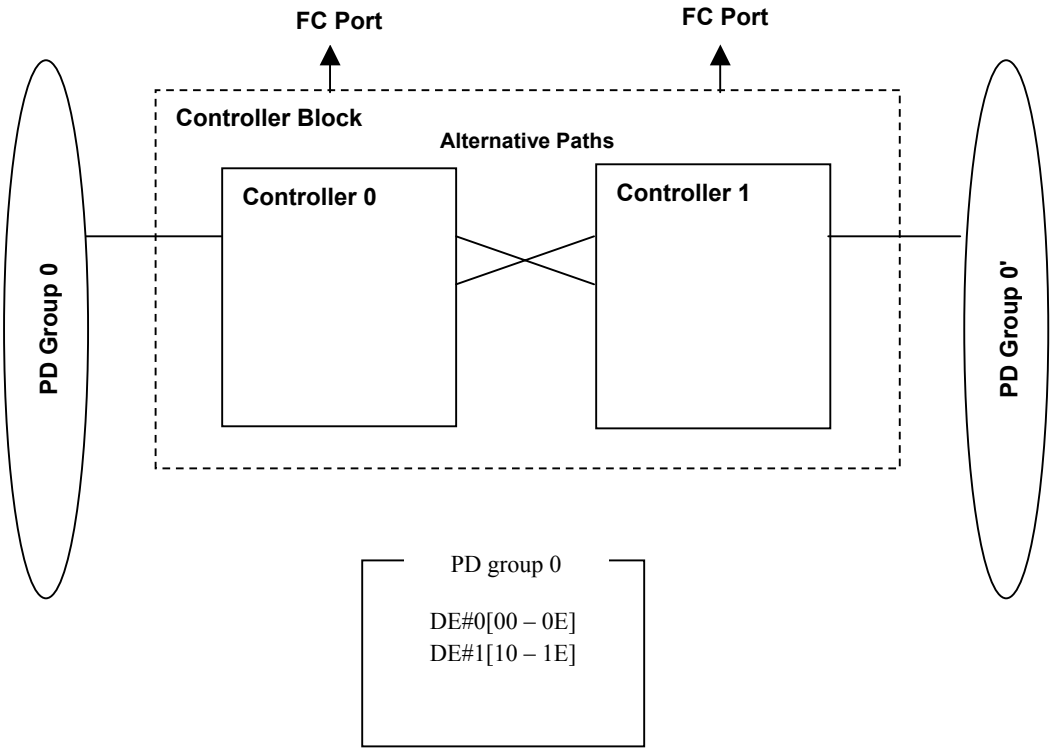
*3 “DE” denotes a disk enclosure.

*4 PD groups 0 and 0’ are the same PD group.

Figure 1-11 2000 Series (S2400) Logical Block Diagram

[100/1000 series logical block diagram (with alternative paths)]

- S100/S1100/S1200/S1300 (with alternative paths)



*1 S100/S1100/S1200/S1300 disk array has only one PD group.

*2 Hexadecimal digits in the brackets are PD numbers.

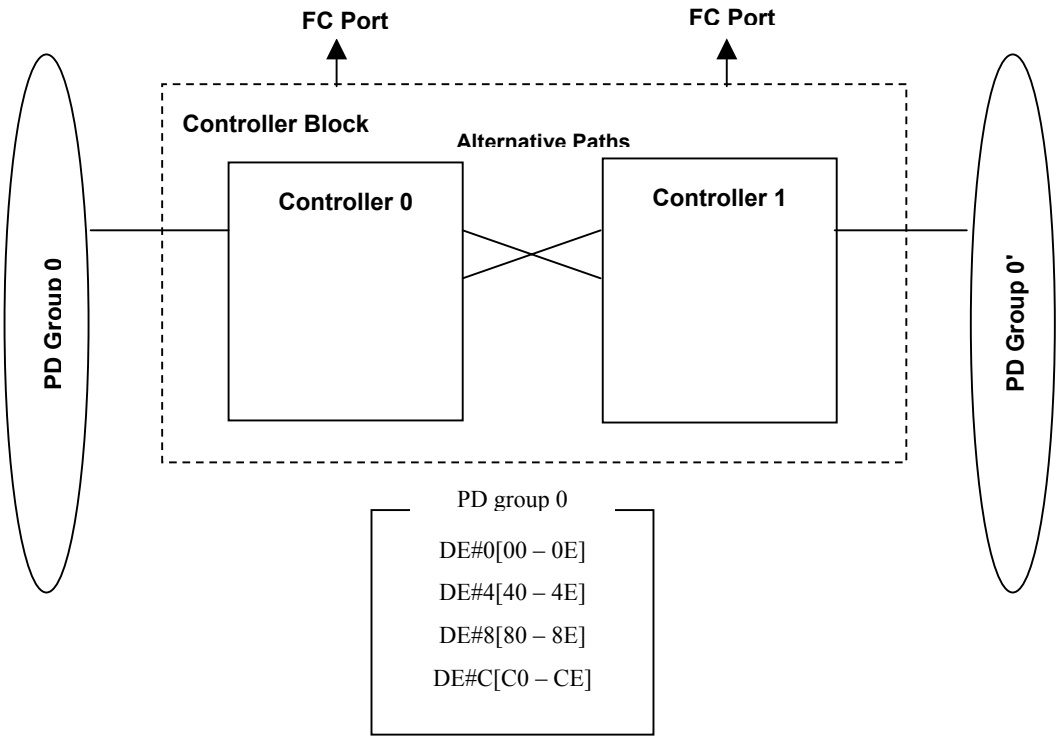
*3 “DE” denotes a disk enclosure.

*4 PD group 0 and PD group 0’ are the same PD group.

Figure 1-12 100/1000 Series (S100/S1100/S1200/S1300) Logical Block Diagram

[100/1000 series logical block diagram (with alternative paths)]

- S400/S1400 (with alternative paths)



*1 S400/S1400 disk array has only one PD group.

*2 Hexadecimal digits in the brackets are PD numbers.

*3 “DE” denotes a disk enclosure.

*4 PD group 0 and PD group 0’ are the same PD group.

*5 S400 cannot be connected to DE#C.

Figure 1-13 100/1000 Series (S400/S1400) Logical Block Diagram

<Components>

Disk array components are shown below.

Table 1-1 Component List (1/2)

Component (Abbreviation)	Configuration Devices (Abbreviation)	Description
Disk Array Controller (DAC)	Host Director (HD)	Host interface control and cache module control device. One to four ports are mounted in single director.
	Replication Director (RD)	Control part of DynamicDataReplication and RemoteDataReplication function. Two ports are mounted in single director.
	Disk Director (DD)	Disk array control device. Four ports are mounted in single director.
	Cache Module Card (CHE)	Cache memory
	Service Processor Card (SVP)	Processing part that provides various interfaces (maintenance PC, Ether, modem, SCBI) to perform power supply control and maintenance.
	Temperature Alarm (DAC_TEMP_ALM)	Temperature abnormality detection part with temperature sensor, in DAC (Disk Array Controller).
	Panel (PANEL)	External panel composed of status display part of disk array, and system power on/off switches.
	Fan (DAC_FANU/FANL)	Cooling fan to maintain the constant temperature inside of the controller. There are two types**:** Upper and Lower.
	Power Supply (DAC_PS)	Power supply part in DAC.
	Battery Backup Unit (DAC_BBU)	Power supply part to hold data of cache module in DAC.
	Basic Cabinet Junction Box (BC_JB)	Connection part of AC power cable in the basic cabinet. It supplies electric power for components (configuration devices) of cabinet.
	Back Board (DAC_BB)	Back board connecting each component (configuration devices) in DAC.
	Power Control Card (PCC)	Power control part.

Table 1-1 Component List (2/2)

Component (Abbreviation)	Configuration Devices (Abbreviation)	Description
Disk Enclosure (DE)	Power Supply (DE_PS)	Power supply part in DE (Disk Enclosure).
	Fan (DE_FAN)	Cooling fan in DE to maintain the constant temperature inside of the unit.
	Adapter Card (DE_ADP)	Adapter Card for connection between PD and DD.
	Extended Cabinet Junction Box (EC_JB)	Connection part of AC power cable in the extended cabinet. It supplies electric power to components (configuration devices) of cabinet.
	Temperature Alarm (DE_TEMP_ALM)	Temperature abnormality detection part with temperature sensor in DE.
	Back Board (DE_BB)	Back board connecting each component (configuration devices) in DE.
Pool		Virtual medium composing RAID by putting multiple physical disks together.
Physical Disk (PD)		Physical Disk
Logical Disk (LD)		Logical Disk (disk from operation host side)

(2) Logical configuration of a disk array

In a disk array, put multiple physical disks together to set up a virtual medium to compose RAID, and partition the space in the virtual medium to make logical disks. Data on the logical disks is stored into the areas of physical disk associated with the partitions on the virtual medium in which the logical disks are composed.

The virtual medium is called a pool or RANK, and it supports different logical disk configurations depending on the disk array.

- Pool

  Disk arrays with pool

  *The disk arrays with pool are the following:

  S400/S1400/S2400/S2800

  In the disk array indicated above, multiple physical disks put together to make up a virtual medium for RAID is called a pool. The logical disks usually belong to one pool, and the required amount of space is assigned from the pool.

  There are two types of pool available as described below. They function in different manners.

  Basic pool

  The basic pool is a virtual medium, which manages the space on the pool using a continuous address space.

  As you handle logical disks on RANK, assign the continuous space on the pool to the logical disks. In addition, like a multi-RANK configuration, the basic pool supports a striping configuration for distributing and storing data into multiple RAID configurations.

  For the practical configurations of physical disks that bind a basic pool, refer to C.3 “List of Pool-Configurable RAID Types”.

  Note that the basic pool does not allow using any additional features such as pool capacity expansion or logical disk capacity expansion.

Dynamic pool

The 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 making up 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 dynamic pool moderates the limit on the number of constituent physical disks and enables flexible configurations. In addition, the dynamic pool allows to use additional features such as pool capacity expansion and logical disk capacity expansion. For details on the dynamic pool, refer to 2.1.2 “Dynamic Pool”.

For the practical configurations of physical disks on a dynamic pool, refer to C.3 “List of Pool-Configurable RAID Types”.

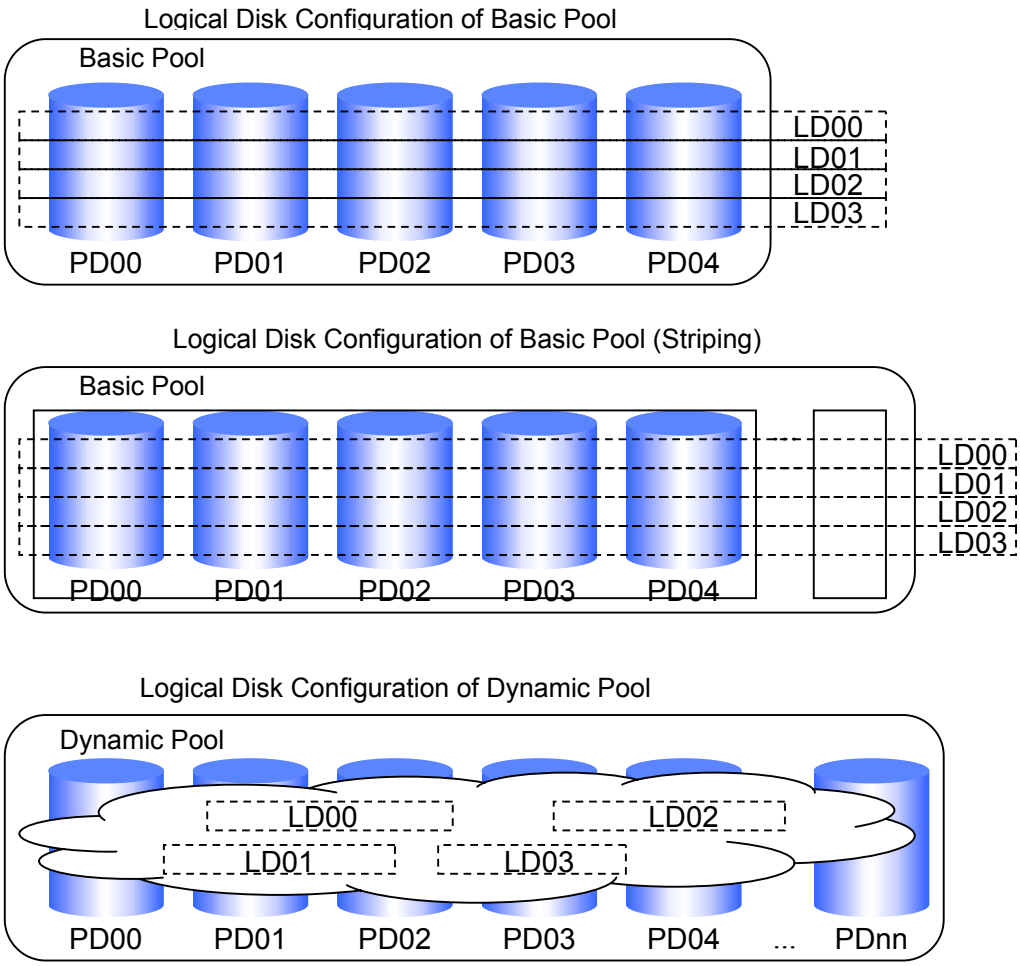


Figure 1-14 Logical Configurations of Disk Arrays (Pool)

- RANK

  <Supported disk arrays>

  Other than disk arrays with pool

  In the disk arrays indicated above, multiple physical disks put together to make up a virtual medium for RAID is called RANK. Areas on RANK are controlled by using a continuous address space.

  The logical disks usually belong to one RANK, and a continuous space on one RANK is assigned to them.

  In a multi-RANK configuration, the logical disks belong to multiple RANKs, and continuous spaces on the multiple RANKs are assigned to them.

  For the types of RAID configurable as RANK, refer to C.2 “List of RANK-Configurable RAID Types”.

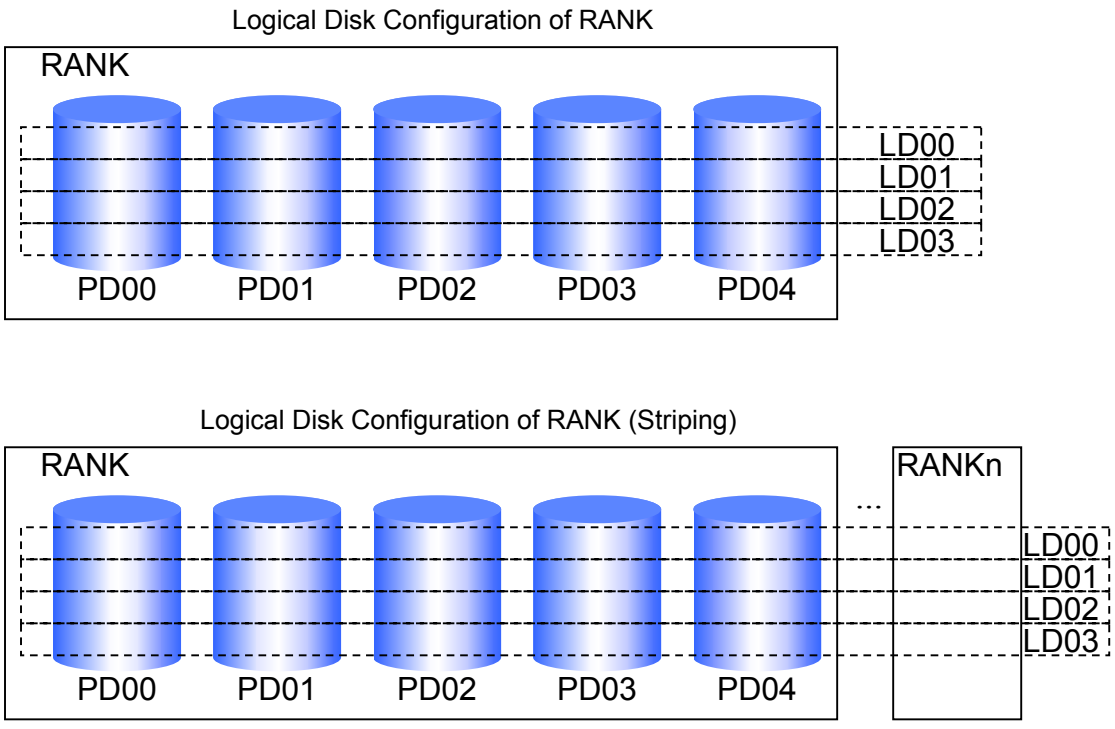


Figure 1-15 Logical Configurations of Disk Arrays (RANK)

Chapter 2 Overview of Disk Array Configuration Setting

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

The disk array configuration setting is a function for setting the configuration when initializing the disk array and when extending the physical disks. This operation can be performed by using a GUI from the iSM client.

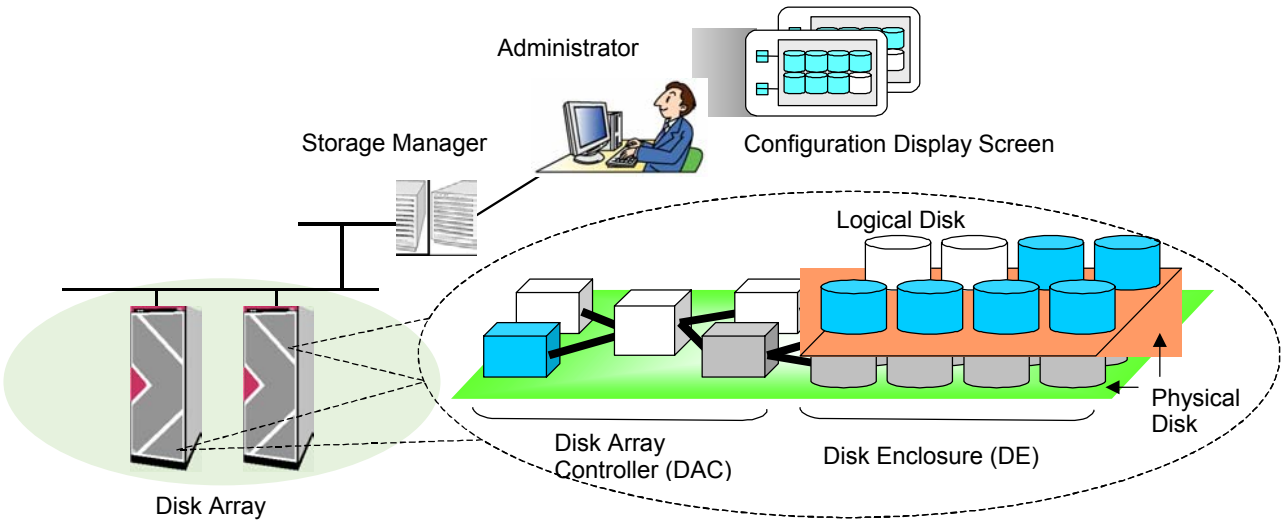


Figure 2-1 Configuration Setting Outline

2.1 Pool and RANK

In a disk array, put multiple physical disks together to set up a virtual medium to compose RAID, and partition the space in the virtual medium to make logical disks. Data on the logical disks is stored into the areas of physical disk associated with the partitions on the virtual medium in which the logical disks are composed.

The virtual medium is called a pool or RANK, and it supports different logical disk configurations depending on the disk array.

- Pool

  <Supported disk array>

  S400/S1400/S2400/S2800

  In the disk array indicated above, multiple physical disks put together to make up a virtual medium for RAID is called a pool. The logical disks usually belong to one pool, and the required amount of space is assigned from the pool.

- RANK

  <Supported disk arrays>

  Other than S400/S1400/S2400/S2800

  In the disk arrays indicated above, multiple physical disks put together to make up a virtual medium for RAID is called RANK. Areas on RANK are controlled by using a continuous address space.

  There are two types of pool available as described below. They function in different manners.

2.1.1 Basic Pool

The basic pool is a virtual medium, which manages the space on the pool using a continuous address space.

As you handle logical disks on RANK, assign the continuous space on the pool to the logical disks. In addition, like a multi-RANK configuration, the basic pool supports a striping configuration for distributing and storing data into multiple RAID configurations.

Note that the basic pool does not allow using any additional features such as pool capacity expansion or logical disk capacity expansion.

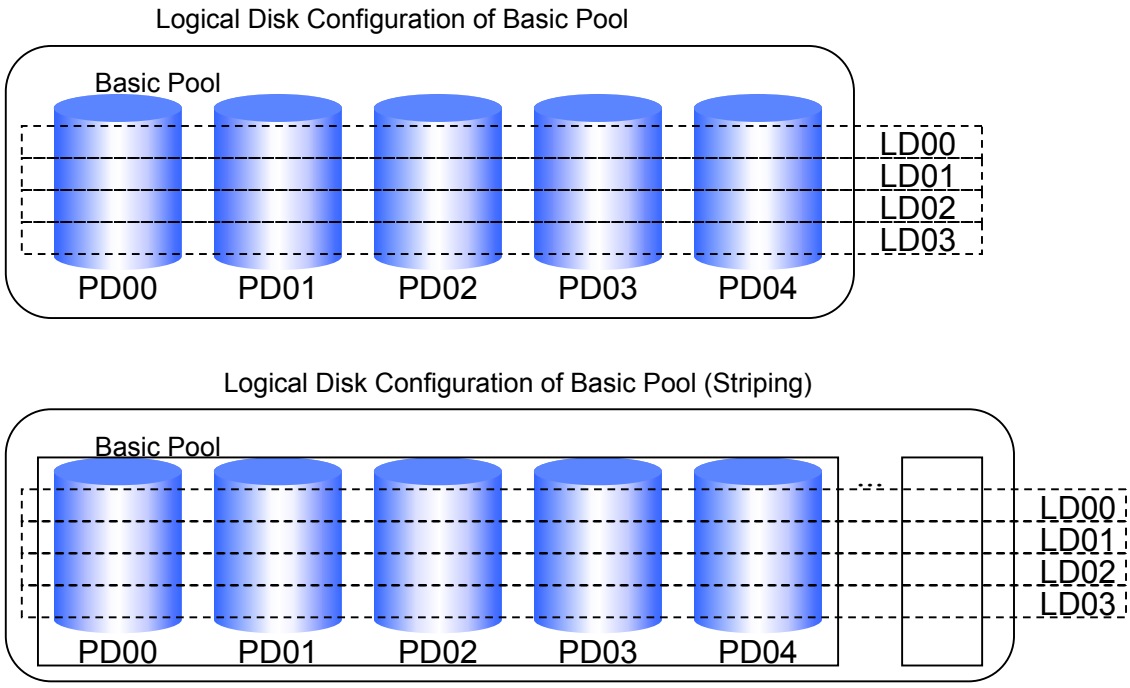


Figure 2-2 Logical Configuration of Disk Arrays (Basic Pool)

The table below shows the number of physical disks and the number of pools available by the RAID type on S400/S1400/S2400/S2800.

- Basic pool

RAID Type \ Disk Array	Disk Array	Number of Physical Disks						
		2	4	5	8	10	16	20
RAID1	S400/S1400/ S2400/S2800	○	-	-	-	-	-	-
RAID5		-	-	○	-	-	-	-
RAID10		-	○	-	○	-	○	-
RAID50		-	-	-	-	○	-	○

○: Available -: Unavailable

2.1.2 Dynamic Pool

The 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 making up 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 dynamic pool moderates the limit on the number of constituent physical disks and enables flexible configurations. In addition, the dynamic pool allows to use additional features such as pool capacity expansion and logical disk capacity expansion.

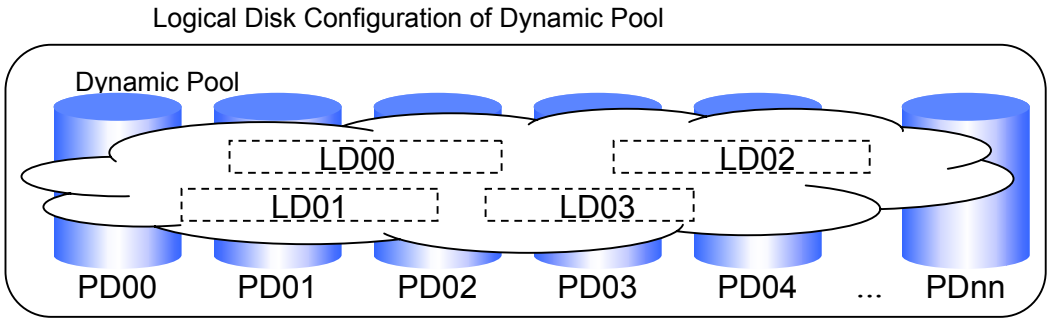


Figure 2-3 Logical Configuration of Disk Arrays (Dynamic Pool)

S400/S1400/S2400/S2800 disk array supports the dynamic pool function.

The dynamic pool function puts a set of physical disks on the disk array together to make up a virtual storage pool. That is, it picks up the amount of storage required for the transaction from space unused in the pool and bind logical disks. If the storage capacity becomes short, you can add physical disks one by one as required and putting them into the pool to expand the unused space of the pool. The additional unused space of the pool can be used to bind a new logical disk or expand the existing logical disk capacity, keeping the current data. In addition, you can put back logical disks no longer needed to the pool to extend the unused space of the pool.

Therefore, the dynamic pool function helps to manage the capacity of the storage efficiently and make a large reduction in the cost on additional storage space. It also helps to flexibly support any configuration changes or expansion of the storage to be done for addition of new transactions or modification to existing transactions.

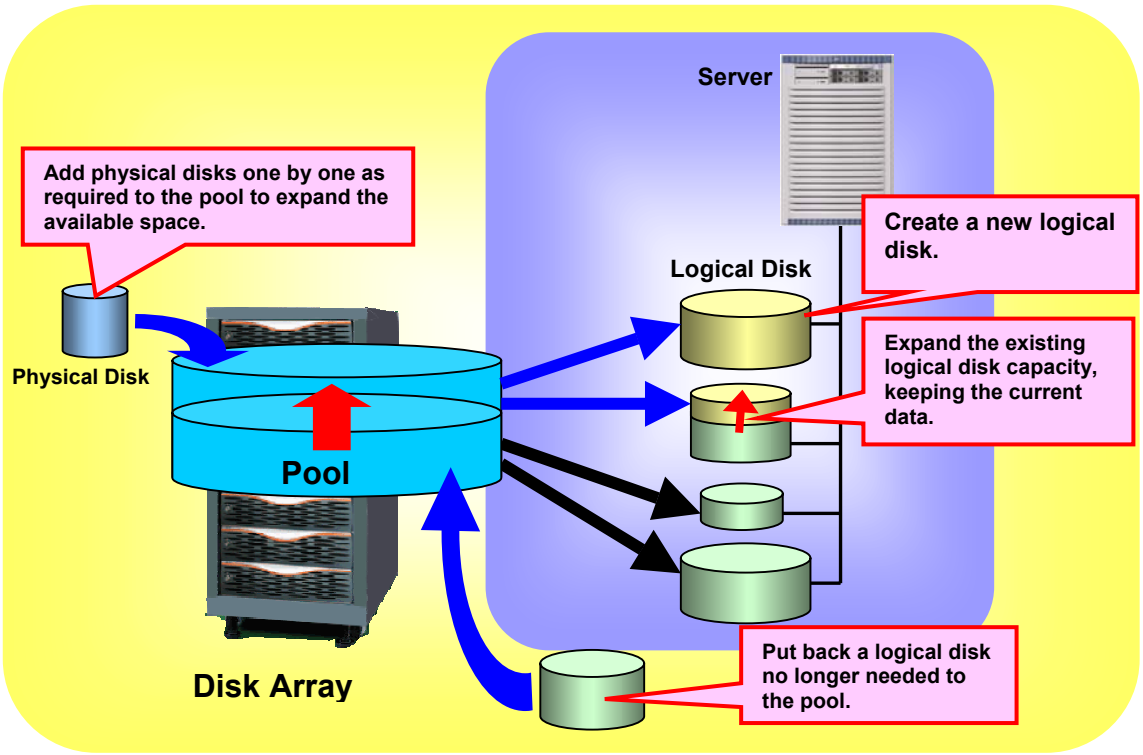


Figure 2-4 Overview of the Dynamic Pool Function

The dynamic pool function provides the following advantages:

- 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 bind a new logical disk or expand the logical disk capacity at that time. This means that you can add physical disks just enough for the required capacity only with the least additional cost.

- 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. In addition, returning logical disks no longer needed to the pool secures the unused space of the pool which can be used for another purpose. With these features, you can flexibly support any configuration changes of storage to be made for modification to existing transactions or operation of existing transactions.

(1) You can bind a dynamic pool:

You can bind a virtual storage space, or a dynamic pool, by selecting a set of unused physical disks on the disk array. The RAID type usable and the number of physical disks required for a dynamic pool are fixed. Select either of the following two types of RAID6 configuration according to the number of physical disks required. The two types of configuration have different capacity efficiencies:

RAID6 (4+PQ): 6 or more physical disks required (capacity efficiency: 67% approx.)
RAID6 (8+PQ): 10 or more physical disks required (capacity efficiency: 80%)

For details on how to bind a dynamic pool, refer to 7.1.1 “Binding a Pool” in Part IV “Operations”.

• Dynamic pool

RAID Type	Disk Array	Number of Physical Disks
RAID6 (4+PQ)	S400/S1400/ S2400/S2800	6 to 60 (120 or 240)*1
RAID6 (8+PQ)		10 to 60 (120 or 240)*1

*1: The maximum number of physical disks is 60 when pools are in use.
To use 61 or more disks, you need to add physical disks by extending dynamic pools.

(2) You can expand the dynamic pool capacity:

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

Usually, expanding the dynamic pool rebuilds data on the additional physical disk(s) to keep the redundancy of RAID. Rebuilding data puts some load to the physical disks of the dynamic pool and influences access to the existing logical disks which belong to the pool. The additional space becomes available after the rebuild process finishes.

However, when the number of physical disks simultaneously added to the pool is a specified number or more, the dynamic pool is expanded and made available without the rebuild process. The additional space is usable immediately after the physical disks are added to the pool.

The RAID configuration cannot be changed from RAID6 (4+PQ) to RAID6 (8+PQ) or vise versa. You need to add physical disks to the pool, keeping the RAID configuration.

For details on how to expand a dynamic pool, refer to 7.1.2 “Expanding Capacity of a Pool” in Part IV “Operations”.

Additional Physical Disks	Configuration	Rebuild after Expansion of Pool
1 to 5	RAID6 (4+PQ)	The pool is rebound. 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 9	RAID6 (8+PQ)	
6 or more	RAID6 (4+PQ)	The pool is not rebound. The expansion of the pool puts no influence on any existing logical disks which belongs to it. The additional space to the pool becomes available immediately after it is added.
10 or more	RAID6 (8+PQ)	

(3) You can bind the logical disks:

You can pick up the amount of storage required from the unused space in the dynamic pool and bind logical disks required for it. For details on how to bind logical disks, refer to 7.2.1 “Binding Logical Disks” in Part IV, “Operations”.

(4) You can expand the logical disk capacity:

You can pick up the amount of storage required from the unused space in the dynamic pool and increase the existing logical disk capacity. While data stored in the logical disks is secured, some space usable for additional logical disks is added after the existing logical disks. The way of having the host identify the additional space depends on the platform.

For details on how to expand the logical disk capacity, refer to 7.2.2 “Expanding Capacity of Logical Disks” in Part IV “Operations”.

Some platforms do not support expansion of logical disk capacity. For details about it, ask the maintenance personnel. In addition, in case of an error or failure, it is recommended to make a backup of data stored in the existing logical disks before expanding the logical disk capacity.

2.1.3 RANK

The logical disks usually belong to one RANK, and a continuous space on one RANK is assigned to them.

In a multi-RANK configuration, the logical disks belong to multiple RANKs, and continuous spaces on the multiple RANKs are assigned to them.

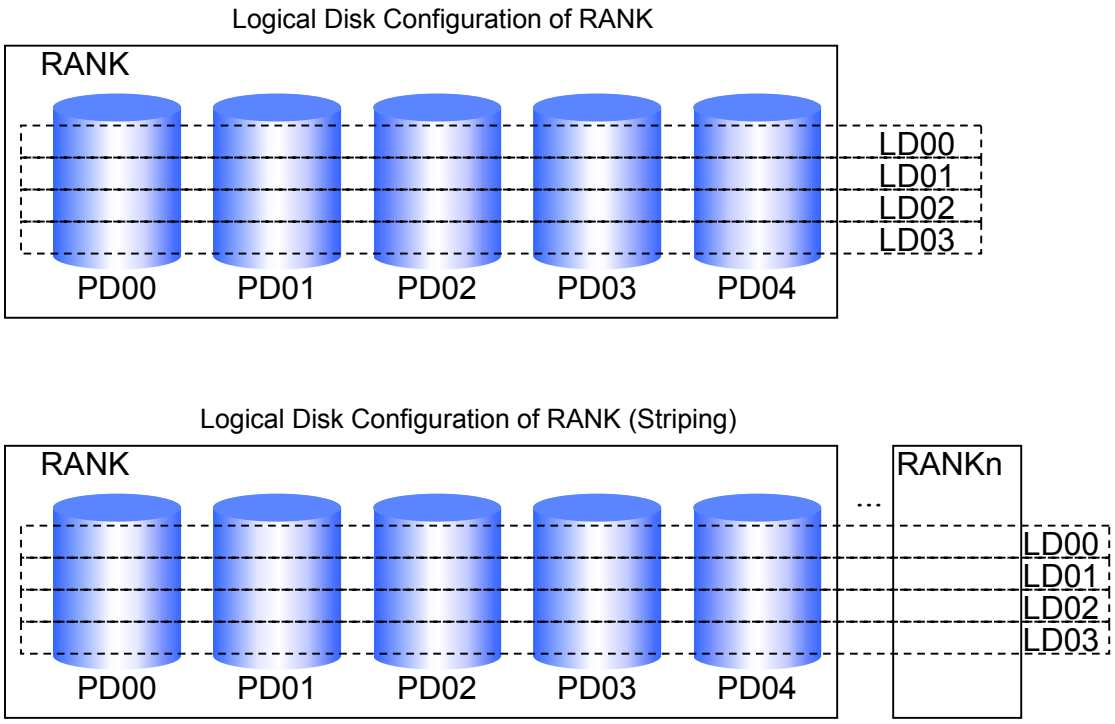


Figure 2-5 Logical Configurations of Disk Arrays (RANK)

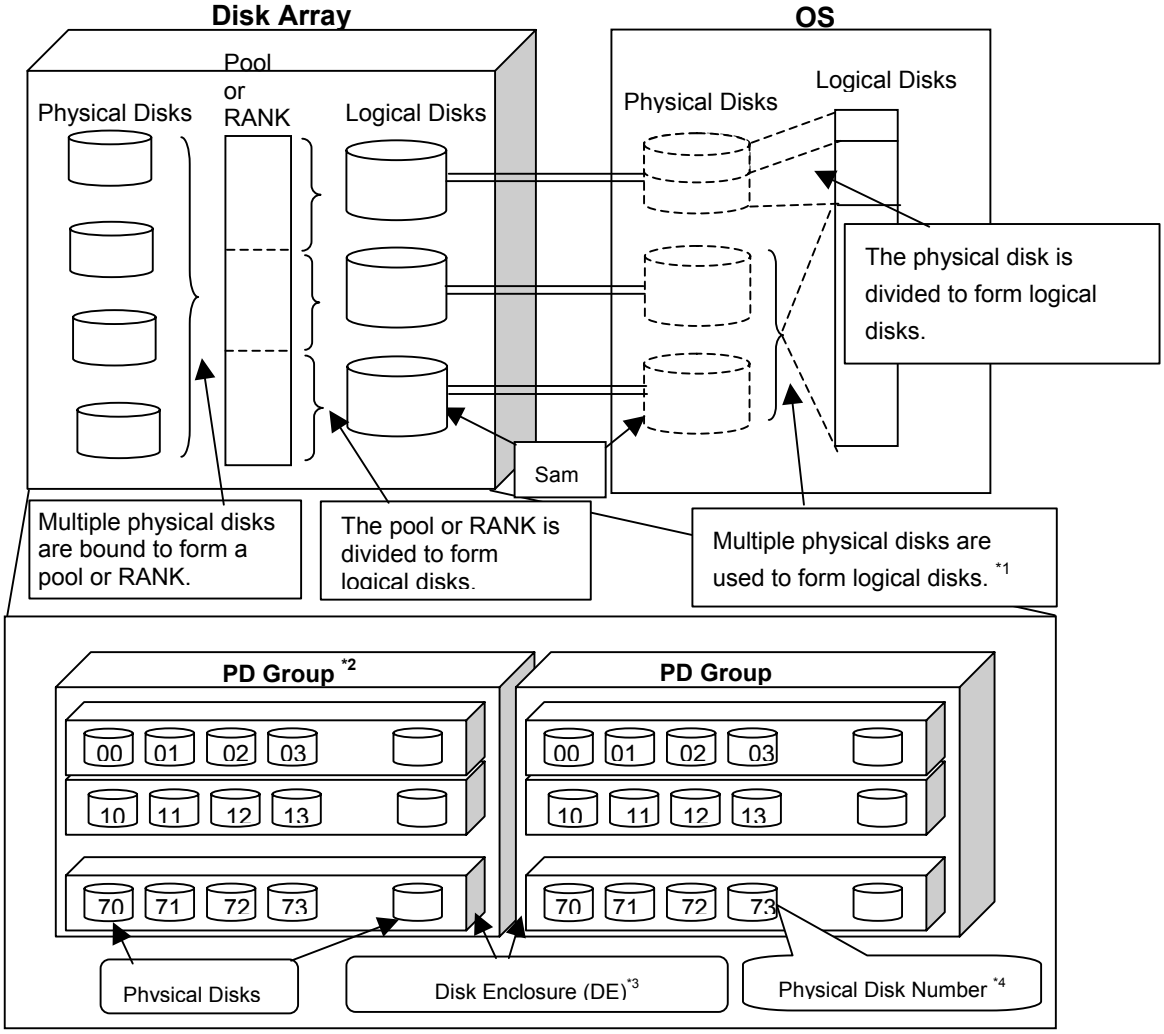
The table below shows the number of physical disks and the number of RANKs available by the RAID type on the 100/1000/2000 series (not including S400/S1400/S2400).

RAID Type \ Disk Array	Disk Array	Number of Physical Disks														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RAID0	100/1000/2000 series	○	-	○	-	○	-	-	-	-	○	-	-	-	-	○
RAID1		-	○	-	-	-	-	-	-	-	-	-	-	-	-	-
RAID5		-	-	○	○	○	○	○	○	○	○	○	○	○	○	○
RAID10		-	-	-	○	-	○	-	○	-	○	-	○	-	○	-

○: Available -: Unavailable

2.2 Logical Disk

The logical disks in the disk array are equivalent to the physical disk when viewed from the OS. In the OS, this physical disk is partitioned to be managed as multiple logical disks. In the disk array, multiple physical disks are bound as a pool or RANK, which is then divided to form logical disks.



*1 When the OS is used to support the volume group and the software RAID, etc.

*2 The PD group refers to a management aggregate of physical disks consisting of one or more DEs.

*3 The Disk Enclosure (DE) refers to a management aggregate of 10 to 15 physical disks.

*4 The physical disk number and the RANK number are given in terms of each PD group.

Figure 2-6 Physical Disks and Logical Disks

2.3 Spare

When binding pools or RANKs other than RAID0, data are still in the disks even when a single physical disk (two physical disks for RAID6) fail(s). However, if one more physical disk fails, data may be in danger of being lost.

To cope with this situation, the reliability of the disk array can be enhanced further by switching to a reserve (i.e. Spare) disk which is set beforehand, at the point when a physical disk fails.

Spares can be set for physical disks which are not used in pool or RANK binding, thus making it possible to recover data to a Spare in the same PD group when a physical disk fails. When recovery to Spares is started, the pool or RANK is rebuilt and the Spares become physical disks which comprise the pool or RANK. The failed physical disk can be replaced without stopping the access to the disk array. Considering the physical layout, it is normally desirable to set one spare disk per DE for the physical disk in the rightmost slot in the DE.

2.4 Nickname

Nicknames refer to any names that can be set for the disk array, the logical disk, the port, and the pool with regard to iSM's management target. Since the names thus set are stored in the disk array, they are held regardless of whether iSM or a disk array is restarted or not.

(1) Disk Array Name
Refers to any ID name for iSM's management target disk array. When the disk array is specified with iSM, the disk array name is used.

(2) LD Name
Refers to any ID name for a logical disk in iSM's management target disk array. When the logical disk is specified with iSM, the LD name is used.

(3) Port Name
Refers to any ID name for a port in iSM's management target disk array. When the port is specified with iSM, the port name is used.

(4) Pool Name
Refers to any ID name for a pool in the iSM's management target disk array. When the pool is specified with iSM, the pool name is used.

Before operating the disk array, users can perform efficient management of the disk array by setting the ID information with the nickname.

Chapter 3 Overview of AccessControl

This section describes functions available when program product "AccessControl" is purchased. The AccessControl is optional software.

The AccessControl provides functions to set and unset information on accessibility from the business server to logical disks.

Using these functions enables users to easily and flexibly change configuration of logical disks and perform accessibility setting.

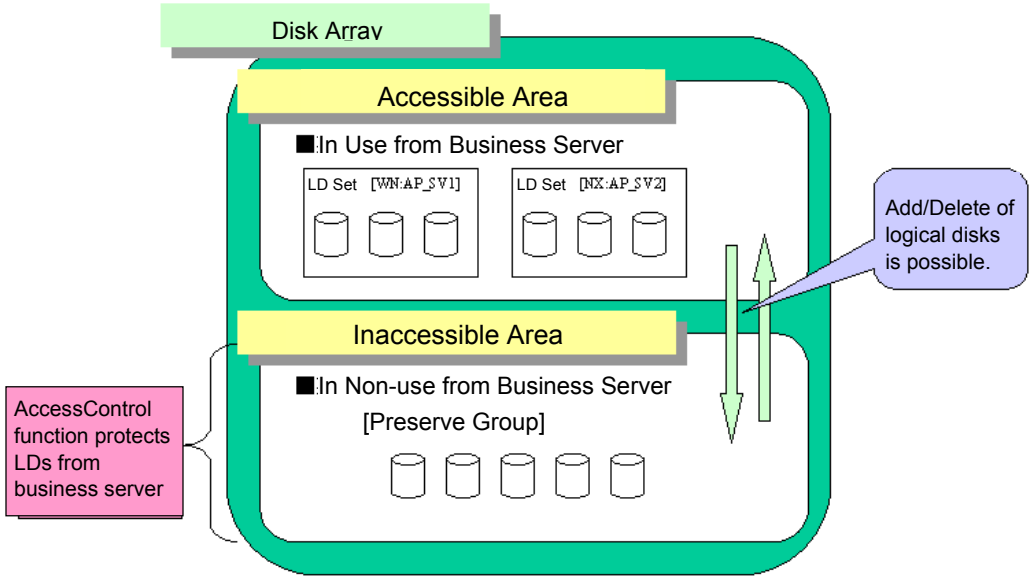


Figure 3-1 Overview of Access Control

- [Inaccessible area]
  Logical disk groups hidden from the business server by using the AccessControl function exist in this area. This area is called Preserve Group.

  [Preserve Group] Logical disks hidden from the business server and inaccessible exist in this area. Contents of the logical disks are retained and existing logical disks include logical disks with no special purpose settings, logical disks set in pairs for replication (MV, RV), volume for snapshots (BV), and link-volume (LV).

- [Accessible area]
  Logical disk groups accessible from the business server by using the AccessControl function exist in this area. Contents of the logical disks depend on the business server, and existing logical disks include ordinary logical disks with no special purpose settings, replication volume (MV, RV), volume for snapshots (BV), and link-volume (LV). In addition, each logical disk is assigned to an LD Set.

3.1 LD Set

The concept of “LD Set” is introduced to Access Control. The concept of LD Set enables to assign logical disks collectively to ports of multiple disk arrays and WWNs. When one single business server has multiple access paths and if its I/O paths are duplicated or it is clustered, define multiple access paths together by using an LD Set.

For ports and WWNs defined as paths of an identical LD Set, Access Control can be collectively set. That is, when you add or remove an LD Set after setting up Access Control, you can collectively handle ports and WWNs with an LD Set specified.

When a disk array with the program product AccessControl(WWN) applied is in use, only WWNs can be defined as paths of LD Sets.

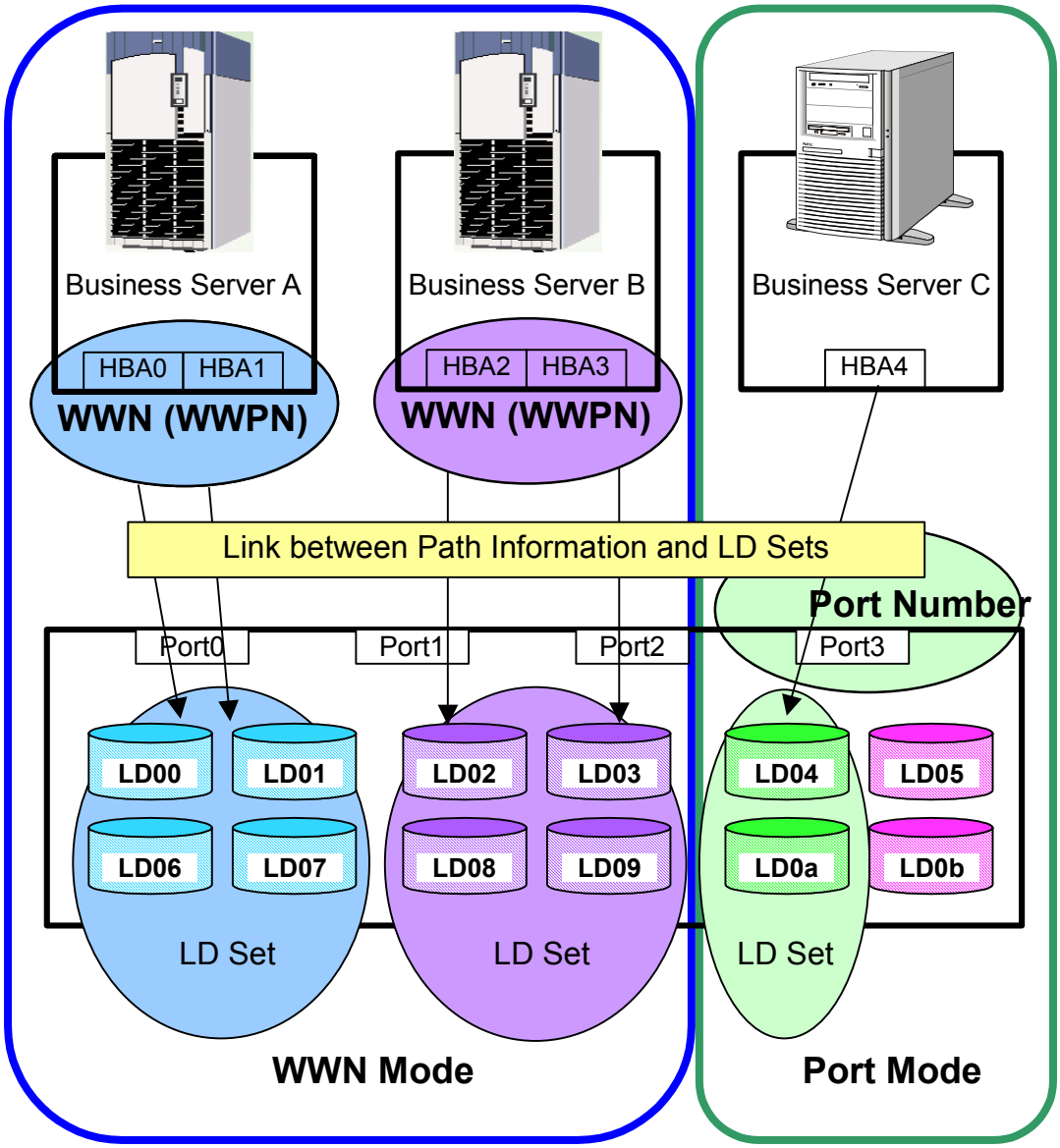


Figure 3-2 Schematic Diagram of AccessControl

3.2 WWN Mode

(1) Function

This function, which can set the accessible logical disk in terms of each business server HBA (Host Bus Adaptor), can set whether the logical disk is accessible or not in terms of each server. The HBA has the only ID code called WWN (World Wide Name). Use this code to set the WWN which allows access to logical disks.

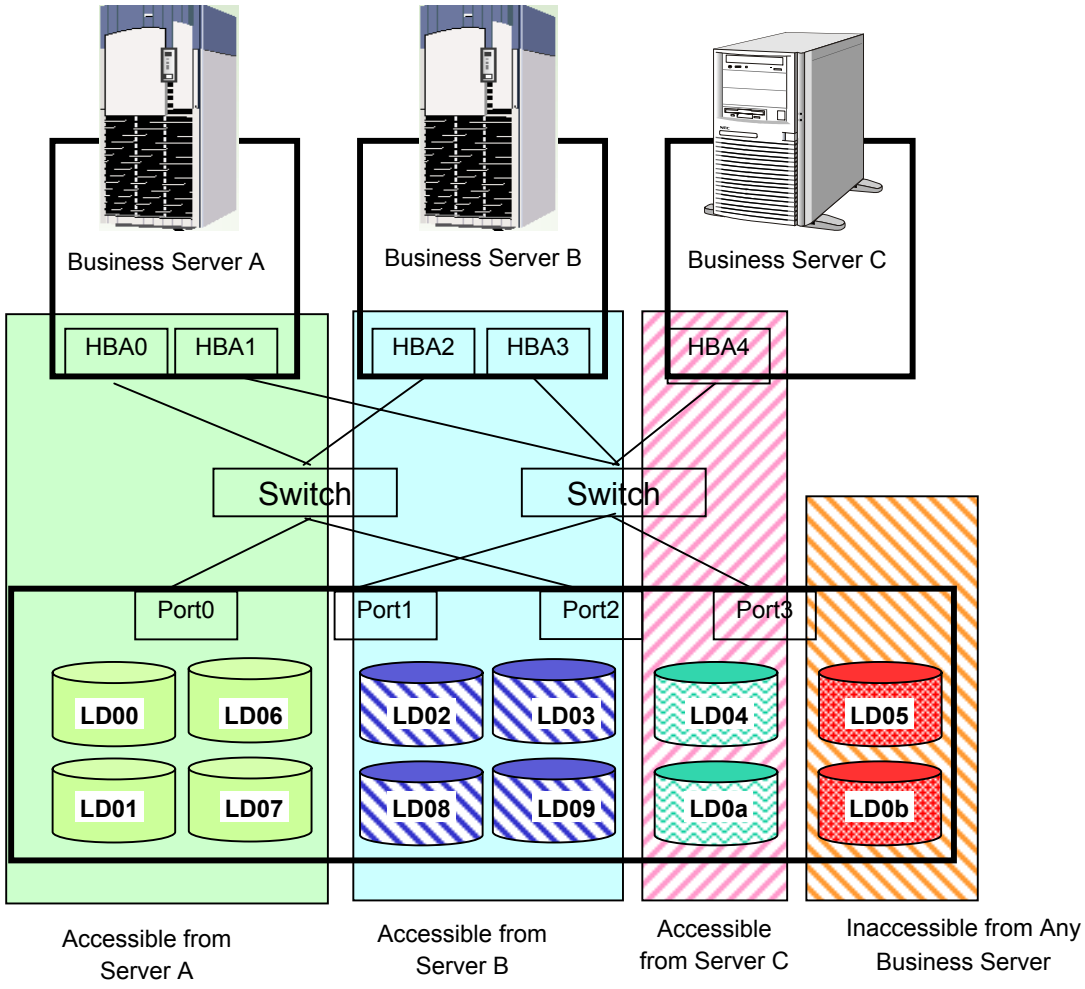


Figure 3-3 Schematic Diagram of AccessControl (WWN Mode)

Table 3-1 Setting WWN and Logical Disk Numbers

HBA \ Logical Disk No.	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 being accessible.

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

According to the settings above:

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

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

This function can divide the logical disks which bind the disk array into logical disk groups in terms of each business server HBA (Host Bus Adaptor). It can also restrict the access in terms of each server, thus making possible data protection and security protection, etc.

(2) Setting

This mode can be set through the configuration setting screen of the iSM client.

3.3 Port Mode

(1) Function

This function, which can set the accessible logical disk in terms of each disk array port, allows the access management for the logical disk in terms of each business server connected to each port of the disk array.

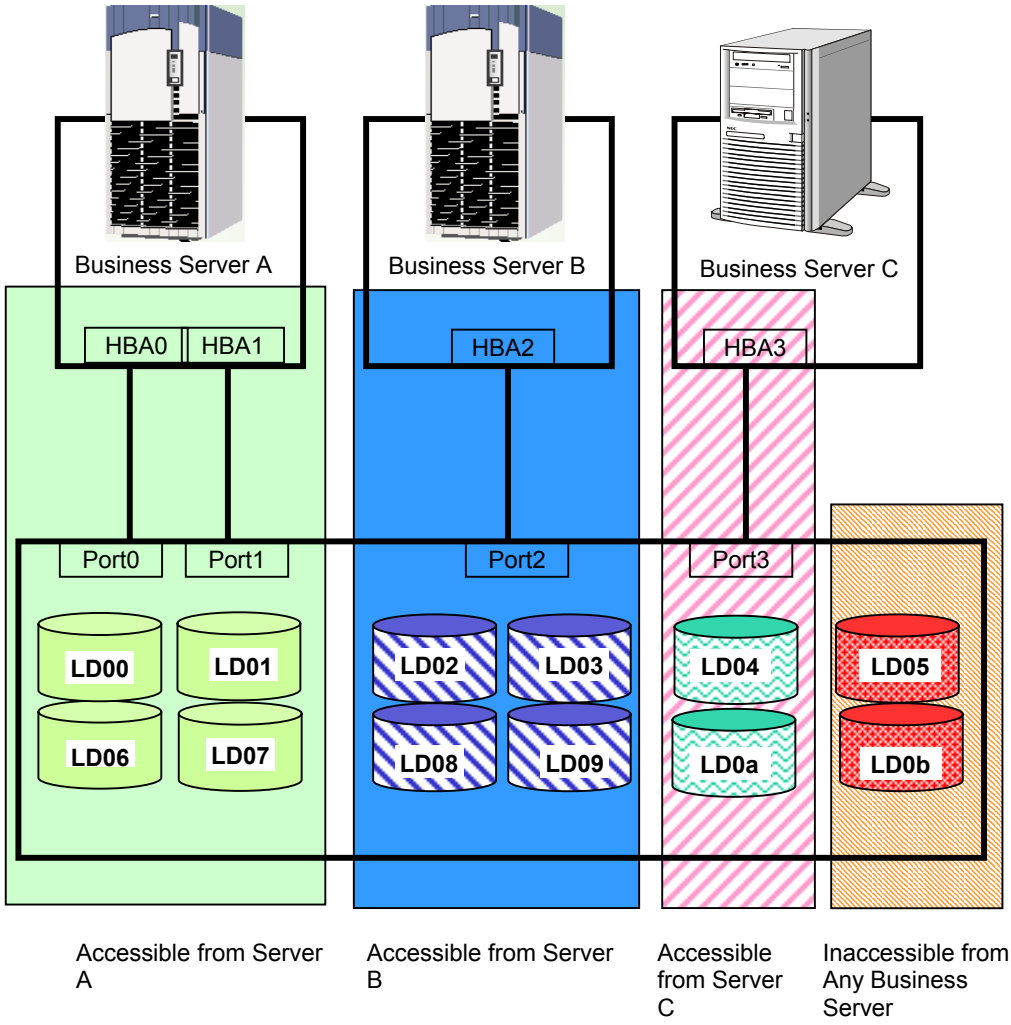


Figure 3-4 Schematic Diagram of Access Control (Port Mode)

Table 3-2 Setting Port and Logical Disk Numbers

Port \ Logical Disk No.	00	01	02	03	04	05	06	07	08	09	0a	0b
Port0	√	√	-	-	-	-	√	√	-	-	-	-
Port1	√	√	-	-	-	-	√	√	-	-	-	-
Port2	-	-	√	√	-	-	-	-	√	√	-	-
Port3	-	-	-	-	√	-	-	-	-	-	√	-

√: Sets the port and logical disk number as being accessible.

-: Sets the port and logical disk number as being inaccessible.

According to the settings in Table 3-2:

- Business server A can access logical disks LD00, LD01, LD06 and LD07 through ports Port0 and Port1.
- Business server B can access logical disks LD02, LD03, LD08 and LD09 through port Port2.

- Business server C can access logical disks LD04 and LD0a through port Port3.
- LD05 and LD0b cannot be accessed from any business 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 protection and security protection, etc. in terms of each business server connected to the port can be achieved through this function.

(2) Setting

This mode can be set through the configuration setting screen of the iSM client.
For setting of a disk array with the program product AccessControl(WWN) in port mode, ask our maintenance personnel.

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Part II Installation

Chapter 4 Configuration Setting and Access Control Installation

4.1 System Configuration

For information on configuration settings and examples of system configuration when using Access Control function, refer to Chapter 3 “System Configuration” of the “Manual Guide”.

4.2 Configuration Setting and AccessControl Installation

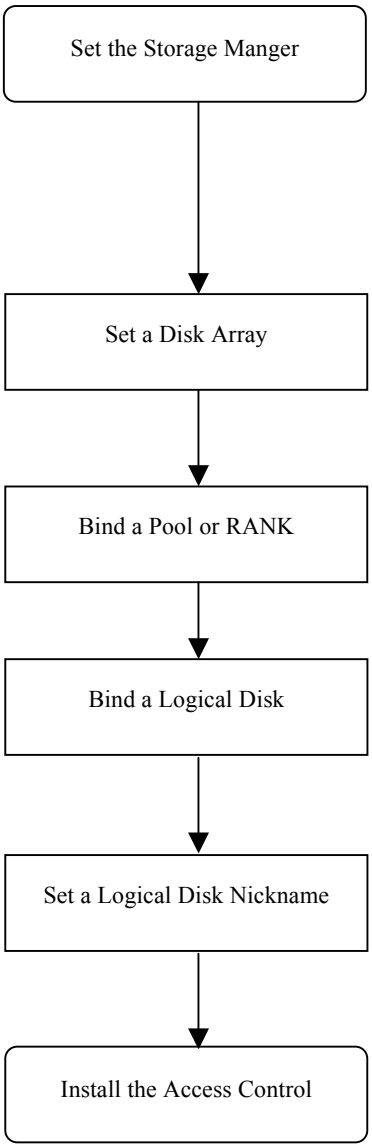
Configuration Setting and Access Control functions are installed at the same time installing the iSM server. For information on installing and uninstalling, refer to “Server Installation” and “Client Installation” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with the OS in use.

Part III Application

Chapter 5 Operation Procedures

5.1 Initial Installation

When initially installing a system and a disk array, make the settings basically in accordance with the following procedure.



Execute the following work while referring to the "User's Manual" or "User's Manual (UNIX)" in accordance with your OS.

- Install the iSM.
- Set the target disk array as a monitoring target.
- Set the user information.

If necessary, set a Disk Array. (For details, refer to 5.1.2 "Setting a Disk Array".)

Bind a pool or RANK. (For details, refer to 5.1.3 "Binding a Pool or RANK".)

Bind a logical disk. (For details, refer to 5.1.4 "Binding a Logical Disk".)

Set a nickname of the logical disk. (For details, refer to 5.1.5 "Setting a Logical Disk Nickname".)

If necessary, newly install the Access Control. (For details, refer to 5.1.6 "Installing the Access Control".)

5.1.1 Setting the Storage Manager

The following work is required before setting the configuration of the disk array.

(1) Installing the Storage Manger

For information on installing the iSM, refer to the “Installation and Setting” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with your OS.

(2) Considering the target Disk Array as a monitoring target

It is necessary to consider the disk array as the monitoring target by iSM in setting the configuration of the disk array. For information on how to target for monitoring, refer to 1.3 “Environmental Setting” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with your OS.

(3) Setting the user information

For user information settings, refer to 1.3 “Environmental Setting” in the “User’s Manual” or “User’s Manual (UNIX)” and 6.2 “Operating Range” in this manual. To set configuration, your user level needs to be Level 3. To see configuration, your user level needs to be Level 1 or higher.

5.1.2 Setting a Disk Array

Depending on the operating environment, it is necessary to set the disk array. For information on the parameters, refer to 6.1 “Parameters”. Before changing the settings, carefully read the disk array manual until they are fully understood. For how to set the disk array, refer to Chapter 9 “Configuration Setting (Common to All Units)”.

5.1.3 Binding a Pool or RANK

Bind the pool or RANK. RAID configurations differ depending on the disk array.

- Disk arrays with pool
  S400/S1400/S2400/S2800
- Disk arrays with RANK
  Other than S400/S1400/S2400/S2800

For specific procedures, refer to 7.1 "Pool Binding" or 8.1 "Binding a RANK".

5.1.4 Binding a Logical Disk

Bind a logical disk on a pool or RANK.

For specific procedure, refer to the following sections.
To bind a logical disk only (individual setting)
- Refer to 7.2.1 "Binding Logical Disks" for disk arrays with pool.
- Refer to 8.2.1 "Binding Logical Disks" for disk arrays with RANK

To bind a pool/RANK and logical disks (batch setting)
- Refer to 7.2.6 "Logical Disk Batch Setting" for disk arrays with pool.
- Refer to 8.2.4 "Logical Disk Batch Setting" for disk arrays with RANK.

Logical disks whose capacities are not the same cannot be paired. Therefore, to use data replication, bind logical disks having the same capacity in advance.

5.1.5 Setting a Logical Disk Nickname

You need to set the logical disk name to change the nickname allocated at logical disk binding.

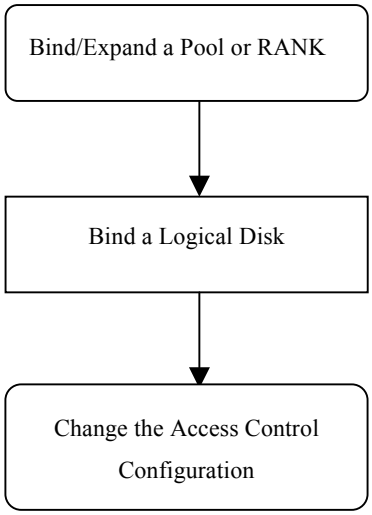
For specific procedure, refer to the following sections.
- Refer to 9.1.4 "Renaming a Logical Disk" to set a nickname.
- Refer to 9.1.5 "Nickname Batch Setting" to set multiple nicknames

5.1.6 Installing the Access Control

Install the Access Control. For specific procedures, refer to 5.4 "Access Control Installation".

5.2 Physical Disk Expansion

When expanding physical disks to the disk array in operation, make the settings basically in accordance with the following procedure.



In operating the program, bind/expand a pool or RANK. (For details, refer to 5.2.1 “Binding and Expanding a Pool or RANK”.)

In operating the program, if necessary, bind a logical disk. (For details, refer to 5.2.2 “Binding a Logical Disk”.)

If necessary, change the Access Control configuration. (For details, refer to 5.2.3 “Changing the Access Control Configuration”.)

5.2.1 Binding and Expanding a Pool or RANK

Build/expand a pool or RANK using the expanded physical disks.

For specific procedure, refer to the following sections.

For disk arrays with pool

- Refer to 7.1.1 "Binding a Pool" to build a new pool.
- Refer to 7.1.2 "Expanding Capacity of a Pool" to expand the existing pool.

For disk arrays with RANK

- Refer to 8.1.1 "RANK Bind" to build a new RANK.
- Refer to 8.1.3 "Expanding a RANK" to expand the existing RANK.

5.2.2 Binding a Logical Disk

Bind/expand a logical disk on the pool or RANK that was newly added or expanded.

For specific procedure, refer to the following sections.

To bind a logical disk only (individual setting)

- Refer to 7.2.1 "Binding Logical Disks" for disk arrays with pool.
- Refer to 8.2.1 "Binding Logical Disks" for disk arrays with RANK.

To bind a pool/RANK and logical disks (batch setting)

- Refer to 7.2.6 "Logical Disk Batch Setting" for disk arrays with pool.
- Refer to 8.2.4 "Logical Disk Batch Setting" for disk arrays with RANK.

To expand a logical disk (individual setting)

- Refer to 7.2.2 "Expanding Capacity of Logical Disks" for disk arrays with pool.

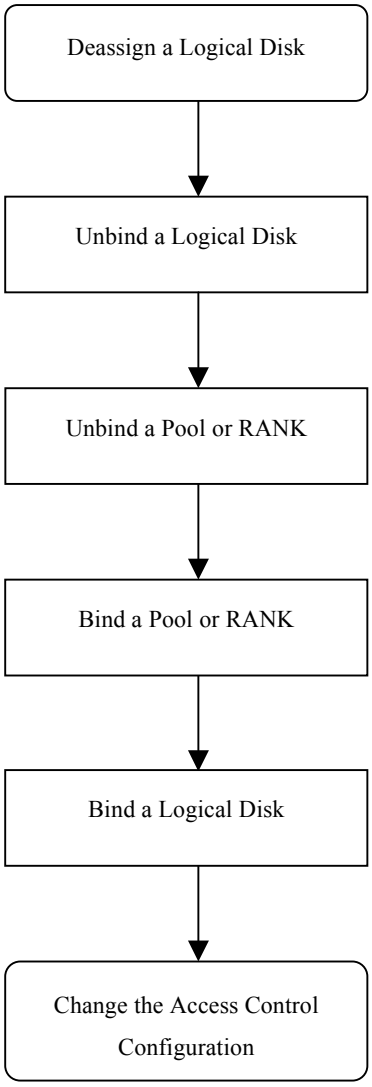
Logical disks whose capacities are not the same cannot be paired. Therefore, to use data replication, bind logical disks having the same capacity in advance.

5.2.3 Changing the Access Control Configuration

Change the Access Control configuration. For specific procedures, refer to 5.6 "Access Control Configuration".

5.3 Logical Disk Configuration Changing

When changing the logical disk configuration, make the settings basically in accordance with the following procedure.



If necessary, unbind a logical disk. (For details, refer to 5.3.2 "Unbinding a Logical Disk".)

If necessary, unbind a pool or RANK. (For details, refer to 5.3.3 "Unbinding a Pool or RANK".)

If necessary, bind a pool or RANK. (For details, refer to 5.3.4 "Binding a Pool or RANK".)

If necessary, bind a logical disk. (For details, refer to 5.3.5 "Binding a Logical Disk".

If necessary, change the Access Control configuration. (For details, refer to 5.3.6 "Changing the Access Control Configuration".)

5.3.1 Deassigning a Logical Disk

Deassign a logical disk from the LD Set. For specific procedures, refer to 10.3.3 "Deassigning a Logical Disk".

5.3.2 Unbinding a Logical Disk

Unbind a logical disk. The data saved in logical disks thus unbound are lost; be careful about this. Unbinding procedures differ depending on the disk array.

- Disk arrays with pool
  S400/S1400/S2400/S2800
- Disk arrays with RANK
  Other than S400/S1400/S2400/S2800

For specific procedure, refer to the following sections.
- Refer to 7.2.3 "Unbinding Logical Disks" for disk arrays with pool.
- Refer to 8.2.2 "Unbinding Logical Disks" for disk arrays with RANK.

5.3.3 Unbinding a Pool or RANK

If necessary, unbind a pool or RANK. Logical disks on the pool or RANK are unbound; be careful about this.

For specific procedure, refer to the following sections.
- Refer to 7.1.3 "Unbinding a Pool" for disk arrays with pool.
- Refer to 8.1.2 "RANK Unbind" for disk arrays with RANK

5.3.4 Binding a Pool or RANK

If you have unbound the pool or RANK, re-bind another pool or RANK.

For specific procedure, refer to the following sections.
- Refer to 7.1.1 "Binding a Pool" for disk arrays with pool.
- Refer to 8.1.1 "RANK Bind" for disk arrays with RANK.

5.3.5 Binding a Logical Disk

Bind a logical disk on the pool or RANK.

For specific procedure, refer to the following sections.
To bind a logical disk only (individual setting)
- Refer to 7.2.1 "Binding Logical Disks" for disk arrays with pool.
- Refer to 8.2.1 "Binding Logical Disks" for disk arrays with RANK.

To bind a pool/RANK and logical disks (batch setting)
- Refer to 7.2.6 "Logical Disk Batch Setting" for disk arrays with pool.
- Refer to 8.2.4 "Logical Disk Batch Setting" for disk arrays with RANK.

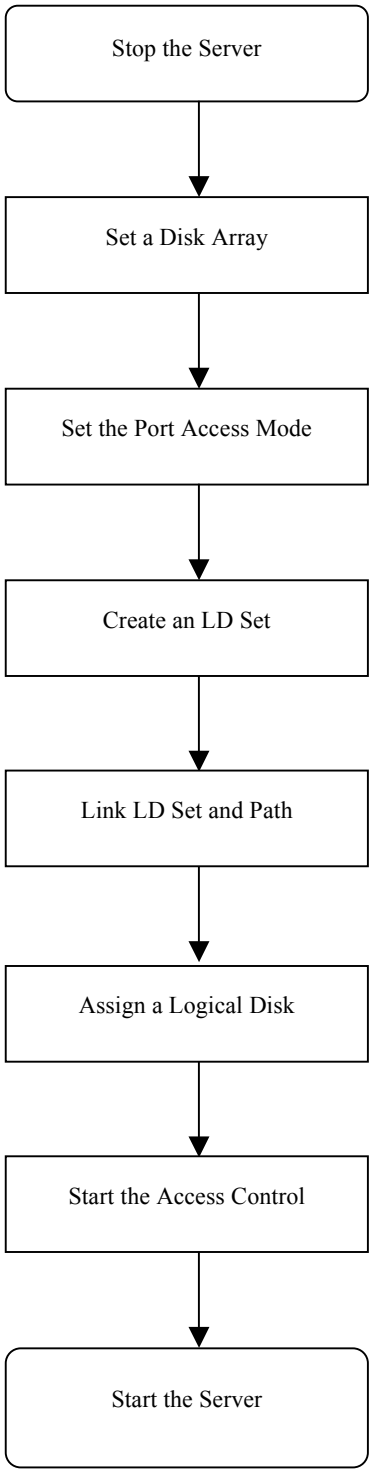
Logical disks whose capacities are not the same cannot be paired. Therefore, to use data replication, bind logical disks having the same capacity in advance.

5.3.6 Changing the Access Control Configuration

Change the Access Control configuration. For specific procedures, refer to 5.6 "Access Control Configuration Changing".

5.4 Access Control Installation

When initially installing Access Control, make the settings basically in accordance with the following procedure.



Set a disk array. (For details, refer to 5.4.2 "Setting a Disk Array".)

Set the port access mode. (For details, refer to 5.4.3 "Setting the Port Access Mode".)

Create an LD Set. (For details, refer to 5.4.4 "Creating an LD Set".)

Set links to the paths of LD Sets. (For details, refer to 5.4.5 "Linking an LD Set and Path".)

Assign a logical disk. (For details, refer to 5.4.6 "Assigning a Logical Disk".)

Start the Access Control. (For details, refer to 5.4.7 "Starting the Access Control".

5.4.1 Stopping the Server

Stop the business server connected to the disk array.

5.4.2 Setting a Disk Array

Depending on the operating environment, it is necessary to set the disk array. For information on the parameters, refer to 6.1 "Parameters". Before changing the settings, carefully read the disk array manual until they are fully understood. For how to set the disk array, refer to Chapter 9 "Configuration Setting (Common to All Units)".

5.4.3 Setting the Port Access Mode

Set the port access mode. Set the port mode to the WWN mode or Port mode depending on your operation. For specific procedures, refer to 10.1 "Changing the Port Mode".

5.4.4 Creating an LD Set

Create an LD Set. Use the LD Set type supporting your business server OS. It is recommended to specify the business server name for the LD Set name. For specific procedures, refer to 10.2.1 "Setting an LD Set".

5.4.5 Linking an LD Set and Path

Link a path to the created LD Set. Link the WWPN for the HBA port in the business server to the LD Set in the WWN mode. Link the disk array port connected to the business server to the LD Set in the Port mode. For specific procedures, refer to 10.2.2 "Linking an LD Set and Path".

5.4.6 Assigning a Logical Disk

Assign a logical disk to the created LD Set. Assign the logical disk accessed from the business server to the LD Set. For specific procedures, refer to 10.3.1 "Assigning a New Logical Disk".

5.4.7 Starting the Access Control

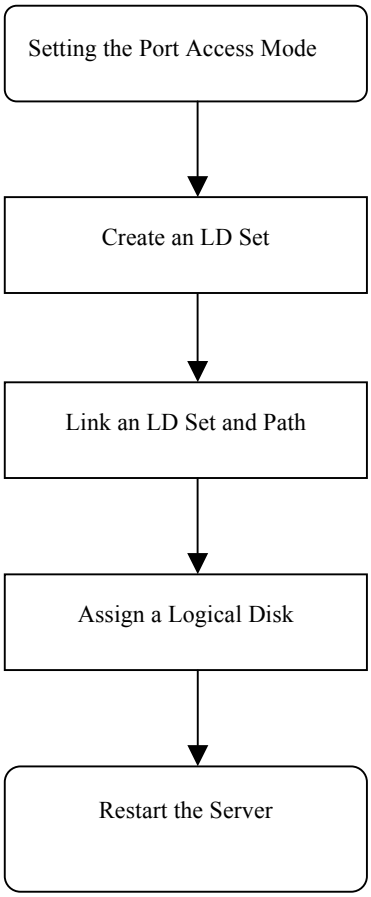
Start the Access Control. Starting the Access Control activates its setting from the business server to the logical disk. For specific procedures, refer to 10.4 "Starting the Access Control".

5.4.8 Starting the Server

Start the business server connected to the disk array.

5.5 Server Expansion

When expanding a server, make the settings basically in accordance with the following procedure.



Create an LD Set. (For details, refer to 5.5.2 "Creating an LD Set".)

Set links to the paths of LD Sets. (For details, refer to 5.5.3 "Linking an LD Set and Path".)

Assign a logical disk. (For details, refer to 5.5.4 "Assigning a Logical Disk".)

5.5.1 Setting the Port Access Mode

Set the port access mode. Set the port mode to the WWN mode or Port mode depending on your operation. For specific procedures, refer to 10.1 "Changing the Port Mode".

5.5.2 Creating an LD Set

Create an LD Set. Use the LD Set type supporting your business server OS. It is recommended to specify the business server name for the LD Set name. For specific procedures, refer to 10.2.1 "Setting an LD Set".

5.5.3 Linking an LD Set and Path

Link a path to the created LD Set. Link the WWPN for the HBA port in the business server to the LD Set in the WWN mode. Link the disk array port connected to the business server to the LD Set in the Port mode. For specific procedures, refer to 10.2.2 "Linking an LD Set and Path".

5.5.4 Assigning a Logical Disk

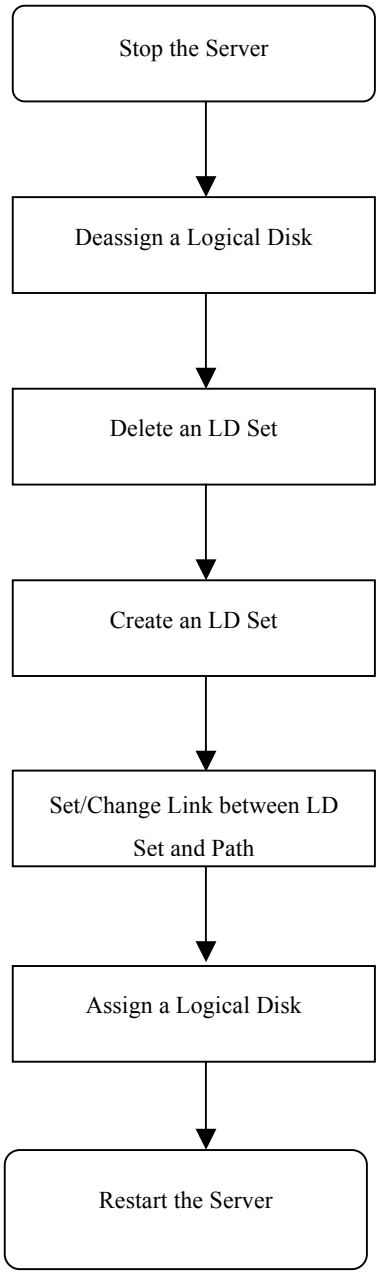
Assign a logical disk to the created LD Set. Assign the logical disk accessed from the business server to the LD Set. For specific procedures, refer to 10.3.1 "Assigning a New Logical Disk".

5.5.5 Restarting the Server

Restart the expanded business server.

5.6 Access Control Configuration Changing

When changing the Access Control configuration, make the settings basically in accordance with the following procedure.



If necessary, deassign a logical disk. (For details, refer to 5.6.2 "Deassigning a Logical Disk".)

If necessary, delete an LD Set. (For details, refer to 5.6.3 "Deleting an LD Set".

If necessary, create an LD Set. (For details, refer to 5.6.4 "Creating an LD Set".)

If necessary, set or change links to the paths of LD Sets. (For details, refer to 5.6.5 "Setting/Changing Link between an LD Set and Path".)

If necessary, assign a logical disk. (For details, refer to 5.6.6 "Assigning a Logical Disk".)

5.6.1 Stopping the Server

Stop the business server operation of which Access Control configuration will be changed.

5.6.2 Deassigning a Logical Disk

Deassign a logical disk from the LD Set. For specific procedures, refer to 10.3.3 "Deassigning a Logical Disk".

5.6.3 Deleting an LD Set

Delete unnecessary LD Sets. For specific procedures, refer to 10.2.4 "Deleting an LD Set".

5.6.4 Creating an LD Set

Create an LD Set. Use the LD Set type supporting your business server OS. It is recommended to specify the business server name for the LD Set name. For specific procedures, refer to 10.2.1 "Setting an LD Set".

5.6.5 Setting/Changing Link between an LD Set and Path

Link a path to the LD Set. Link the WWPN for the HBA port in the business server to the LD Set in the WWN mode. Link the disk array port connected to the business server to the LD Set in the Port mode. For specific procedures, refer to 10.2.2 "Linking an LD Set and Path".

5.6.6 Assigning a Logical Disk

Assign a logical disk to the LD Set. Assign the logical disk accessed from the business server to the LD Set. For specific procedures, refer to 10.3.1 "Assigning a New Logical Disk" and 10.3.2 "Assigning an Additional Logical Disk".

5.6.7 Restarting the Server

Restart the business server of which Access Control configuration was changed.

Part IV Operations

Chapter 6 Parameters

This chapter describes parameters.

6.1 Parameters

The disk arrays respectively have their own specific disk array settings and referenceable parameters. Table 6-1 lists the parameters specifiable and referenceable on each disk array series.

Table 6-1 Setting/Display Parameter List (1/4)

Setting/Display Screen	Setting/Display Parameter *1	Disk Array Series Name		
		400	1400/ 2400	2800
LD Batch Binding	LD Batch Binding	√	√	√
Nickname Batch Setting	Nickname Batch Setting	√	√	√
Replication Batch Setting	Replication Batch Setting	–	√	√
RANK/spare Setting	RANK Bind	–	–	–
	RANK Unbind	–	–	–
	RANK Information Display	–	–	–
	Capacity Expansion	–	–	–
	Change Rebuild Time	–	–	–
	Rebuild Start Instruction *2	–	–	–
	Spare Bind	√	√	√
	Spare Unbind	√	√	√
	Physical Disk Information Display	√	√	√
Pool Setting	Pool Bind	√	√	√
	Pool Unbind	√	√	√
	Pool Capacity Expansion	√	√	√
	Change Pool Rebuild Time	√	√	√
	Change Pool Expansion Time	√	√	√
	Change Pool Name	√	√	√
	Pool Information Display	√	√	√
Pool Setting (Snapshot)	Snapshot Reserve Area (SRA) Bind	√	√	√
	Snapshot Reserve Area (SRA) Unbind	√	√	√
	Snapshot Reserve Area (SRA) Expansion	√	√	√

Table 6-1 Setting/Display Parameter List (2/4)

Setting/Display Screen	Setting/Display Parameter *1	Disk Array Series Name		
		400	1400/ 2400	2800
LD Setting	LD Bind	√	√	√
	LD Unbind	√	√	√
	LD Information Display	√	√	√
	Change Ownership	–	–	–
	Change Format Time	√	√	√
	Change LD Name	√	√	√
	Logical Disk Capacity Expansion	√	√	√
LD Setting (Snapshot)	Generation Adding	√	√	√
	Generation Unbind	√	√	√
	LV Binding	√	√	√
Nickname Setting	Setting/Displaying Disk Array Name	√	√	√
	Setting/Displaying Port Name	√	√	√
Platform Setting	Setting/Display Port Platform	√	√	√
Network Setting	Setting/Display Disk Array Network	√	√	√
License	Unlocking License	√	√	√
Special Setting	Setting/Displaying Cross Call	–	–	–
	Setting/Displaying Auto Assignment	–	–	–
	Setting/Displaying Spare Mode	–	–	–
	Setting/Displaying Expand LUN	–	–	–
	Setting/Displaying Disk Array Time	√	√	√
	Get Log *3	√	√	√
Access Control Setting	Setting/Displaying Access Control	√	√	√
LD Administrator Setting	Setting/Displaying Access Control	–	–	√
	Initialization of Logical Disk	–	–	√
	Initialization of EVN (Extended Volume Name)	–	–	√
	Setting/Displaying of Performance Optimization	–	–	–
Setting Cache Segment	Setting Cache Segment	–	–	√
	Assigning Logical Disk /Freeing Logical Disk	–	–	√
	Displaying Segment State	–	–	√
Get Configuration Information	Get Configuration Information *3	√	√	√

√: Specifiable –: Not specifiable

Table 6-1 Setting/Display Parameter List (3/4)

Setting/Display Screen	Setting/Display Parameter *1	Disk Array Series Name							
		1100	1200	100/ 1300	2100	2200	2300	3100/ 4100	3300/ 4300
LD Batch Binding	LD Batch Binding	√	√	√	√	√	√	–	–
Nickname Batch Setting	Nickname Batch Setting	√	√	√	√	√	√	√	√
Replication Batch Setting	Replication Batch Setting	–	–	–	√	√	√	√	√
RANK/spare Setting	RANK Bind	√	√	√	√	√	√	–	–
	RANK Unbind	√	√	√	√	√	√	–	–
	RANK Information Display	√	√	√	√	√	√	√	√
	Capacity Expansion	√	√	√	√	√	√	–	–
	Change Rebuild Time	√	√	√	√	√	√	–	–
	Rebuild Start Instruction *2	√	√	√	√	√	√	–	–
	Spare Bind	√	√	√	√	√	√	–	–
	Spare Unbind	√	√	√	√	√	√	–	–
	Physical Disk Information Display	√	√	√	√	√	√	√	√
Pool Setting	Pool Bind	–	–	–	–	–	–	–	–
	Pool Unbind	–	–	–	–	–	–	–	–
	Pool Capacity Expansion	–	–	–	–	–	–	–	–
	Change Pool Rebuild Time	–	–	–	–	–	–	–	–
	Change Pool Expansion Time	–	–	–	–	–	–	–	–
	Change Pool Name	–	–	–	–	–	–	–	–
	Pool Information Display	–	–	–	–	–	–	–	–
Pool Setting (Snapshot)	Snapshot Reserve Area (SRA) Bind	–	–	–	–	–	–	–	–
	Snapshot Reserve Area (SRA) Unbind	–	–	–	–	–	–	–	–
	Snapshot Reserve Area (SRA) Expansion	–	–	–	–	–	–	–	–
LD Setting	LD Bind	√	√	√	√	√	√	–	–
	LD Unbind	√	√	√	√	√	√	–	–
	LD Information Display	√	√	√	√	√	√	√	√
	Change Ownership	√	√	√	√	√	√	–	–
	Change Format Time	√	√	√	√	√	√	–	–
	Change LD Name	–	–	–	–	–	–	–	–
	Logical Disk Capacity Expansion	–	–	–	–	–	–	–	–
LD Setting (Snapshot)	Generation Adding	–	–	–	–	–	–	–	–
	Generation Unbind	–	–	–	–	–	–	–	–
	LV Binding	–	–	–	–	–	–	–	–

Table 6-1 Setting/Display Parameter List (4/4)

Setting/Display Screen	Setting/Display Parameter *1	Disk Array Series Name							
		1100	1200	100/ 1300	2100	2200	2300	3100/ 4100	3300/ 4300
Nickname Setting	Setting/Displaying Disk Array Name	√	√	√	√	√	√	√	√
	Setting/Displaying Port Name	√	√	√	√	√	√	√	√
Platform Setting	Setting/Display Port Platform	–	√	√	–	√	√	–	–
Network Setting	Setting/Display Disk Array Network	–	√	√	–	√	√	–	–
License	Unlocking License	–	–	√	–	–	√	–	√
Special Setting	Setting/Displaying Cross Call	√	√	√	√	√	√	–	–
	Setting/Displaying Auto Assignment	√	√	√	√	√	√	–	–
	Setting/Displaying Spare Mode	√	√	√	√	√	√	–	–
	Setting/Displaying Expand LUN	√	√	√	√	√	√	–	–
	Setting/Displaying Disk Array Time	√	√	√	√	√	√	–	–
	Get Log *3	√	√	√	√	√	√	–	–
Access Control Setting	Setting/Displaying Access Control	√	√	√	√	√	√	√	√
LD Administrator Setting	Setting/Displaying Access Control	–	–	–	–	–	–	√	√
	Initialization of Logical Disk	–	–	–	–	–	–	√	√
	Initialization of EVN (Extended Volume Name)	–	–	–	–	–	–	√	√
	Setting/Displaying of Performance Optimization	–	–	–	–	–	–	√	√
Setting Cache Segment	Setting Cache Segment	–	–	–	–	–	–	√	√
	Assigning Logical Disk /Freeing Logical Disk	–	–	–	–	–	–	√	√
	Displaying Segment State	–	–	–	–	–	–	√	√
Get Configuration Information	Get Configuration Information *3	√	√	√	√	√	√	√	√

√: Specifiable –: Not specifiable

Notes:

*1: To set the parameters, your user level needs to be L3 (level 3). However, it is allowed for any user whose user level is L1 (level 1) or L2 (level 2) to display the parameters in reference mode. For information about the operation levels, refer to 6.2 “Operating Range”.

*2: While the Rebuild Start Instruction parameter can also be operated in reference mode, your user level needs to be L3 (level 3).

*3: The Get Log and Get Configuration Information parameters can also be operated in reference mode.

6.2 Operating Range

Set level 1 to 3 as a user level. The following shows target users and executable functions at each level:

- Level 1 (L1):
  This level is defined for general users. The users are permitted to perform only reference operation focusing on status display or monitoring.

- Level 2 (L2):
  This level is defined for operators. The operators are permitted to perform the level 1 operations and execute functions necessary for daily operations.

- Level 3 (L3):
  This level is defined for system administrators. The system administrators are permitted to execute all functions including various settings for disk arrays.

After connection to the iSM server, the user level is displayed on the status bar of the iSM client. Each user can use the functions allowed for the indicated level only.

Chapter 7 Disk Array Configuration Setting (S400/S1400/S2400/S2800)

This chapter describes how to set the configuration of the disk array in S400/S1400/S2400/S2800. For configuration setting in S100/S1100/S1200/S1300/S2100/S2200/S2300, refer to Chapter 8.

7.1 Pool Binding

Specify the physical disks of the disk array to be put in the RAID configuration and assign the RAID type to bind a pool. Then, bind the logical disks to the pool to bind the logical disks. In addition, bind a control volume individually. A control volume is a volume for control over snapshot operation. (For the details of control volumes, refer to "Snapshot User's Manual (Function Guide)" (IS030).)

After adding physical disks, take the steps stated above to the added physical disks to bind the logical disks. Adding physical disks puts no influence on any existing logical disks, which belongs to the pool and already in use. Adding and binding logical disks to the pool also puts no influence on any existing logical disks.

Pools are classified into two types; the dynamic pool allows expanding the capacity of the pool and the logical disks, and the basic pool does not allow expanding the capacity of the pool and the logical disks.

The logical disk configurations selectable by the pool are as follows:

Logical disk configuration: Dynamic pool RAID6 (4+PQ)/(8+PQ)

Basic pool RAID1 (1+1)
Basic pool RAID5 (4+P)
Basic pool RAID10 (1+1) × 2/(1+1) × 4/(1+1) x 8
Basic pool RAID50 (4+P) × 2/(4+P) × 4

Bind logical disks in accordance with the following procedure.

(1) Pool Bind
(2) LD Bind

7.1.1 Binding a Pool

Bind a pool through wizard. Bind a new pool following the steps indicated on the wizard.

(1) Starting up the pool binding wizard

Click the [Pool Binding] button in the “LD Individual Bind/Unbind” screen.

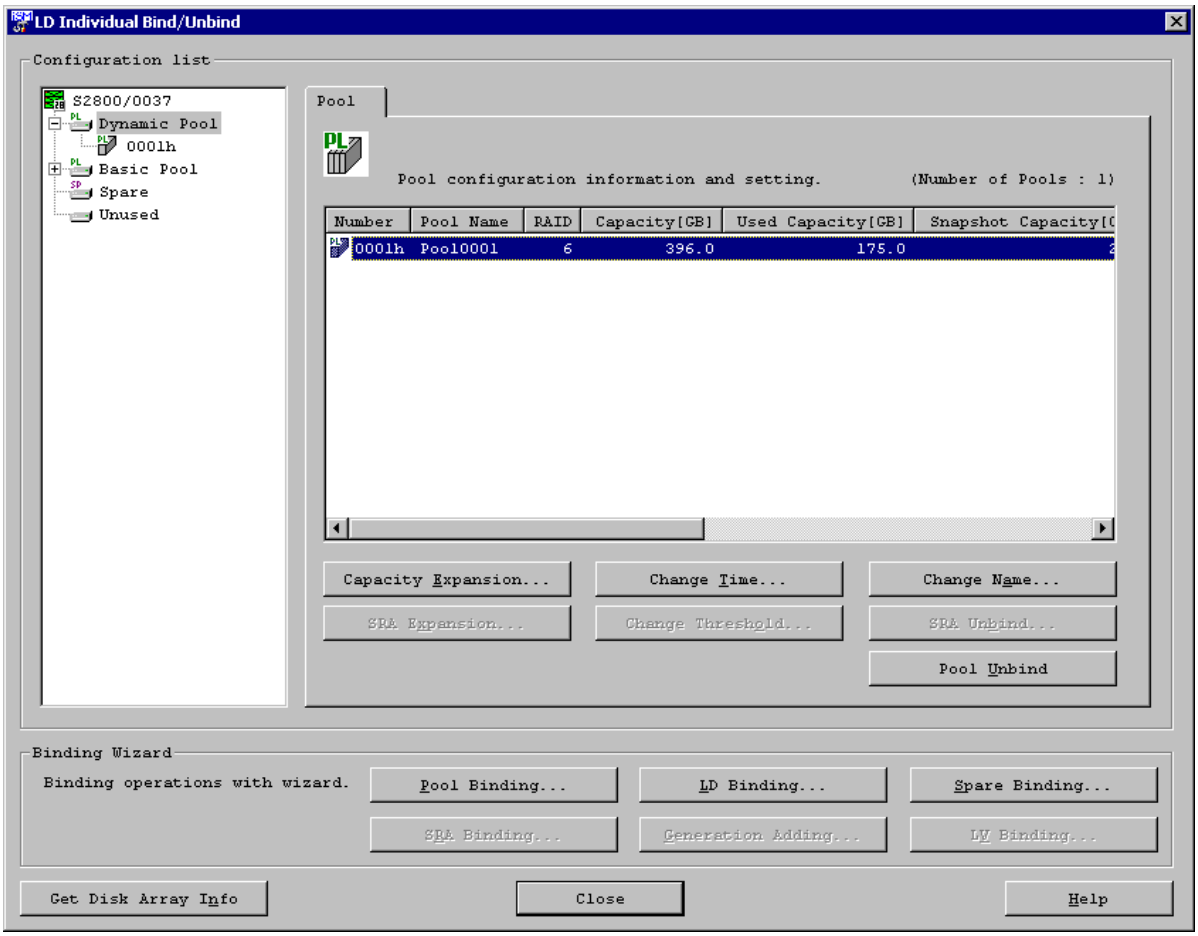


Figure 7-1 Starting Up Pool Binding Wizard

(2) Setting about the pool binding wizard

Clicking the [Pool Binding] button on the "LD Individual Bind/Unbind" screen displays the "Welcome to the Pool Binding Wizard" screen.

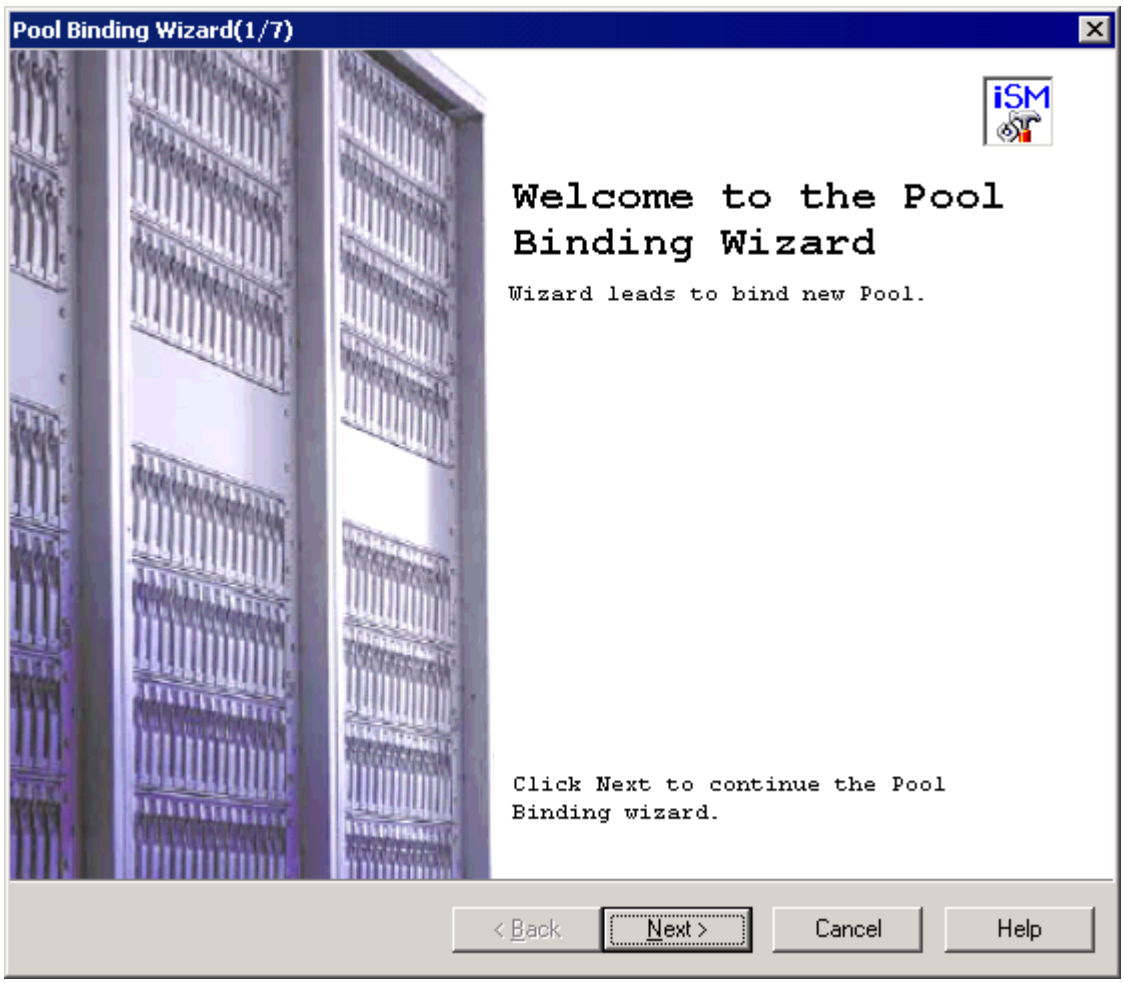


Figure 7-2 Setting About Pool Binding Wizard

[Next] button: Displays the "Pool Selection" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(3) Selecting the pool type

Clicking the [Next] button on the "Welcome to the Pool Binding Wizard" screen displays the "Pool Selection" screen.

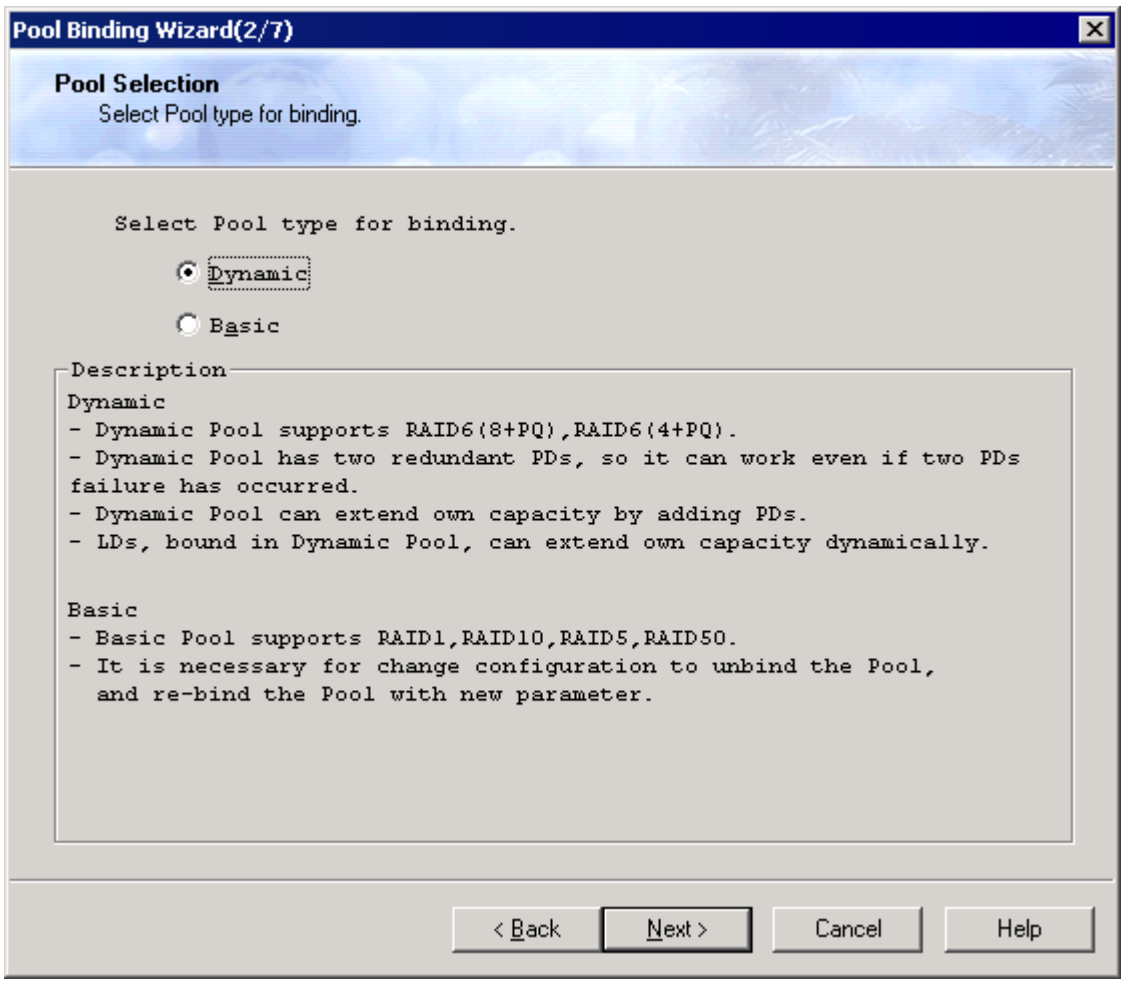


Figure 7-3 Selecting Pool Type

You can bind a pool of either of the following types with a fixed RAID configuration:

Dynamic:	RAID6 (8+PQ) or RAID6(4+PQ) is allowed. The dynamic pool and its logical disks are easy to expand.
Basic:	RAID1, RAID10, RAID5, or RAID50 is allowed. It is not allowed to expand any basic pool and its logical disks.
[Next] button:	Displays the "RAID Type Selection" screen.
[Back] button:	Displays back the "Welcome to the Pool Binding Wizard" screen.
[Cancel] button:	Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(4) Selecting the RAID type

Clicking the [Next] button on the “Pool Selection” screen displays the “RAID Type Selection” screen.

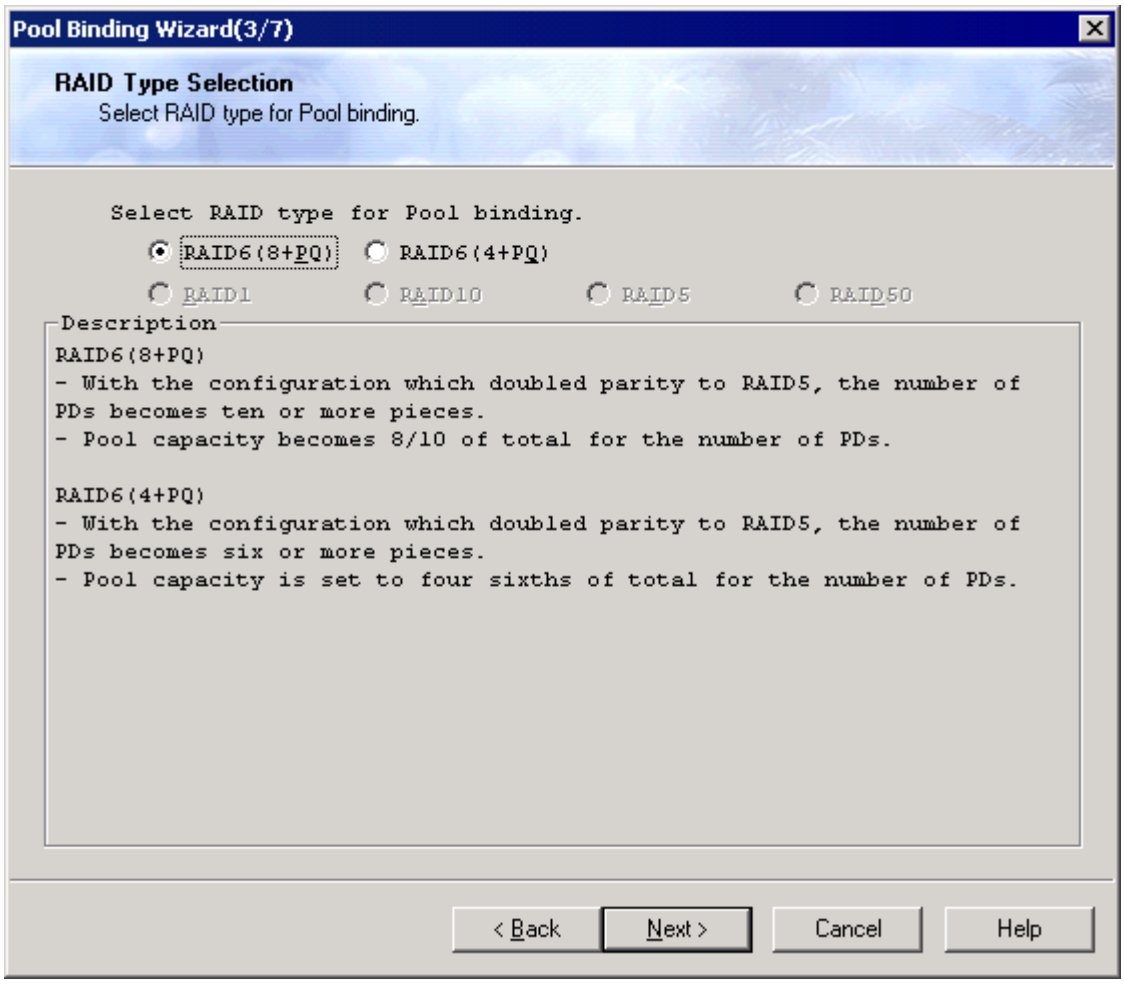


Figure 7-4 Selecting RAID Type (for Dynamic Pool)

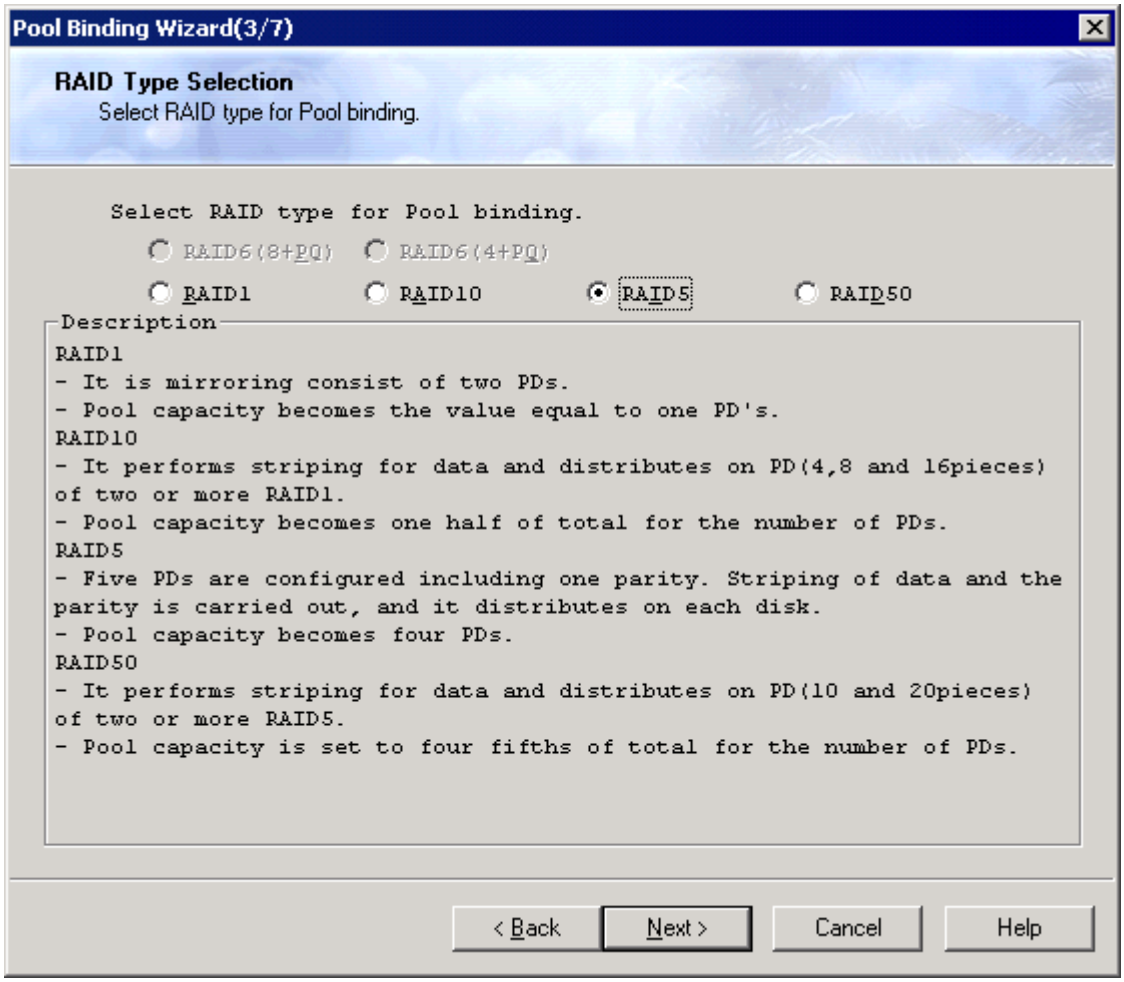


Figure 7-5 Selecting RAID Type (for Basic Pool)

RAID type radio button: Put a checkmark on the RAID type of the pool you want to bind. The selections depend on the type you specified on the “Pool Selection” screen.

[Next] button: Displays the “PD Selection” screen.

[Back] button: Displays back the “Pool Selection” screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(5) Selecting physical disks

Clicking the [Next] button on the "RAID Type Selection" screen displays the "PD Selection" screen.

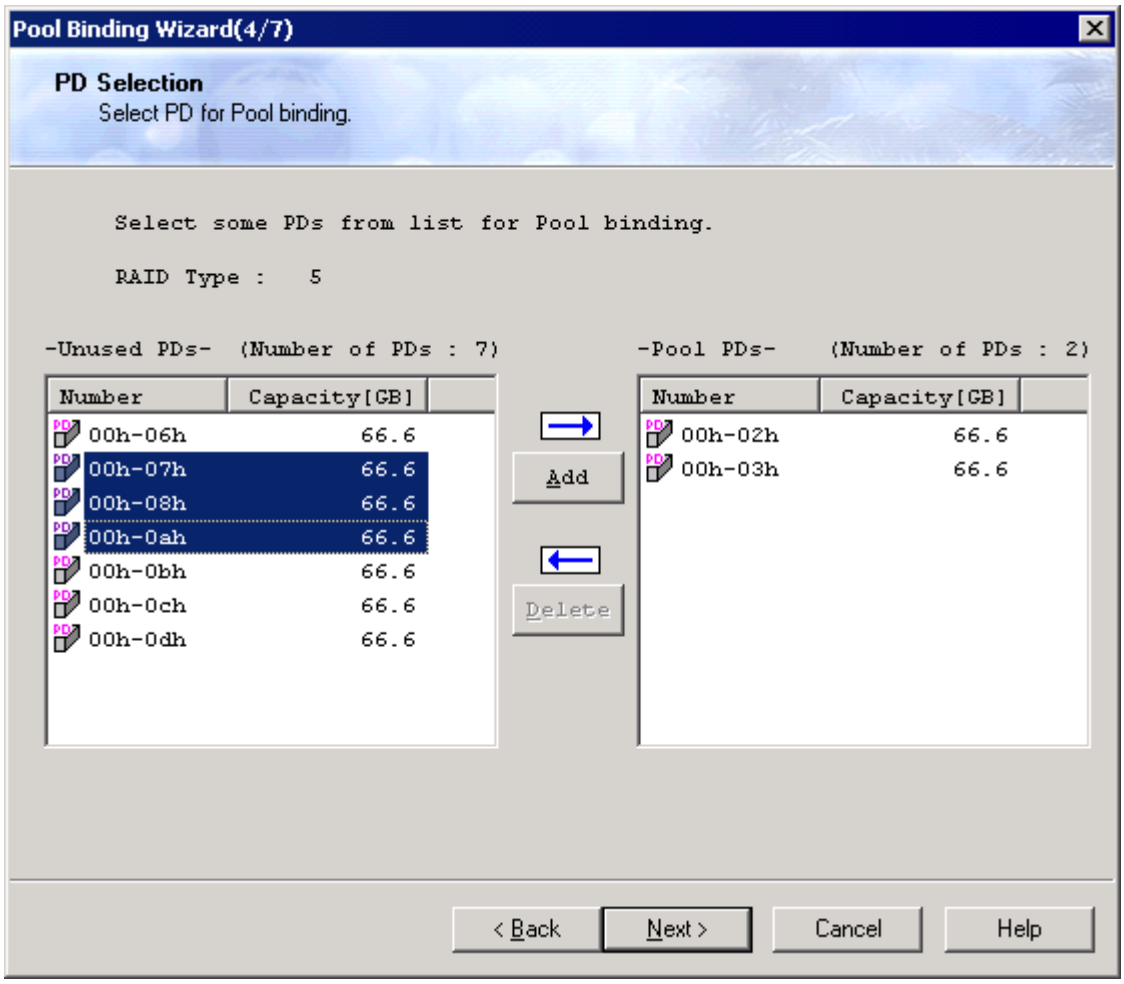


Figure 7-6 Selecting Physical Disks

Unused PDs: Lists physical disks still unused.

Pool PDs: Lists the physical disks to use for the pool.

[Add] button: Select unused physical disks to use for the pool, then click this button to add them to the pool.

[Delete] button: Select any physical disks to be removed from the pool, then click this button. The selected physical disks are restored as unused.

[Next] button: Displays the "Detail Parameter Setting for Pool Binding" screen.

[Back] button: Displays back the "RAID Type Selection" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

If no RAID type is available for the pool with the physical disks you selected, any of the [25201], [25202], or [25227] message box is displayed as follows:.

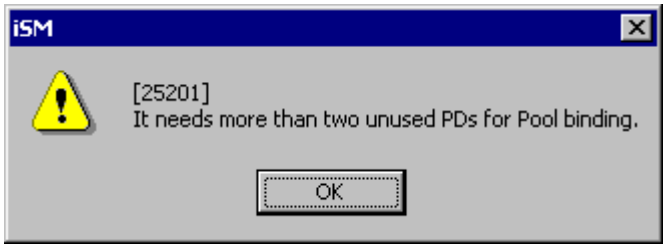


Figure 7-7 Message Box

(6) Setting detailed parameters

Clicking the [Next] button on the "PD Selection" screen displays the "Detail Parameter Setting for Pool Binding" screen.

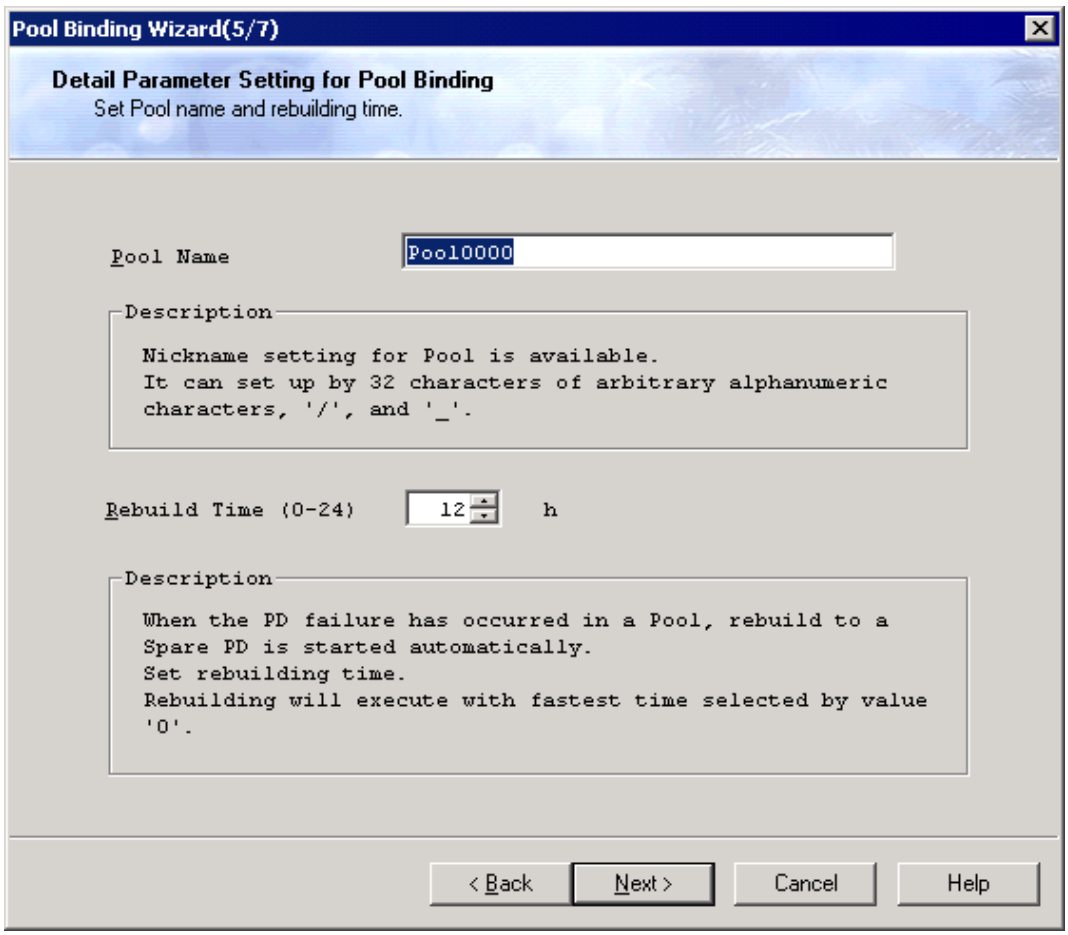


Figure 7-8 Setting Detailed Parameters

Pool Name: Specify the name of the pool. This screen initially puts the name automatically assigned in the form of "Pool" + Number (hexadecimal, 4 digits) in the field. Note that you cannot specify any name already used in the disk array.

Any pool name that does not conform to the following rules is invalid:

- Number of available characters: 1 to 24 characters
- Available characters:
  - Alphabet: A to Z (a to z)
    * Upper- and lower-case characters are distinguished.
  - Numerals: 0 to 9
  - Underbar: _
  - Slash: /

* All the characters must be 1-byte characters.

For an invalid pool name, any of the [25203], [25204], or [25205] message box is displayed as follows:

Figure 7-9 Message Box

Rebuild Time: Specify the duration of time to do rebuild if a physical disk becomes faulty. You can specify 0 to 24 hours. Although specifying 0 rebuilds the faulty disk in the shortest time, select an appropriate time taking account of the load to the host I/O. The time specified in the field is just a target, thus it is not assured to take the specified time.

[Next] button: Displays the “Confirmation for Pool Binding Parameter” screen.

[Back] button: Displays back the “PD Selection” screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(7) Checking for the parameters specified for the pool

Clicking the [Next] button on the "Detail Parameter Setting for Pool Binding" screen displays the "Confirmation for Pool Binding Parameter" screen.

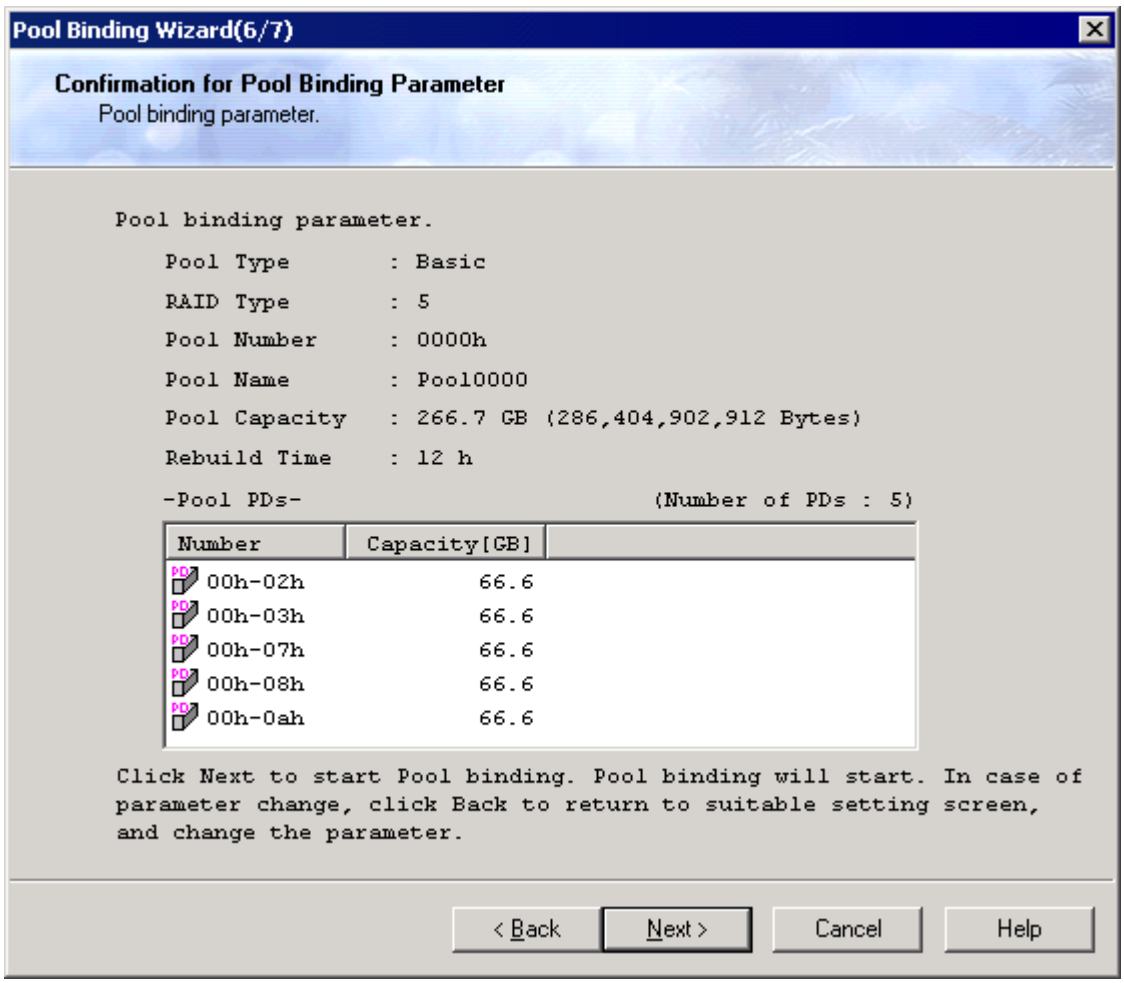


Figure 7-10 Checking for Parameters Specified for Pool

Pool Type: Type of the pool

RAID Type: RAID type of the pool

Pool Number: Number of the pool to bind

Pool Name: Name of the pool to bind

Pool Capacity: Capacity of the pool to bind

Rebuild Time: Duration of time to rebuild the pool

Pool PDs: List of physical disks that bind the pool

Number of PDs: Number of physical disks that bind the pool

[Next] button: Displays a message asking you to proceed.

[Back] button: Displays back the “Detail Parameter Setting for Pool Binding” screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

Figure 7-11 Message Box to Start Binding Pool

Insufficient license capacity

Binding or expanding pools may result in insufficiency of license capacity due to the increased capacity. This status restricts operation of the following functions as described below:

- DDR/RDR

  Pairs cannot be newly set or unpaired.

  Replication operation for set pairs is possible.
- RDR DisasterRecovery

  ATgroup creation, deletion, ATgroup rename, and ATgroup volume creation/deletion are disabled.

  ATgroup that is already set can be manipulated.
- Snapshot configuration

  Generations cannot be added or deleted.

  Only thresholds can be changed.
- Snapshot

  No restriction is placed.
- Cache partitioning

  New cache segments cannot be bound.

  LDs can be allocated or unbounded for cache segments that are already defined.

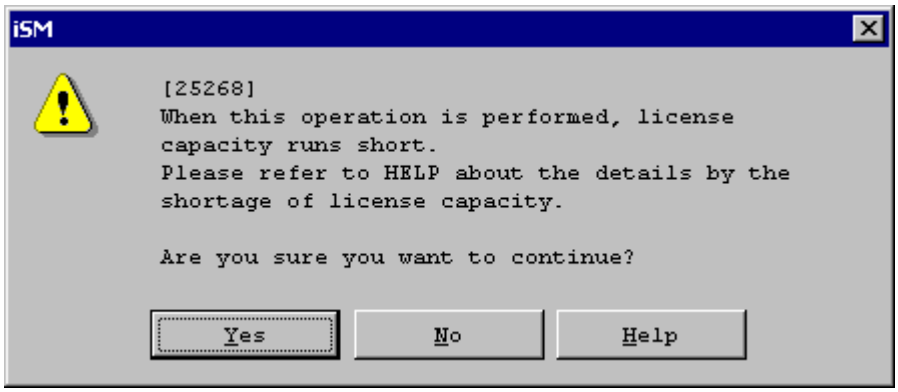


Figure 7-12 License Capacity Insufficiency Inquiry Message

(8) Finishing binding the pool

When the pool is successfully bound, the following screen is displayed:

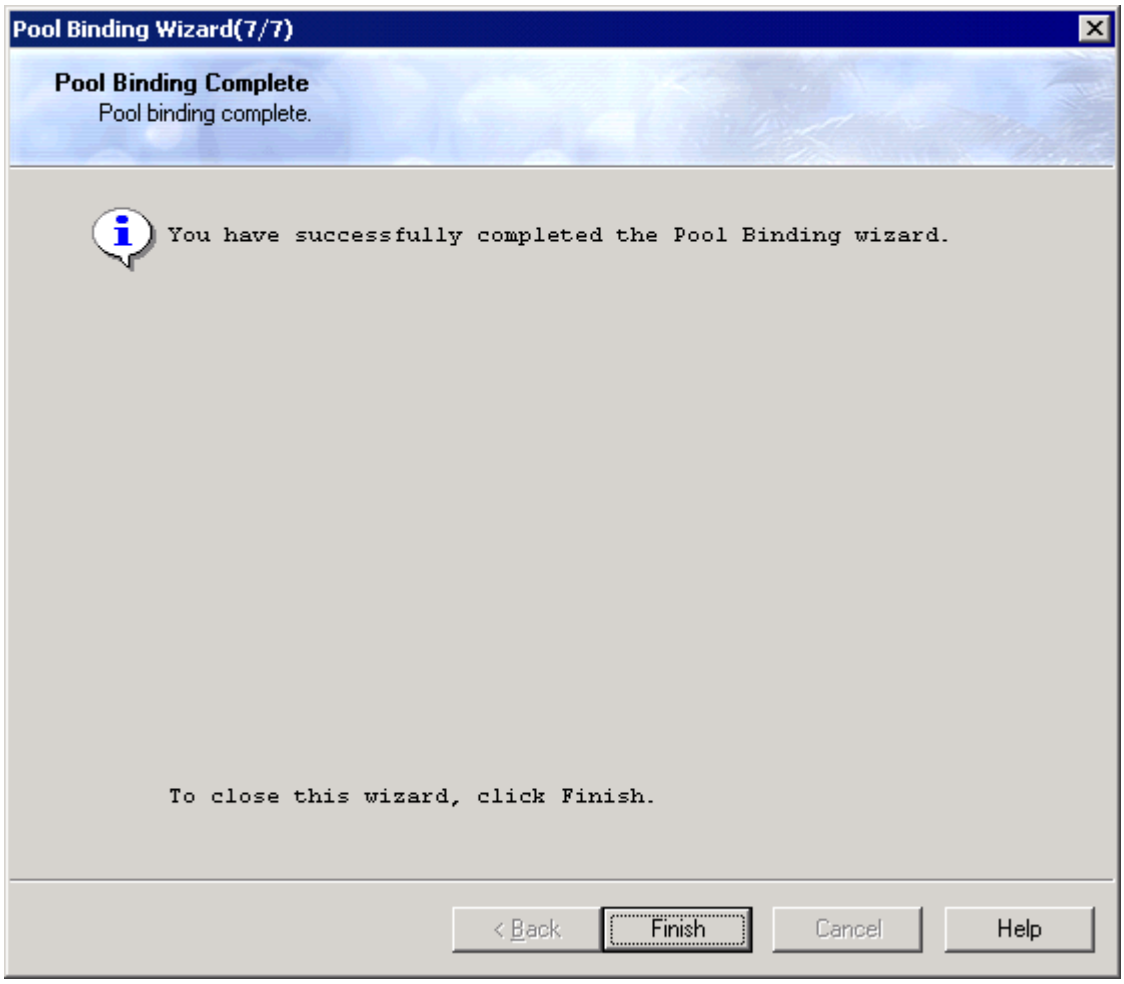


Figure 7-13 Pool Successfully Bound

[Finish] button: Closes the wizard.

7.1.2 Expanding Capacity of a Pool

You can expand the capacity of a pool from the “LD Individual Bind/Unbind” screen.

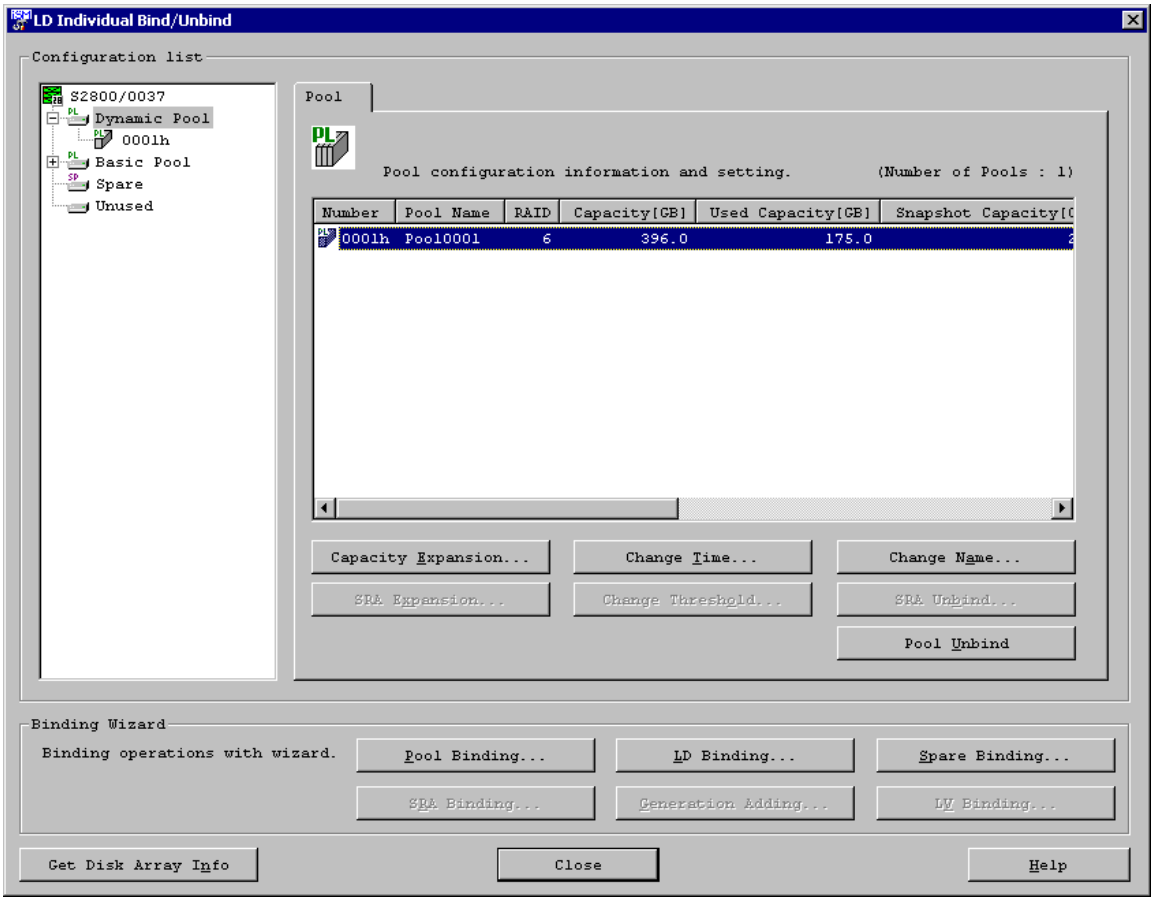


Figure 7-14 Expanding the Pool Capacity

<Steps for expanding the capacity of a pool>

1. Select Dynamic Pool to be expanded in the configuration tree view.

2. Select a dynamic pool to be expanded from the list of pools in the detailed information view.

3. Click the [Capacity Expansion] button.

4. A dialog box for expanding the capacity of a pool appears.

Before expanding the capacity of a pool, be sure to check that the physical disks of the pool have no problem.

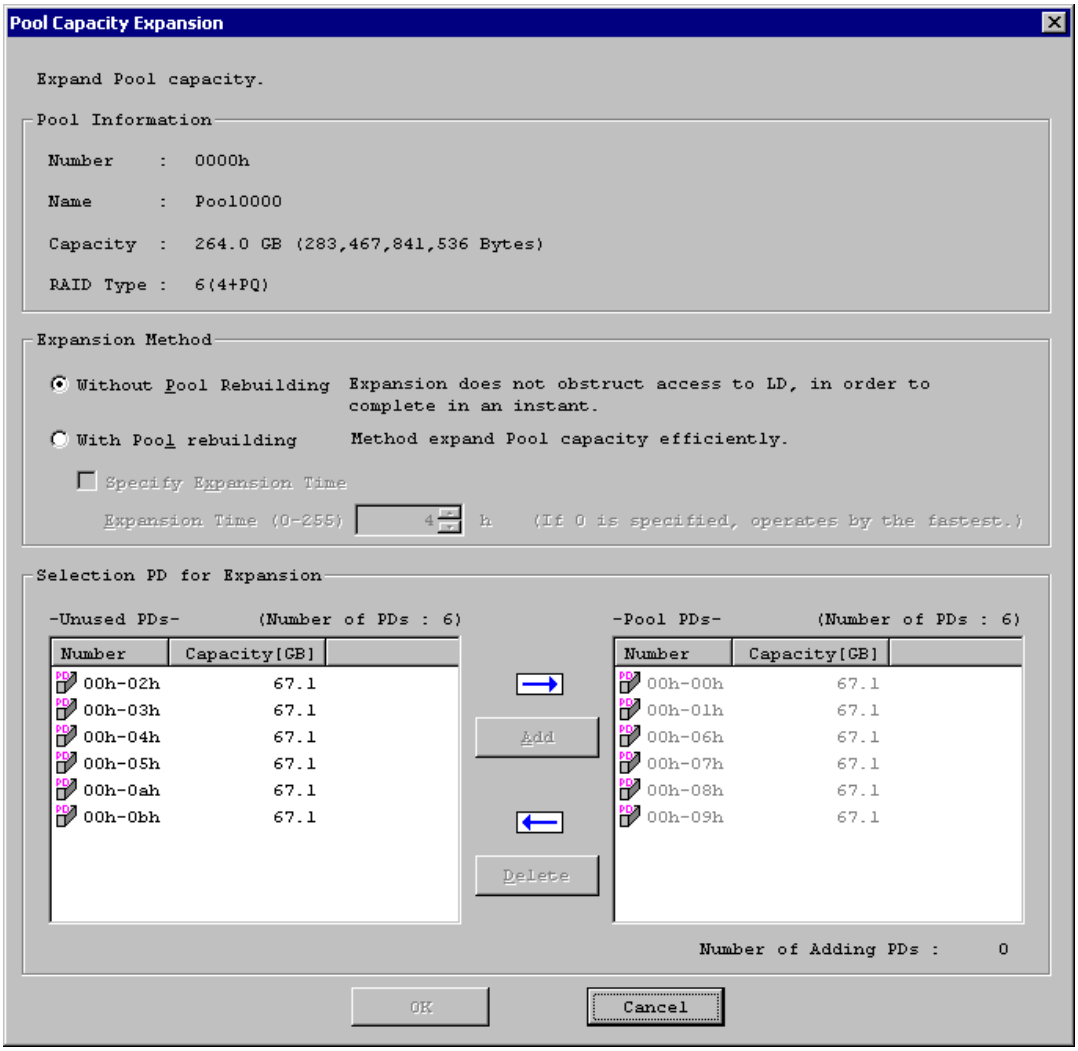


Figure 7-15 Pool Capacity Expansion Dialog

Pool Information

Number: Number of the pool

Name: Name of the pool

Capacity: Current capacity of the pool

RAID Type: Current RAID type

Expansion Method

Without Pool Rebuilding: Allows expanding the capacity of the pool without any influence to the existing logical disks. For a pool in a configuration of RAID6 (4+PQ), 6 or more physical disks are needed. For a pool in a configuration of RAID6 (8+PQ), 10 or more physical disks are needed.

With Pool rebuilding: Allows expanding the capacity of the pool without any restriction on the number of the logical disks, in a relatively longer time.

Specify Expansion Time: Allows specifying the duration of time to expand the all physical disks only when you specified “With Pool Rebuilding”. Although specifying 0 expands the capacity in the shortest time, select an appropriate time taking account of the load to the host I/O. The time specified in the field is just a target, thus it is not assured to take the specified time.

Selection PD for Expansion

Unused PDs: Lists disks still unused.

Pool PDs: List of disks that will compose the pool after expansion

Number of Adding PDs: Number of physical disks to be added to the pool

[Add] button: Select unused physical disks to use for the pool in the “Unused PD” list, then click this button to add them to the pool.

[Delete] button: Select any physical disks to be removed from the pool in the “to Pool” list, then click this button. The selected physical disks are restored to the list of unused physical disks.

* It is not allowed to select any physical disks already put in the other pools.

Clicking the [OK] button displays a confirmation to ask whether you want to expand the capacity of the pool.

If the physical disks selected are insufficient for the expansion, either of the [25218] or [25227] message box is displayed as follows:

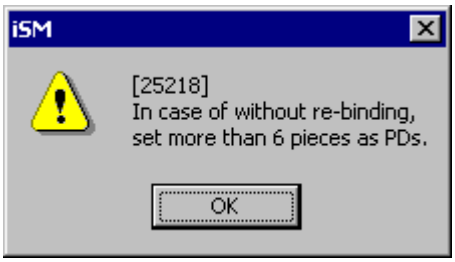


Figure 7-16 Message Box

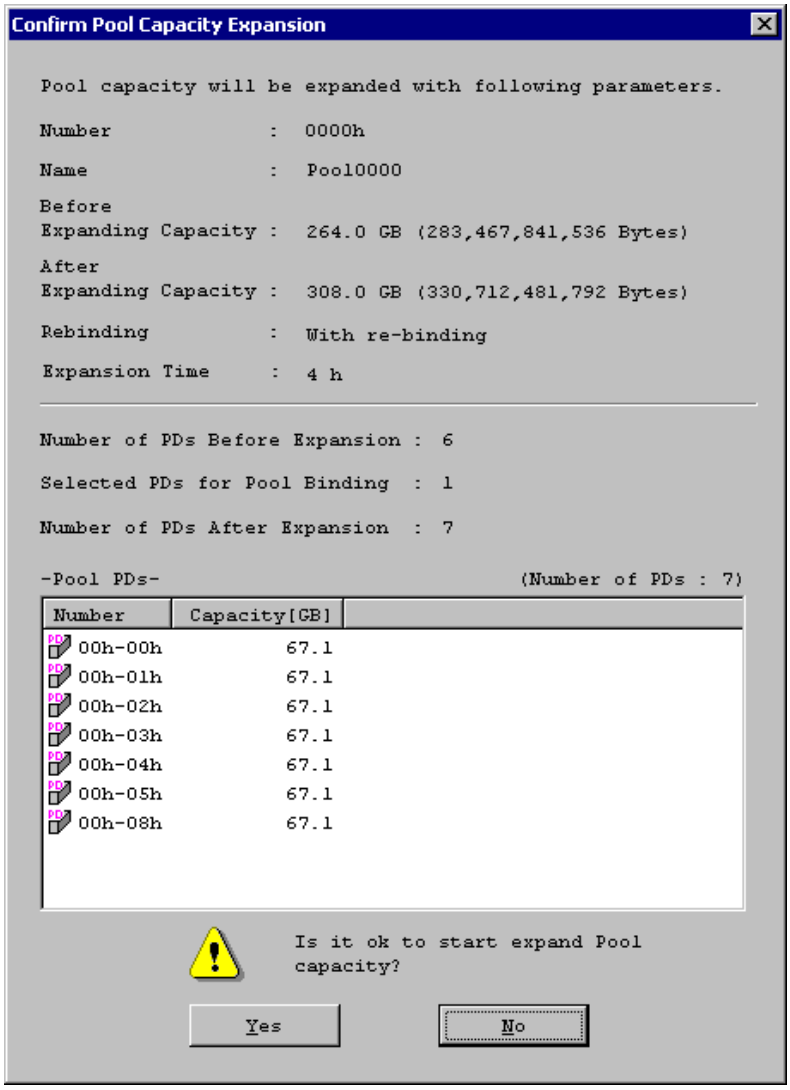


Figure 7-17 Message for Asking Expansion of Pool Capacity

Information about the pool:

Number:	Number of the pool
Name:	Name of the pool
Before Expanding Capacity:	Capacity of the pool before expansion
After Expanding Capacity:	Capacity of the pool after expansion
Rebinding:	Way of expanding the capacity of the pool
Expansion Time:	Duration of time to expand the physical disks

Information about the physical disks:

Number of PDs Before Expansion:	Number of physical disks that compose the pool before expansion
Selected PDs for Pool Binding:	Number of physical disks to be added to expand the pool
Number of PDs After Expansion:	Number of physical disks that are composing the pool after expansion
Pool PDs:	List of physical disks that will compose the pool after expansion
[Yes] button:	Starts expanding the capacity of the pool
[No] button:	Returns to the “Pool Capacity Expansion” dialog box.

Insufficient license capacity

Expanding a pool may result in insufficiency of license capacity. For insufficiency of license capacity, refer to Page IV-19.

5. When the pool is successfully expanded, the following message is displayed.

Figure 7-18 Message for Successful Completion of Expanding Pool

7.1.3 Unbinding a Pool

You can unbind a pool from the “LD Individual Bind/Unbind” screen.

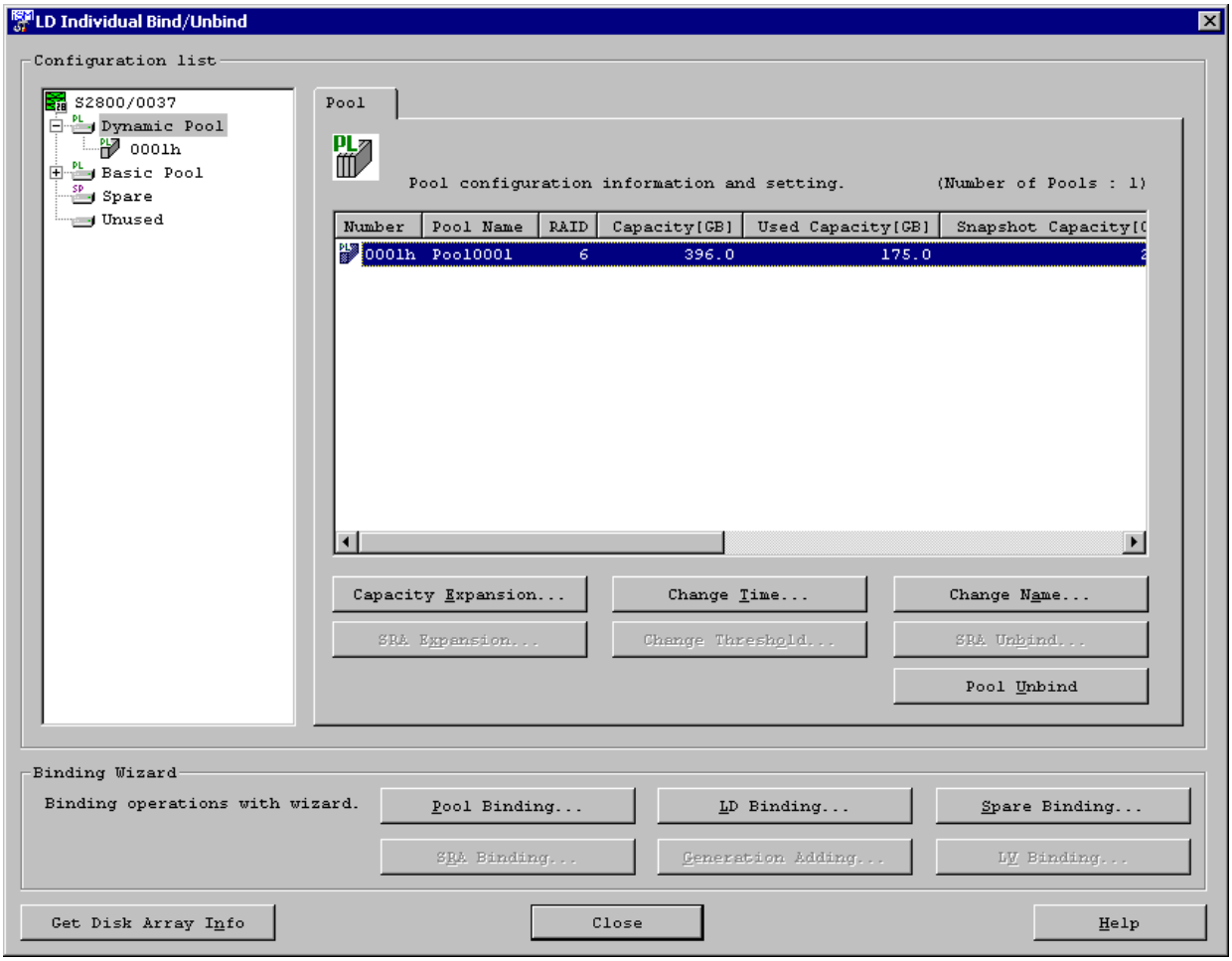


Figure 7-19 Unbinding a Pool

<Steps for unbinding a pool>

1. Select Basic Pool or Dynamic Pool in the configuration tree view.

2. Select a pool to be unbound from the list of pools in the detailed information view.

3. Click the [Pool Unbind] button.

4. A message box asking you to unbind the pool is displayed.

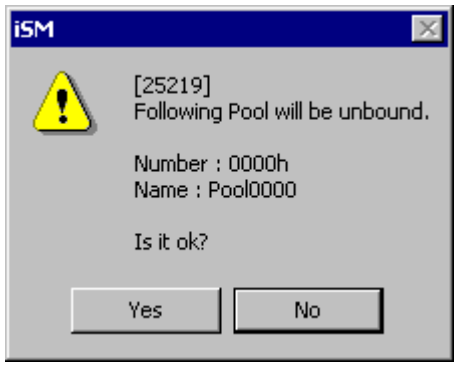


Figure 7-20 Message Box for Unbinding a Pool

When the pool to be unbound has logical disks already bound, the following dialog box is displayed to ask you to unbind the logical disks together, unbinding the pool.

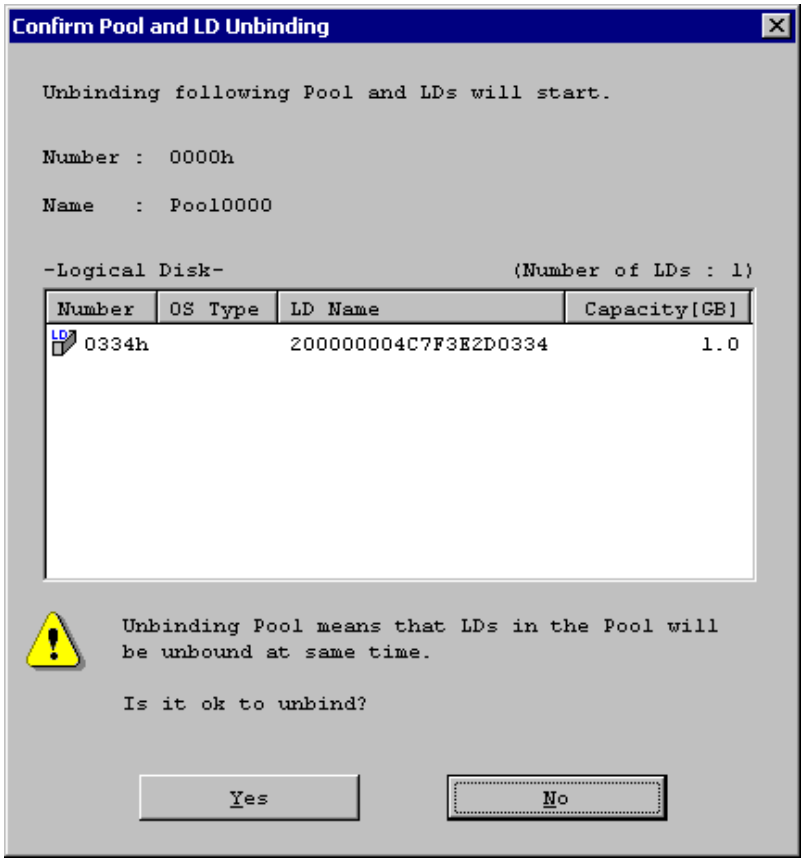


Figure 7-21 Message for Unbinding a Pool and Logical Disks

You cannot unbind the pool if any of the logical disks in it are:

1. In Access Control (Port mode).
2. In Access Control (WWN mode).
3. Paired.
4. SRA bound (snapshot).
5. Link setting is performed (snapshot).
6. Assigned to a cache segment (setting cache segment).
7. A reserve group is set (LD Administrator).

To unbind the pool, be sure to release the logical disks in the states mentioned above, if any.

5. When the pool is successfully unbound, the following message is displayed. When the logical disks are unbound together, a message is displayed for successful completion of unbinding the logical disks first, then a message is displayed for successful completion of unbinding the pool.

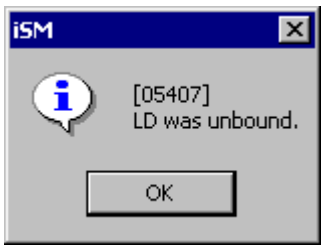


Figure 7-22 Message for Successful Completion of Unbinding Logical Disks

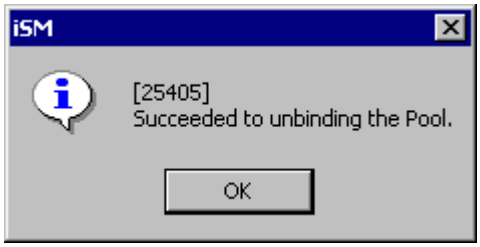


Figure 7-23 Message for Successful Completion of Unbinding Pool

7.1.4 Renaming a Pool

You can rename a pool from the “LD Individual Bind/Unbind” screen.

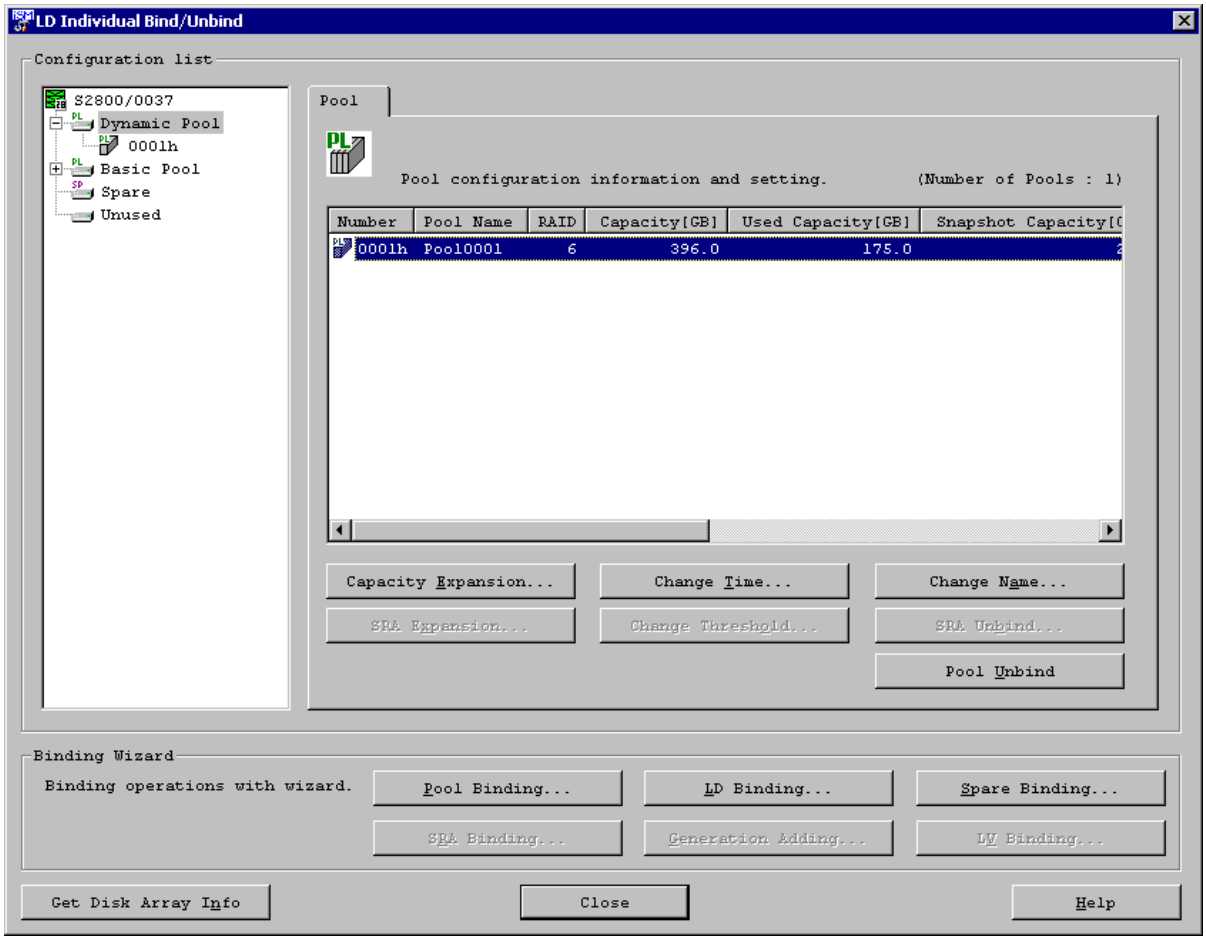


Figure 7-24 Renaming a Pool

<Steps for renaming a pool>

1. Select Basic Pool or Dynamic Pool in the configuration tree view.

2. Select a pool to be renamed from the list of pools in the detailed information view.

3. Click the [Change Name] button.

4. A dialog box for renaming a pool appears.

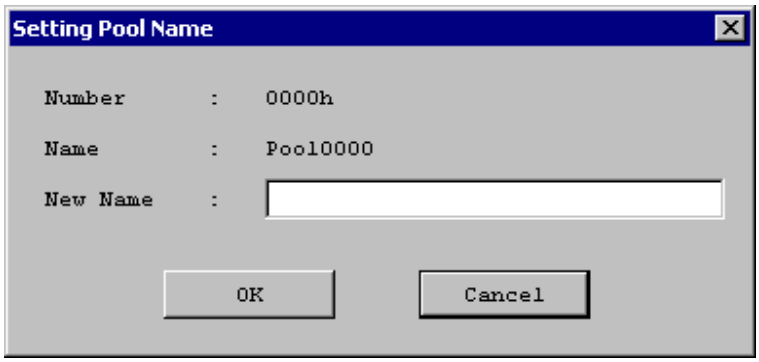


Figure 7-25 Dialog Box for Renaming a Pool

New Name: Specify the new name to be assigned to the pool.
For details on how to rename a pool, refer to “Pool Name” in 7.1.1 (6) “Setting detailed parameters”.

5. When the pool is successfully renamed, the following message box is displayed.

Figure 7-26 Message for Successful Completion of Renaming a Pool

7.1.5 Changing Rebuild Time and Expansion Time of a Pool

You can change the rebuild time and expansion time of a pool from the “LD Individual Bind/Unbind” screen.

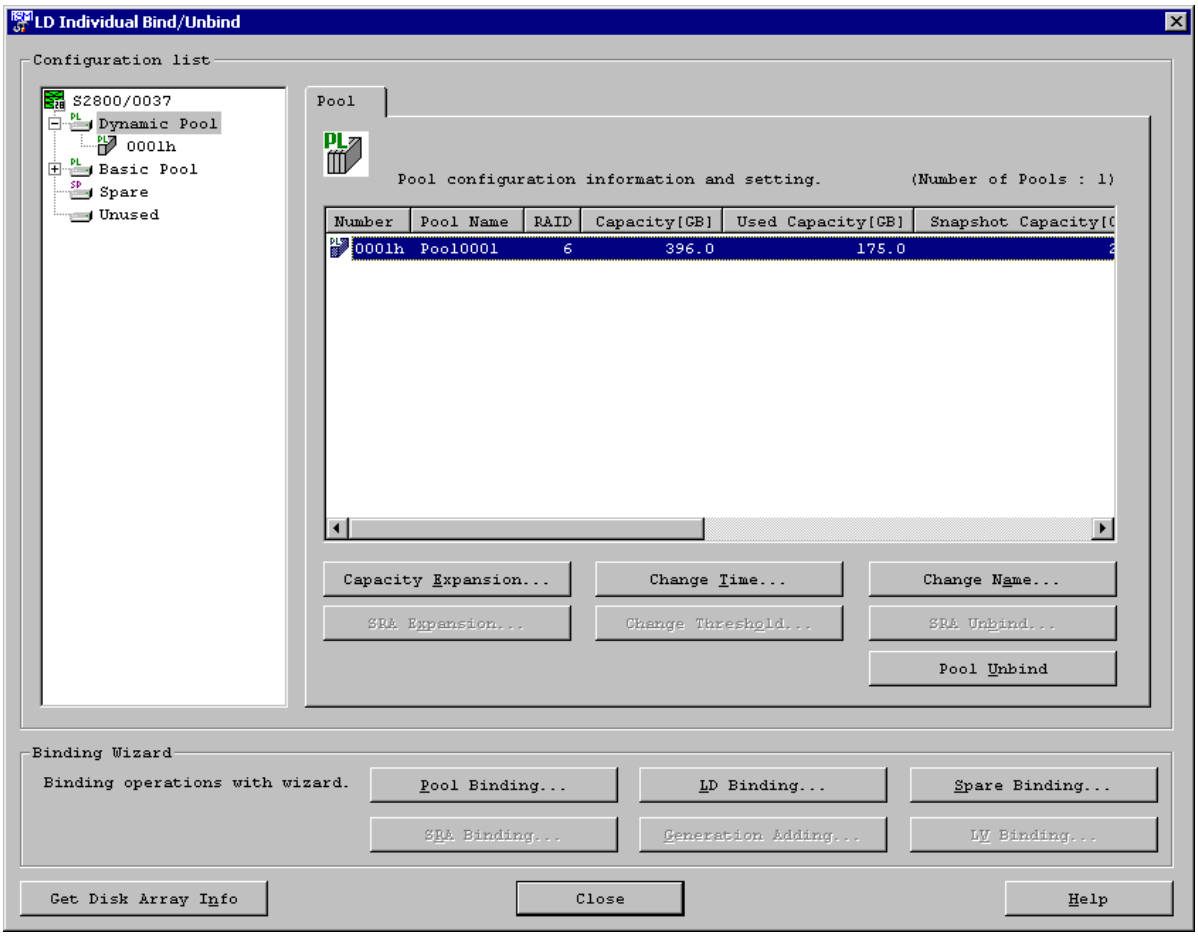


Figure 7-27 Changing the Rebuild Time and Expansion Time of a Pool

<Steps for the rebuild/expansion time of a pool>

1. Select Basic Pool or Dynamic Pool in the configuration tree view.

2. Select a pool whose time setting is to be changed from the list of pools in the detailed information view.

3. Click the [Change Time] button.

4. A dialog box for changing the rebuild/expansion time of a pool appears.

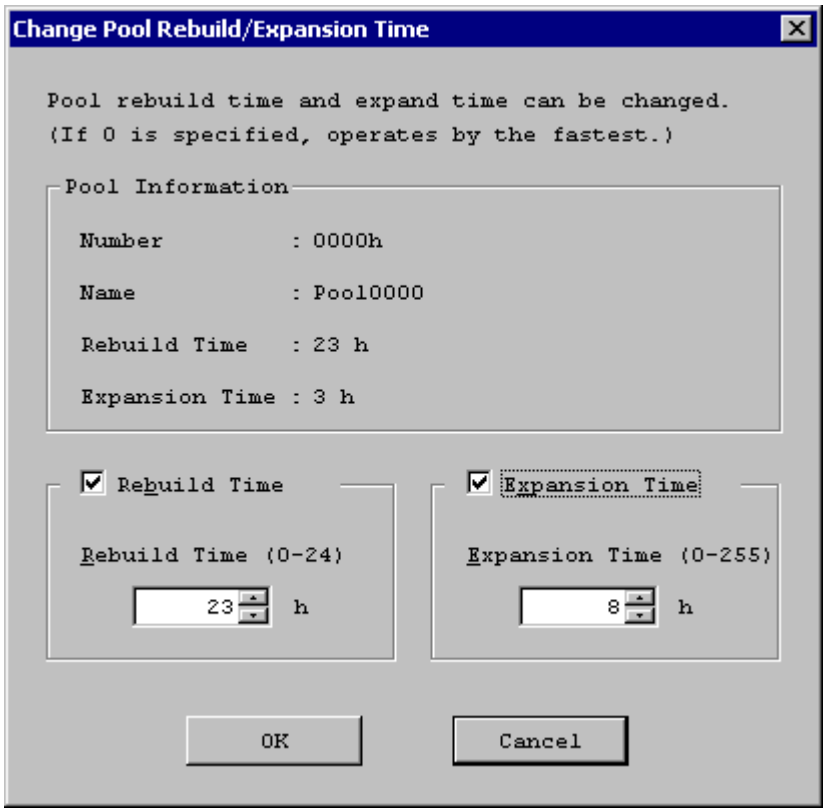


Figure 7-28 Change Pool Rebuild/Expansion Time Dialog

Pool Information:

Number: Number of the pool

Name: Name of the pool

Rebuild Time: Current duration of time specified to rebuild the pool

Expansion Time: Current duration of time specified to expand the pool (selectable only when expanding the pool)

Rebuild Time: Specify the duration of time to rebuild the pool.
Specify the duration of time to do rebuild if a physical disk becomes faulty in the disk array. You can specify 0 to 24 hours. Although specifying 0 rebuilds the faulty disk in the shortest time, select an appropriate time taking account of the load to the host I/O. The time specified in the field is just a target, thus it is not assured to take the specified time.

Expansion Time: Specify the duration of time to expand the (Only Dynamic Pool) pool.
You can specify the duration of time to expand the physical disks added to the pool.
Although specifying 0 expands the pool in the shortest time, select an appropriate time taking account of the load to the host I/O. The time specified in the field is just a target, thus it is not assured to take the specified time.

5. Put a checkmark on the item you want to change, then specify the time.

6. When the time is successfully changed, the following message is displayed:

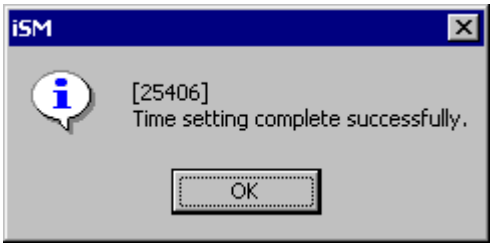


Figure 7-29 Message for Successful Completion of Changing Time

7.2 Method of Binding Logical Disks

Bind logical disks of the disk array in accordance with the following procedure in terms of each PD group.

(1) Spare Bind

It is necessary to set Spares in accordance with their applications. For information on Spares, refer to 2.3 “Spare”.

(2) Pool/RANK Bind

After considering the RAID characteristics, bind the RAID type pools suitable to the application.

Refer to Appendix C “RAID” for the types of RAID.

In pool or RANK binding, pay attention to the fact that the maximum capacity of the logical disk is less than the pool or RANK capacity.

(3) LD Bind

Bind the logical disk with the most suitable capacity in accordance with its application. It is impossible to set a pair unless the logical disk capacity is the same; therefore, when using data replications, it is necessary to bind logical disks of the same capacity beforehand.

7.2.1 Binding Logical Disks

Bind logical disks through wizard. Bind logical disks to a specified pool following the steps indicated on the wizard. To bind a control volume, follow this procedure.

(1) Starting up the LD binding wizard

Click the [LD Binding] button in the "LD Individual Bind/Unbind" screen.

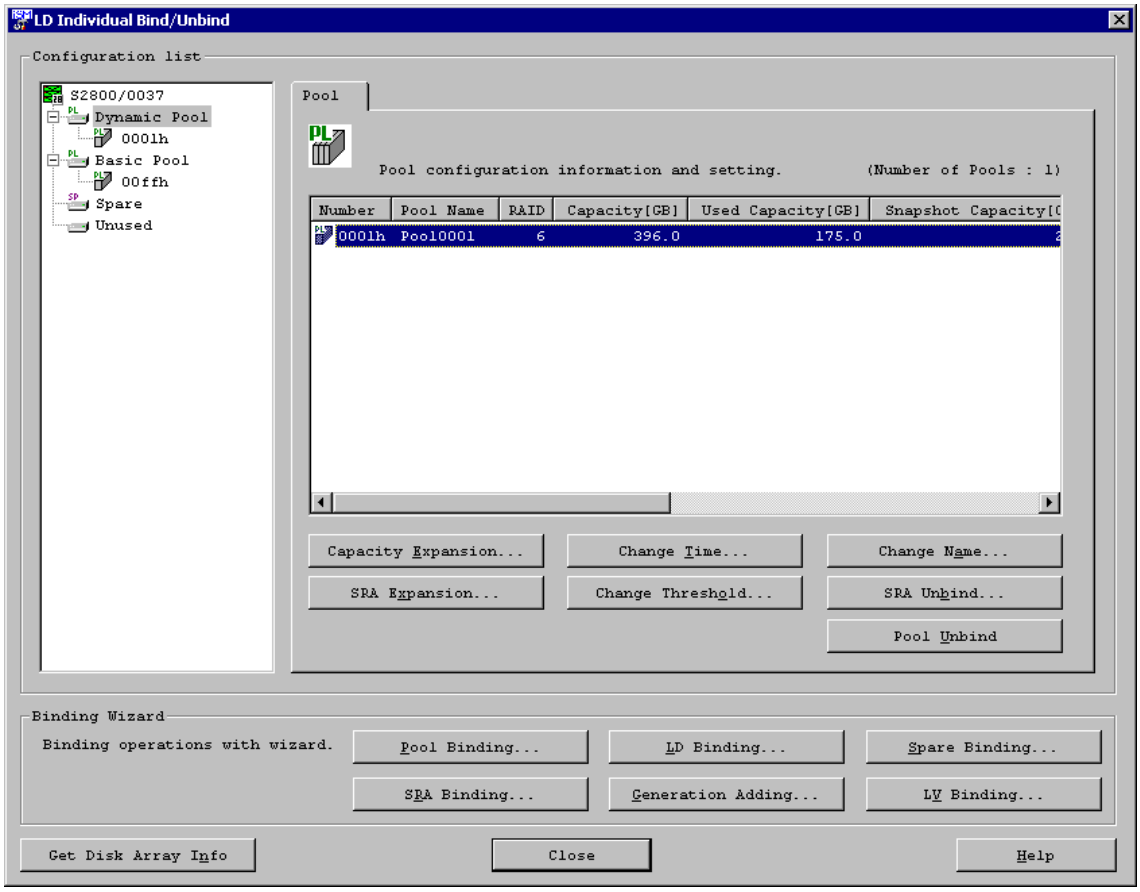


Figure 7-30 Starting Up Wizard for Binding Logical Disks

(2) Setting about the LD binding wizard

Clicking the [LD Binding] button on the "LD Individual Bind/Unbind" screen displays the "Welcome to the LD Binding Wizard" screen.

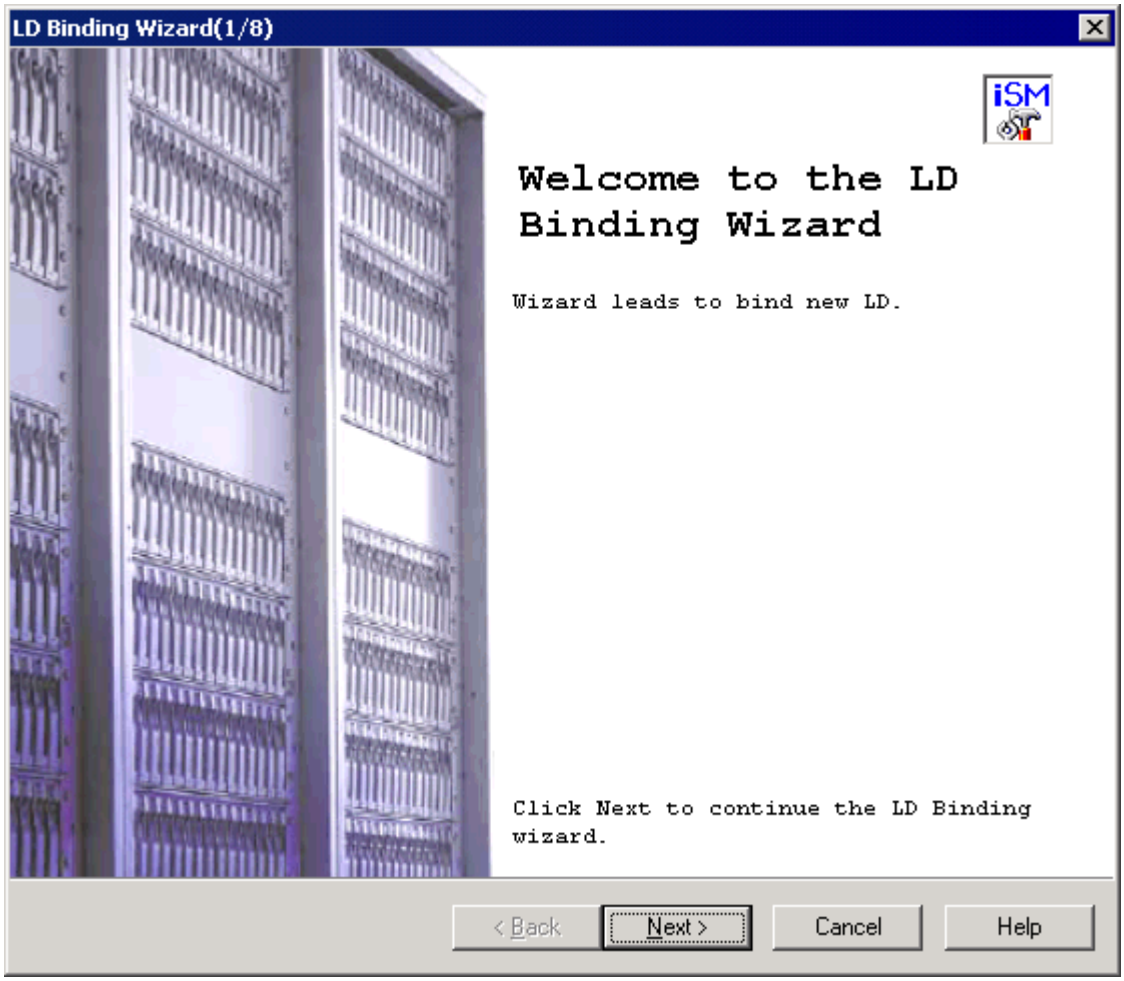


Figure 7-31 Setting about Wizard for Binding Logical Disks

[Next] button: Displays the "Pool Selection" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(3) Selecting a pool

Clicking the [Next] button on the "Welcome to the LD Binding Wizard" screen displays the "Pool Selection" screen.

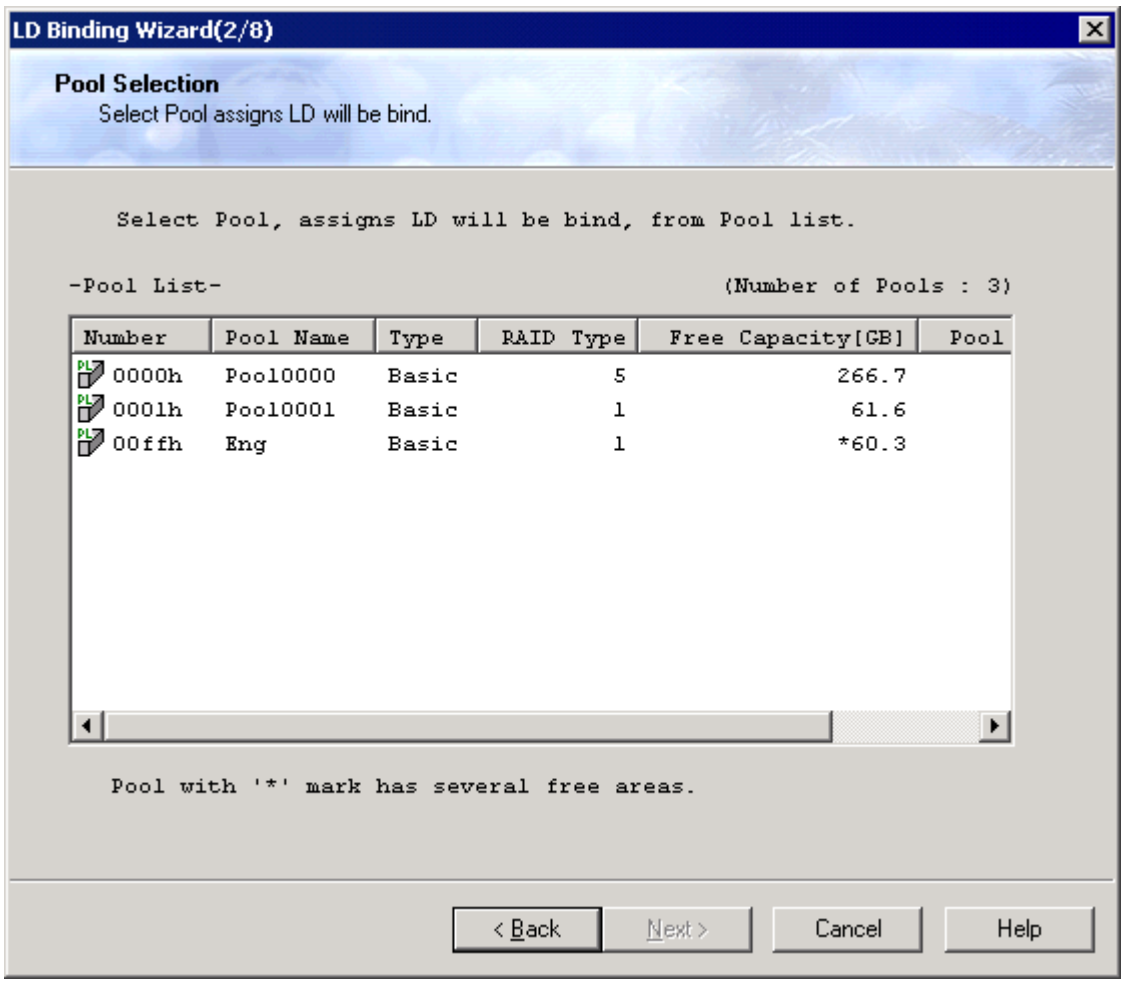


Figure 7-32 Selecting Pool Type

Pool List: Allows selecting a pool you want to bind logical disks in it.
An asterisk (*) in the "Free Capacity[GB]" field indicates that the pool has multiple unused areas. (An asterisk is displayed for a basic pool whose areas are fragmented due to logical disks removed.)

[Next] button: Displays the "Free Area Selection" screen when you select a pool with multiple unused areas. When you select a pool without multiple unused areas or dynamic pool, the "Binding Method" screen is displayed.

[Back] button: Displays back the "Welcome to the LD Binding Wizard" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(4) Selecting unused areas

Selecting a pool with multiple unused areas and clicking the [Next] button on the “Pool Selection” screen displays the “Free Area Selection” screen.

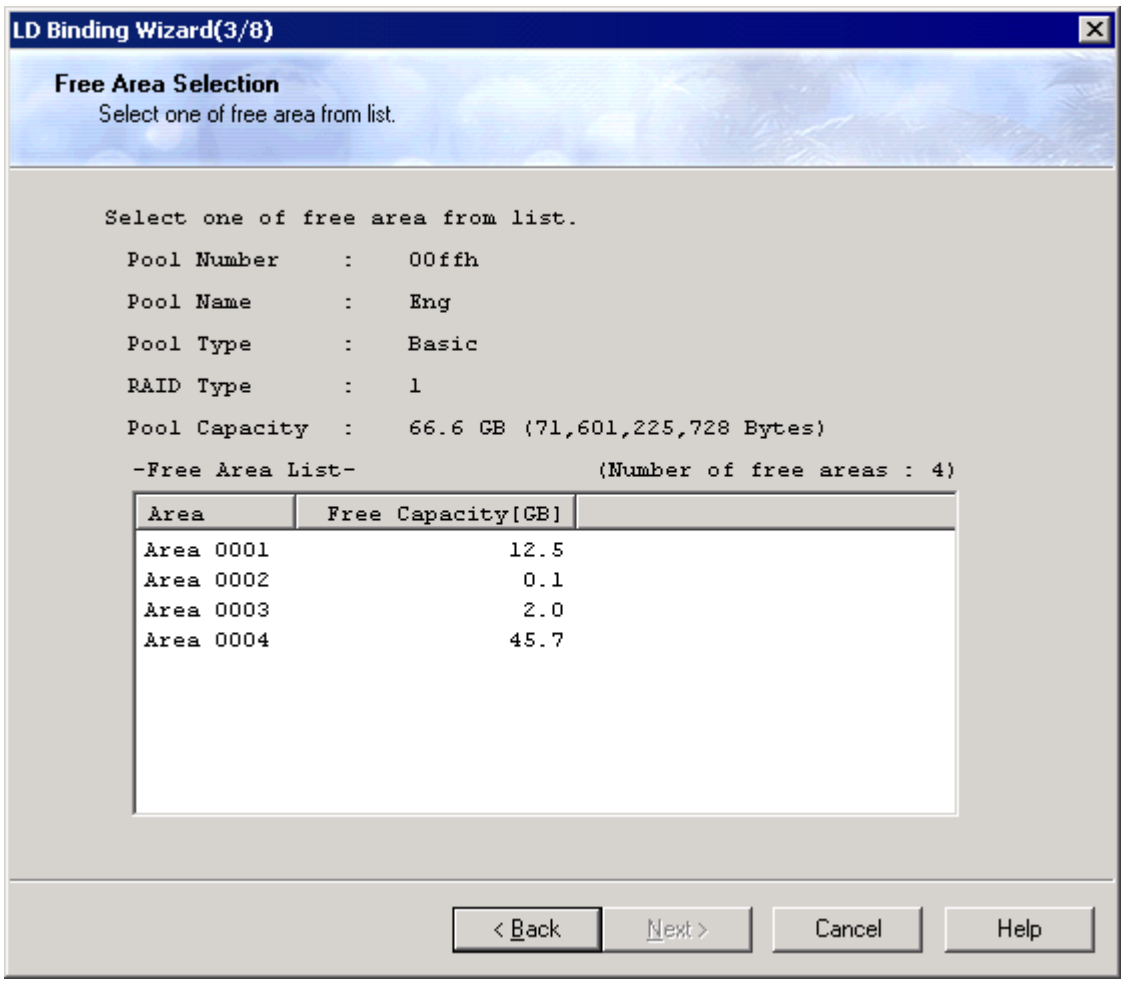


Figure 7-33 Selecting Unused Areas

Free Area List: Allows selecting areas in which to bind logical disks.

[Next] button: Displays the “Binding Method” screen.

[Back] button: Displays back the “Pool Selection” screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(5) Specifying the way of binding the logical disks

Clicking the [Next] button on the “Free Area Selection” screen displays the “Binding Method” screen. This screen is displayed when you select a pool without multiple unused areas or dynamic pool and click the [Next] button on the “Pool Selection” screen.

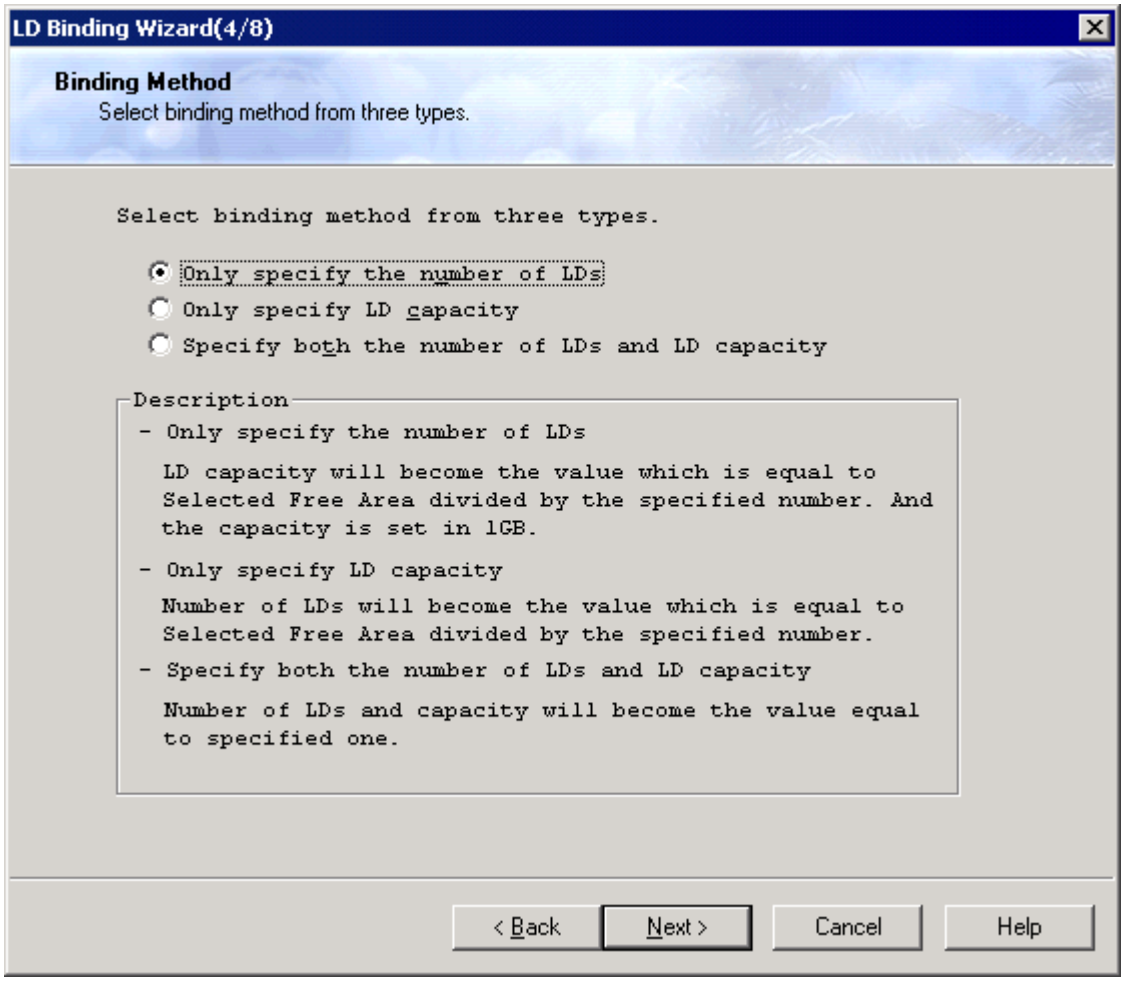


Figure 7-34 Specifying the Way of Binding the Logical Disks

Specify one of the following ways of binding the logical disks:

- Only specify the number of LDs (default)
  Specify the number of logical disks to bind in the pool.

- Only specify LD capacity
  Specify the capacity of each of the logical disks to bind in the pool. You can specify a recommended capacity, set the capacity same with that of a logical disk already bound, or directly designate any value for the capacity.

- Specify both the number of LDs and LD capacity
  Specify any desired values for the number of logical disks and the capacity of one logical disk.
  To bind a control volume, check this option.

[Next] button: One of the following screens is displayed according to the specified way of binding the logical disks:

- Check-marking on [Only specify the number of LDs]:
  Displays the “Specify Number of LDs” screen.
- Check-marking on [Only specify LD capacity]:
  Displays the “Specify the Capacity” screen.
- Check-marking on [Specify both the number of LDs and LD capacity]:
  Displays the “Specify Number of LDs and LD Capacity” screen.

[Back] button: Displays back the “Free Area Selection” screen. When you select a pool without multiple unused areas or dynamic pool, the “Pool Selection” screen is displayed again.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

Although the capacity specified in the field is that of the region you can use, there are some region for controlling the disks of the pools in addition to the region usable by the user.

(6)-1 Specifying the number of logical disks

Check-marking on [Only specify the number of LDs] on the "Binding Method" screen and clicking the [Next] button displays the "Specify Number of LDs" screen.

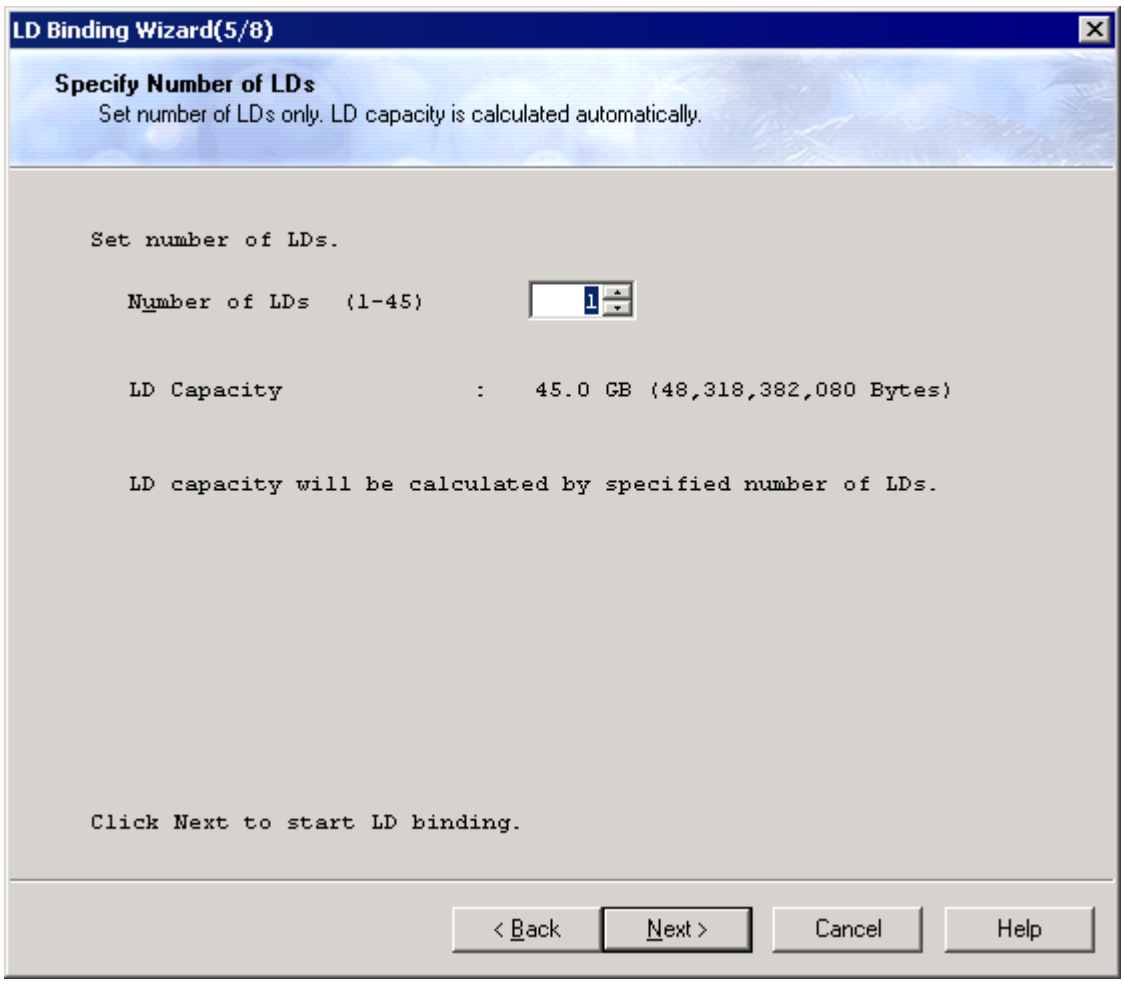


Figure 7-35 Specifying the Number of Logical Disks

Number of LDs: Specify the number of logical disks to bind.
Each logical disk is bound in the unit of 1 GB, and the maximum available capacity is automatically calculated.

[Next] button: Displays the "Setting Detail Parameter for LD Binding" screen.

[Back] button: Displays back the "Binding Method" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(6)-2 Specifying the logical disk capacity

Check-marking on [Only specify LD capacity] on the “Binding Method” screen and clicking the [Next] button displays the “Specify the Capacity” screen.

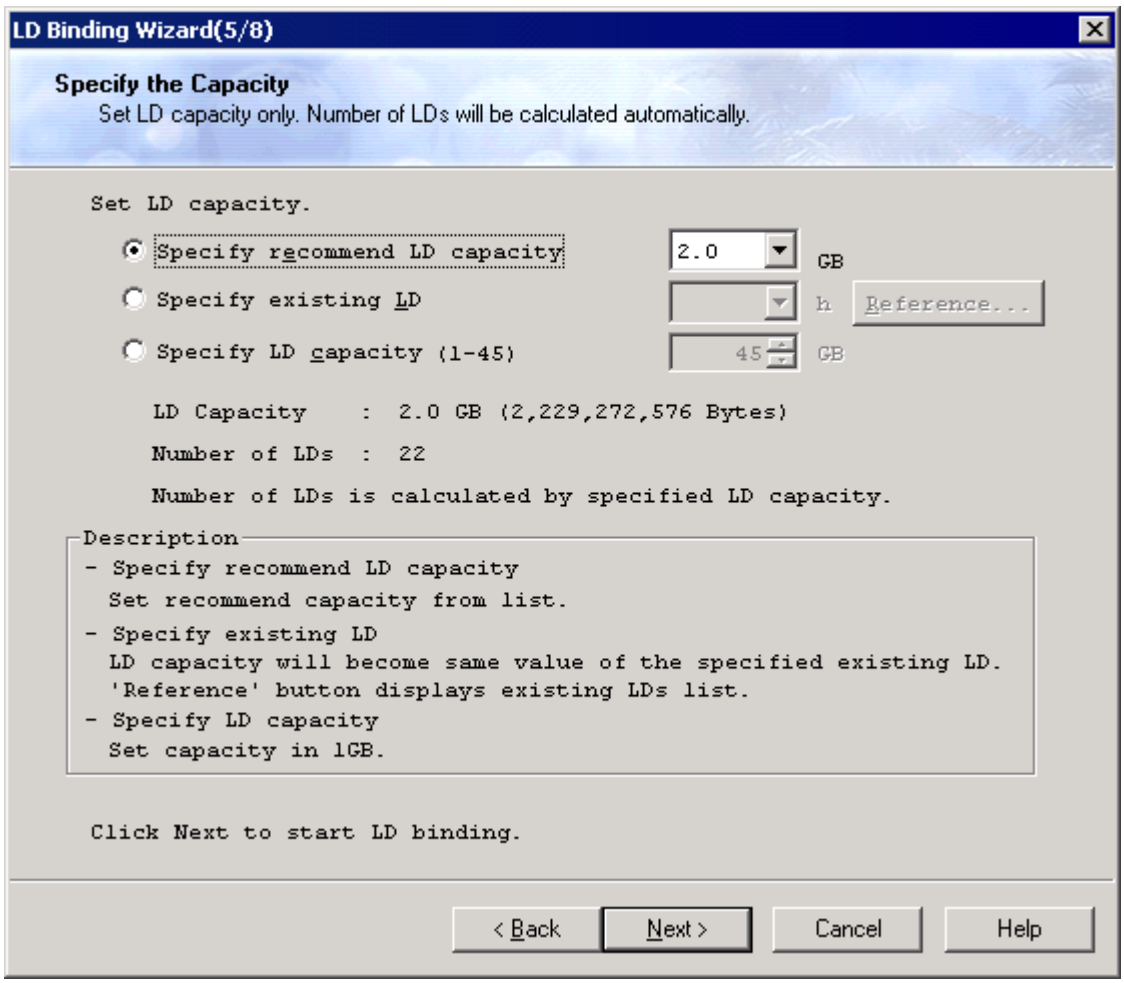


Figure 7-36 Specifying the Logical Disk Capacity

Use one of the following ways of specifying the capacity of the logical disks to bind:

- Specify recommend LD capacity

  Specify one of the recommended values for the capacity of the logical disks to bind from the pull-down menu.

- Specify existing LD

  Select a logical disk already bound to apply the capacity of the logical disk. You can select a logical disk in the “LD Specification” screen by clicking the [Reference] button.

- Specify LD capacity

  Specify the capacity in units of 1 GB directly. The number of logical disks allowed to bind is automatically calculated according to the value of the capacity you specified.

Note that specifying a recommended capacity makes the capacity occupied by the pool larger than the capacity of the logical disks by 0.2 GB approximately and maximum.
For details, refer to Appendix D “Notes on Use for Data Replication”.

[Next] button: Displays the “Setting Detail Parameter for LD Binding” screen.

[Back] button: Displays back the “Binding Method” screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(6)-3 Specifying the number of logical disks and the logical disk capacity

Check-marking on [Specify both the number of LDs and LD capacity] on the "Binding Method" screen and clicking the [Next] button displays the "Specify Number of LDs and LD Capacity" screen.

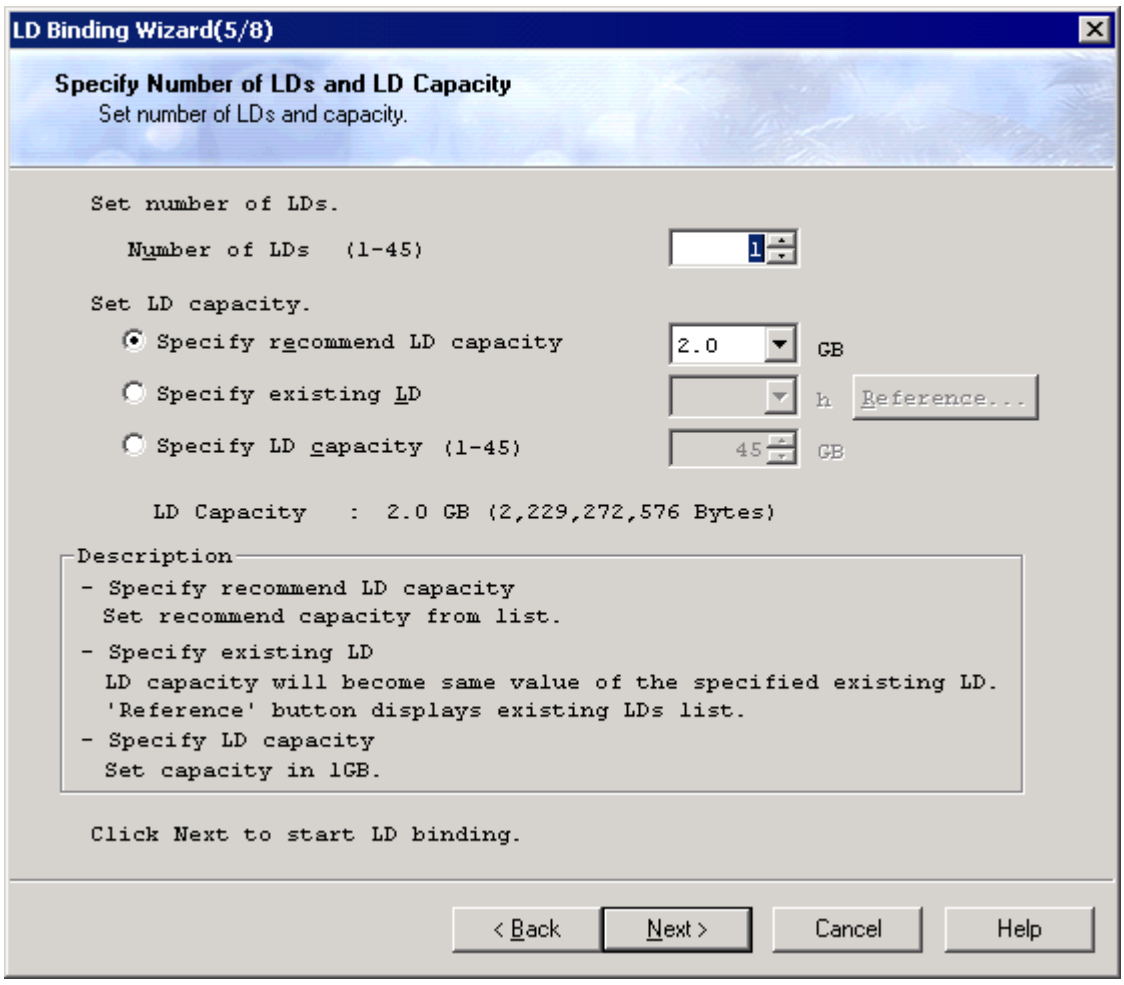


Figure 7-37 Specifying the Number of Logical Disks and Logical Disk Capacity

Number of LDs: Specify the number of logical disks according to (6)-1.

Set LD capacity: Specify the capacity of the logical disks according to (6)-2.

[Next] button: Displays the "Setting Detail Parameter for LD Binding" screen.

[Back] button: Displays back the "Binding Method" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

About control volumes

(1) A control volume is a volume for control over a disk array. To use SnapControl, it is required on the server where the LV is used.

(2) Specify the capacity of a control volume following the steps described below:

1. Specify the recommended capacity, and display the pull down menu.
2. From the pull down menu, select the capacity of 0.2 GB (0.2 GB appears on the top of the pull down menu).

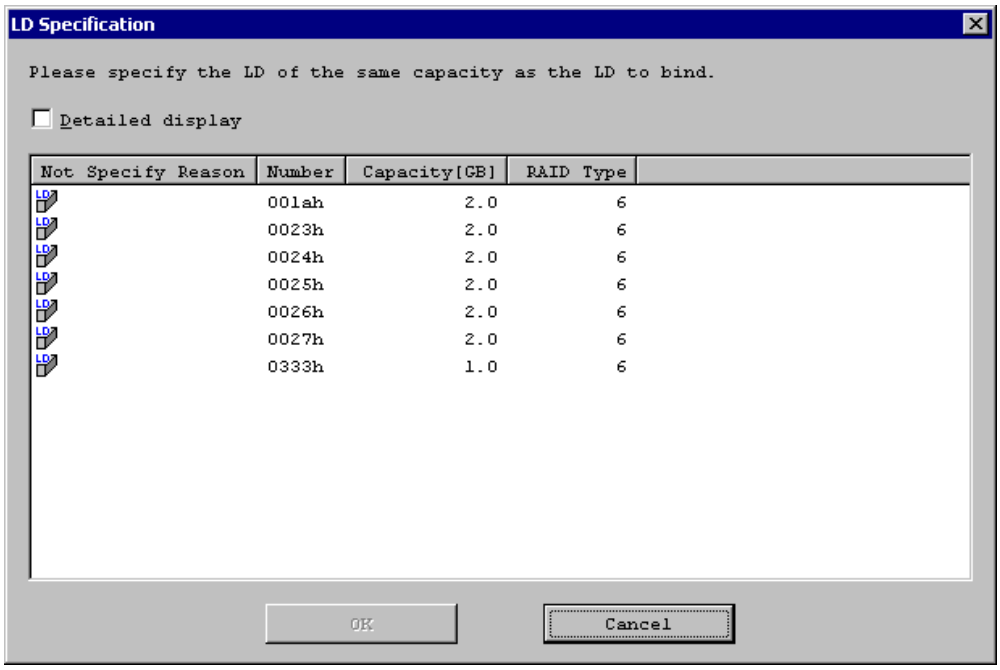


Figure 7-38 Screen for Specifying Logical Disks and Their Capacity

By selecting a logical disk from the list, you can bind the logical disks setting their capacities same with it. For an unselectable logical disk, either of the following reasons is indicated in the Not Specify Reason column:

- Excess of capacity: The capacity of the logical disk is exceeding the unused space of the pool.
- Capacity unit disagreement: It is not possible to bind logical disks setting the same capacity with that of this logical disk.

For detailed reasons for mismatching capacity units and details on binding logical disks with a RAID configuration different from those in use, refer to Appendix D “Notes on Use for Data Replication”.

[OK] button: Applies the parameter you specified on this screen, and displays back the screen on which you specified the capacity of the logical disks or the number of logical disks and their capacity.

[Cancel] button: Displays back the screen on which you specified the capacity of the logical disks or the number of logical disks and their capacity. All parameter changes you made on this screen are canceled.

It is allowed to change the logical disk number selection displayed through this wizard or number displayed on the LD specification screen to the name of the logical disk. For details, refer to “Client Start/Stop” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with the OS in use. Note that selecting detailed view in the LD specification screen switches the positions of the numbers and the logical disk names.

(7) Setting the detailed parameters for binding the logical disks

The "Setting Detail Parameter for LD Binding" screen allows checking for and changing the format, name, and initial number of the logical disks, and the time to bind them.

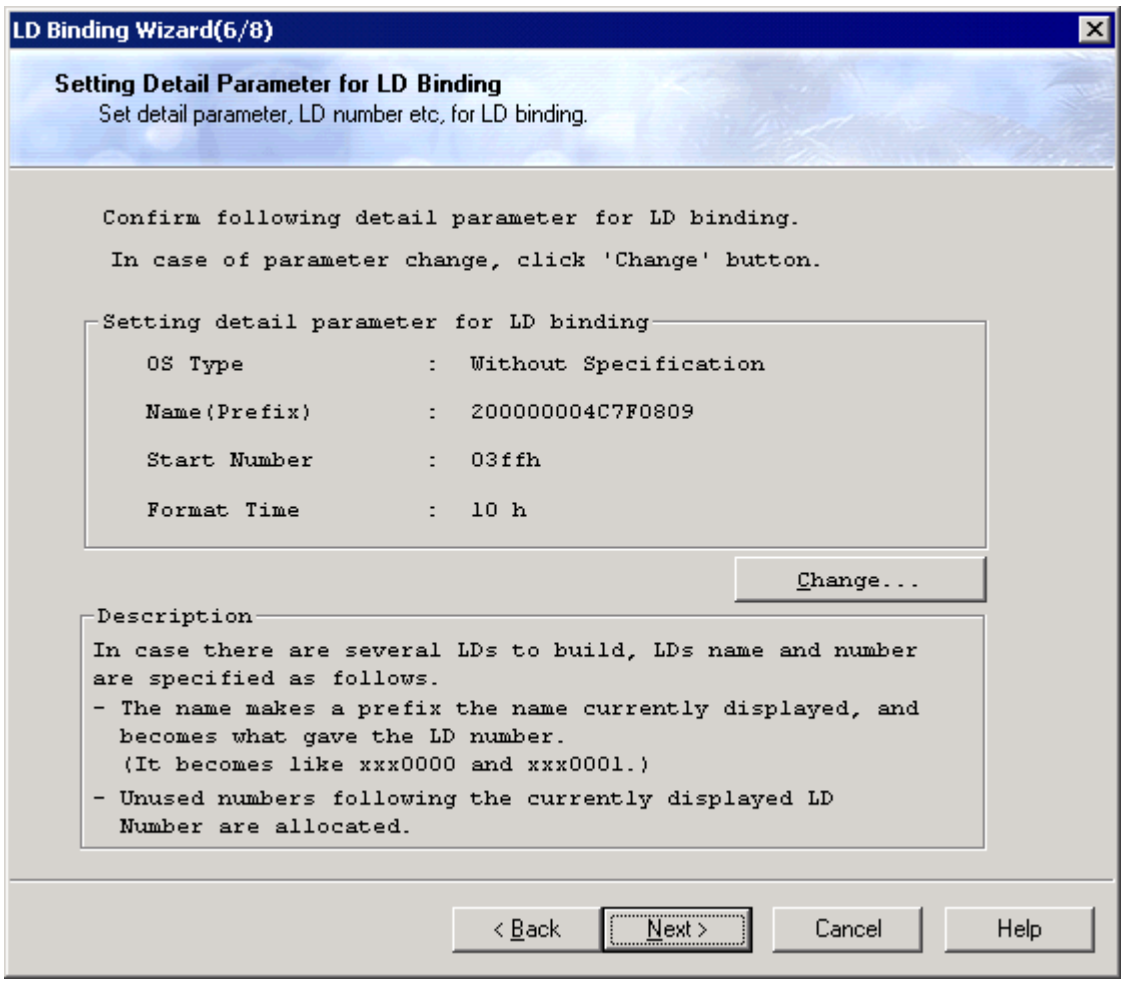


Figure 7-39 Specifying Detailed Settings of the Logical Disks

[Change] button: Allows you to make changes for the items displayed in the "Setting Detail Parameter for LD Binding" screen. If you need to make changes, click this button to make changes on the "Change" dialog box. Otherwise, click the [Next] button to proceed.

[Next] button: Displays the "Confirmation for LD Binding" screen.

[Back] button: Displays back the "Specify Number of LDs", "Specify the Capacity", or "Specify Number of LDs and LD Capacity" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

Clicking the [Change] button on the “Setting Detail Parameter for LD Binding” screen displays the [Change] dialog:

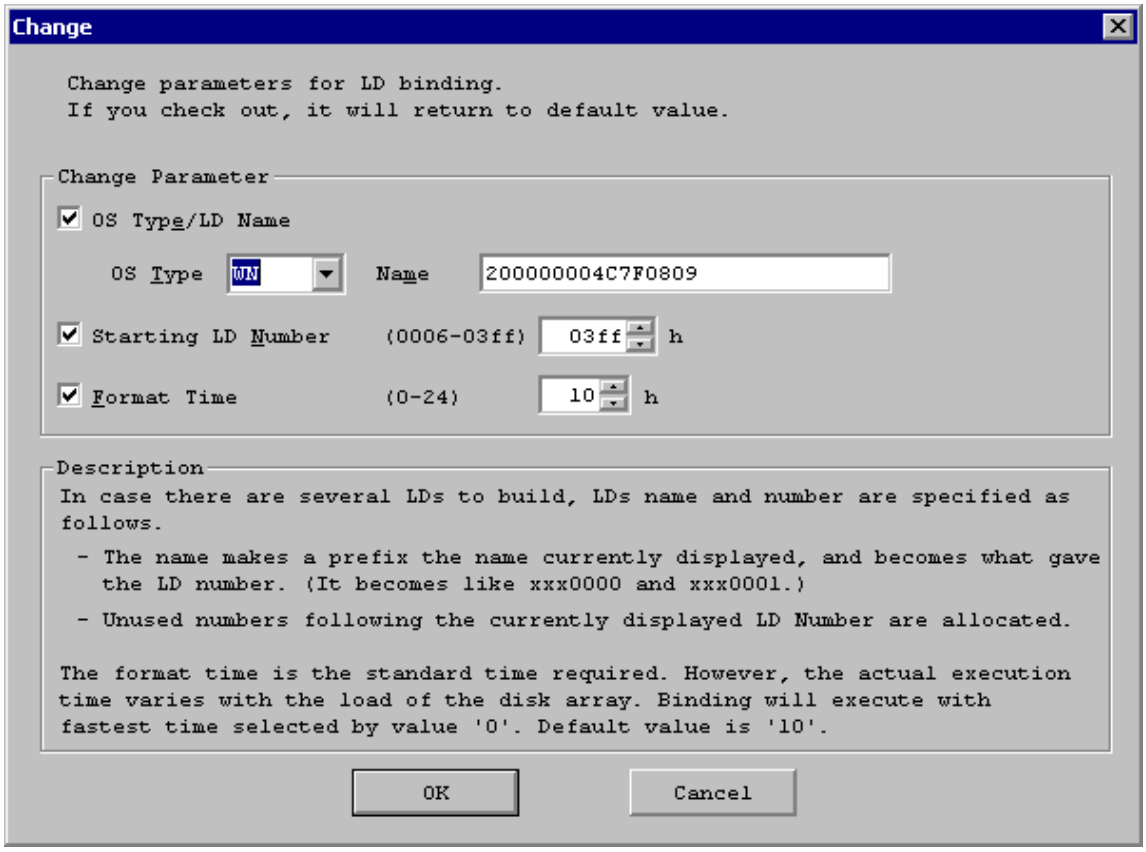


Figure 7-40 Change Dialog Box

OS Type/LD Name: You can specify the format and name of the logical disks to bind. The logical disk name must be unique in the system. (Do not assign the same name twice or more.) Therefore, when you bind multiple sets of logical disks simultaneously, the logical disks are named with the character string specified and automatically numbered in order.

The initial value of the logical disk name field consists of 20 characters; 16 characters specific to the disk array and 4 characters of the logical disk number. When you do not make any change for logical disk name, the initial value is used in the form mentioned above:

Example: 200000004C518CAC0000, 200000004C518CAC0001, ...

Not changing the logical disk format displays a blank in the OS Type field.

Note that inputting a blank to the format sets the initial values for shipment; a blank in the OS Type field and 16 characters specific to the disk array + 4 characters of the logical disk number in the Name field.
Table 7-1 lists the selectable logical disk formats.

You can change the logical disk format and name later from the main window on the iSM client or according to 7.2.4 “Renaming a Logical Disk”.

Table 7-1 List of Formats

Format	Description
A4	Logical disk operated on the ACOS-4 system (If you are setting this format, ask our maintenance engineer.)
A2	Logical disk operated on the ACOS-2 system
AX	Logical disk operated on the AIX system
CX	Logical disk operated on the Solaris system
NX	Logical disk operated on the HP-UX system
LX	Logical disk operated on the Linux system
WN	Logical disk operated on the Windows system

(1) Any logical disk name that does not conform to the following rules is invalid:

- Number of available characters: 1 to 24 characters
- Available characters:
  - Alphabet: A to Z (a to z)
    * Upper- and lower-case characters are distinguished.
  - Numerals: 0 to 9
  - Underbar: _
  - Slash: /

* All the characters must be 1-byte characters.

(2) An invalid specification applies the logical disk name to be assigned by default.

(3) On the ACOS-4 system, use the logical disk id names same with those on the host.

For details about the format A4, refer to Appendix G “ACOS-4 Resource Operation Guard”.

Starting LD Number: A number which is equal to or higher than the specified logical disk number and still unused is assigned.

When this parameter is omitted (or if the specified number is invalid), the number subsequent to the largest logical disk number already occupied is assigned.

For example, when logical disk numbers 0, 1, 3, and 4 are in use, new logical disks are numbered as follows:

When omitted: 5, 6, 7 …
When 0 specified: 2, 5, 6 …
When 10 specified: 10, 11, 12 …

Remark: Unlike in the case of the screen of S100/S1100/S1200/S1300/S2100/S2200/S2300, the screen allows changes for previous values.

Format Time: Specify the maximum duration of time to bind the logical disks (only for those to be bound in a basic pool).

You can specify 0 to 24 hours. Specifying 0 binds the logical disks in the shortest time. The time specified in the field is just a target, thus it is not assured to take the specified time.

The specified time is the standard average, thus the time actually required depends on the load on the disk array.

Specify 0 to bind the logical disks in the shortest time. Otherwise, specify a larger value (24 or close to it) to reduce load to the disk array and give priority to the I/O of other transactions.

[OK] button: Displays back the screen for specifying the details of the logical disks with the parameter(s) you changed.

[Cancel] button: Displays back the screen for specifying the details of the logical disks. All parameter changes you made on this screen are canceled.

(8) Checking for the parameters specified for the logical disks to bind

Clicking the [Next] button on the "Setting Detail Parameter for LD Binding" screen displays the "Confirmation for LD Binding" screen.

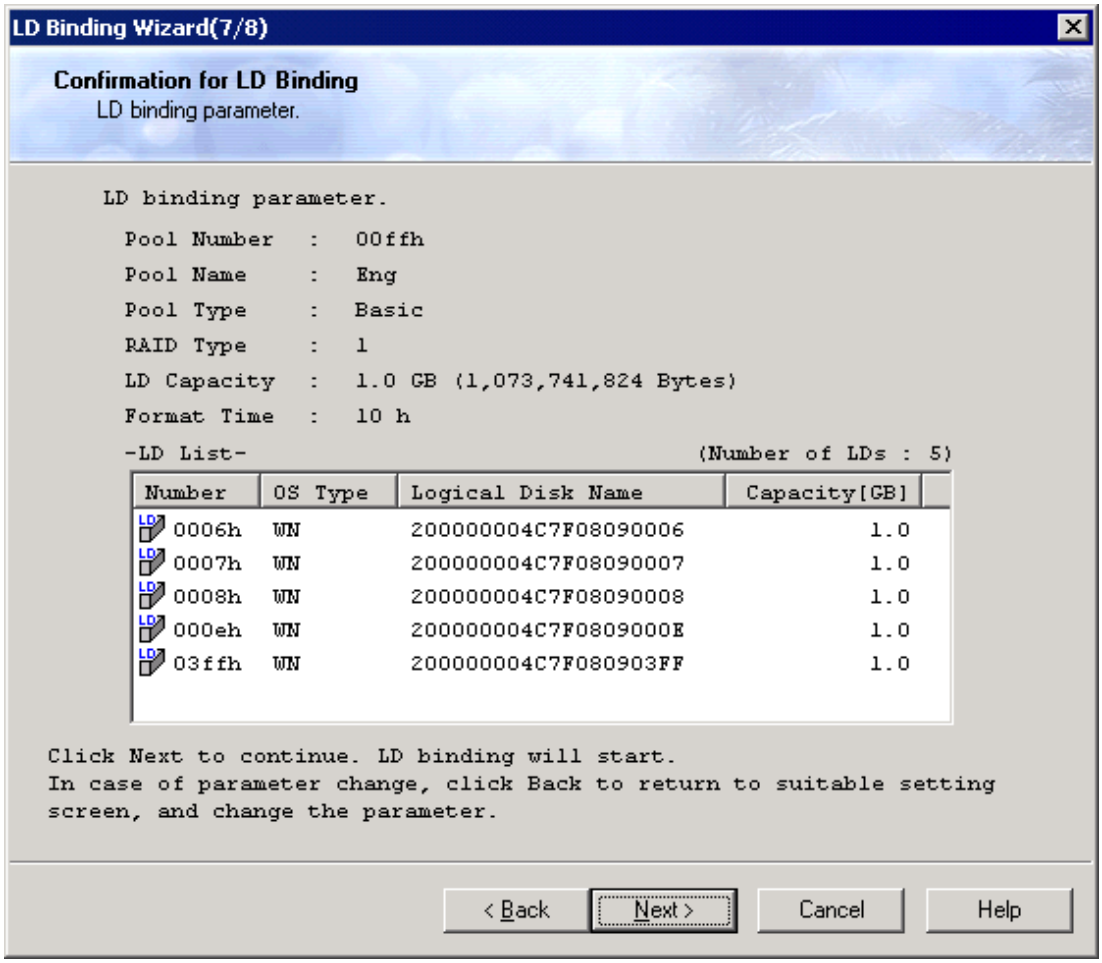


Figure 7-41 Checking the Parameters Specified for the Logical Disks

[Next] button: Displays a message asking you to proceed.

[Back] button: Displays back the "Setting Detail Parameter for LD Binding" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

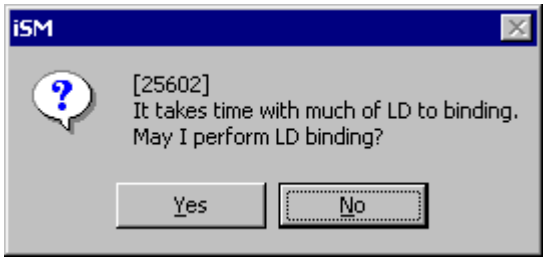


Figure 7-42 Message Box to Start Binding Logical Disks

(9) Finishing binding the logical disks

When the logical disks are successfully bound, the following screen is displayed:

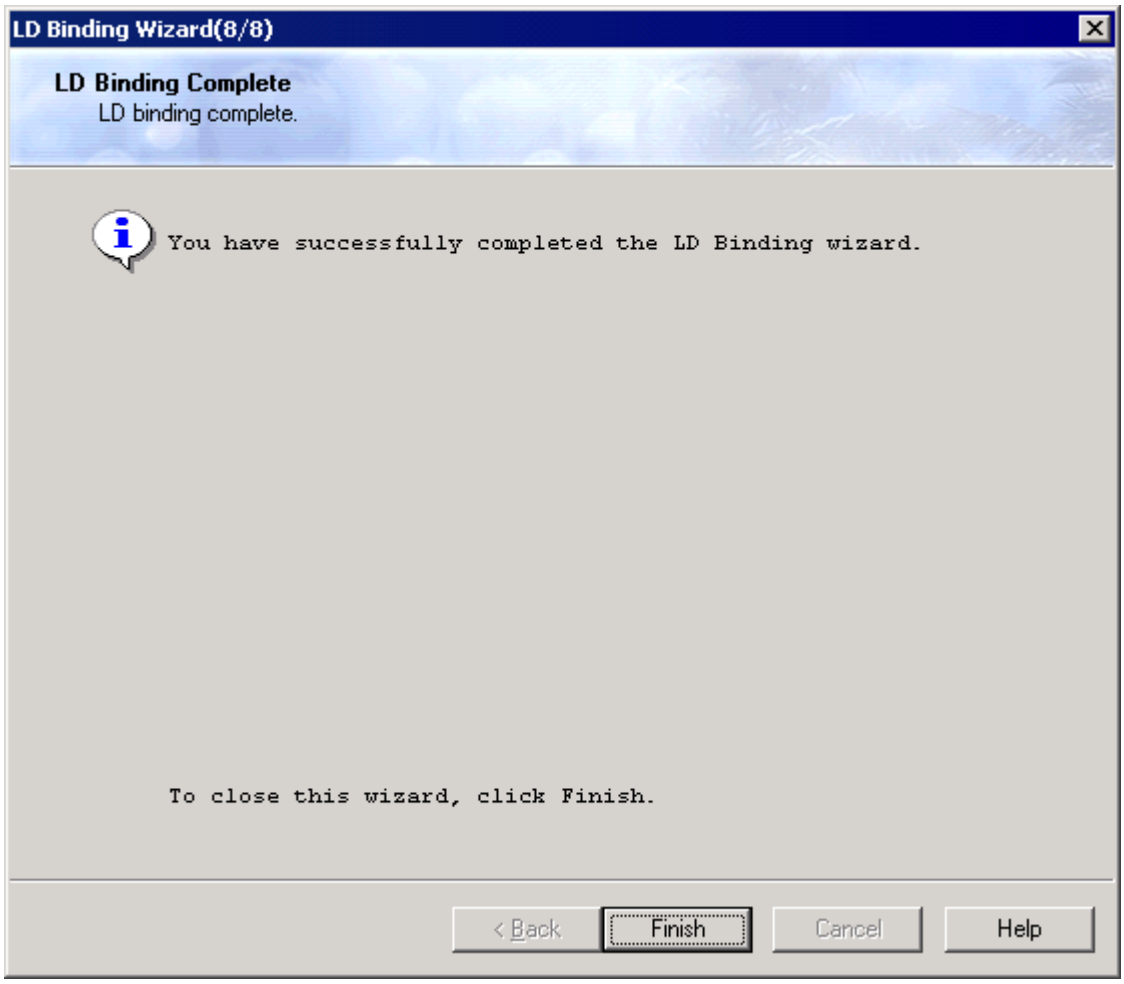


Figure 7-43 Successful Completion of Binding Logical Disks

[Finish] button: Closes the wizard.

7.2.2 Expanding Capacity of Logical Disks

You can expand the logical disk capacity from the “LD Individual Bind/Unbind” screen.

You can expand the capacity of logical disks which belong to a dynamic pool.

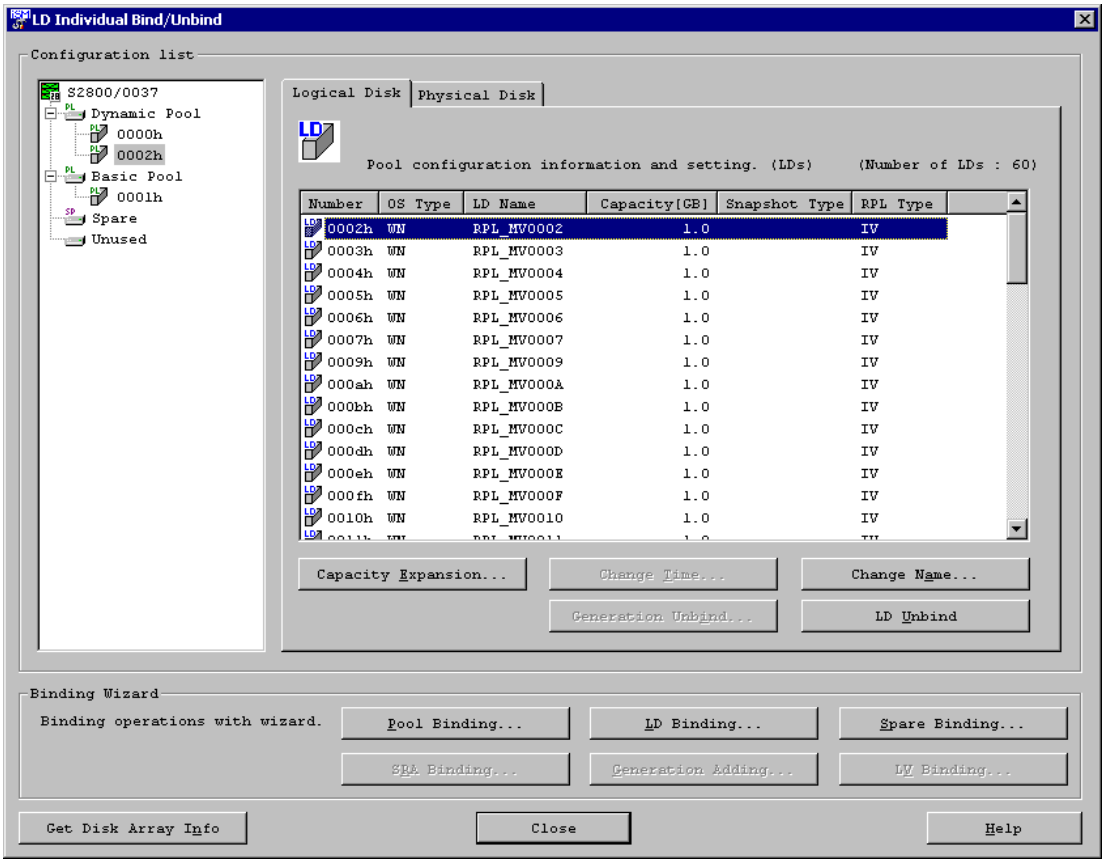


Figure 7-44 Expanding the Capacity of Logical Disks

<Steps for expanding the capacity of logical disks>

1. Select a dynamic pool in the configuration tree view.

2. Click the [Logical Disk] tab on the detailed information view.

3. Select a logical disk you want to remove from the list of logical disks in the detailed information view.

4. Click the [Capacity Expansion] button.

5. The “LD Capacity Expansion” dialog appears.

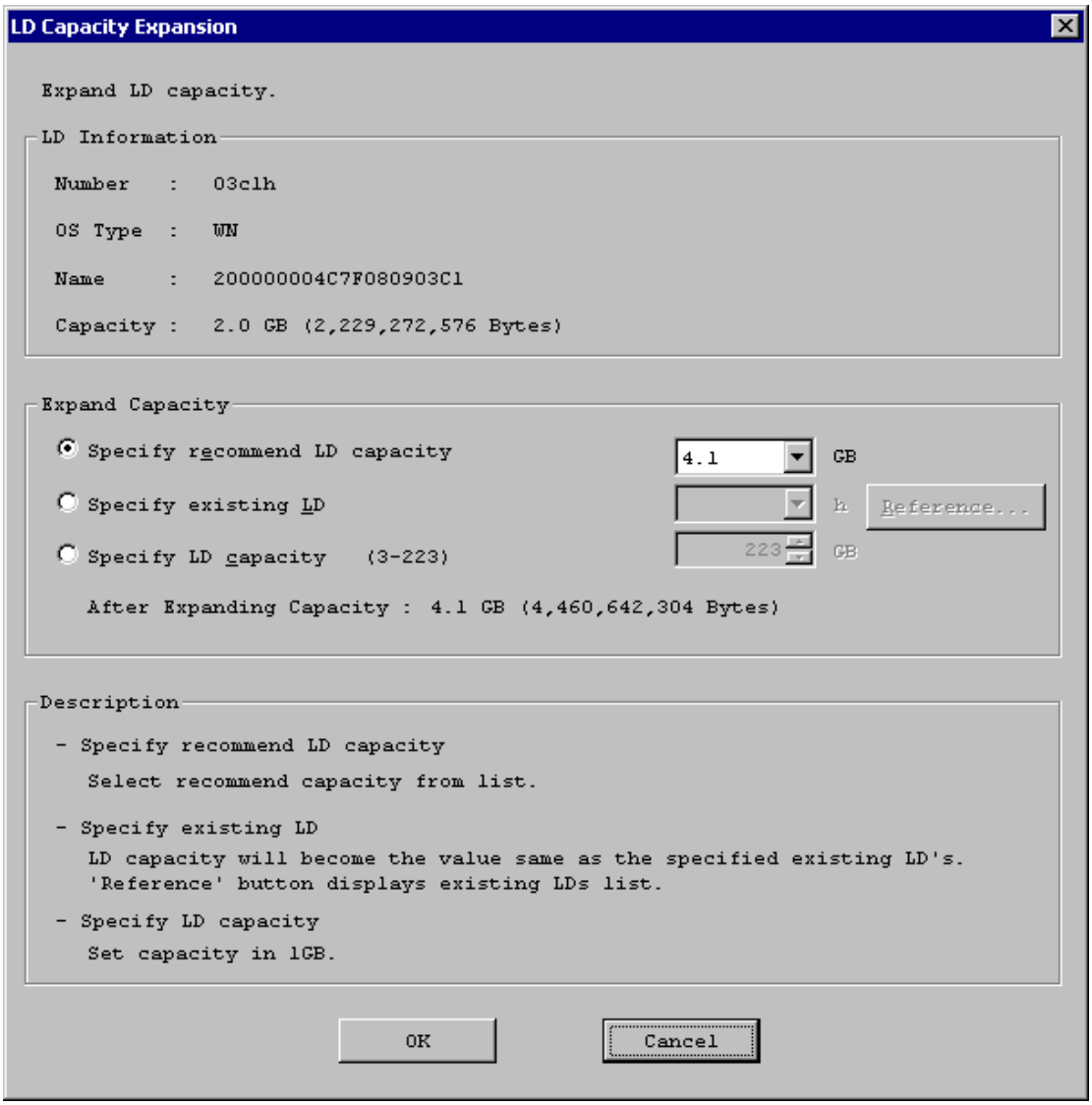


Figure 7-45 LD Capacity Expansion Dialog

For details on how to expand the logical disk capacity, refer to 7.2.1 (6)-2 “Specifying the logical disk capacity”.

[OK] button: Displays the dialog box for checking the parameters of the logical disks expanded.

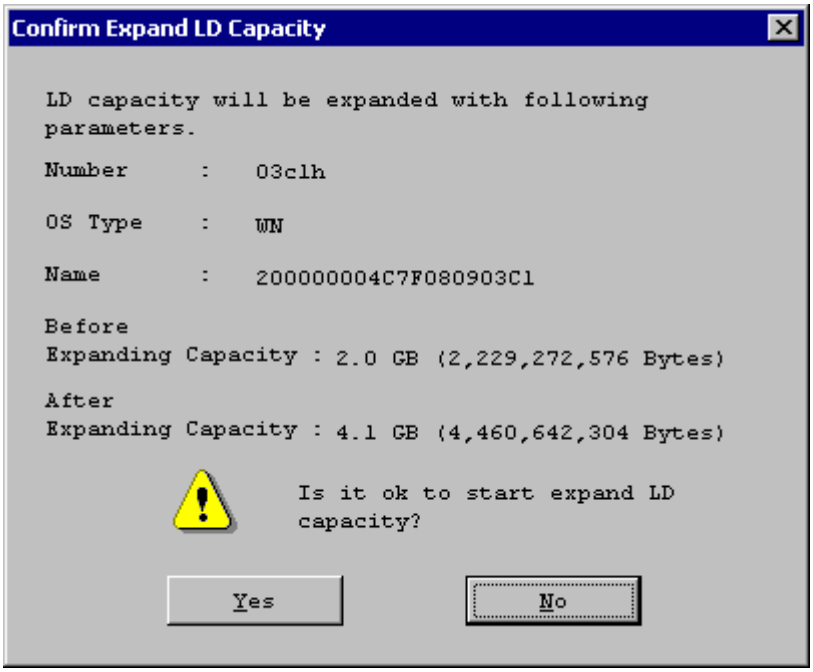


Figure 7-46 Dialog Box for Checking the Parameters of the Logical Disks Expanded

[Yes] button: Starts expanding the capacity of the logical disks.

[No] button: Returns to the “LD Capacity Expansion” dialog.

6. When the capacity is successfully changed, the following message is displayed:

Figure 7-47 Message for Successful Completion of Expanding the Capacity

If the logical disks in the pool are in the following states, it is impossible to expand them.

1. Pairing is performed

   Execute the expanding after removing these conditions.

2. The snapshot classification is set to BV, SV, LV, or SDV.

7.2.3 Unbinding Logical Disks

You can unbind logical disks from the “LD Individual Bind/Unbind” screen.

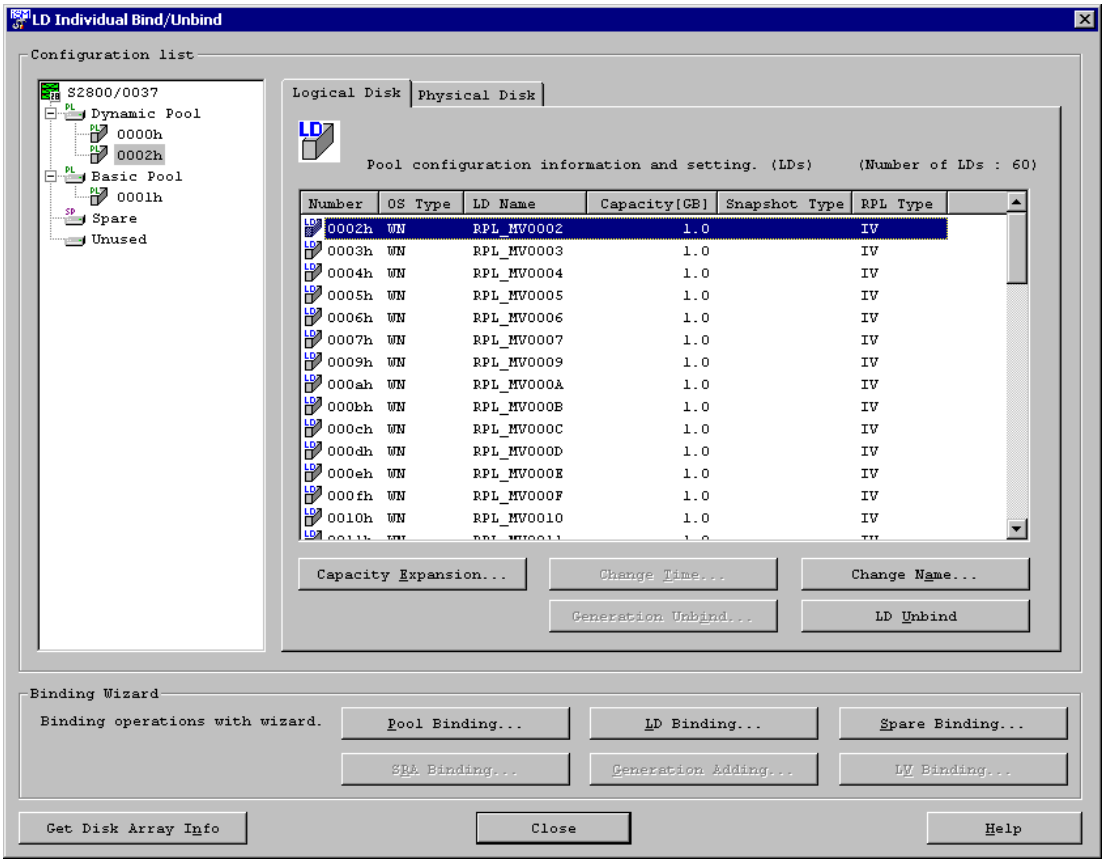


Figure 7-48 Unbinding Logical Disks

<Steps for unbinding logical disks>

1. Select a basic pool or dynamic pool in the configuration tree view.

2. Click the [Logical Disk] tab on the detailed information view.

3. Select a logical disk you want to remove from the list of logical disks in the detailed information view.

4. Click the [LD Unbind] button.

5. A message box asking you to unbind the logical disk is displayed.

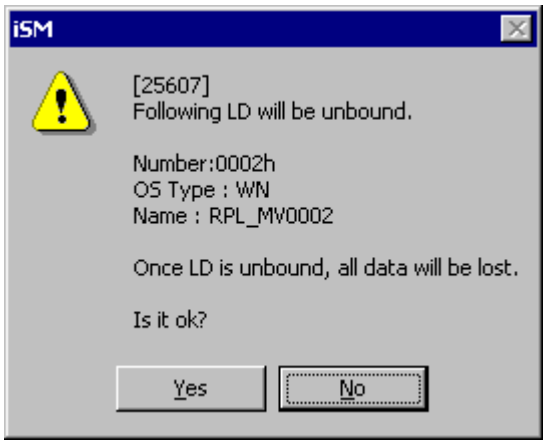


Figure 7-49 Message Box for Confirmation of Unbinding a Logical Disk

If the logical disks in the pool are in the following states, it is impossible to unbind them.

1. Managed by the Access Control (PORT mode).
2. Managed by the Access Control (WWN mode).
3. Pairing is performed.
4. Link setting is performed (snapshot).
5. Assigned to a cache segment (cache segment setting).
6. A reserve group is set (LD Administrator).

Execute the unbinding after removing these conditions.

6. When the logical disk is successfully unbound, the following message is displayed.

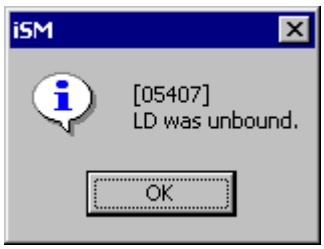


Figure 7-50 Message for Successful Completion of Unbinding Logical Disks

7.2.4 Renaming a Logical Disk

You can rename a logical disk from the “LD Individual Bind/Unbind” screen.

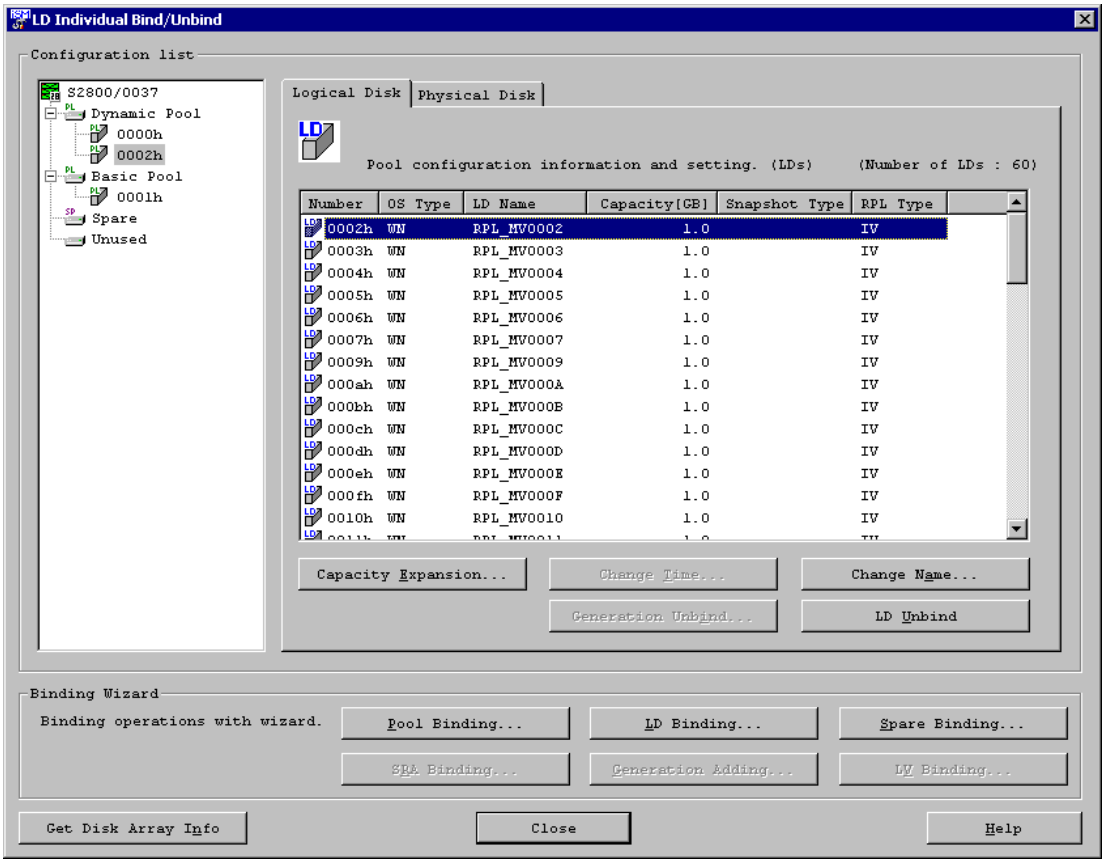


Figure 7-51 Renaming a Logical Disk

<Steps for renaming a logical disk>

1. Select a basic pool or dynamic pool in the configuration tree view.

2. Click the [Logical Disk] tab on the detailed information view.

3. Select a logical disk you want to remove from the list of logical disks in the detailed information view.

4. Click the [Change Name] button.

5. The dialog for renaming a logical disk appears.

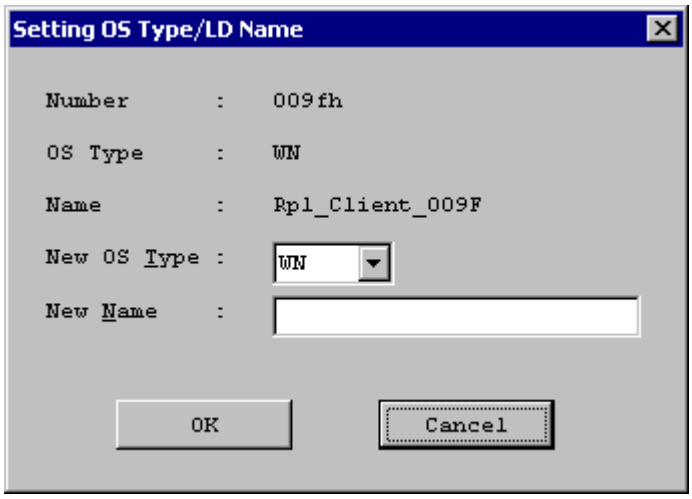


Figure 7-52 Dialog for Renaming a Logical Disk

(1) The logical disk name must be unique in the system. (Do not assign the same name twice or more.)

(2) The initial value of the logical disk name field consists of 20 characters; 16 characters specific to the disk array and 4 characters of the logical disk number.

(3) Any logical disk name that does not conform to the following rules is invalid:

- Number of available characters: 1 to 24 characters
- Available characters:
  - Alphabet: A to Z (a to z)
    * Upper- and lower-case characters are distinguished.
  - Numerals: 0 to 9
  - Underbar: _
  - Slash: /

* All the characters must be 1-byte characters.

6. When the logical disk is successfully renamed, the following message is displayed.

Figure 7-53 Message for Successful Completion of Renaming the Logical Disk

7.2.5 Changing Time to Bind Logical Disks

You can change the duration of time to bind logical disks from the “LD Individual Bind/Unbind” screen.

You can change the time to bind logical disks which belong to a basic pool.

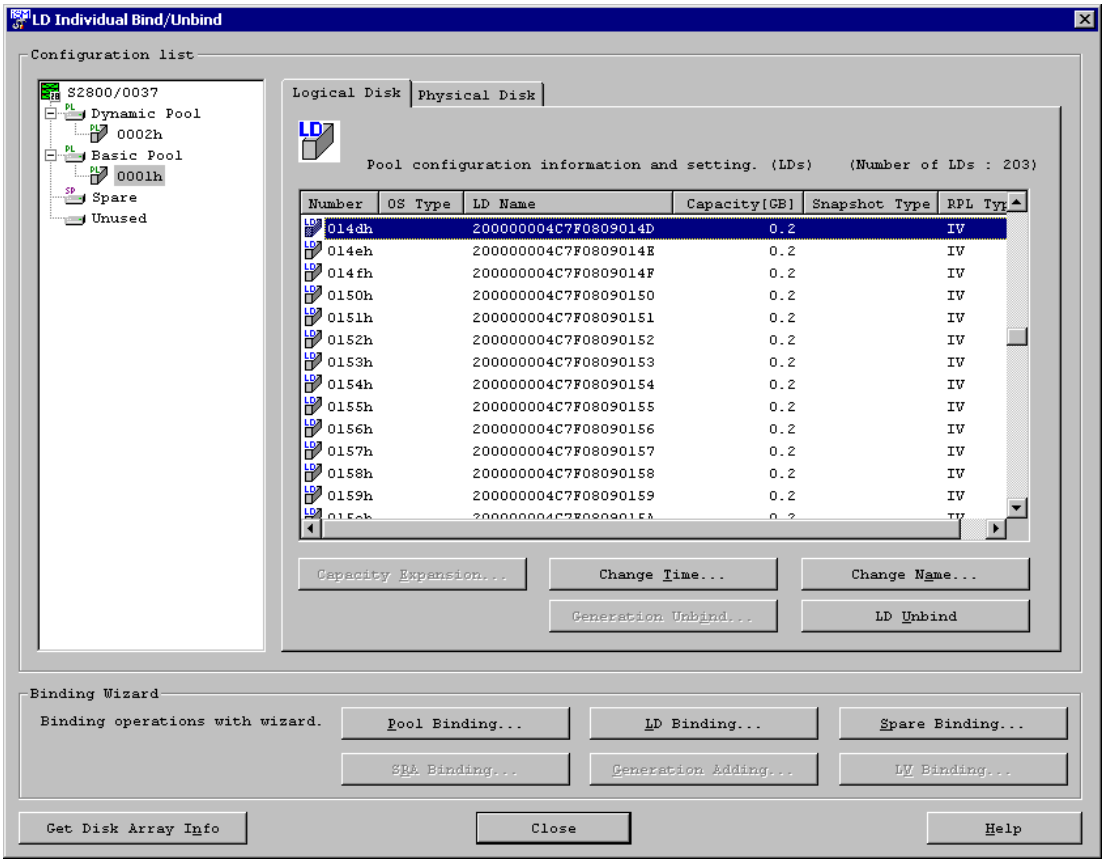


Figure 7-54 Changing the Time to Bind Logical Disks

<Steps for changing the time to bind logical disks>

1. Select a basic pool in the configuration tree view.

2. Click the [Logical Disk] tab on the detailed information view.

3. Select a logical disk you want to remove from the list of logical disks in the detailed information view.

4. Click the [Change Time] button.

5. The “Change Pool Rebuild/Expansion Time” dialog box appears.

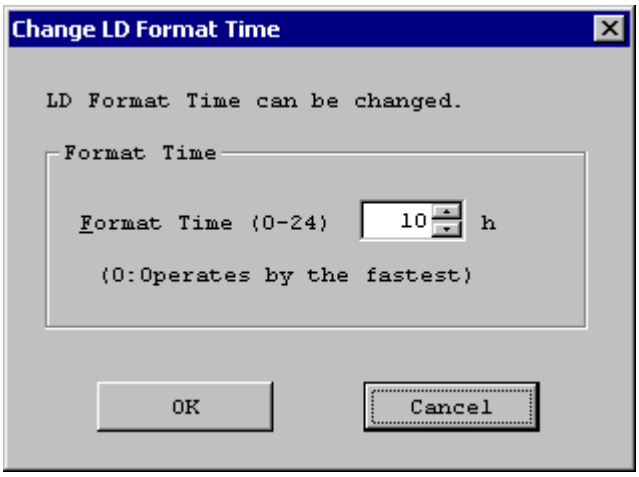


Figure 7-55 Dialog Box for Changing the Time to Build Logical Disks

Specify the duration of time to bind the logical disks. You can specify 0 to 24 hours. Although specifying 0 binds the logical disks in the shortest time, select an appropriate time taking account of the load to the host I/O. The time specified in the field is just a target, thus it is not assured to take the specified time.

6. When the time is successfully changed, the following message is displayed:

Figure 7-56 Message for Successful Completion of Changing the Time

7.2.6 Logical Disk Batch Setting

Specify the same RAID type and logical disk capacity for the unused physical disks on the disk array. The selectable logical disk configuration is as follows:

- RAID6 (8+PQ) The required number of physical disks is 10 or more, and the available capacity of the pool is approximately 80% of the capacity of all the physical disks.

Batch binding logical disks is to make up logical disks collectively and easily by specifying some parameters about the RAID type, the number of logical disks, and other related items. This section describes the steps for batch binding logical disks and some notes on doing that.

S400/S1400/S2400/S2800 disk array provides a wizard for binding logical disks collectively.

The batch binding wizard allows going through all the steps on unused physical disks from binding a pool to binding the logical disks. The available capacity of the pool is the same with that of the logical disks. The pool is bound with a configuration of RAID6 (8+PQ). Set other parameters for binding logical disks according to 7.2 “Method of Binding Logical Disks”.

(1) Starting up the LD Batch Binding Wizard

To start up the LD Batch Binding Wizard, click the [LD Bind] button in the "Configuration- [Setting Mode]" menu.

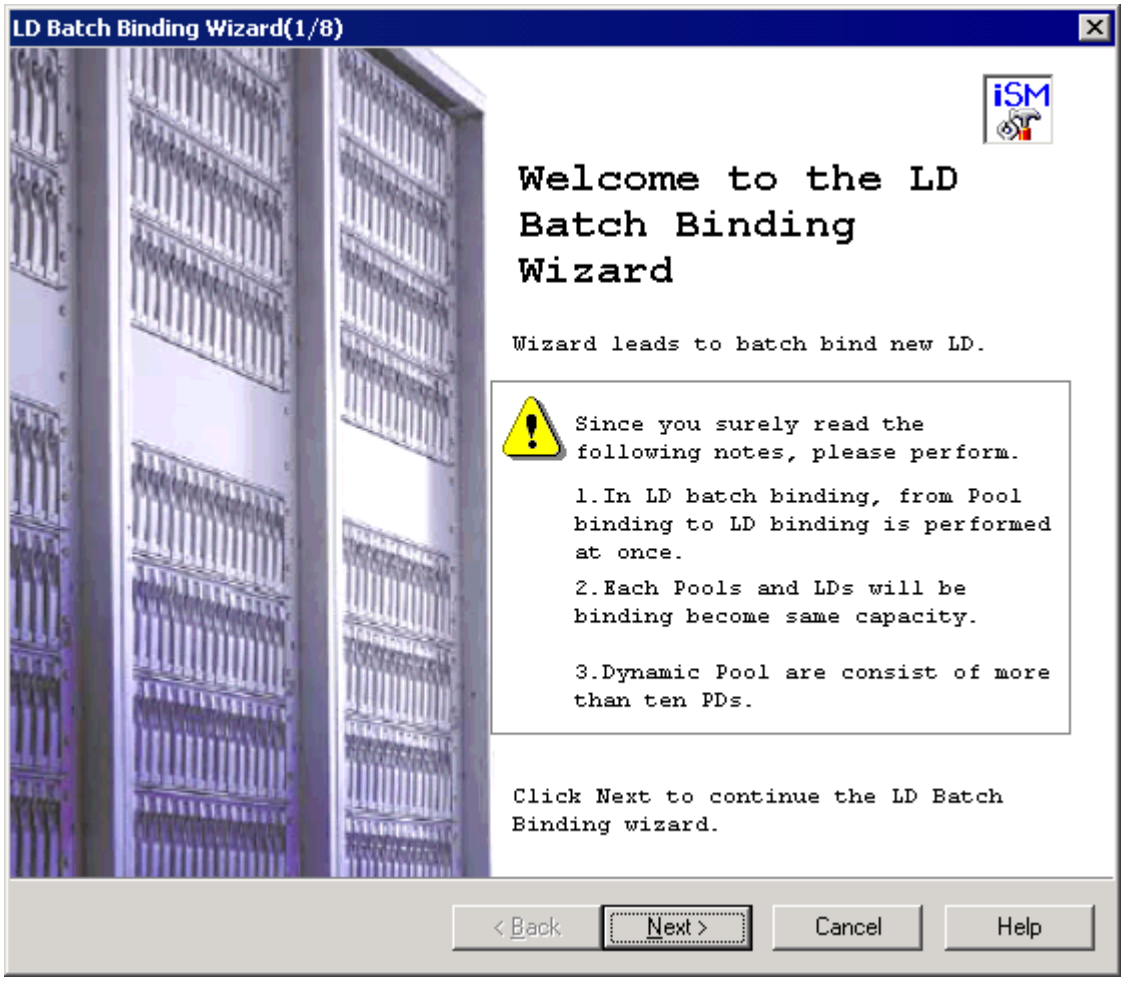


Figure 7-57 Starting up the LD Batch Binding Wizard

[Next] button: Displays the "Number of Pools and Spares" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(2) Specifying the number of pools and the number of spares

Clicking the [Next] button on the initial screen of the LD Batch Binding Wizard displays the "Number of Pools and Spares" screen.

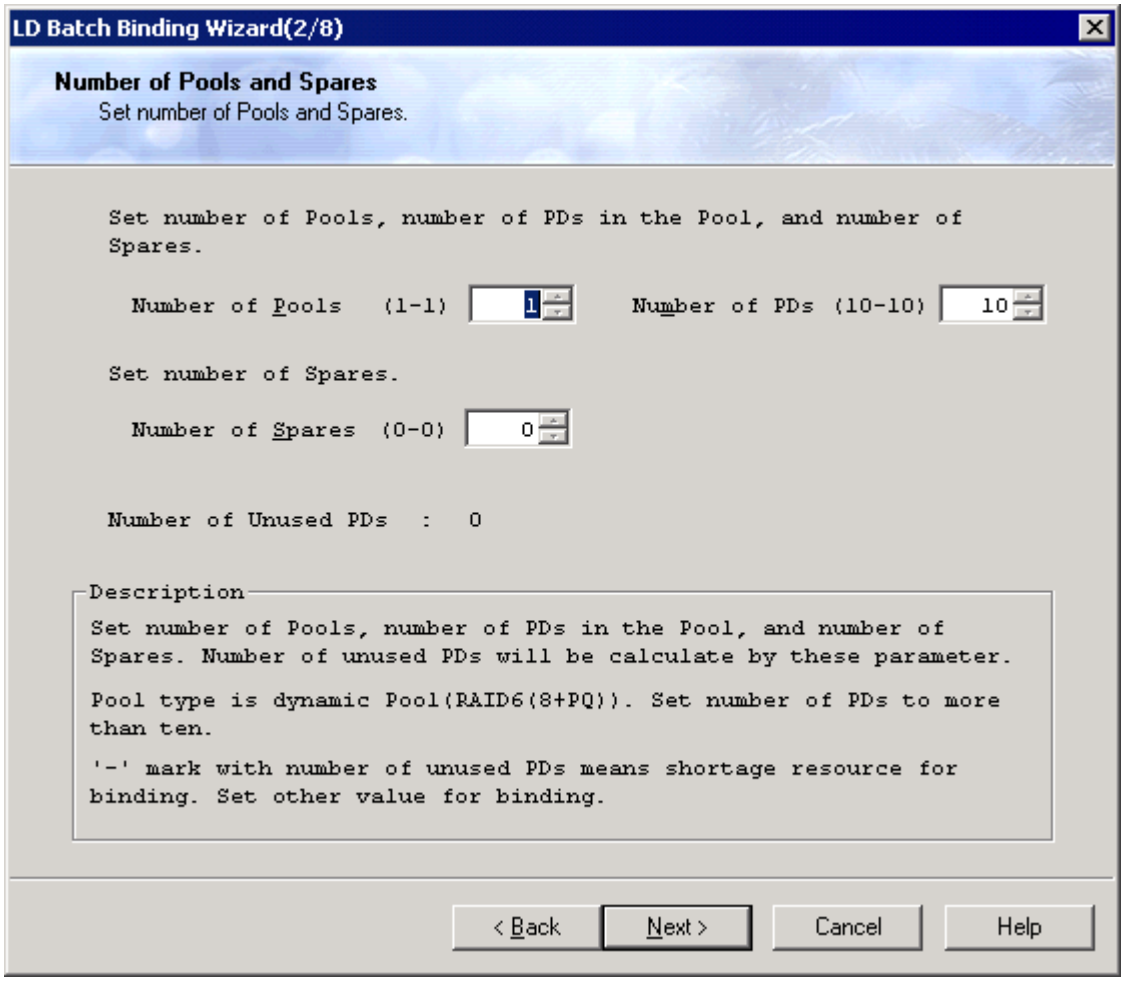


Figure 7-58 Specifying the Number of Pools and Spares

Number of Pools: Specify the number of pools you want to bind.
The pools you are going to bind need to be a dynamic pool which consists of 10 physical disks. Their configuration is set to RAID6 (8+PQ).

Number of PDs: Specify the number of physical disks used to bind the pool(s).

Number of Spares: Specify the number of spares you want to use.

[Next] button: Displays the "Confirmation for Pool Binding Parameter" screen.

[Back] button: Displays back the "Welcome to the LD Batch Binding Wizard" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(3) Checking for the parameters specified for the pool(s)

Clicking the [Next] button on the "Number of Pools and Spares" screen displays the "Confirmation for Pool Binding Parameter" screen.

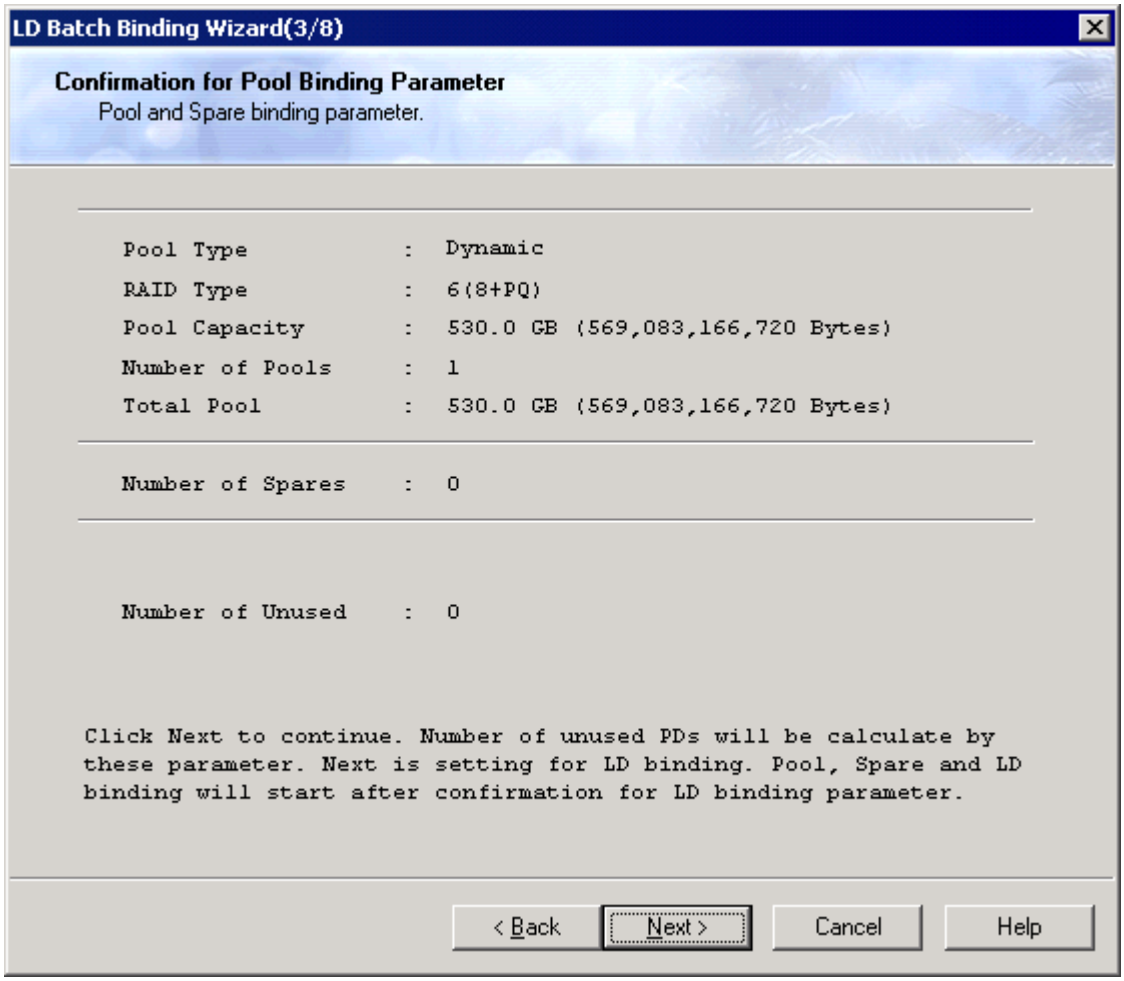


Figure 7-59 Checking for the Parameters Specified for the Pool(s)

(A) Parameters for the pool(s)

Pool Type: Type of the pool(s)

RAID Type: RAID type of the pool(s)

Pool Capacity: Capacity per pool

Number of Pools: Number of pools to bind

Total Pool: Total capacity of the pool(s) to bind

(B) Parameters for the physical disks

Number of Spares: Number of spares to bind (in total)

Number of Unused: Number of disks unused to bind the pool(s).
When you use the batch bind wizard, some physical disks remain unused depending on the parameters specified in Number of Pools, Number of PDs, and Number of Spares.

[Next] button: Displays the “Binding Method” screen.

[Back] button: Displays back the “Number of Pools and Spares” screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(4) Specifying the way of binding the logical disks

Clicking the [Next] button on the "Confirmation for Pool Binding Parameter" screen displays the "Binding Method" screen.

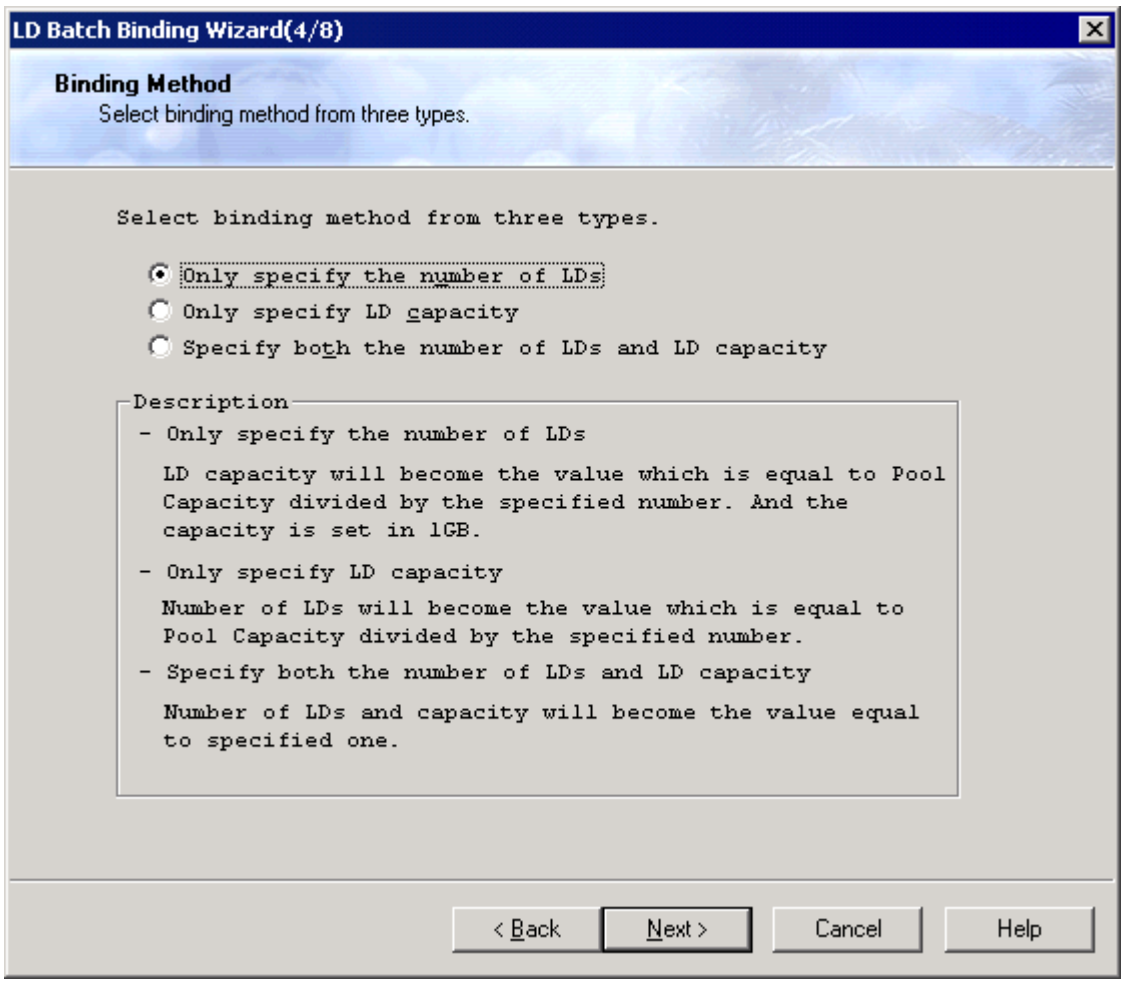


Figure 7-60 Specifying the Way of Binding Logical Disks

Specify one of the following ways of binding the logical disks:

- Only specify the number of LDs
  Specify the number of logical disks to bind per pool.

- Only specify LD capacity
  Specify the capacity of each of the logical disks to bind per pool. You can specify a recommended capacity, set the capacity same with that of a logical disk already bound, or directly designate any value for the capacity.

- Specify both the number of LDs and LD capacity
  Specify any desired values for the number of logical disks and the capacity of one logical disk.

[Next] button: One of the following screens is displayed according to the specified way of binding the logical disks:

- Check-marking on [Only specify the number of LDs]:
  Displays the “Specify Number of LDs” screen.
- Check-marking on [Only specify LD capacity]:
  Displays the “Specify the Capacity” screen.
- Check-marking on [Specify both the number of LDs and LD capacity]:
  Displays the “Specify Number of LDs and LD Capacity” screen.

[Back] button: Displays back the “Confirmation for Pool Binding Parameter” screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

Although the capacity specified in the field is that of the region you can use, there are some region for controlling the disks of the pools in addition to the region usable by the user.

(5)-1 Specifying the number of logical disks

Check-marking on [Only specify the number of LDs] on the "Binding Method" screen and clicking the [Next] button displays the "Specify Number of LDs" screen.

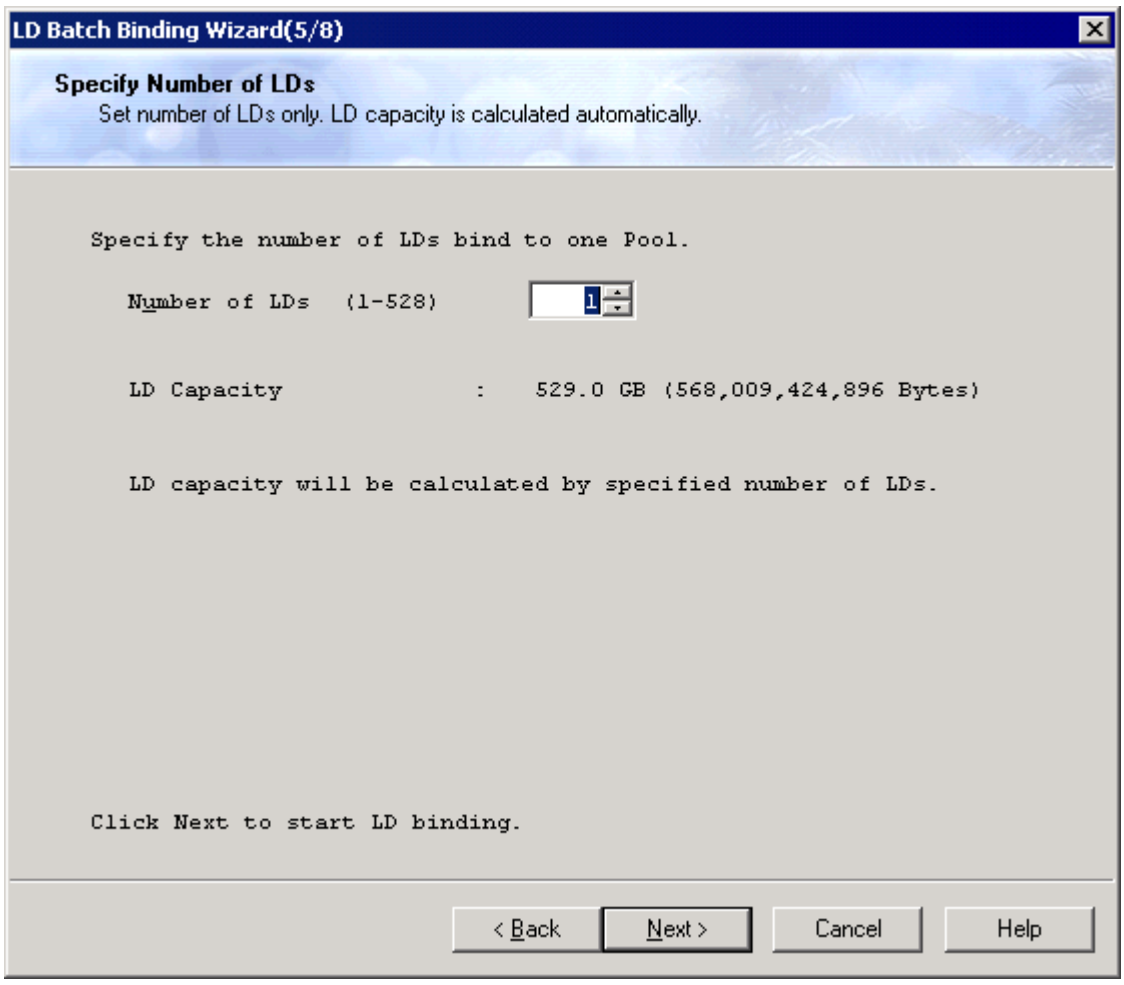


Figure 7-61 Specifying the Number of Logical Disks

Number of LDs: Specify the number of logical disks to bind.
The capacity of each logical disk is set in the unit of 1 GB, and the maximum available capacity for the logical disks is automatically calculated. In addition to that, there is the number of logical disks to bind in one pool, thus the number of logical disks actually bound is the specified number multiplied by the number of pools.

[Next] button: Displays the "Setting Detail Parameter for LD Binding" screen.

[Back] button: Displays back the "Binding Method" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(5)-2 Specifying the logical disk capacity

Check-marking on [Only specify LD capacity] on the "Binding Method" screen and clicking the [Next] button displays the "Specify the Capacity" screen.

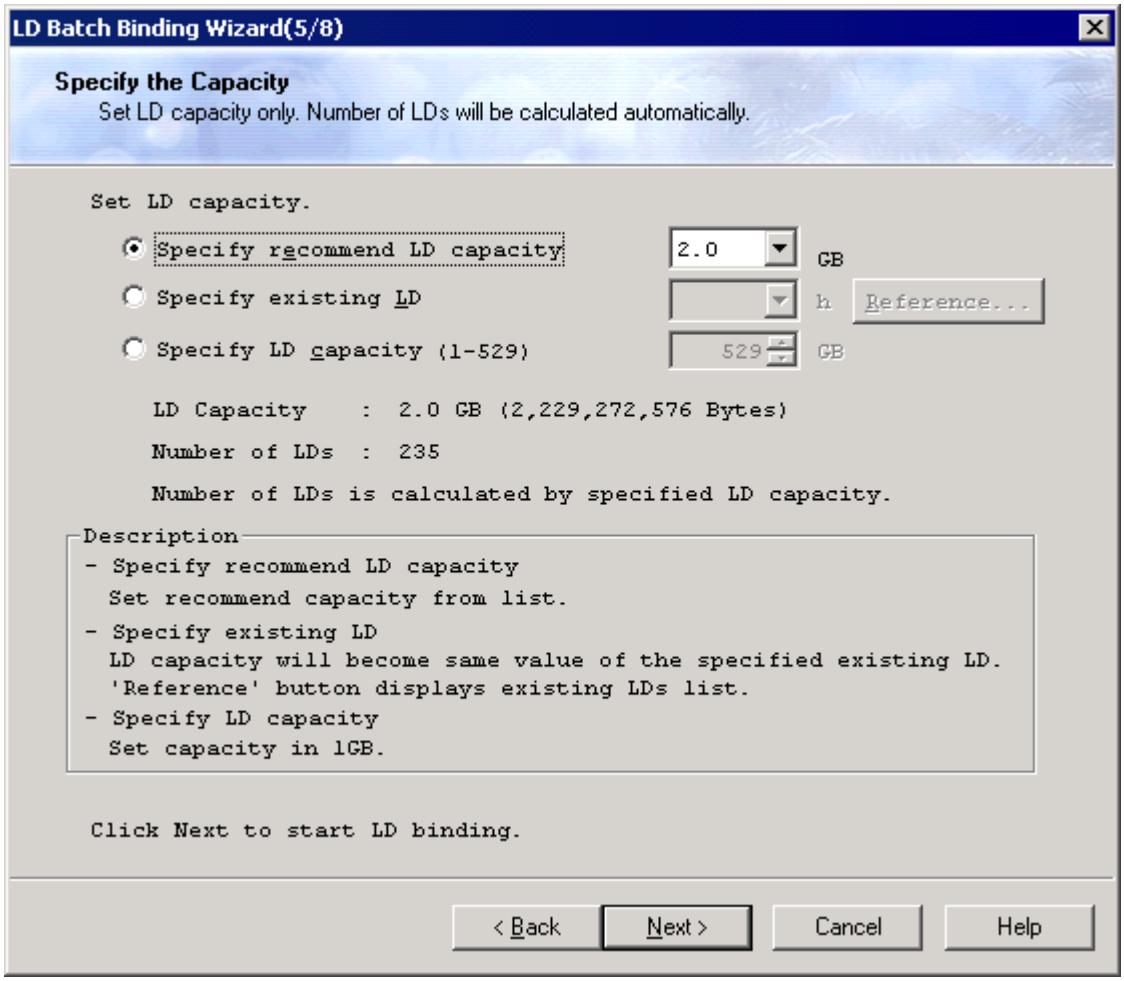


Figure 7-62 Specifying the Logical Disk Capacity

Use one of the following ways of specifying the capacity of the logical disks to bind:

- Specify recommend LD capacity
  Specify one of the recommended values for the capacity of the logical disks to bind from the pull-down menu.

- Specify existing LD
  Select a logical disk already bound to apply the capacity of the logical disk. You can select a logical disk in the "LD Specification" screen by clicking the [Reference] button. (Refer to Figure 7-64 "Screen for Specifying a Logical Disk".)

- Specify LD capacity
  Specify the capacity in units of 1 GB directly. The number of logical disks allowed to bind is automatically calculated according to the value of the capacity you specified.

Note that specifying a recommended capacity makes the capacity occupied by the pool larger than the capacity of the logical disks by 0.2 GB approximately and maximum.
For details, refer to Appendix D “Notes on Use for Data Replication”.

[Next] button: Displays the “Setting Detail Parameter for LD Binding” screen.

[Back] button: Displays back the “Binding Method” screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(5)-3 Specifying the number of logical disks and the logical disk capacity

Check-marking on [Specify both the number of LDs and LD capacity] on the "Binding Method" screen and clicking the [Next] button displays the "Specify Number of LDs and LD Capacity" screen.

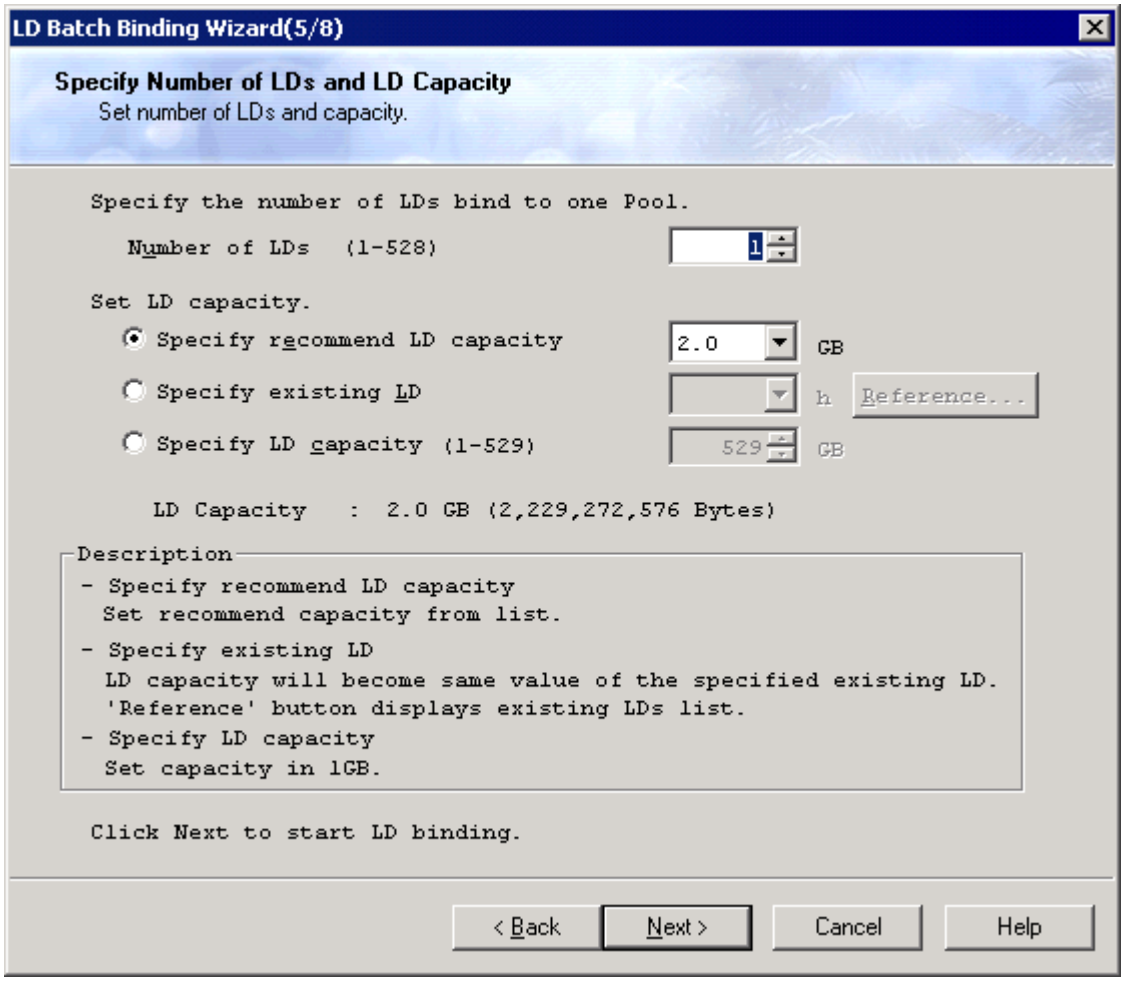


Figure 7-63 Specifying the Number of Logical Disks and Logical Disk Capacity

Specify the number of logical disks according to (5)-1.

Specify the capacity of the logical disks according to (5)-2.

[Next] button: Displays the "Setting Detail Parameter for LD Binding" screen.

[Back] button: Displays back the "Binding Method" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

Selecting a logical disk and clicking the [Reference] button displays the following screen:

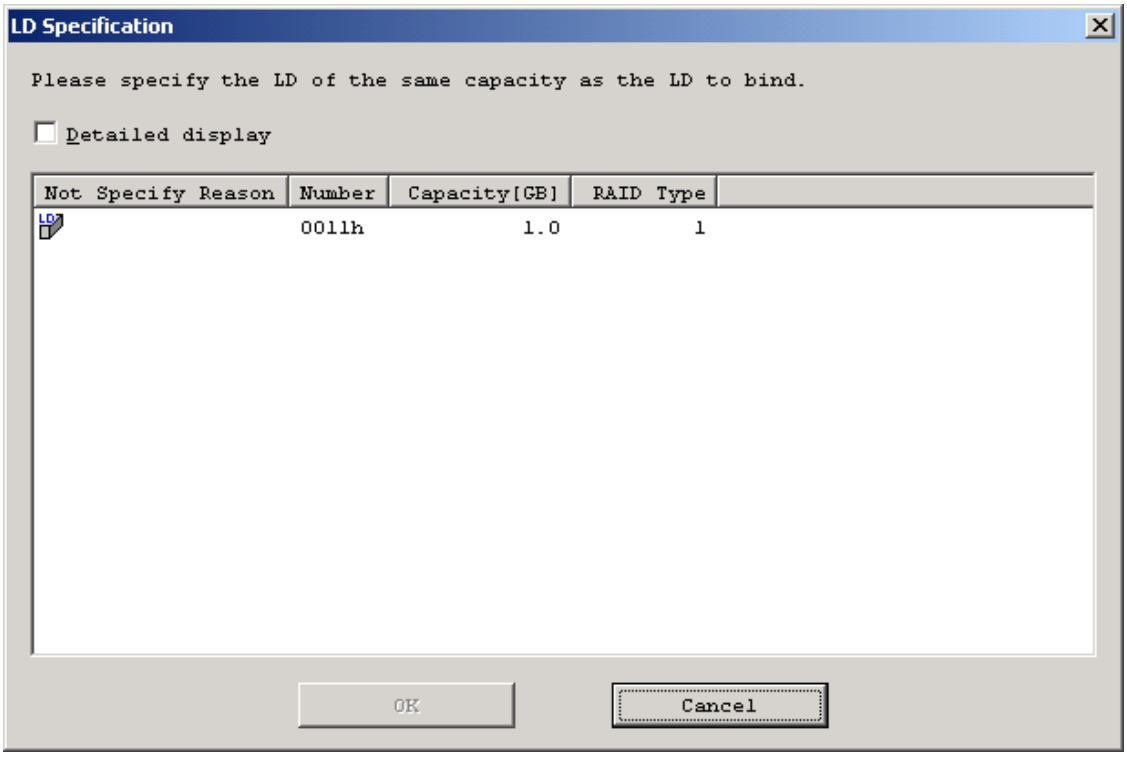


Figure 7-64 Screen for Specifying a Logical Disk

By selecting a logical disk from the list, you can bind the logical disks setting their capacities same with it. For an unselectable logical disk, either of the following reasons is indicated in the “Not Specify Reason” column:

- Excess of capacity:
  The capacity of the logical disk is exceeding the unused space of the pool.

- Capacity unit disagreement:
  It is not possible to bind logical disks setting the same capacity with that of this logical disk. For detailed reasons for mismatching capacity units and details on binding logical disks with a RAID configuration different from those in use, refer to Appendix D “Notes on Use for Data Replication”.

[OK] button: Applies the parameter you specified on this screen, and displays back the screen on which you specified the capacity of the logical disks or the number of logical disks and their capacity.

[Cancel] button: Displays back the screen on which you specified the capacity of the logical disks or the number of logical disks and their capacity. All parameters you specified on this screen are canceled.

It is allowed to change the logical disk number selection displayed through this wizard or number displayed on the LD specification screen to the name of the logical disk. For details, refer to “Client Start/Stop” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with the OS in use. Note that selecting detailed view in the LD specification screen switches the positions of the numbers and the logical disk names.

(6) Specifying the detailed settings of the logical disks

The "Setting Detail Parameter for LD Binding" screen allows checking for the format, name, and initial number of the logical disks, and the time to bind them.

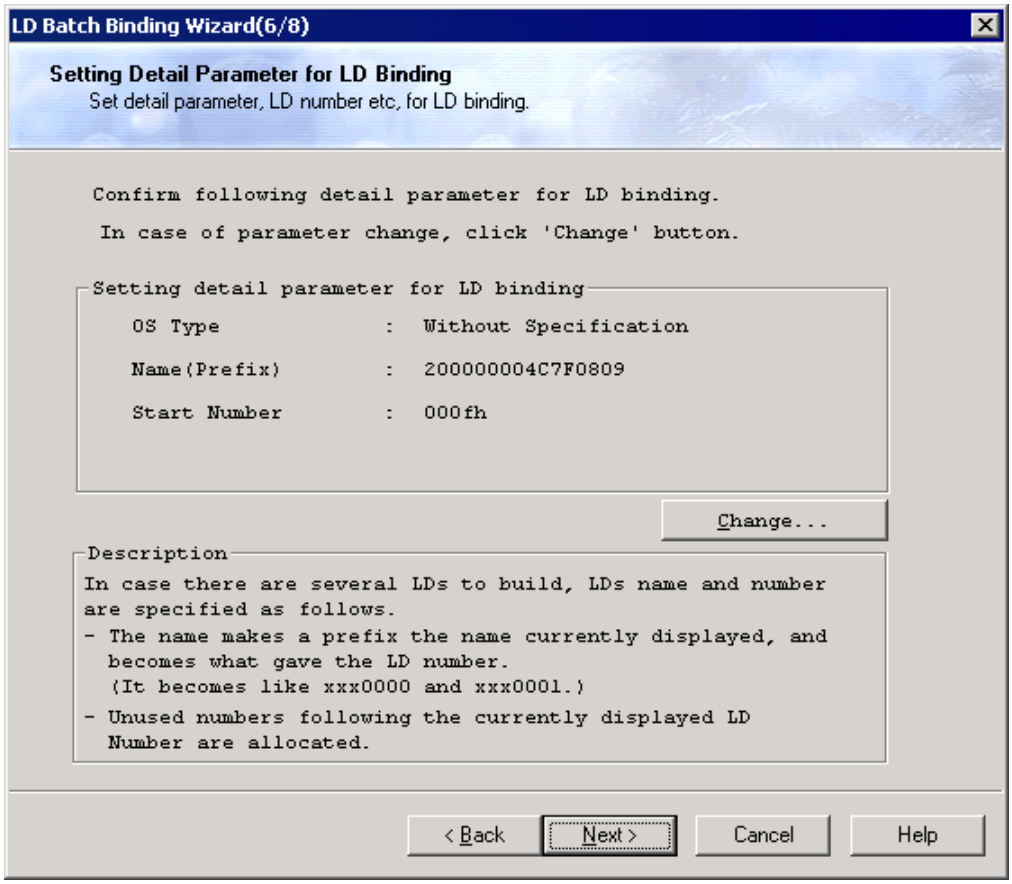


Figure 7-65 Specifying the Detailed Settings of the Logical Disks

OS Type/Name: You can specify the format and name of the logical disks to bind. The logical disk name must be unique in the system. (Do not assign the same name twice or more.) Therefore, when you bind multiple sets of logical disks simultaneously, the logical disks are named with the character string specified and automatically numbered in order.

The initial value of the logical disk name field consists of 20 characters; 16 characters specific to the disk array and 4 characters of the logical disk number. When you do not make any change for logical disk name, the initial value is used in the form mentioned above:

Example: 200000004C518CAC0000, 200000004C518CAC0001, ...

Not changing the logical disk format displays a blank in the OS Type field.

Note that inputting a blank to the format sets the initial values for shipment; a blank in the OS Type field and 16 characters specific to the disk array + 4 characters of the logical

disk number in the Name field.

Table 7-2 lists the selectable logical disk formats.

You can change the logical disk format and name later from the main window on the iSM client or according to 7.2.4 “Renaming a Logical Disk”.

Table 7-2 List of Formats

Format	Description
A2	Logical disk operated on the ACOS-2 system
A4	Logical disk operated on the ACOS-4 system (If you are setting this format, ask our maintenance engineer.)
AX	Logical disk operated on the AIX system
CX	Logical disk operated on the Solaris system
LX	Logical disk operated on the Linux system
NX	Logical disk operated on the HP-UX system
WN	Logical disk operated on the Windows system

(1) Any logical disk name that does not conform to the following rules is invalid:

- Number of available characters: 1 to 24 characters
- Available characters:
  - Alphabet: A to Z (a to z)
    * Upper- and lower-case characters are distinguished.
  - Numerals: 0 to 9
  - Underbar: _
  - Slash: /

* All the characters must be 1-byte characters.

(2) An invalid specification applies the logical disk name to be assigned by default.

(3) On the ACOS-4 system, use the logical disk id names same with those on the host.

For details about the format A4, refer to Appendix G “ACOS-4 Resource Operation Guard”.

Start Number: A number which is equal to or higher than the specified logical disk number and still unused is assigned.

When this parameter is omitted (or if the specified number is invalid), the number subsequent to the largest logical disk number already occupied is assigned.

For example, when logical disk numbers 0, 1, 3, and 4 are in use, new logical disks are numbered as follows:

When omitted: 5,6,7...
When 0 specified: 2,5,6...
When 10 specified: 10,11,12...

[Change] button: Displays the screen which allows changing parameters. (Refer to Figure 7-66 “Change Parameter Screen”.)

[Next] button: Displays a message asking you to proceed.

[Back] button: Displays back the “Specify Number of LDs”, “Specify the Capacity”, or “Specify Number of LDs and LD Capacity” screen

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

Clicking the [Change] button on the “Setting Detail Parameter for LD Binding” screen displays the following screen:

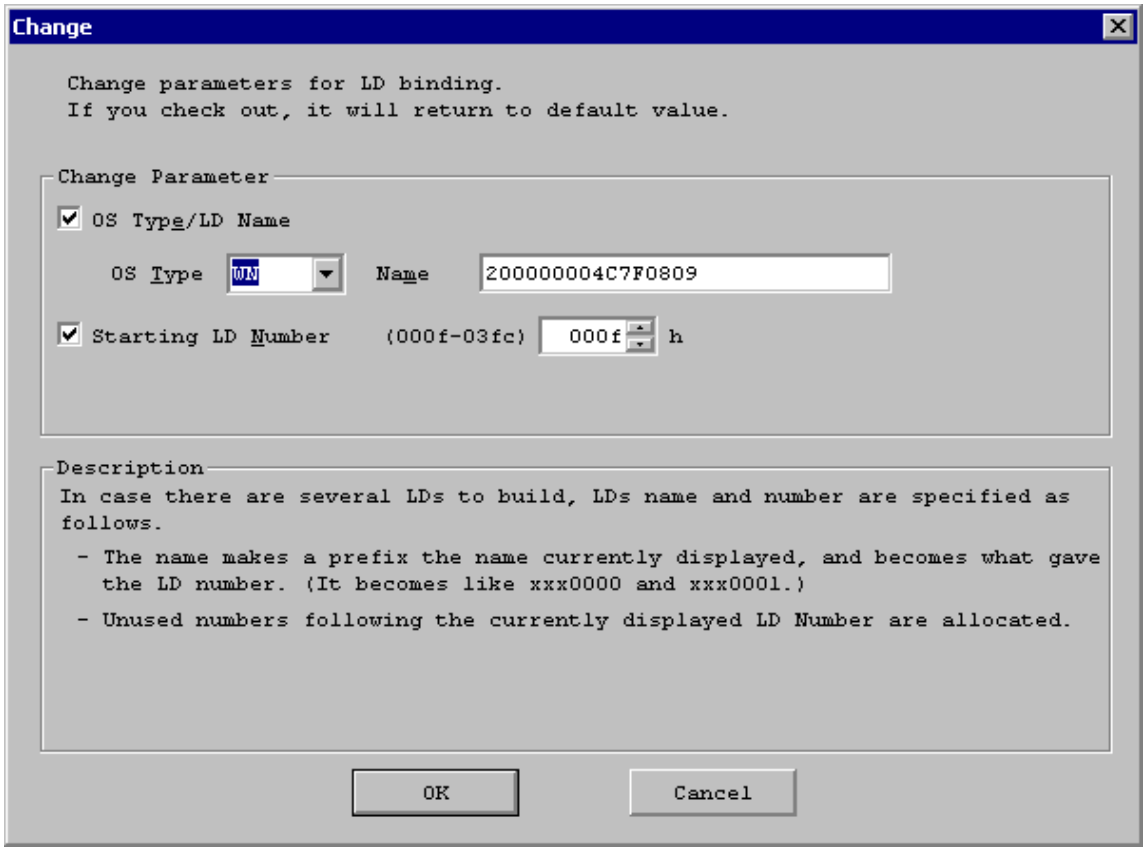


Figure 7-66 Change Parameter Screen

[OK] button: Displays back the screen for specifying the details of the logical disks with the parameter(s) you changed.

[Cancel] button: Displays back the screen for specifying the details of the logical disks. All parameter changes you made on this screen are canceled.

(7) Checking for the parameters for batch binding the logical disks

Clicking the [Next] button on the "Setting Detail Parameter for LD Binding" screen displays the "Confirmation for LD Batch Binding Parameter" screen. Check for the parameters specified for batch binding the logical disks, then click the [Next] button to start binding the pool(s) and the logical disks.

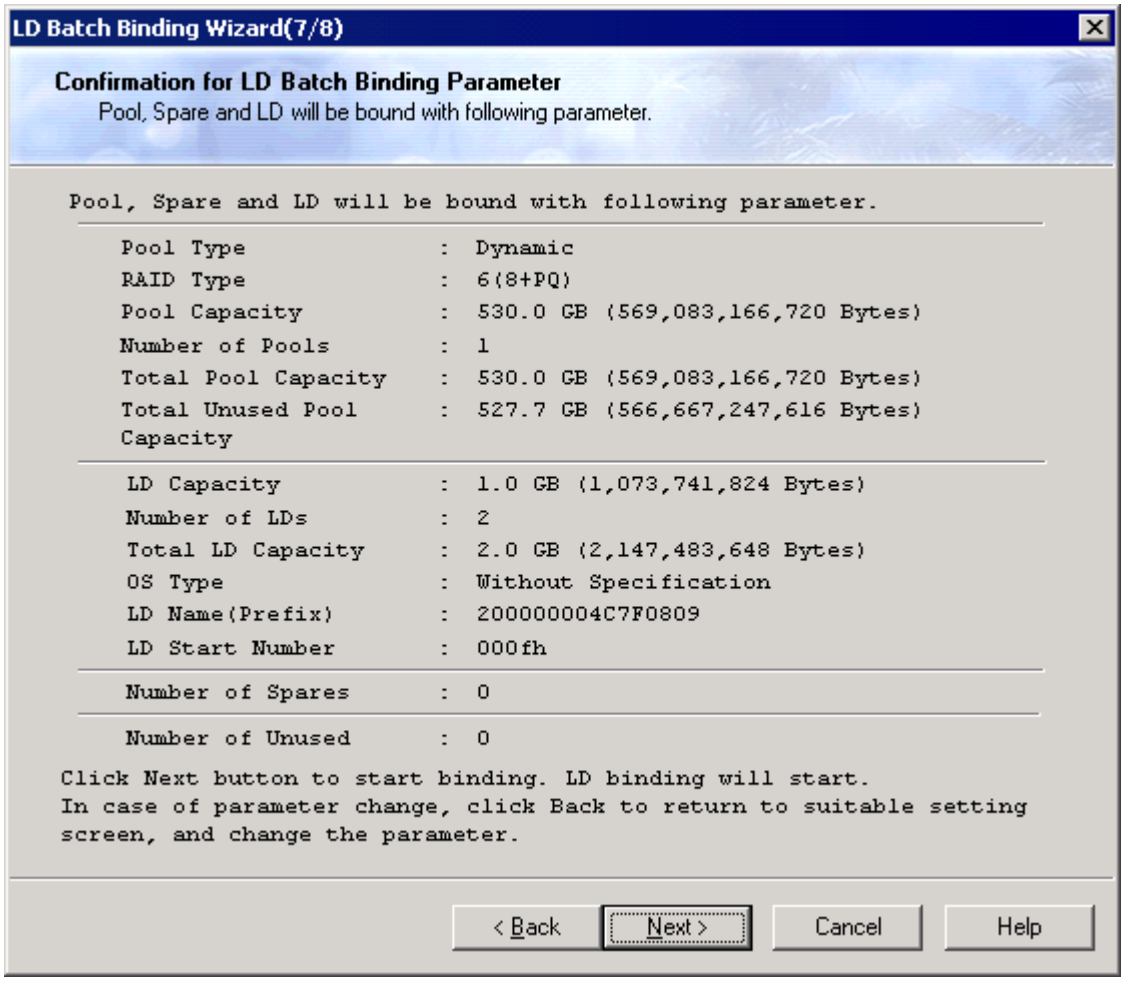


Figure 7-67 Checking for the Parameters of Batch Binding the Logical Disks

(A) Parameters for the pool(s)

Pool Type: Type of the pool(s)

RAID Type: RAID type of the pool(s)

Pool Capacity: Capacity per pool

Number of Pools: Number of pools to bind

Total Pool Capacity: Total capacity of the pool(s) to bind

Total Unused Pool Capacity: Capacity which is not used for binding the logical disks in the pool to bind

(B) Parameters for the logical disks

LD Capacity:	Capacity of each of the logical disks to bind
Number of LDs:	Number of logical disks to bind Number of all logical disks to bind
Total LD Capacity:	Total amount of all logical disks to bind “LD Capacity” × “Number of LDs” = “Total LD Capacity”
OS Type:	Format of the logical disks to bind
LD Name(Prefix):	Name of the logical disks to bind
LD Start Number:	Initial number of the logical disks to bind

(C) Parameters for the physical disks

Number of Spares:	Number of spares to bind (in total)
Number of Unused:	Number of disks unused to bind the pool(s) When you use the batch bind wizard, some physical disks remain unused depending on the parameters specified in “Number of Pools”, “Number of PDs”, and “Number of Spares”.
[Next] button:	Displays a message asking you to proceed.
[Back] button:	Displays back the “Setting Detail Parameter for LD Binding” screen.
[Cancel] button:	Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

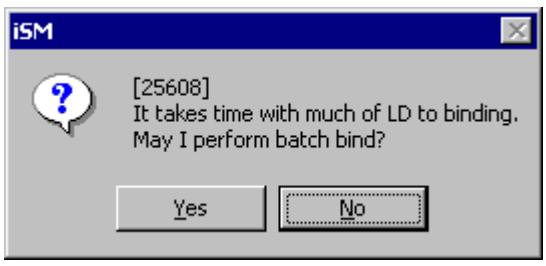


Figure 7-68 Message for Asking To Proceed

Insufficient license capacity

Binding or expanding pools may result in insufficiency of license capacity due to the increased capacity. For insufficiency of license capacity, refer to Page IV-19.

(8) Finishing batch binding the logical disks

On successful completion, the following screen is displayed:

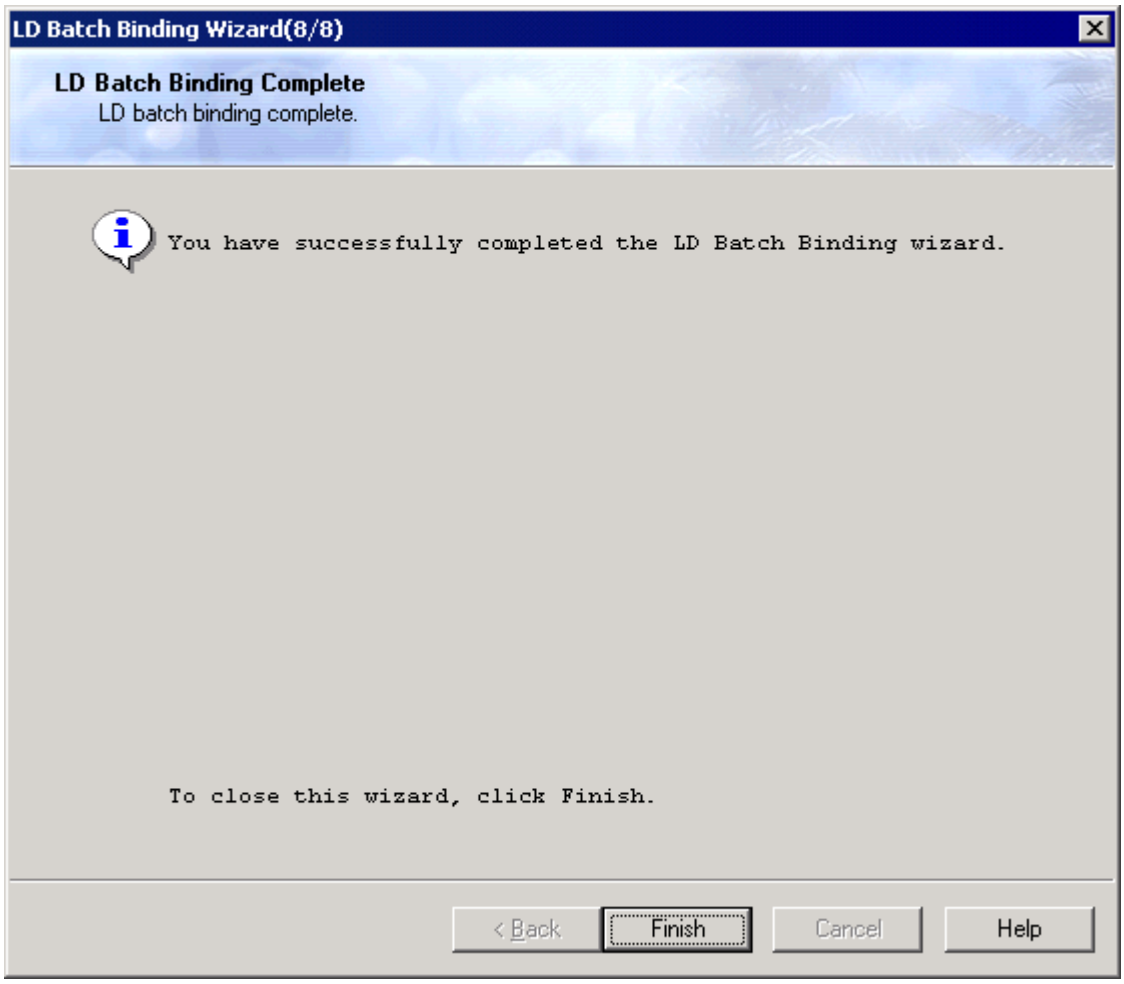


Figure 7-69 Successful Completion of LD Batch Binding

Note that successful completion in this section means that the sequence to bind the logical disks started successfully. Thus, you need to check that the logical disks are correctly set up from the main window of the iSM client.

[Finish] button: Closes the wizard.

On unsuccessful completion, the following screen is displayed:

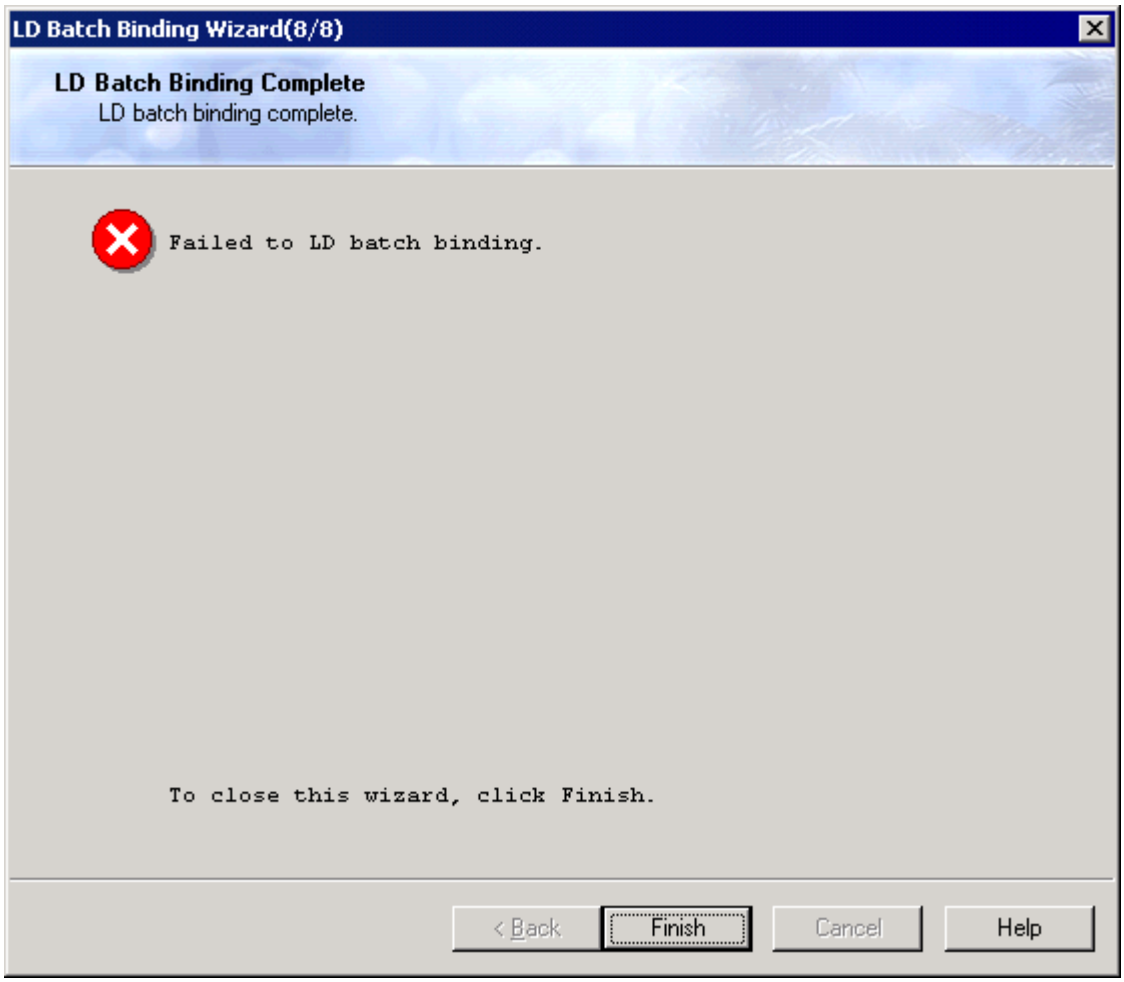


Figure 7-70 Screen On Unsuccessful Completion

Possible causes of an LD batch binding failure may be a communication error between the iSM server and the iSM client, a problem in the disk array, and so forth. If a communication error is the cause of unsuccessful completion, the instruction to do batch binding the logical disks has been correctly issued, thus re-connect the iSM client and check for the communication between them. If there may be an error in the disk array, check the operation records in which the iSM server is logging errors. Then, take an appropriate measure for the error according to the iSM server log, then try to redo batch binding the logical disks.

7.3 Binding a Spare

7.3.1 Binding a Spare

Bind spare disks on the disk array through wizard. You can bind spare disks following the steps on the wizard.

(1) Starting up the spare binding wizard

Click the [Spare Binding] button in the “LD Individual Bind/Unbind” screen.

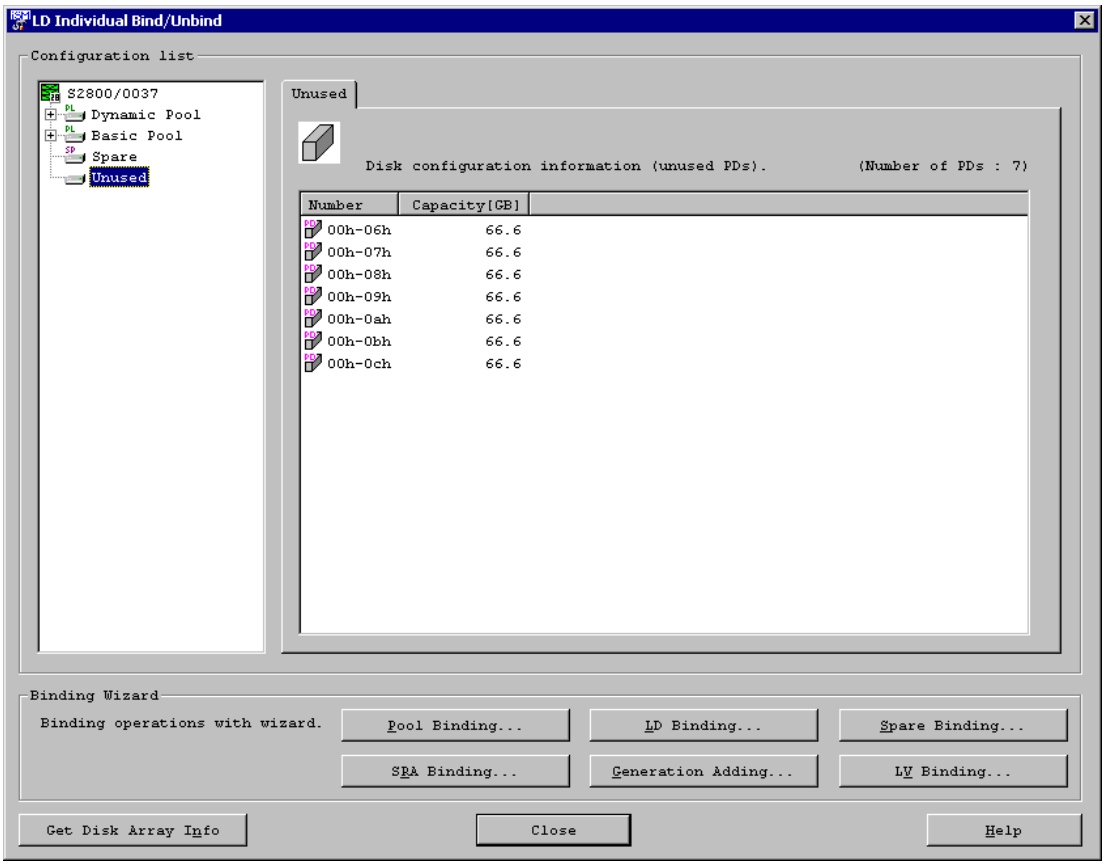


Figure 7-71 Starting Up the Spare Binding Wizard

(2) Setting about the spare binding wizard

Clicking the [Spare Binding] button on the "LD Individual Bind/Unbind" screen displays the "Welcome to the Spare Binding Wizard" screen.

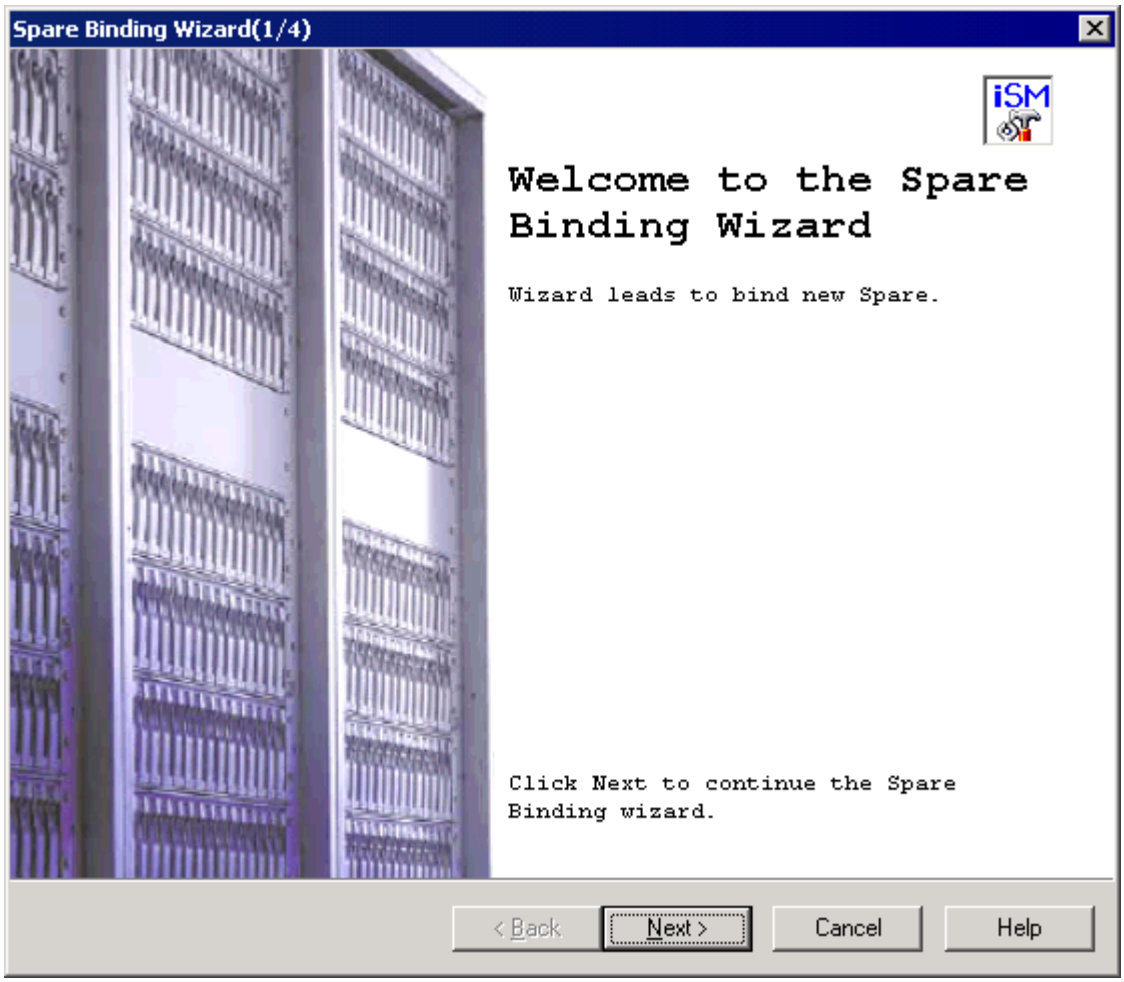


Figure 7-72 Setting about the Spare Binding Wizard

[Next] button: Displays the "PD Selection" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(3) Selecting physical disks

Clicking the [Next] button on the "Welcome to the Spare Binding Wizard" screen displays the "PD Selection" screen.

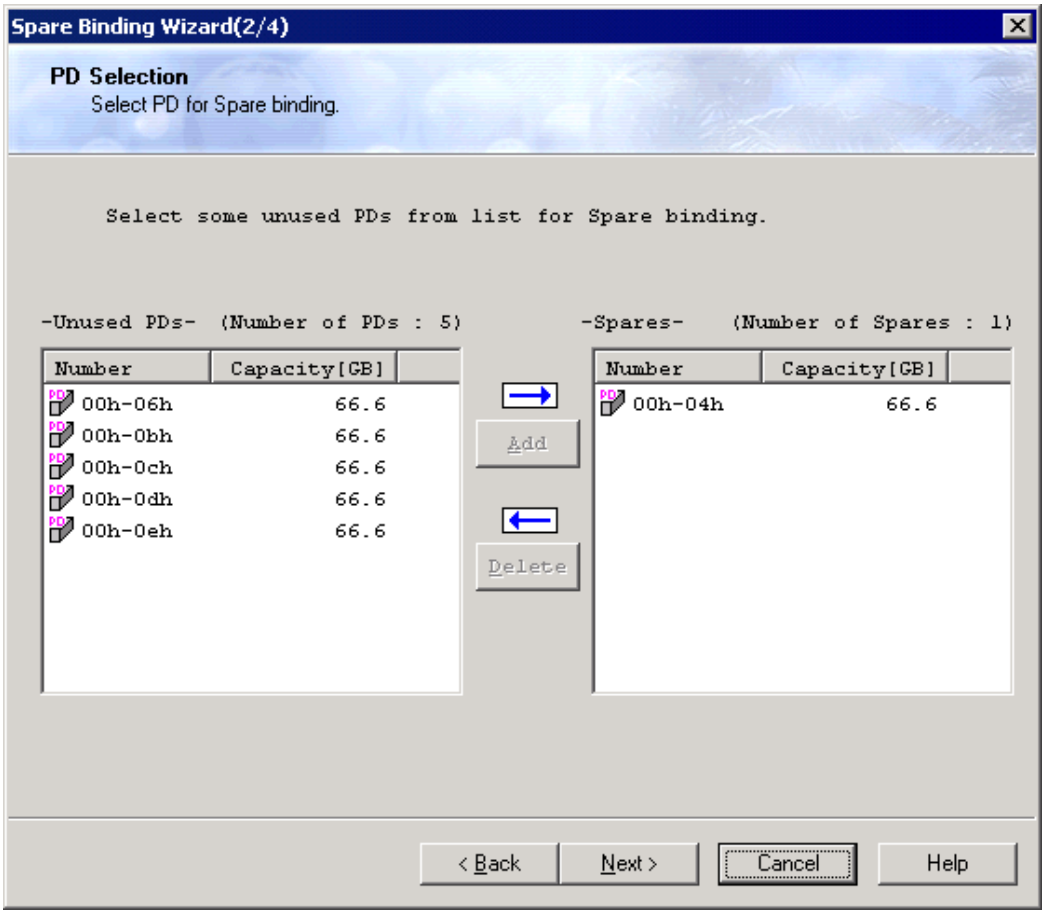


Figure 7-73 Selecting Physical Disks

Unused PDs: Allows selecting unused physical disk(s) to be used as spare disks.

Spares: Lists spare disks to be bound on the disk array.

[Add] button: Select unused physical disk(s) to be used as spare disks, then click this button to add them as spares.

[Delete] button: Select any physical disks you do not want to use as spares, then click this button. The selected physical disks are restored to the list of unused physical disks.

[Next] button: Displays the "Confirmation for Spare Binding Parameter" screen.

[Back] button: Displays back the "Welcome to the Spare Binding Wizard" screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

(4) Checking for the parameters specified for the spare

Clicking the [Next] button on the “PD Selection” screen displays the “Confirmation for Spare Binding Parameter” screen.

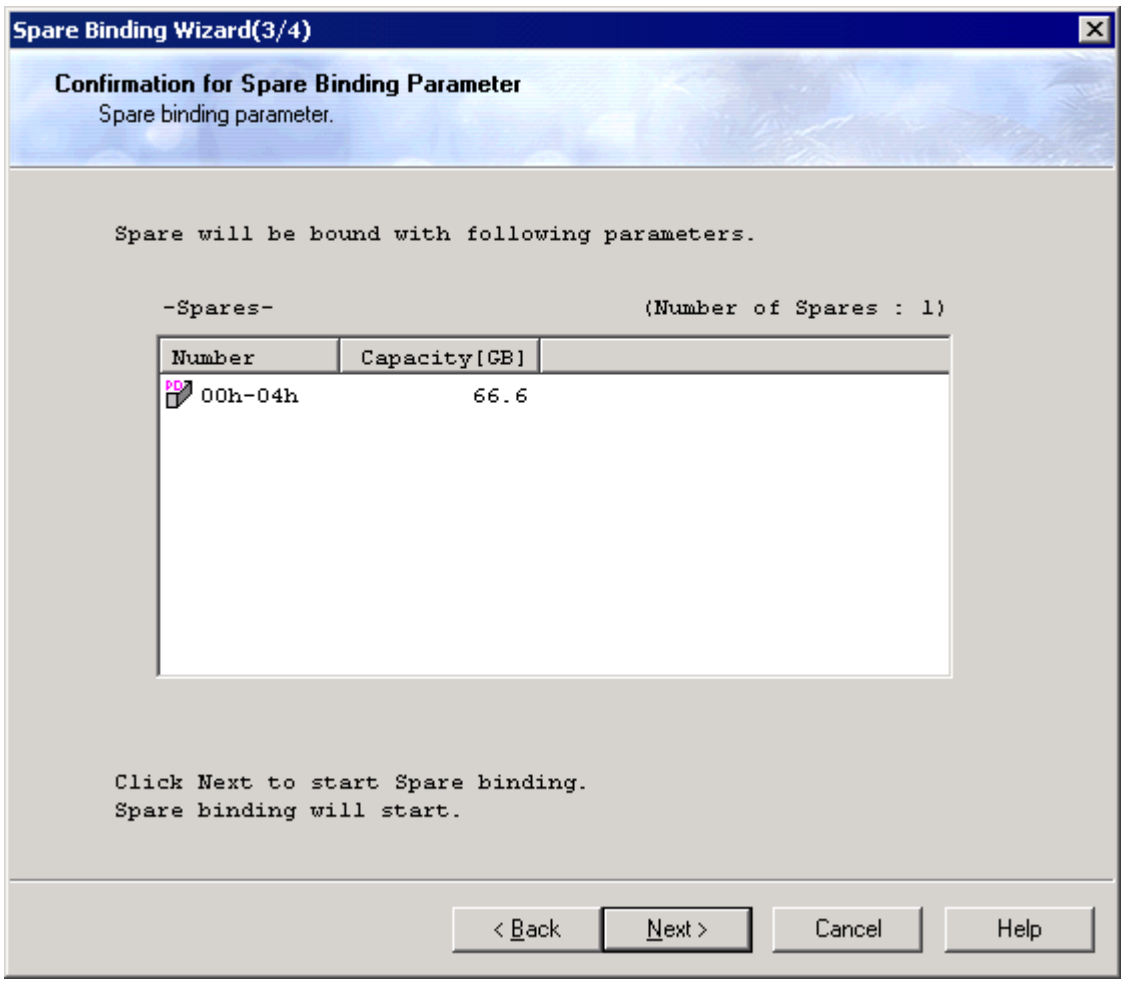


Figure 7-74 Checking for the Parameters Specified for a Spare

Spares: List of physical disks assigned as spares.

Number of Spares: Indicates the number of physical disks assigned as spares.

[Next] button: Displays a message asking you to proceed.

[Back] button: Displays back the “PD Selection” screen.

[Cancel] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

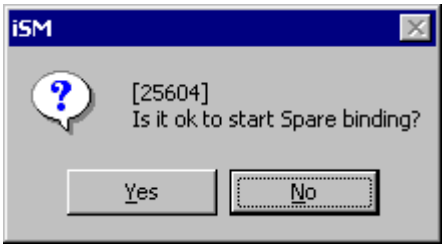


Figure 7-75 Message Box to Start Binding the Spare

(5) Finishing binding the spare

When the spare is successfully bound, the following screen is displayed:

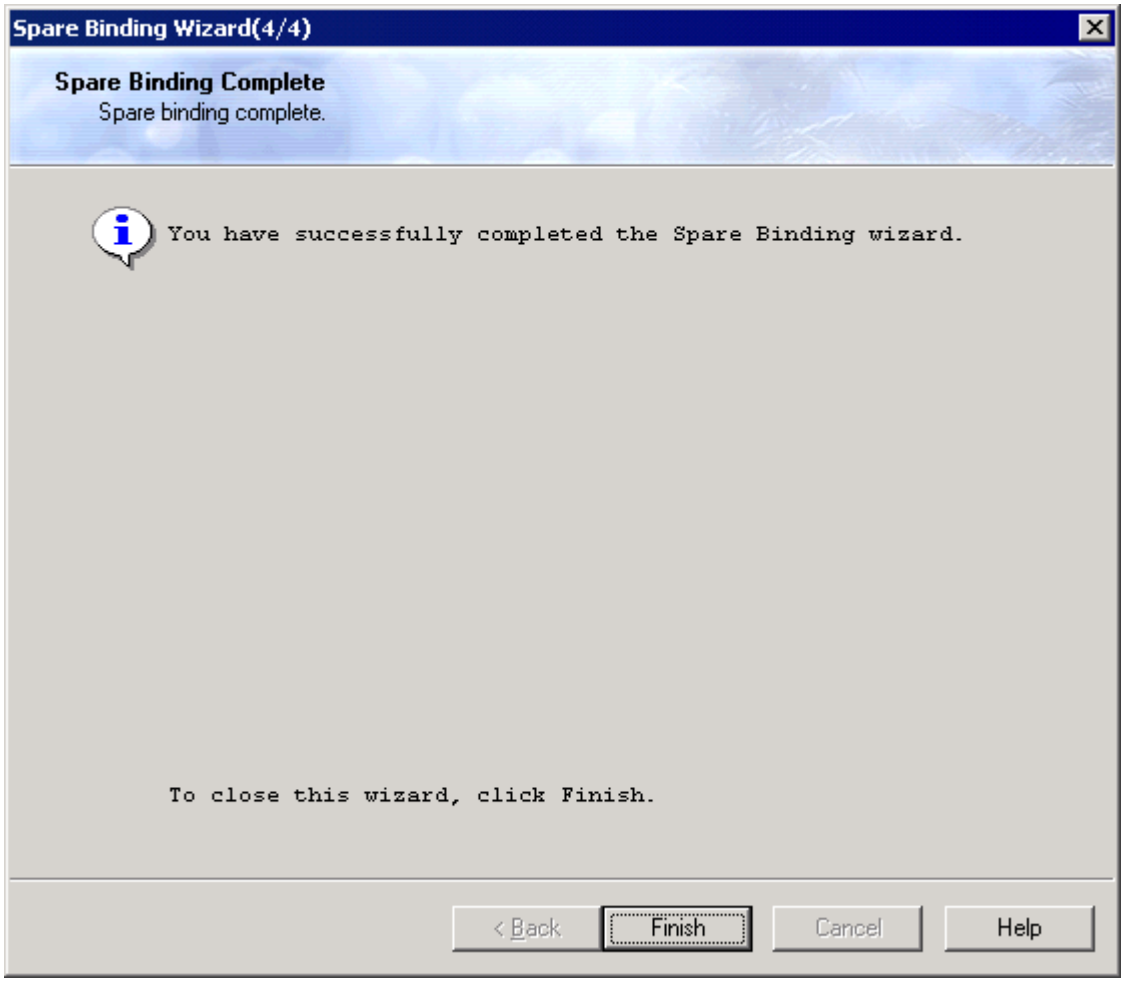


Figure 7-76 Spare Successfully Bound

[Finish] button: Displays a confirmation to ask whether you want to quit the wizard, then the wizard closes if agreed.

7.3.2 Unbinding a Spare

You can unbind spares out of the disk array from the “LD Individual Bind/Unbind” screen.

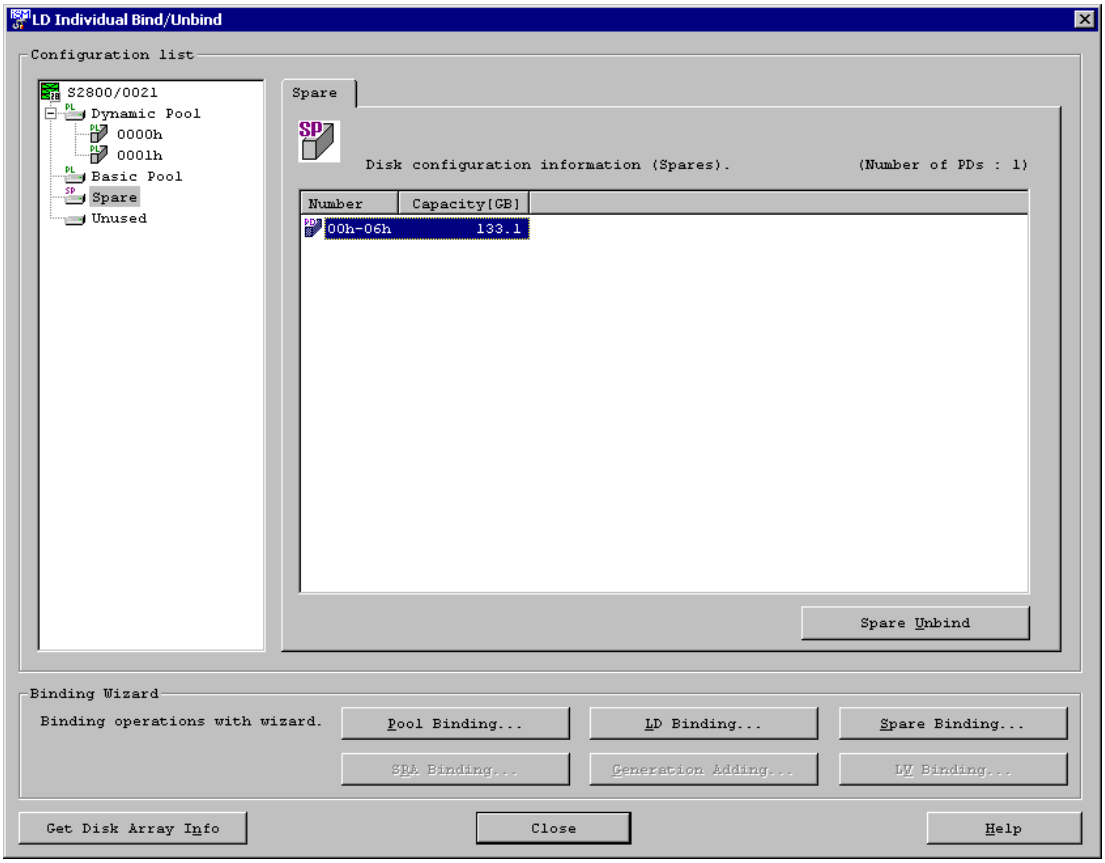


Figure 7-77 Unbinding a Spare

<Steps for unbinding a spare>

1. Select Spare in the configuration tree view.

2. Select a spare you want to unbind out of the array from the list of spares in the detailed information view.

3. Click the [Spare Unbind] button.

4. A message box asking you to unbind the spare is displayed.

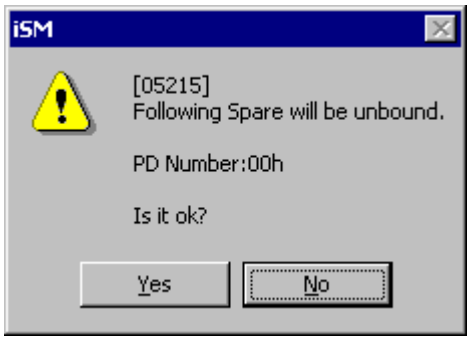


Figure 7-78 Message Box for Unbinding Spare

5. When the spare is successfully unbound, the following message is displayed.

Figure 7-79 Message for Successful Completion of Unbinding the Spare

7.4 Explanation of Configuration Setting Screen

7.4.1 Logical Disk Binding List Screen

Clicking the [LD Bind/Unbind] button on "Configuration - [Setting Mode]" displays the following screen. This section provides the description of the items displayed on this screen according to the alphabets encircled on the figure shown below. For details about operations, refer to the following sections:

- To handle a pool: Refer to 7.1 "Pool Binding".
- To handle logical disks: Refer to 7.2 "Method of Binding Logical Disks".
- To handle a spare: Refer to 7.3 "Binding a Spare".
- To handle a snapshot: Refer to the "Snapshot User's Manual (Function Guide)" (IS030).

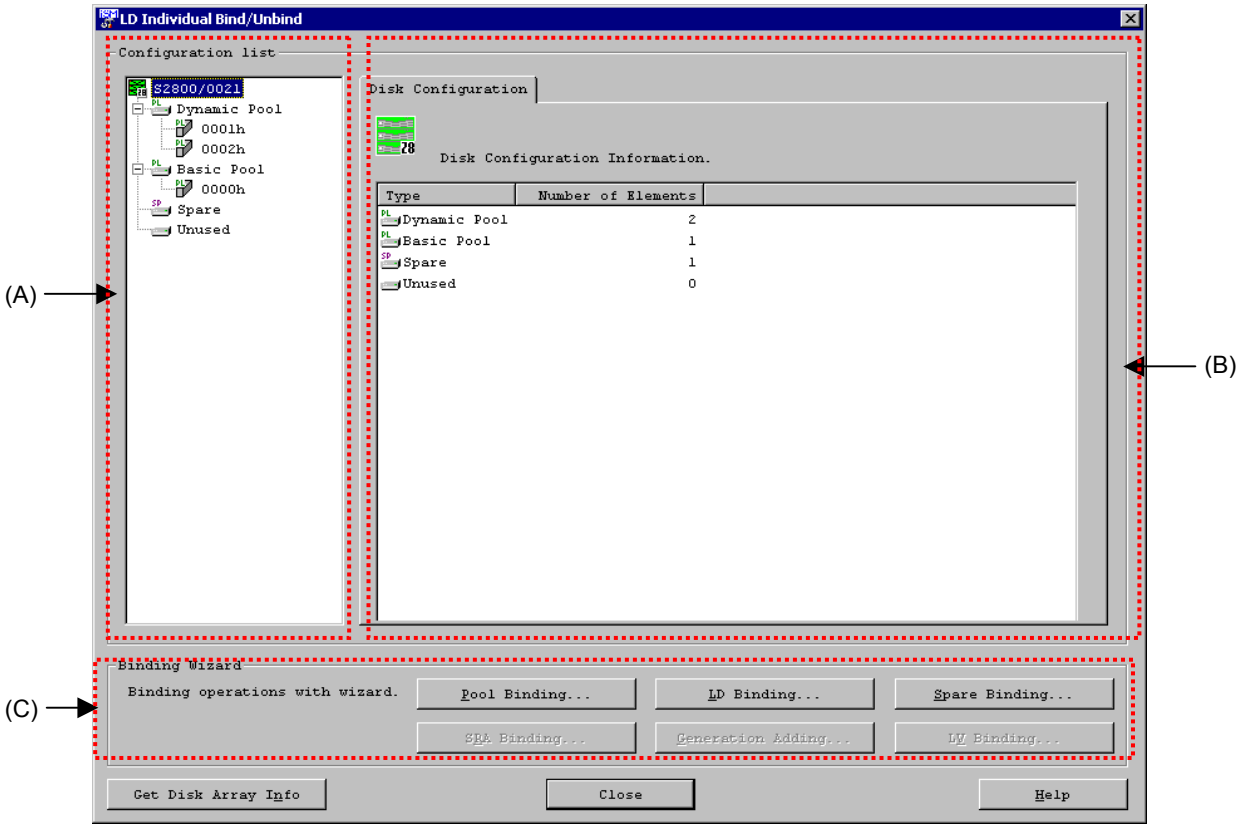


Figure 7-80 Logical Disk Configuration Screen (LD Individual Bind/Unbind Screen)

(A) Configuration tree view

The configuration tree view shows disk configurations in the disk array, classifying them into four categories in the form of a tree:

- Dynamic Pool
  Indicates dynamic pool(s) already bound in the disk array.
- Basic Pool
  Indicates basic pool(s) already bound in the disk array.
- Spare
  Indicates spare(s) already bound in the disk array.
- Unused
  Indicates physical disk(s) that remain unassigned to any pool or spare.

(B) Detailed information view

The detailed information view shows any of the following information according to the selection in the configuration tree view:

<When you select a disk configuration>

The number of basic pools, number of dynamic pools, number of spares, and number of unused logical disks are displayed by the category.

<When you select Dynamic Pool>

Pools already bound are listed.

- [Pool] tab
  The [Pool] tab shows the name, RAID type, capacity, and so forth about the pool selected. You can expand the capacity of the pool, rename it, change the rebuild time, and unbind the pool on this tab.

<When you select individual component of a dynamic pool>

Detailed information about the pool is displayed on the [Logical Disk] tab and [Physical Disk] tab:

- [Logical Disk] tab
  The [Logical Disk] tab shows a list of logical disks bound in the pool. You can expand the capacity of the logical disks, rename it, or unbind the logical disks on this tab.
- [Physical Disk] tab
  The [Physical Disk] tab shows a list of physical disks that compose the pool.

<When you select Basic Pool>

Pools already bound are listed.

- [Pool] tab
  The [Pool] tab shows the name, RAID type, capacity, and so forth about the pool selected. You can rename the pool, change the rebuild time, and unbind the pool on this tab.

<When you select individual component of a basic pool>

Detailed information about the pool is displayed on the [Logical Disk] tab and [Physical Disk] tab:

- [Logical Disk] tab
  The [Logical Disk] tab shows a list of logical disks bound in the pool. You can rename the logical disks, change the format time, and unbind the logical disks on this tab.
- [Physical Disk] tab
  The [Physical Disk] tab shows a list of physical disks that compose the pool.

<When you select Spare>

The spares already set up are listed. You can unbind spares on this screen.

<When you select Unused>

Physical disk(s) that remain unassigned to any pool or spare are listed.

(C) Binding Wizard area

This area provides the following buttons for binding a pool, logical disks, and a spare:

- [Pool Binding] button
  Starts the wizard for binding a pool. Bind a new pool following the steps on the wizard.
- [LD Binding] button
  Starts the wizard for binding logical disks. Bind logical disks following the steps on the wizard. For details on how to bind logical disks, refer to 7.2.1 “Binding Logical Disks”.
- [Spare Binding] button

Starts the wizard for binding a spare. Set an unused physical disk as a spare following the steps on the wizard. For details on how to bind a spare, refer to 0 “
Binding a Spare”.

The following buttons start a wizard for binding a volume for snapshot operation. These buttons are available with a valid DynamicSnapVolume license

For how to bind volumes, refer to the “Snapshot User’s Manual (Function Guide)” (IS030).

- [SRA Binding] button
  Starts the wizard for binding an SRA (snapshot reserve area). Bind a new SRA following the steps on the wizard.
- [Generation Adding] button
  Starts the wizard for adding a generation. Add a generation following the steps on the wizard.
- [LV Binding] button
  Starts the wizard for binding a link-volume. Bind a link-volume following the steps on the wizard.

7.4.2 Logical Disk Configuration Screen

Selecting a disk configuration in the logical disk configuration screen shows a list of constituents of the disk array.

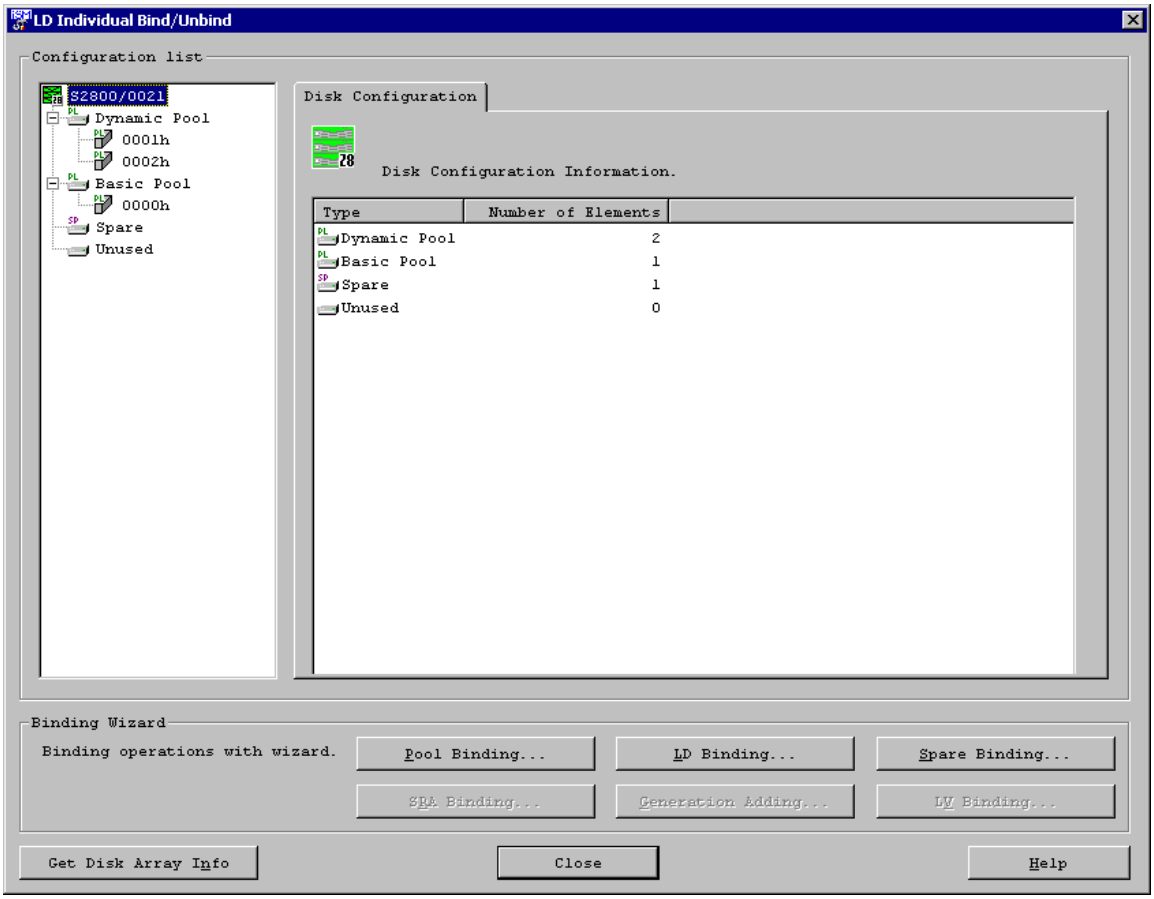


Figure 7-81 Logical Disk Configuration Screen (LD Individual Bind/Unbind Screen)

The detailed information view displays the following information:

- Type: Constituents of the disk array (basic pool, dynamic pool, spare, and unused)
- Number of Elements: Number of constituents by the type

7.4.3 Pool List View

Selecting Basic Pool or Dynamic Pool in the configuration tree view shows the pool list view.

(1) [Pool] tab

For each of the pools displayed, you can expand its capacity, change its rebuild time, rename it, and unbind it on this tab. If you select Dynamic Pool for using snapshots, you can expand the snapshot reserve area (SRA), change the threshold, and unbind the snapshot reserve area (SRA). For operation of snapshots, refer to the "Snapshot User's Manual (Function Guide)".

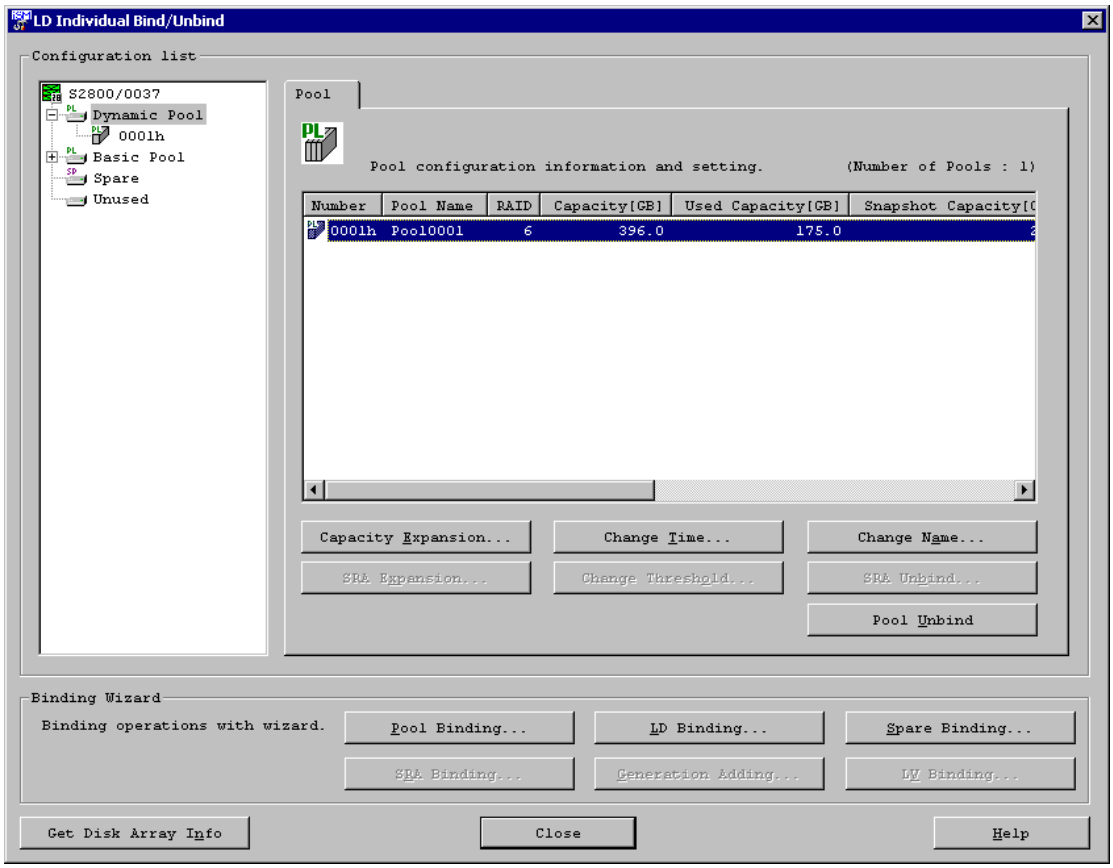


Figure 7-82 Pool List View - [Pool] Tab

The pool list view displays the following information:

- Number: Number of the pool (hexadecimal, 4 digits)
- Pool Name: Name of the pool (up to 32 characters)
- RAID: RAID type of the pool
- Capacity[GB]: Capacity of the pool (up to one decimal place)
- Used Capacity[GB]: Capacity used by the logical disks in the pool (up to one decimal place)

- Snapshot Capacity [GB]: Capacity bound as a snapshot reserve area (up to one decimal place)
- Snapshot Used Capacity [GB]: Capacity used by the snapshot (up to one decimal place)
- Snapshot Threshold [GB]: Specified threshold capacity for the snapshot used capacity (up to one decimal place)
- Number of LDs: Number of logical disks used in the pool
- Number of PDs: Number of physical disks that compose the pool

7.4.4 Pool Information View

Selecting a basic pool or dynamic pool in the configuration tree view shows the pool info view. You can see the information about the pool by the physical disk and logical disk.

(1) [Logical Disk] tab

The [Logical Disk] tab shows a list of logical disks used in the pool. For the logical disks displayed, you can expand their capacity, change the rebuild time, rename them, and unbind them on this tab. If you select Dynamic Pool for using snapshots, you can unbind generations. For operation of snapshots, refer to the "Snapshot User's Manual (Function Guide)" (IS030).

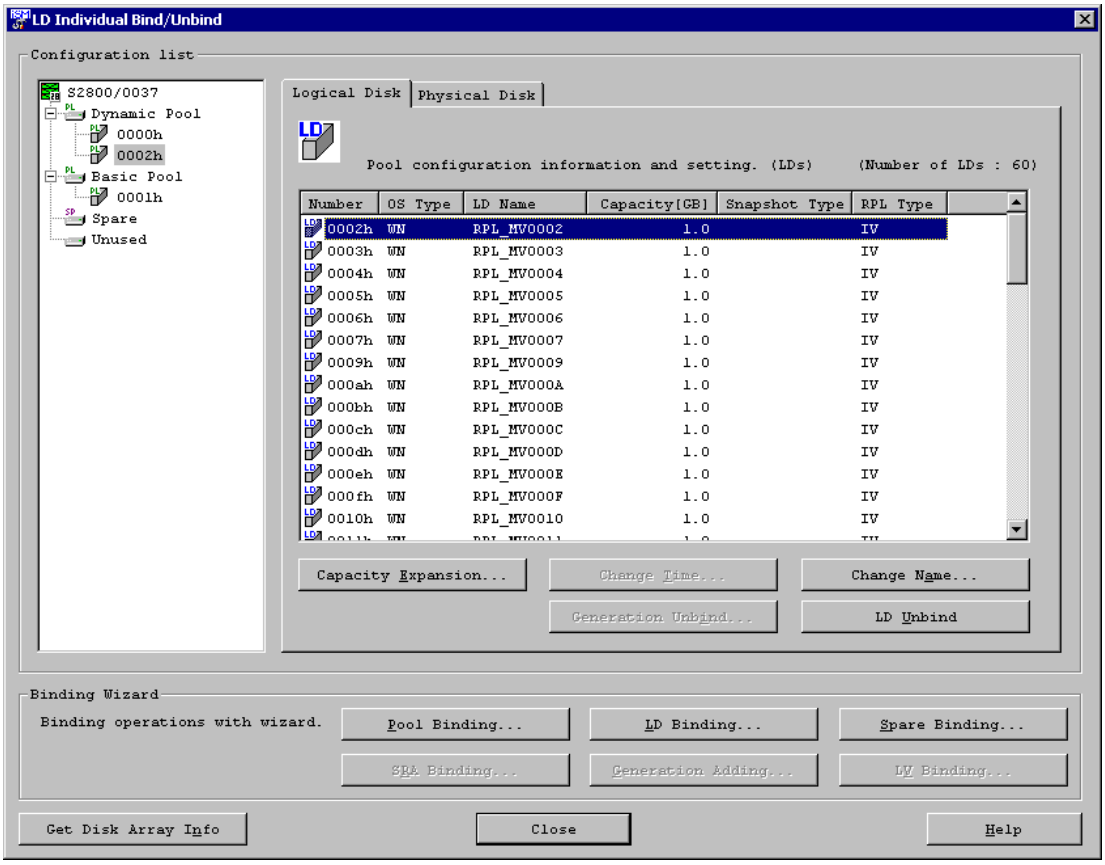


Figure 7-83 Pool Information View - [Logical Disk] Tab

The [Logical Disk] tab displays the following information. However, [Snapshot Type] and [RPL Type] are displayed only when each license is canceled.

- Number: Number of the logical disk (hexadecimal, 4 digits)
- OS Type: Format of the logical disk
- LD Name: Name of the logical disk (up to 24 characters)

- Capacity [GB]: Capacity of the logical disk (up to one decimal place)

- Snapshot Type: Type of the use of the snapshot
  - Blank: Volume that is not used for snapshots
  - BV: Base-volume. This volume has a snapshot generation.
  - LV: Link-volume. This volume is necessary for substantiating snapshot generations, etc.
  - SDV: Snapshot-data-volume. This is a special logical disk configuring a snapshot reserve area (SRA).
  - SV: Snapshot-volume. This is a snapshot generation volume.
  - SV*: A type of snapshot-volume, which is an illegal volume that is not set as a generation. As this volume cannot be used for a snapshot, unbind the logical disk.

- RPL Type: Type of the volume used for replication
  - Blank: Cannot be used as a replication volume.
  - IV: Not used as a replication volume.
  - MV: Used as the copy-source volume.
  - RV: Used as the copy-destination volume.
  - RV/MV: Used as both RV and MV.

(2) [Physical Disk] tab

The [Physical Disk] tab shows a list of physical disks used in the pool.

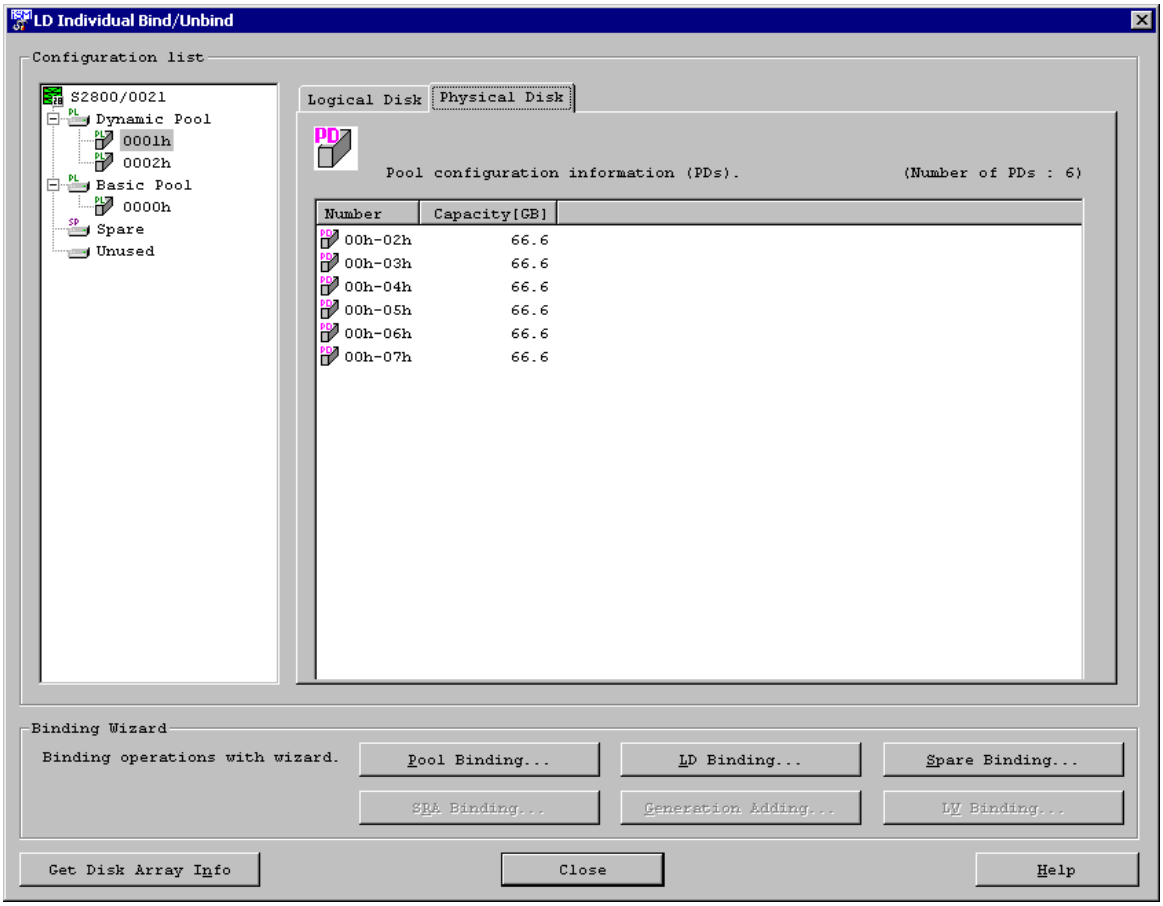


Figure 7-84 Pool Information View - [Physical Disk] Tab

The [Physical Disk] tab displays the following information:

- Number: Number of the physical disk
  PD group number (hexadecimal, 2 digits) + PD number (hexadecimal, 2 digits)

- Capacity [GB]: Capacity of the physical disk (up to one decimal place)

7.4.5 Spare List View

Selecting Spare in the configuration tree view shows a list of spares. You can unbind spares on this screen.

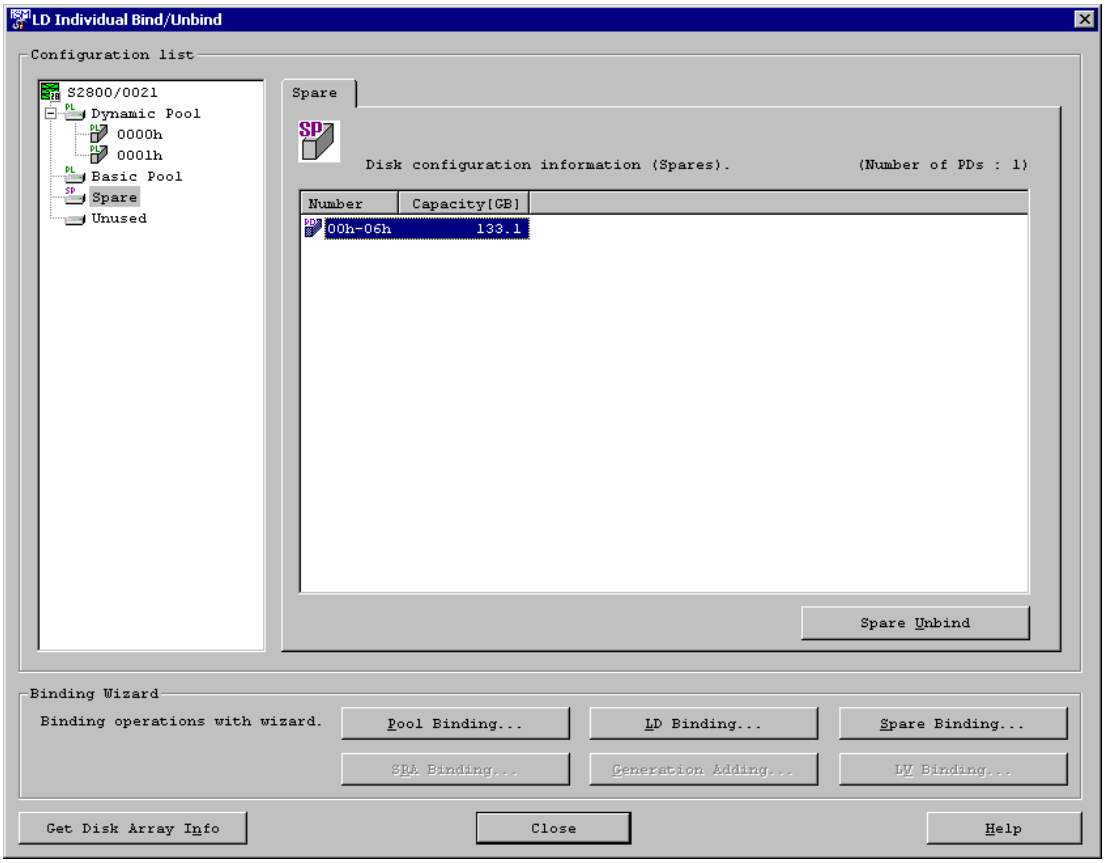


Figure 7-85 Spare List View

The spare list view displays the following information:

- Number: Number of the physical disk
  PD group number (hexadecimal, 2 digits) + PD number (hexadecimal, 2 digits)

- Capacity [GB]: Capacity of the physical disk (up to one decimal place)

7.4.6 Unused Disk List View

Selecting Unused in the configuration tree view shows a list of unused disks.

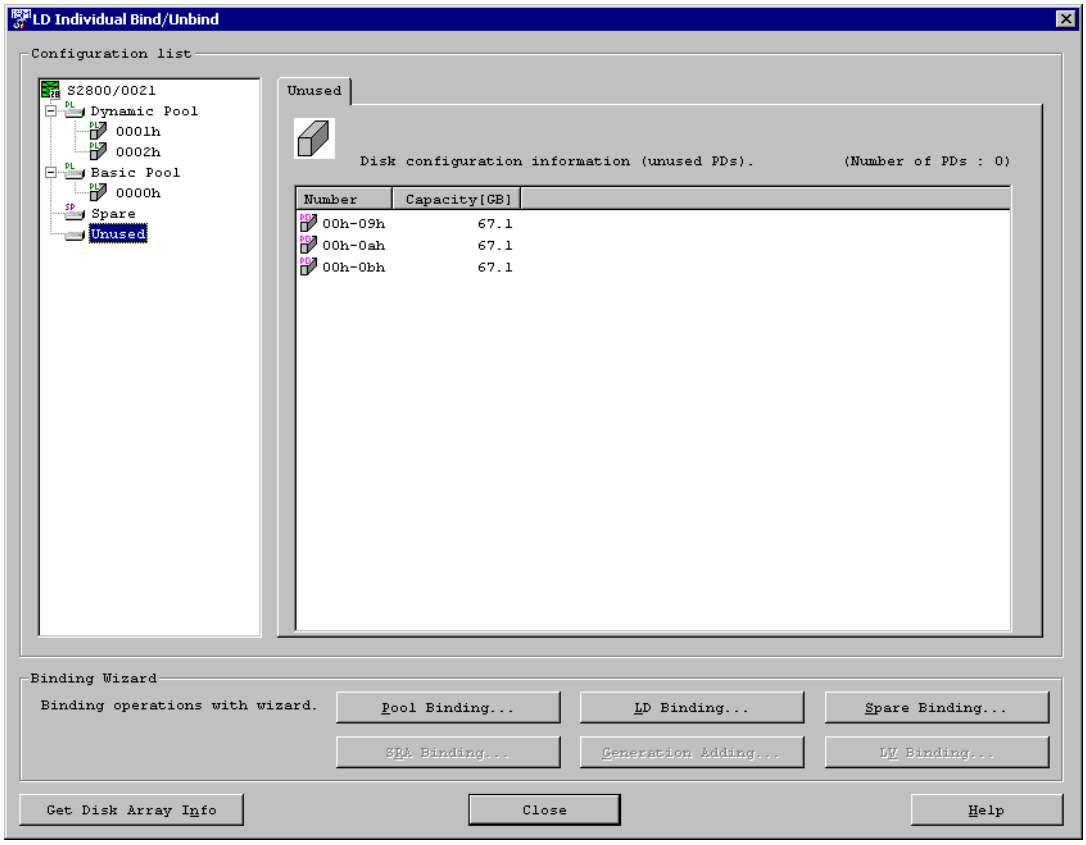


Figure 7-86 Unused Disk List View

The unused disk list view displays the following information:

- Number: Number of the physical disk
  PD group number (hexadecimal, 2 digits) + PD number (hexadecimal, 2 digits)

- Capacity [GB]: Capacity of the physical disk (up to one decimal place)

Chapter 8 Disk Array Configuration Setting (S100/S1100/S1200/S1300/S2100/S2200/S2300)

This chapter describes how to set the configuration of the disk array in S100/S1100/S1200/S1300/S2100/S2200/S2300. For configuration setting in S400/S1400/S2400/S2800, refer to Chapter 7.

8.1 Binding a RANK

The RANK is bound by specifying the physical disks and the RAID type for binding RAID from the physical disks installed on the disk array. Then, for the RANK thus bound, logical disks can be bound by binding logical disks.

When extending physical disks, logical disks can be bound for the extended physical disks in accordance with the same procedure, thus not affecting the logical disks on other RANKs already in use. Even when new logical disks are additionally bound for the same RANK, they do not affect the already bound logical disks.

Regarding LD binding, selections can be made from the following configurations, thus making possible a different configuration for each RANK.

Logical disk configuration:	RAID1	(1+1)
	RAID5	(2+P)/(3+P)/(4+P)/(5+P)/(6+P)/ (7+P)/(8+P)/(9+P)/(10+P)/(11+P)/ (12+P)/(13+P)/(14+P)
	RAID0	1/3/5/10/15
	RAID10	(2+2)/(3+3)/(4+4)/(5+5)/(6+6)/(7+7)

* Only Windows and Solaris can specify RAID0. However, do not use RAID0 in a highly reliable system (e.g., cluster environment) because RAID0 has no redundancy.

Logical disks are bound for the 3000/4000 series disk array when it is initially installed.

To bind logical disks, refer to the following descriptions.

RANK Bind (8.1.1)

RANK Unbind (8.1.2)

Expanding a RANK (8.1.3)

Setting RANK Rebuild Time (8.1.4)

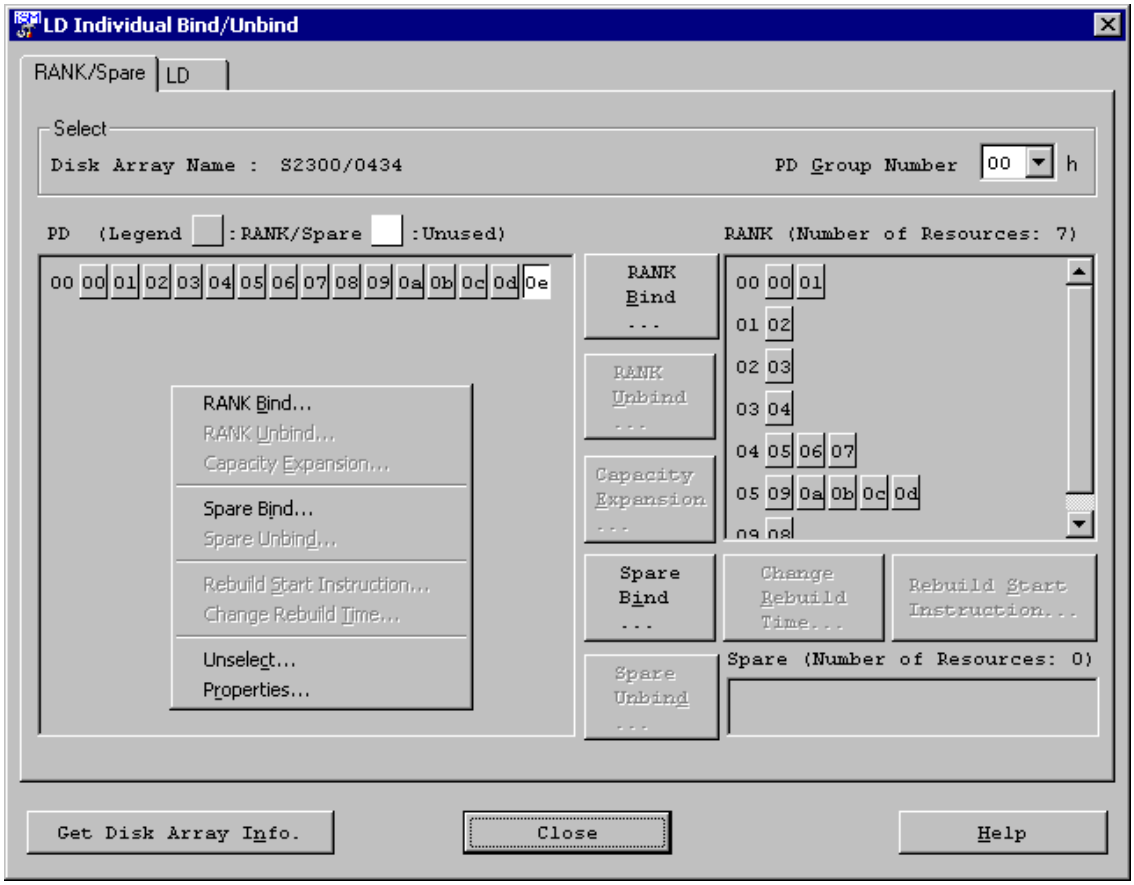


Figure 8-1 RANK/Spare Tab Screen

8.1.1 RANK Bind

Selecting unused PDs enables this button, thus making it possible to bind RANKs. Refer to Figure 8-1 “RANK/Spare Tab Screen”.

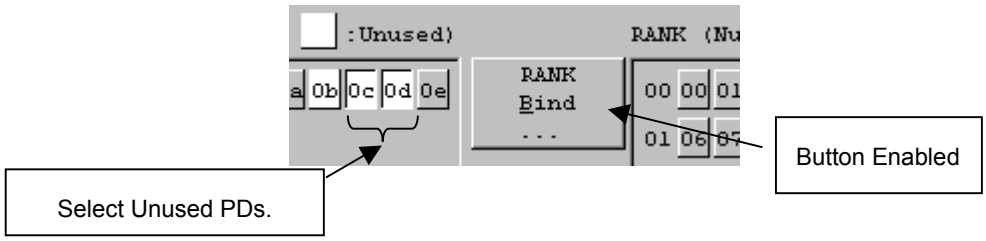


Figure 8-2 RANK Bind

Click the [RANK Bind] button to display the following dialog.

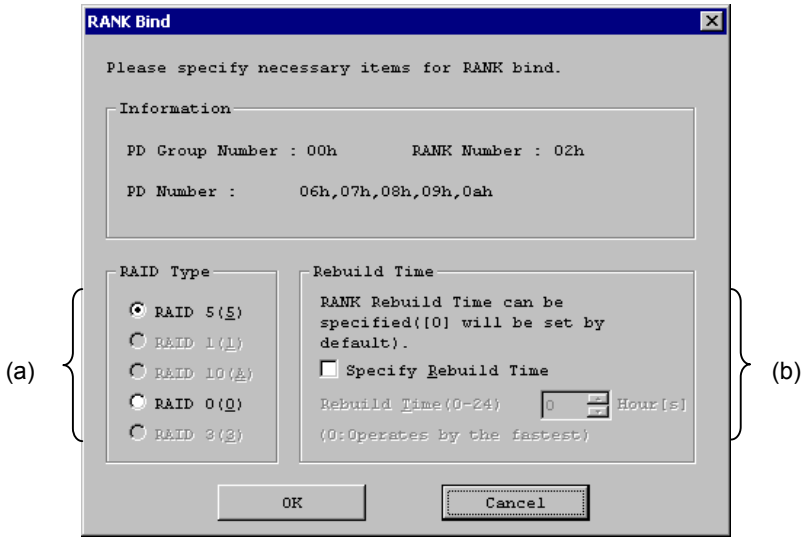


Figure 8-3 RANK Bind Confirmation Dialog

RAID types satisfying the following conditions can be specified:

- RAID type supported by the disk array
- RAID type of a RANK that can be bound with the selected number of physical disks

The following message is displayed if there are no RAID types of RANKs that can be bound with the selected number of physical disks.

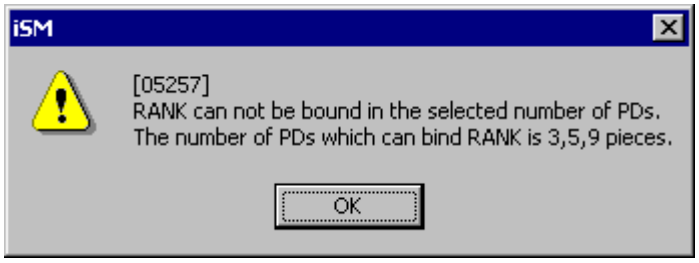


Figure 8-4 Message if Binding a RANK is Impossible

To bind a RANK, click the [OK] button in the RANK Bind confirmation dialog box. Binding a RANK does not take much time.

(a) and (b) in the diagram are described below.

(a) RAID Type

The selectable RAID type varies depending on the number of selected PDs. The list is shown in Table 8-1 for your reference.

Table 8-1 Selectable RAID Types

RAID Type	Target Disk Array	Selected PD Count														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RAID0	100/1000/2000 Series	√	-	√	-	√	-	-	-	-	√	-	-	-	-	√
RAID1		-	√	-	-	-	-	-	-	-	-	-	-	-	-	-
RAID5		-	-	√	√	√	√	√	√	√	√	√	√	√	√	√
RAID10		-	-	-	√	-	√	-	√	-	√	-	√	-	√	-

√: Select enable -: Select disable

(b) Rebuild Time

Specifies the maximum time required for rebuilding the RANK. It is possible to select 0 to 24 hours as Rebuild Time. Select 0 to perform rebuilding in the shortest amount of time. In consideration of the host I/O load, set a suitable value for Rebuild Time. Moreover, the time is an indication and it does not always take the time as specified.

8.1.2 RANK Unbind

Selecting a RANK from the PD window or the RANK window on the RANK/Spare Tab screen (Figure 8-1) enables RANK Unbind.

Even during LD binding, it is possible to unbind LDs.

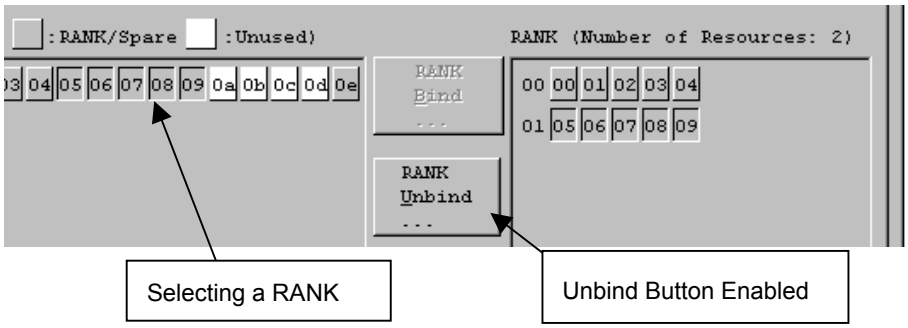


Figure 8-5 RANK Unbind

If LDs are already bound in the RANK to unbind, a message as follows will appear asking whether to unbind the LDs or not.

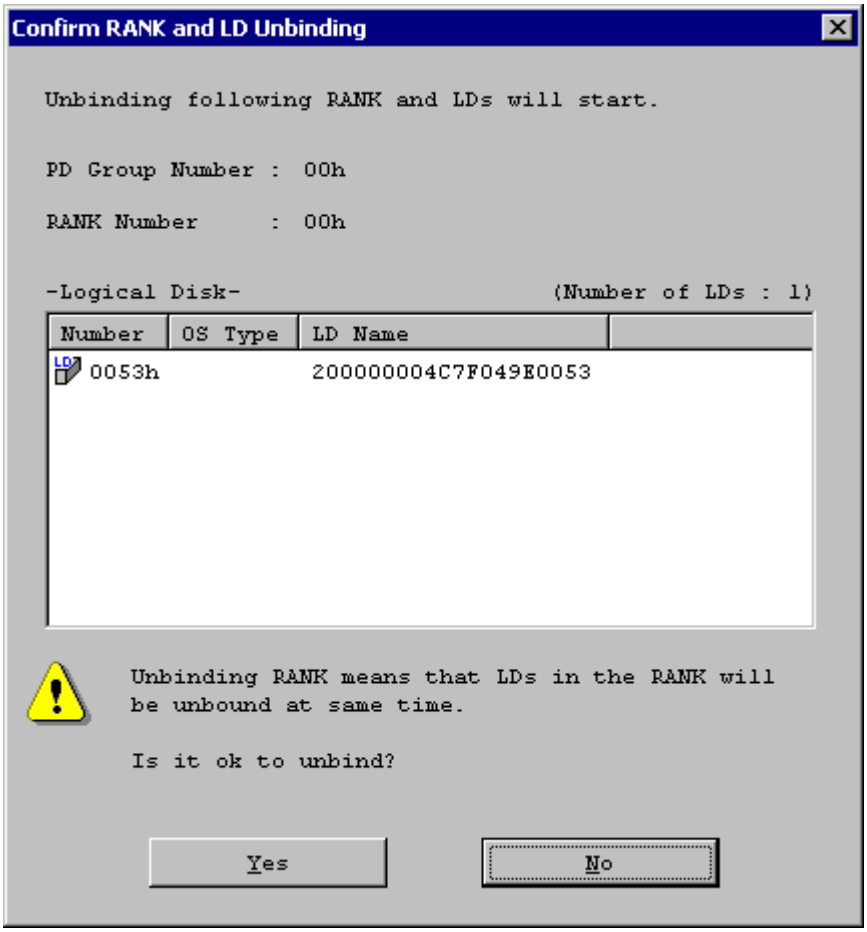


Figure 8-6 RANK/LD Unbind Check

Select [Yes] to unbind the LDs and RANK.

If LDs in the RANK are in the following states, it is impossible to unbind them.

1. Managed by the Access Control (PORT Mode).
2. Managed by the Access Control (WWN Mode)
3. Pairing is performed.

Execute the unbinding after removing these conditions.

8.1.3 Expanding a RANK

Selecting unused PDs after selecting the RAID5 RANK from the PD window or the RANK window on the RANK/Spare Tab screen (Figure 8-1) enables the [Capacity Expansion] button.

* Only Windows and Solaris can use this function.

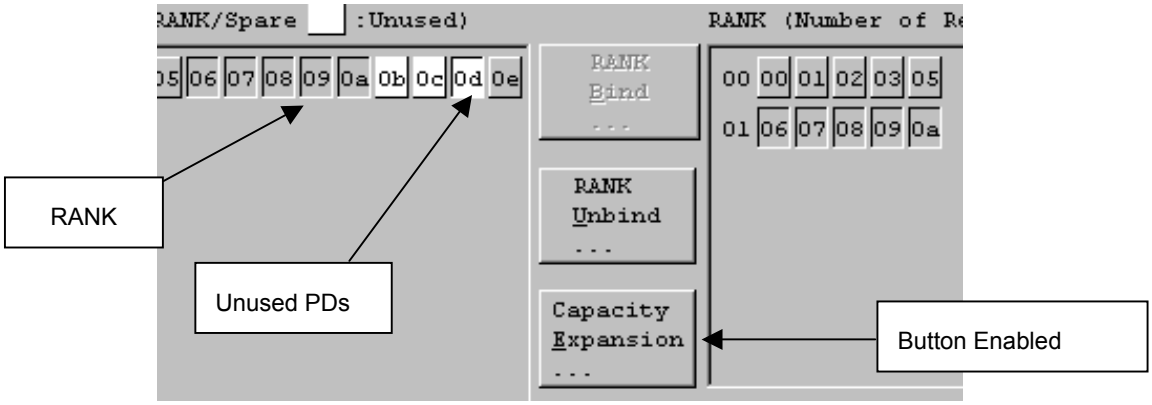


Figure 8-7 Capacity Expansion

Click the [Capacity Expansion] button to display the following dialog.

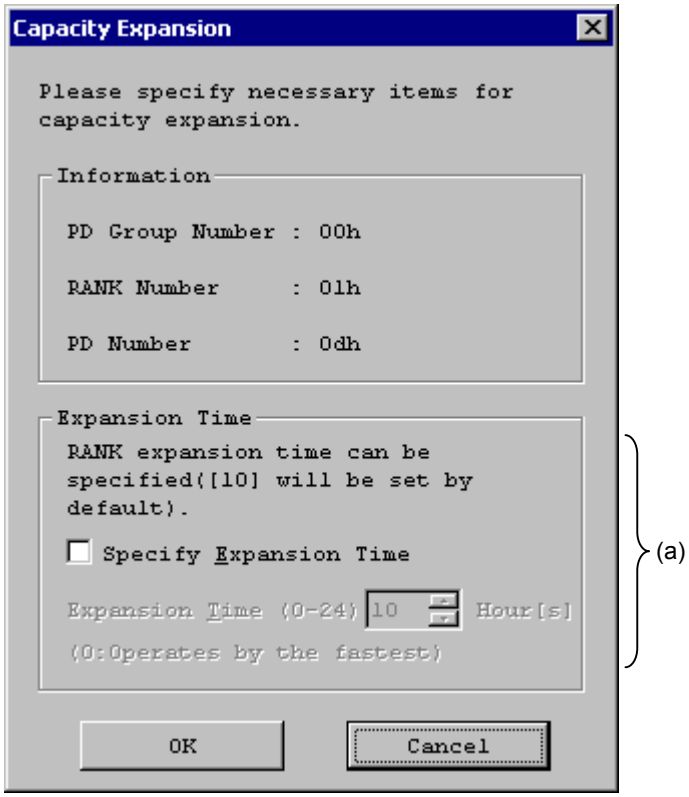


Figure 8-8 Capacity Expansion Confirmation Dialog

Click the [OK] button to execute the capacity expansion.

(a) Expansion Time

Specifies the maximum time required for rebuilding the RANK. It is possible to select 0 to 24 hours as Rebuild Time. When 0 is specified, the rebuilding is performed at the maximum speed. Moreover, the time is an indication and it does not always take the time as specified.

When extending multiple physical disks, extend them one by one. Make sure that the extension of one disk has been completed before extending the next physical disk.

When the capacity expansion is successful, end the configuration setting and check the iSM client screen until the completion. As shown in Figure 8-9, the expansion is completed when the display is changed from "Attn. (expanding)" to "Ready".

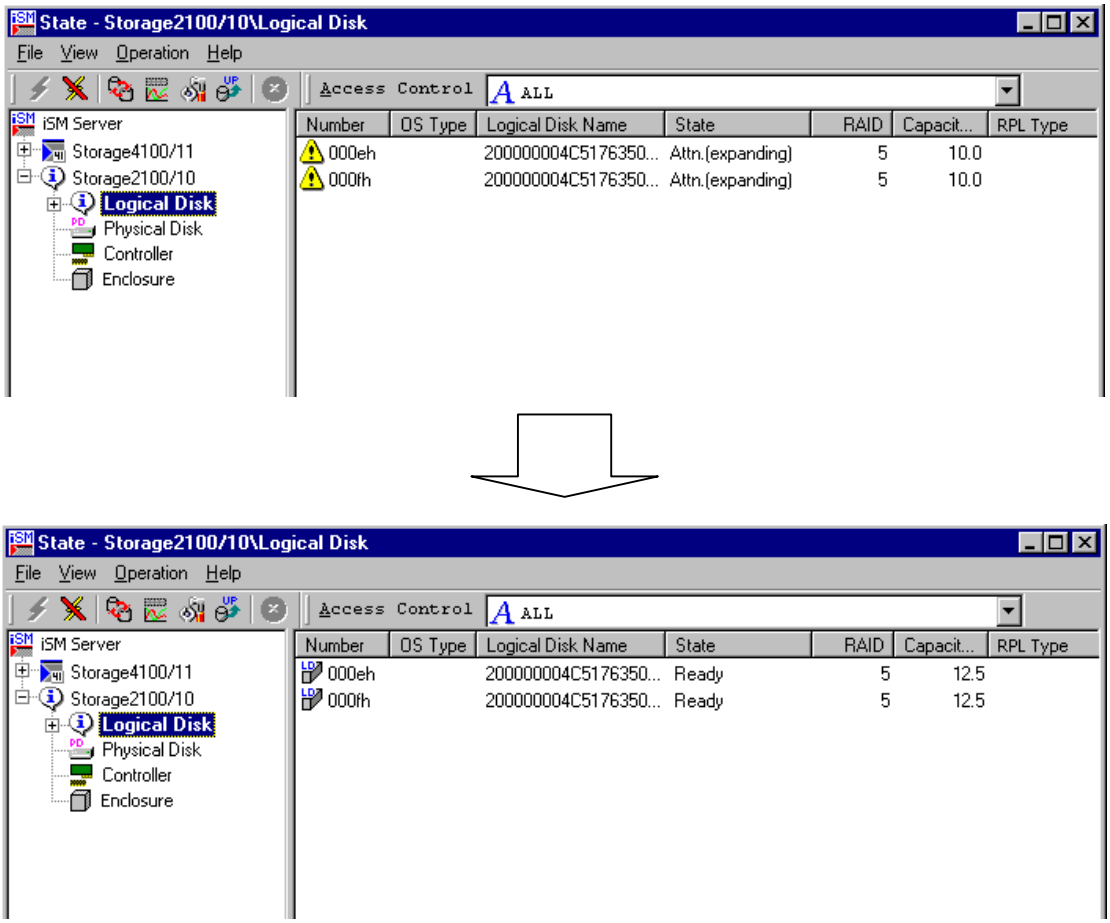


Figure 8-9 Capacity Expansion State

8.1.4 Setting RANK Rebuild Time

(1) Change Rebuild Time

By Change Rebuild Time, it is possible to change the data rebuild time when the failure occurs at the RANK selected on the RANK/Spare Tab screen (Figure 8-1).

Selecting RANKs from the PD window or the RANK window enables [Change Rebuild Time].

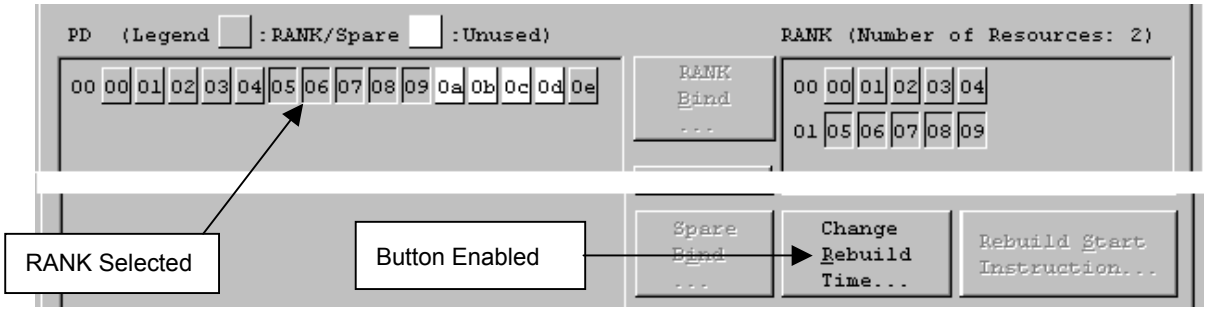


Figure 8-10 Change Rebuild Time

Click the [Change Rebuild Time] button to display the following dialog.

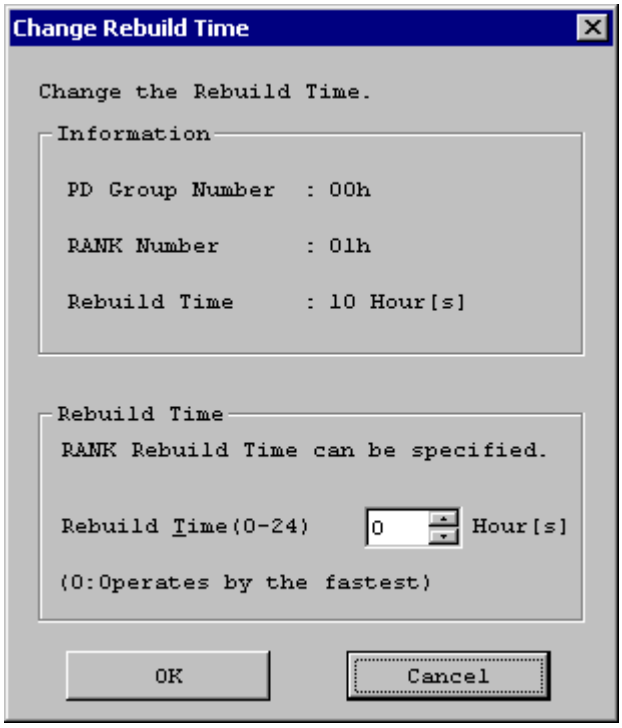


Figure 8-11 Change Rebuild Time Setting

Changing the Rebuild Time and then clicking the [OK] button result in changing the Rebuild Time. For the Rebuild Time, 0 to 24 hours can be selected. Select 0 to perform rebuilding in the shortest amount of time. In consideration of the host I/O load, set a suitable value for Rebuild Time.

The RANK Rebuild Time is specified during RANK building. Here, considering the host I/O load, the Rebuild Time can be changed.

(2) Rebuild Start Instruction

If one of the physical disks configuring a logical disk fails, the logical disk is placed in the Reduce state and the RANK which includes this logical disk is also placed in the Reduce state. When the RANK is in the Reduce state, data can be rebuilt during operations by using the [Rebuild Start Instruction].

The [Rebuild Start Instruction] button is enabled when a reduced RANK is selected in the PD window or RANK window and when a spare disk is selected in this status.

To confirm the reduced status of a RANK, display the main screen of the iSM client.

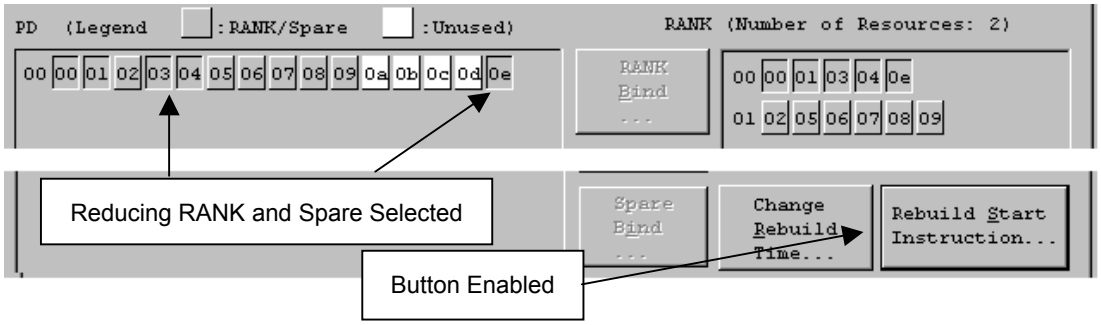


Figure 8-12 Rebuild Start Instruction

Click the [Rebuild Start Instruction] button to display the following dialog.

Reducing RANK and Spare selected

Only reducing RANK selected

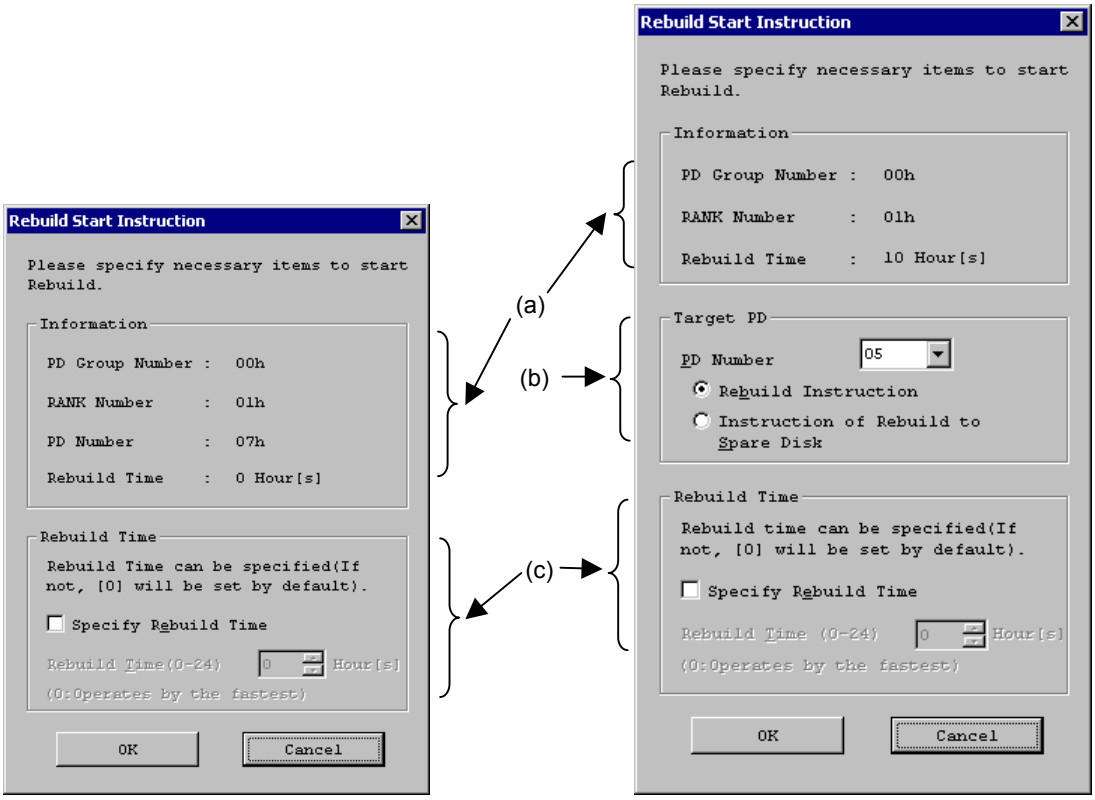


Figure 8-13 Rebuild Start Instruction Confirmation

Click the [OK] button to start rebuilding.

(a), (b), and (c) in the diagram are described.

(a) Information

The specified RANK and PD group are displayed.

When this dialog is output by selecting the spare, the spare for rebuilding is displayed.

(b) Target PD

When only reducing RANK is selected, it is necessary to specify the rebuild target disk.

* Rebuild Instruction

  Target Disk Number contains the PD number configuring the RANK. Therefore, when the PD is replaced with a normal PD, specify the PD number.

* Instruction of Rebuild to Spare Disk

  For the Instruction of Rebuild to Spare Disks, the Spare disk is automatically determined by the disk array. Therefore, specify the target disk number by entering the number of the failed physical disk.

(c) Rebuild Time

Specifies the maximum time required for rebuilding the RANK. It is possible to select 0 to 24 hours as Rebuild Time. Select 0 to perform rebuilding in the shortest amount of time. In consideration of the host I/O load, set a suitable value for Rebuild Time. Moreover, the time is an indication and it does not always take the time as specified.

Change the RANK Rebuild Time by using the “Change Rebuild Time” previously described.

If LDs are not bound on the RANK, the rebuild start instruction fails.

8.2 Method of Binding Logical Disks

To bind logical disks, refer to the following descriptions.

Binding Logical Disks (8.2.1)

Unbinding Logical Disks (8.2.2)

Setting Logical Disk Bind Time (8.2.3)

Logical Disk Batch Setting (8.2.4)

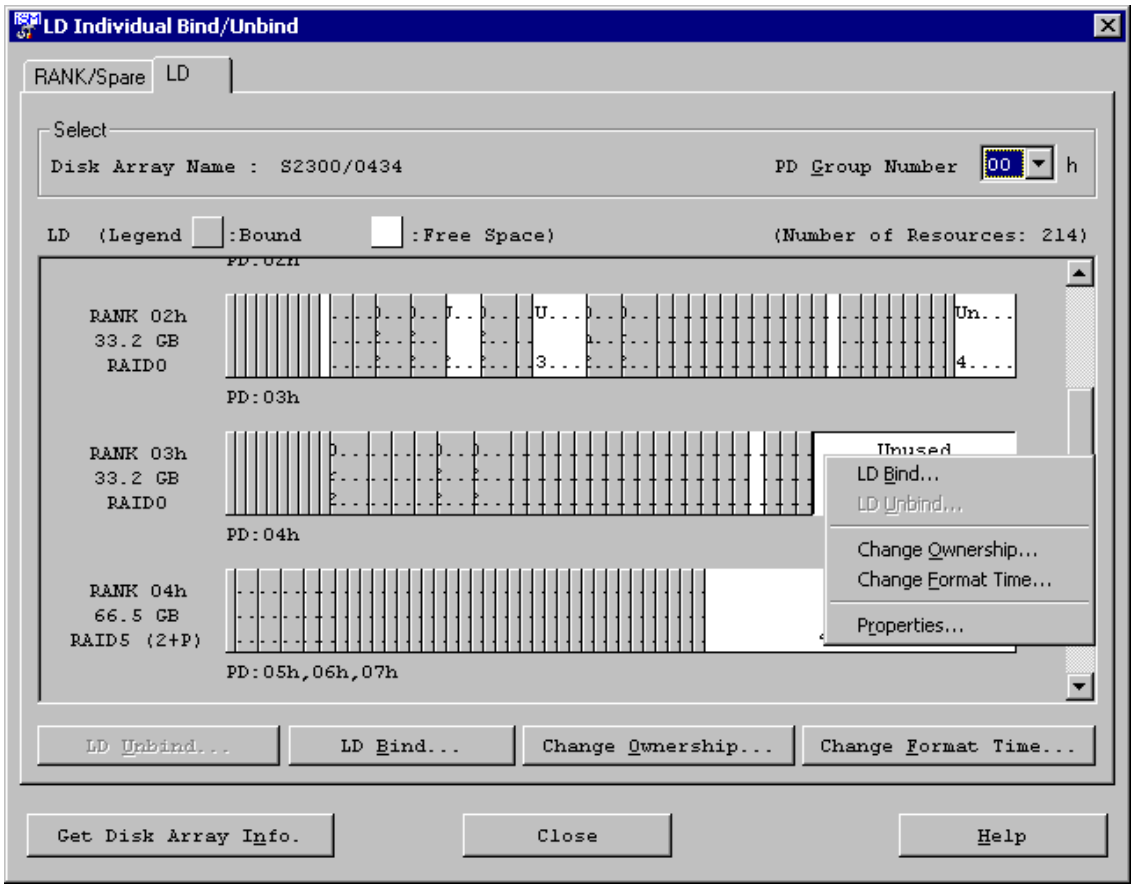


Figure 8-14 LD Individual Bind/Unbind

8.2.1 Binding Logical Disks

In this dialog, LD binding/unbinding can be performed. The operation can be performed by using the popup menu (right-click) or the buttons on the screen after selecting a logical disk or free space of RANK on the LD Individual Bind/Unbind screen (Figure 8-14).

Selecting a free space of RANK will enable the [LD Bind] button.

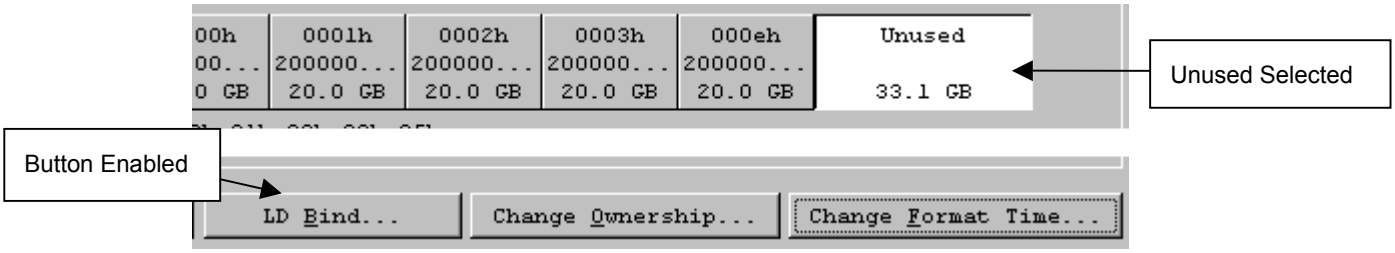


Figure 8-15 LD Bind

Click the [LD Bind] button to display the following screen.

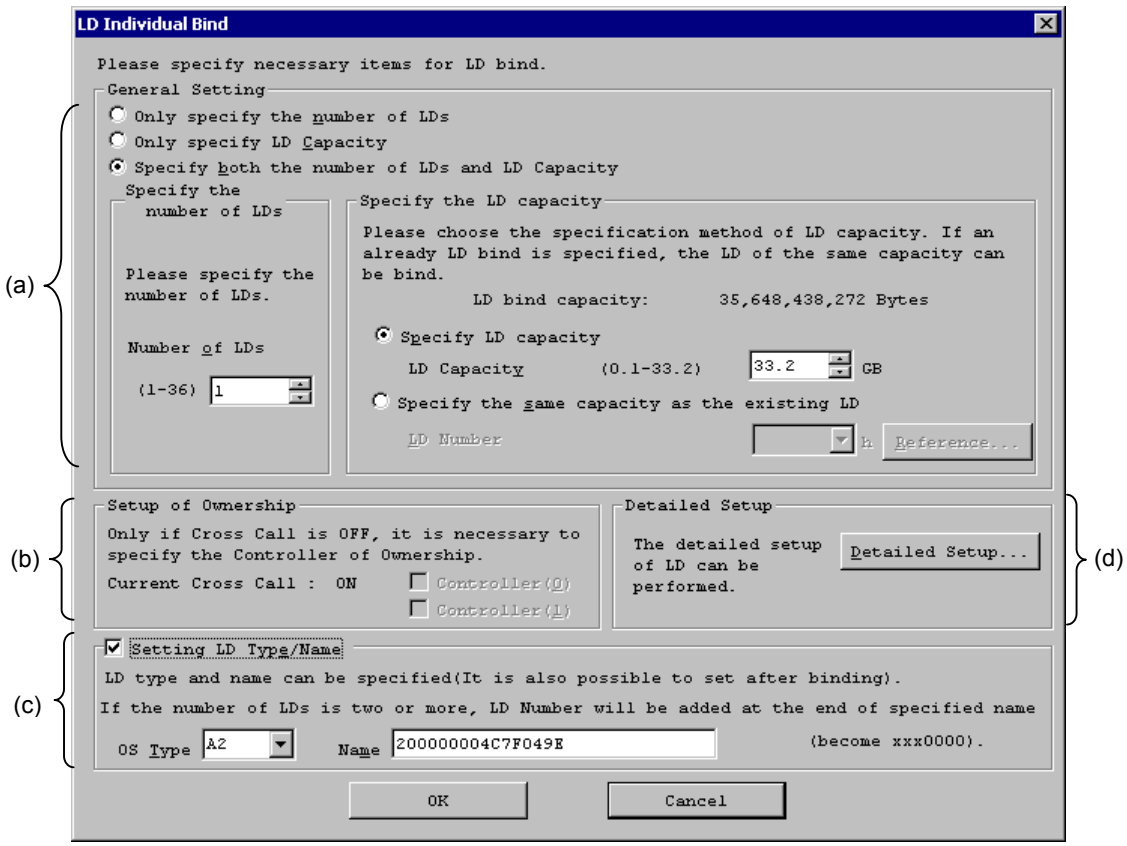


Figure 8-16 LD Bind Dialog

Clicking the [OK] button after specifying the required particulars in this screen will start the LD binding.

(a), (b), (c), and (d) in the screen are described as follows.

(a) General Setting

- LD Setting

  The number of LDs and the LD Capacity are specified here. It is also possible to specify either of them. When only the number of LD is specified, the maximum capacity that can be created is automatically calculated.

  When only the LD Capacity is specified, the maximum number of logical disks that can be created is calculated.

  If having specified LD Capacity, you can either enter a numeric value or specify a bound logical disk. To bind logical disks having the same capacity as for a bound one, you should select [Only specify LD capacity]. Logical disks having the same capacity are necessary for using the data replication function*. Clicking the [Reference] button in Figure 8-16 displays the screen below.

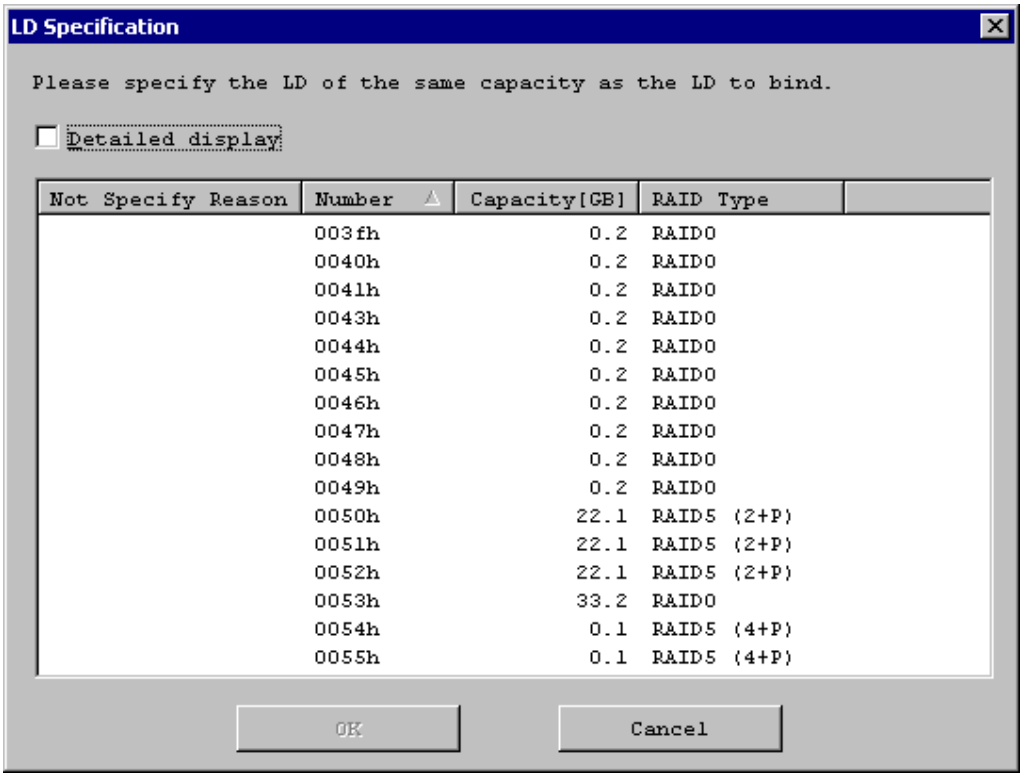


Figure 8-17 LD Specification Screen

The figure shows an example of binding logical disks by selecting 10 GB of free space for the RANK of RAID5 (3+P).

Selecting a logical disk from the list makes it possible to bind another logical disk having the same capacity as that selected one. If a logical disk cannot be selected, the “Not Specify Reason” field displays one of the reasons:

- Excess of capacity:
  The capacity of this logical disk exceeds the free space of the RANK.
- Capacity unit disagreement:
  No logical disk can be bound that will have the same capacity as this logical disk.

For detailed reasons for capacity unit disagreement or information on binding logical disks having a different configuration from the already bound RAID configuration, refer to Appendix D “Notes on Use for Data Replication”.

The logical disk number selection in the LD Bind dialog and the number display item in the LD specification screen can be replaced with logical disk names. For information on the settings, refer to “Client Start/Stop” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with the OS in use. Note that, if the detailed display is selected for the LD specification screen, the display order of the numbers and logical disk names in the list is changed.

* Refer to the “Data Replication User’s Manual (Function Guide)” (IS015) for the data replication function.

(b) Setup of Ownership

At Cross Call OFF, the controller must be specified.

At Cross Call ON, this setting is disabled; however, settings are made with controller 0. For information on the Cross Call, refer to 8.5.1 “Cross Call and Auto Assignment”. For information on the LD Ownership, refer to 8.5.2 “Ownership”.

(c) Setting LD Type/Name

For the logical disks to be bound, it is also possible to simultaneously set its type and name.

The LD name needs to be unique in the system (no two names are allowed). Therefore, when binding two or more logical disks, LD names consisting of a specified character string to which a sequence number is a sequential number is added are automatically given.

Example: DiskName0000, DiskName0001, DiskName0002 ...

The details of item are the same as (G) “Setting LD Type/Name” of 8.2.4 “Logical Disk Batch Setting”.

(d) Detailed Setup

- Start LD Number
  An unused numbers following the specified LD Number is allocated. When omitted (with Start LD Number disabled), the number immediately after the maximum among the LD Numbers in use is allocated.

  Example: The numbers allocated when LD Numbers 0, 1, 3 and 4 exist are as follows.

Omitted: 5, 6, 7...

0 specified: 2, 5, 6...

10 specified: 10, 11, 12...

- Format Time

  Specifies the maximum LD Format Time.

  It is possible to select 0 to 24 hours as Format Time. When 0 is specified, the formatting is performed at the maximum speed. Moreover, the time is an indication and it does not always take the time as specified.

The specified time is the standard time required. However, the actual execution time varies with the load of the disk array.

Specify 0 to complete the LD binding at the maximum speed. If the business operation I/O is preferred, specify a large value (such as 24) to lower the load to the Disk Array.

8.2.2 Unbinding Logical Disks

Selecting a bound LD enables the [LD Unbind] button.

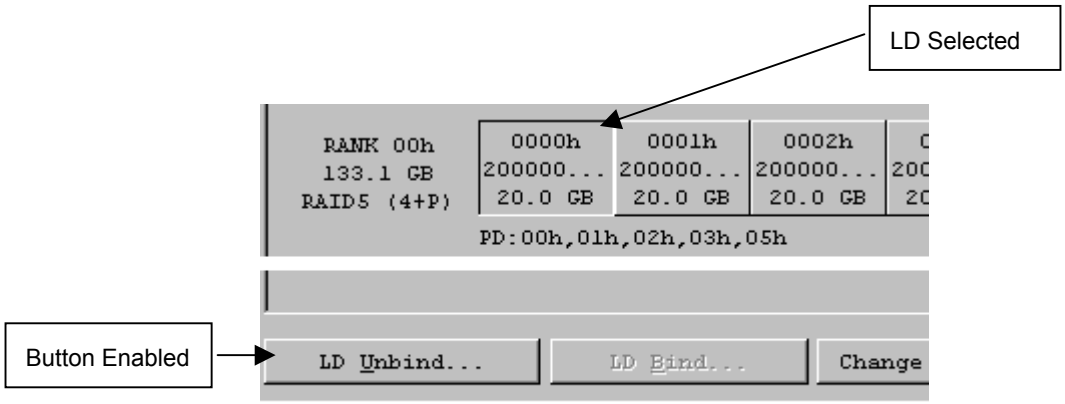


Figure 8-18 LD Unbind

Click the [LD Unbind] button to display a message box as shown below.

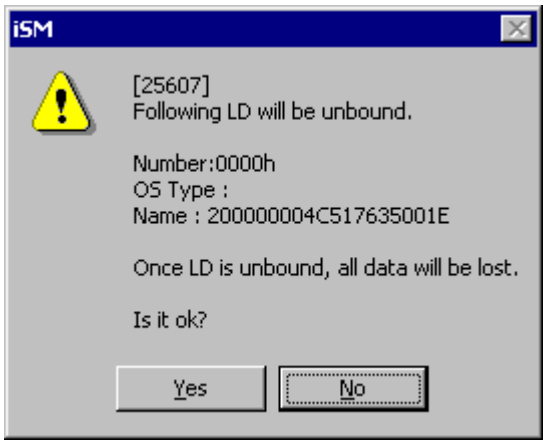


Figure 8-19 LD Unbind Confirmation Message

Select [Yes] from this screen to unbind the logical disk.

If the logical disks are in the following states, it is impossible to unbind them.

1. Managed by the Access Control (PORT mode).
2. Managed by the Access Control (WWN mode).
3. Pairing is performed.

Execute the unbinding after removing these conditions.

8.2.3 Setting Logical Disk Bind Time

Changes the format time of logical disks being bound.

This setting, which acts upon the whole disk array, is unrelated to selecting a logical disk. Clicking this button displays a dialog box as shown below, thus making it possible to change the Format Time.

Specifies the maximum required Format Time.

It is possible to select 0 to 24 hours as Format Time. When 0 is specified, the formatting is performed at the maximum speed. Moreover, the time is an indication and it does not always take the time as specified.

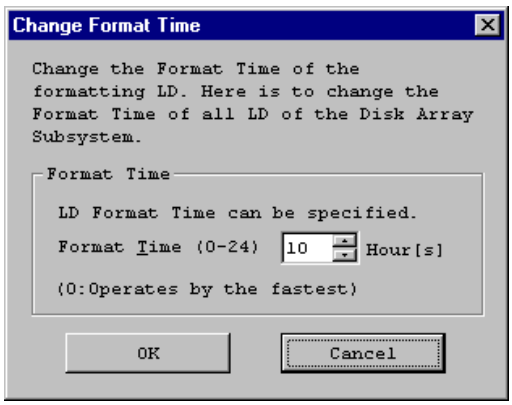


Figure 8-20 Change Format Time Dialog

Specify 0 to complete the LD binding at the maximum speed. If the business operation I/O is preferred, specify a large value (such as 24) to lower the load to the Disk Array.

8.2.4 Logical Disk Batch Setting

All the physical disks or unused physical disks mounted on the disk array are specified and all the logical disks are bound in the same RAID type with the same LD Capacity. Please note that when binding all physical disks, if the required data has been stored in the operating disk array, the data recorded in all the logical disks in use is erased. Please be careful about it. If the data in use are necessary, select unused physical disks or bind logical disks newly from unused physical disks through individual bind.

There are the following four logical disk configurations which can be selected.

- High reliability: RAID1 (1+1) Consisting of two PDs, the RANK Capacity is the same as that of about one PD.
- Standard: RAID5 (4+P) Consisting of five PDs, the RANK Capacity is the same as that of about four PDs.
- Large capacity: RAID5 (6+P) Consisting of seven PDs, the RANK Capacity is the same as that of about six PDs.
- Huge capacity: RAID5 (8+P) Consisting of nine PDs, the RANK Capacity is the same as that of about eight PDs.

The LD Batch Binding refers to bind multiple logical disks in a batch in accordance with simple parameter instructions such as the RAID type and the number of logical disks. The procedure and precautions for its execution are described below.

To collectively bind logical disks, selecting all physical disks, first unbind all configurations already made. Therefore, please note that all the RANKs and logical disks that are already bound will be unbound.

(1) Execution procedure

The procedure for Batch Binding of logical disks is as follows. The screen transition is shown in Figure 8-21.

(i) Select the disk array from the iSM client main screen and then start [Configuration] from the menu or from the toolbar.

(ii) Click [Setting] from the “Select Operation Mode” dialog.

(iii) Click the [LD Bind] button on “Configuration- [Setting Mode]” to display the LD Batch Binding screen. (For details of the LD Batch Binding screen, refer to 8.2.4 (5) “LD Batch Binding screen”.)

(iv) Set the necessary item on the LD Batch Binding screen and then click the [OK] button to output the LD Batch Binding Confirmation screen. (For details of display items, refer to 8.2.4 (6) “Confirm LD Batch Binding screen”.)

(v) If there is no problem with the value to bind, click the [Yes] button. LD Batch Binding will start.

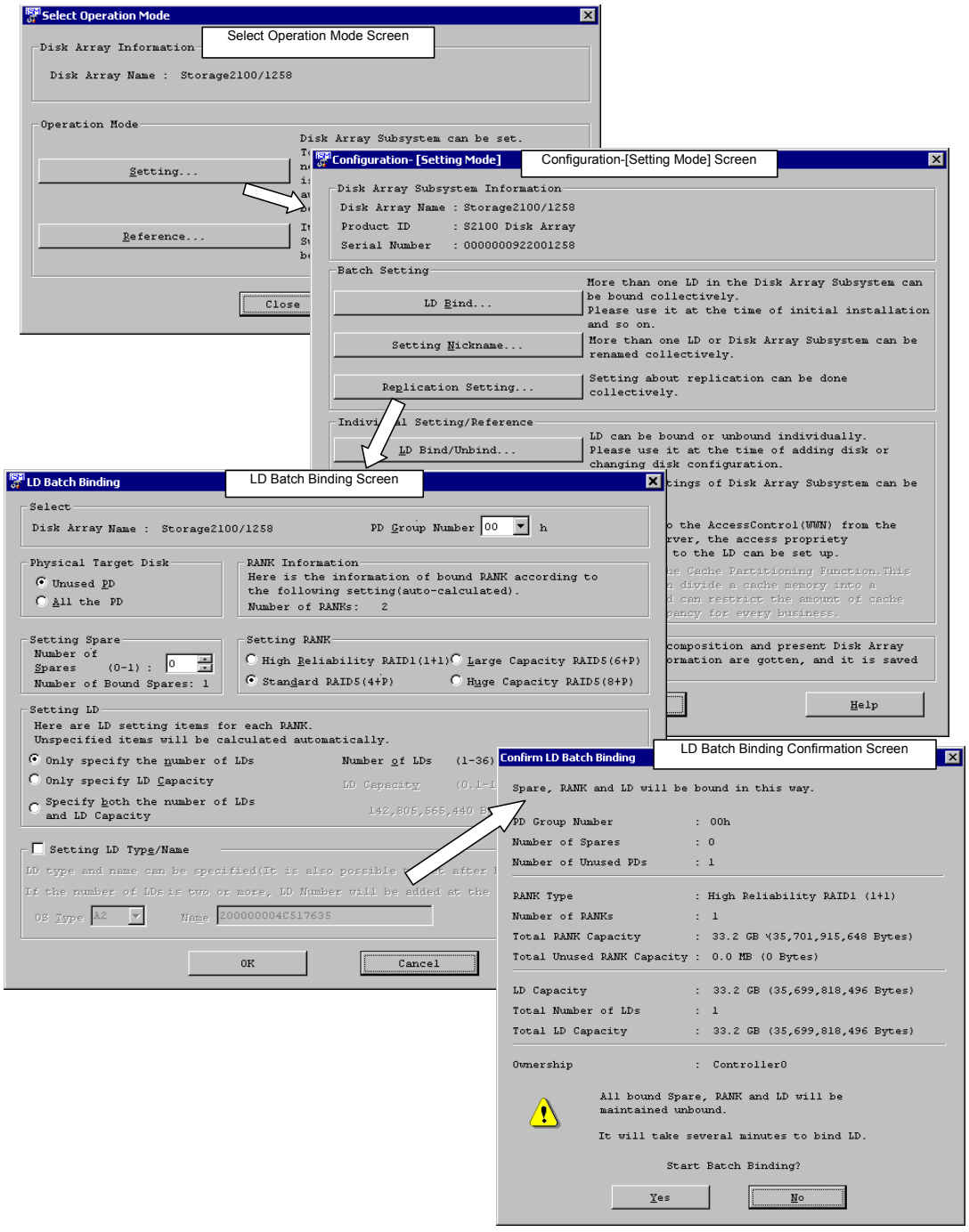


Figure 8-21 Transition of LD Batch Binding Screens

(2) Execution conditions

When batch binding logical disks for all the physical disks, all the existing settings are unset. Therefore, if any one of the following conditions is met, the batch binding cannot be executed.

(i) Logical disks managed by the Access Control (Port mode) are present.
(ii) Logical disks managed by the Access Control (WWN mode) are present.
(iii) Logical disks that are set in pairs are present.

Execute the batch binding after unset the states above.

(3) Disk relationship

When binding logical disks, it is necessary to understand the relationship between the physical disk, the RANK, and the logical disk.

Figure 8-22 shows the relationship between the physical disk, the RANK, and the logical disk.

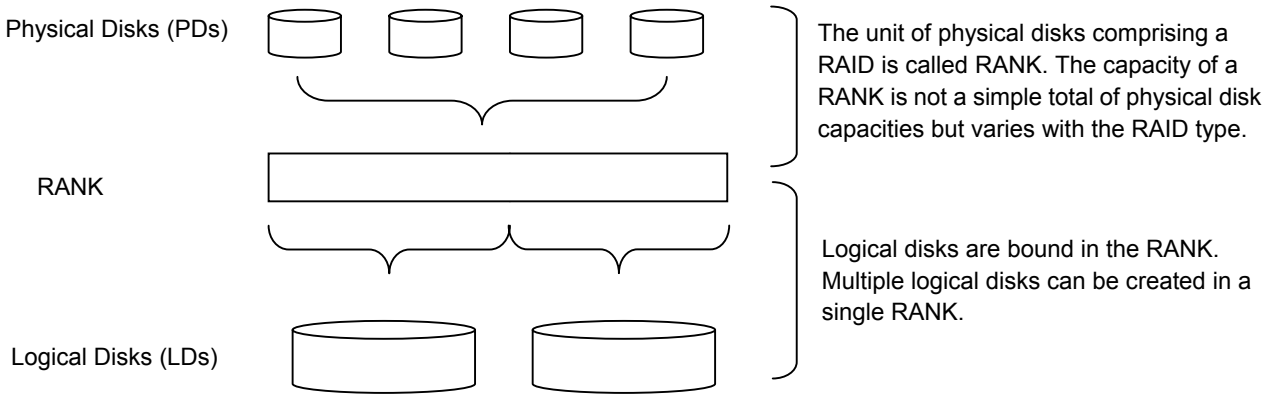


Figure 8-22 Disk Relationship Diagram

(4) Complement

In the batch binding, it is executed from RANK Bind to LD Bind all at once. In this case, both the RANK and the LD are bound with the same capacity. Regarding the RANK binding, four patterns based on the combinations of the PD count and the RAID type can be specified. However, when binding through other settings, refer to 8.2 “Method of Binding Logical Disks”.

The screen displayed when binding logical disks in a batch and the details are described below.

(5) LD Batch Binding screen

The LD Batch Binding screen is shown in Figure 8-23. The displays and setting items in the screen are described below.

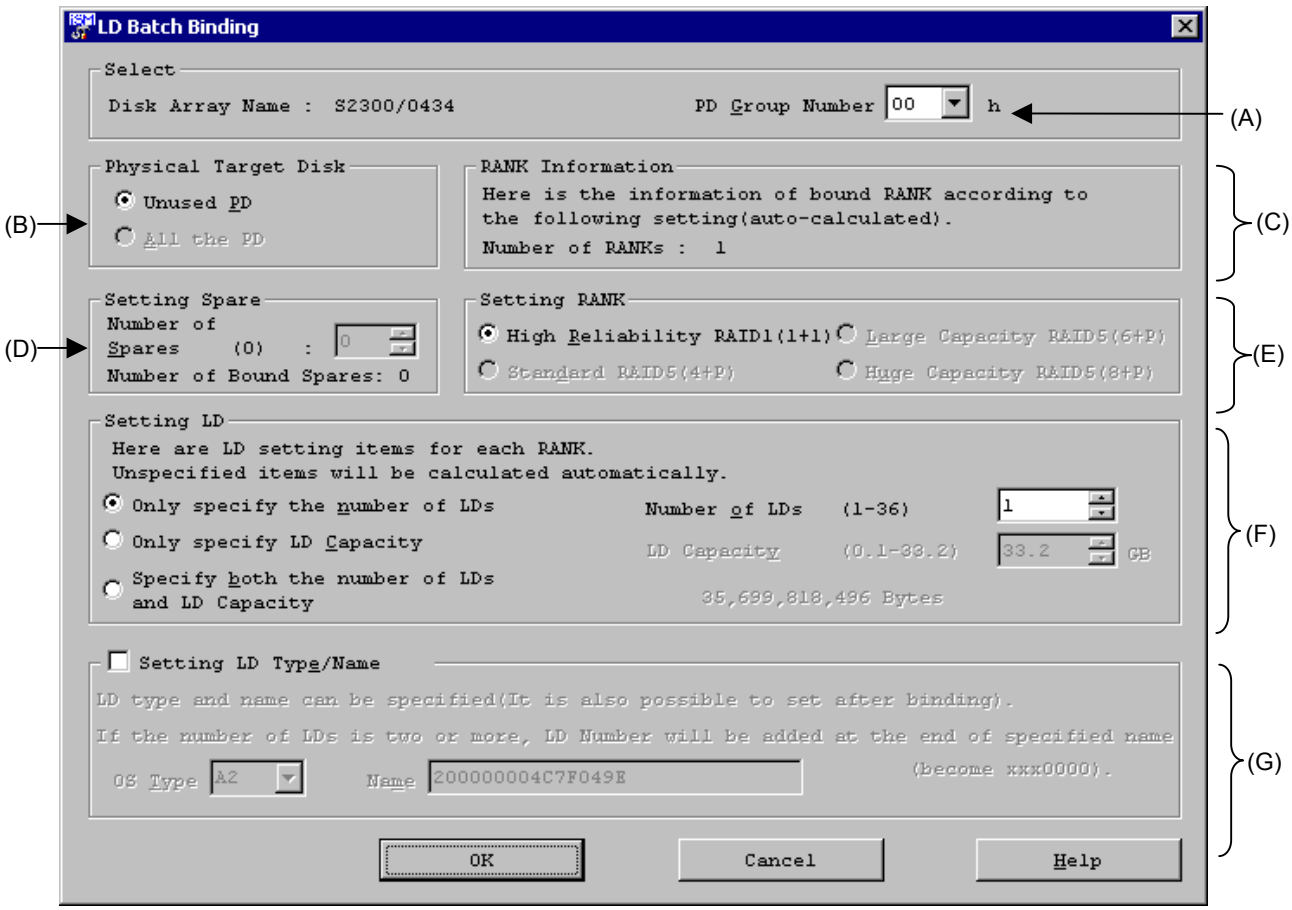


Figure 8-23 LD Batch Binding Screen

(A) PD Group Number

The PD group of LD Batch Binding is specified here. The PD groups existing in the disk array are displayed in the pull-down list. Select one from the list.

The PD group refers to a management aggregate of PDs; therefore, it is impossible to form a configuration spanning two or more PD groups. Binding logical disks shall be set within this PD group.

(B) Physical Target Disk

Select batch binding target physical disks.

- All the PD

  Batch binds all physical disks that exist in the specified PD group. Unbinds all the spares and RANKs which have already been bound, and newly binds them.

• Unused PD

Binds physical disks which have not configured the spare and RANK in the specified PD group. Does not unbind spares and RANKs which have already been bound.

(C) RANK Information

The number of RANKs to bind is displayed.

The number of displays is automatically calculated depending on the disk array setting state as well as the set values of spares and LDs.

(D) Setting Spare

Specifies the number of spares. The set value up to twice as many as the DE count can be specified. However, the maximum value varies with the number of spare binding target physical disks. For example, if the DE count is 2, the specifiable range is 0 to 4 and the initial value is 2. Since there are up to 8 spares per PD group, the upper limit of the set value is 8 when the DE count is 4 or more.

Up to two spares can be created for a disk enclosure (DE).

DEs are physical components of the disk array on which physical disks are mounted.

When binding unused physical disks, the maximum value varies with the number of spares that have already been bound.

(E) Setting RANK

Specifies the RAID type of the RANK to bind. This setup and the PD capacity determine the RANK capacity.

• High Reliability RAID1 (1+1): Consisting of two PDs, the RANK capacity is equivalent to that of about one PD.

• Standard RAID5 (4+P): Consisting of five PDs, the RANK capacity is equivalent to that of about four PDs.

• Large Capacity RAID5 (6+P): Consisting of seven PDs, the RANK capacity is the same as that of about six PDs.

• Huge Capacity RAID5 (8+P): Consisting of nine PDs, the RANK capacity is the same as that of about eight PDs.

Initial setting is set as “Standard RAID5 (4+P)”.

(F) Setting LD

Specifies the number of LDs to bind or their capacity (or both).

- Only specify the number of LDs

  The maximum capacity that can be created is automatically calculated for the individual LD Capacity. Since, in this case, the number of LDs to bind in a RANK is specified, the number of actually bound LDs is the specified value multiplied by the RANK count.

- Only specify LD capacity

  The maximum number that can be created is automatically calculated for the number of LDs to be bound in the RANK. Information such as the number of LDs that are finally bound and their capacity can be checked with 8.2.4 (6) “Confirm LD Batch Binding screen” after clicking the [OK] button.

- Specify both the number of LDs and LD capacity

  Any value can be set to the number of logical disks/capacity. The acceptability of the set value is verified after the [OK] button is clicked. If the set value is in error, an error message is output.

1. The capacity which is entered into the input field can be used by the user. However, depending on the input value and the RAID configuration, a capacity exceeding this value may be obtained. The reason is that, since the minimum unit that can be bound in the case of RAID5(n+P) is 128KBxn, disks are bound in terms of rounded-up MBs if the resulting figure cannot be divided. As the area for use in the RANK, there is not only the capacity for use by the user but also the disk management area.
2. The maximum number of LDs which can be bound in the same RANK is 36.

(G) Setting LD Type/Name

For the LDs to bind, it is possible to set their formats and names simultaneously with their binding. The LD name needs to be unique in the system (no two names must not be the same). Therefore, when binding multiple LDs, the LD names in which the sequential numbers are added to the specified character strings are automatically given.

The value initially displayed in the LD name input field is 20 characters which result from adding 4 characters of the logical disk number to 16 characters inherent to the disk array. When the logical disk name is not changed, the above-mentioned initial value is set.

When the LD type is not changed, the LD Type is made blank.

Example: 0200200000004C518CAC0000, 200000004C518CAC0001, …

Moreover, when the LD Type is made blank, the value set before shipment is initially displayed. The LD Type is made blank, and “16 characters inherent to the disk array + 4 characters of the logical disk number” is set for

the LD name.

A list of selectable LD Type is shown in Table 8-2.

The LD Type and LD name can be changed later on the main screen of the iSM client or in 7.2.4 “Renaming a Logical Disk”.

Table 8-2 List of LD Type

LD Type	Description
A2	Operating LDs by the ACOS-2 system
A4	Operating LDs by the ACOS-4 system (If you are setting this type, ask our maintenance personnel.)
AX	Operating LDs by the AIX system
CX	Operating LDs by the Solaris system
LX	Operating LDs by the Linux system
NX	Operating LDs by the HP-UX system
WN	Operating LDs by the Windows system

1. LD name which do not abide by the following regulations cannot be set.
   - Number of available characters: 1 to 24 characters
   - Available characters:
     - Alphabet: A to Z (a to z)
       * Upper- and lower-case characters are distinguished.
     - Numerals: 0 to 9
     - Underbar: -
     - Slash: /

   * All the characters must be 1-byte characters.
2. If this set value is in error, the same LD name as when this setting is omitted is given.
3. On the ACOS-4 system, make sure that the LD name matches the LD identifier name on the host.

For information on the “A4” format, refer to Appendix G “ACOS-4 Resource Operation Guard”.

(6) Confirm LD Batch Binding screen

Click the [OK] button after entering the required parameters into the LD Batch Bind screen described in (5) to display the confirmation screen shown in Figure 8-24.

If there are no problems with the setting information on batch binding, click [Yes]. The RANK and LD binding will start.

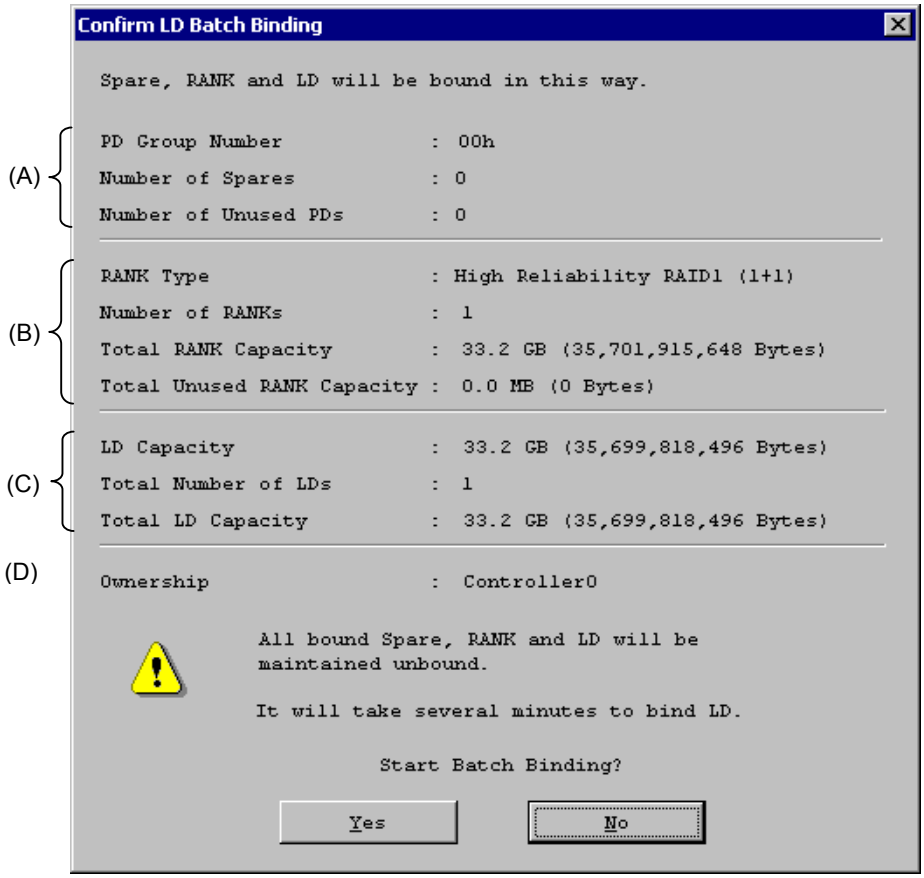


Figure 8-24 Confirm LD Batch Binding Screen

(A) Information About PD

- PD Group Number: PD group number to bind
- Number of Spares: (total) Number of spares to bind
- Number of Unused PDs: Number of PDs unused for binding

For batch binding, the number of PDs for RANK Bind is any of 2, 5, 7, and 9. Therefore, depending on specifying the physical configuration and “Setting RANK”, “Unused PD” may be present.

Example: In the event of a single DE with 15 PDs in the DE, these values are as shown in the table below.

Table 8-3 Number of Unused PDs

RANK Setting	Number of Spares	Number of Created RANKs	Number of Unused PDs
High Reliability RAID1 (1+1)	1	7	0
Standard RAID5 (4+P)	1	2	4
Standard RAID5 (4+P)	2	2	3

(B) Information About RANK

- RANK Type: RAID type and the number of PDs which bind the RANK
  - High reliability RAID1 (1+1): Mirroring configuration based on two PDs
  - Standard RAID5 (4+P): Striping configuration based on five PDs
  - Large capacity RAID5 (6+P): Striping configuration based on seven PDs
  - Huge capacity RAID5 (8+P): Striping configuration based on nine PDs
- Number of RANKs: Number of RANKs to bind
- Total RANK Capacity: Total capacity of RANKs to bind
- Total Unused RANK Capacity: Capacity of the free space for LD Binding in the RANK to bind. If the LD Capacity is automatically calculated, it is basically 0 here.

(C) Information About LD

- LD Capacity: Capacity of a single LD to bind
- Total Number of LDs: Total number of LDs to bind
  Not the number of LDs per RANK but the total number of LDs to bind
- Total LD Capacity: Total capacity of all the LDs to bind
  LD Capacity × Total Number of LDs = Total LD Capacity

(D) Information About LD Ownership

The ownership of the LDs to bind is displayed. Fixed to controller 0.

The Ownership is valid only when Cross Call is OFF. To set the LD Ownership to controller 1 when Cross Call is ON, use “Change Ownership” after binding or specify the controller on “Individual Bind of LD” and perform binding.

(7) Result screen

When LD Batch Binding is completed successfully, a message box as shown below appears.

Figure 8-25 Success Message Box

"Bind" here means that LD binding started successfully. Check the LD state for information by using the main screen of the iSM client to see if the actual binding is completed or not.

Immediately after the binding is started, "Attn.(formatting)" appears as shown in Figure 8-26.

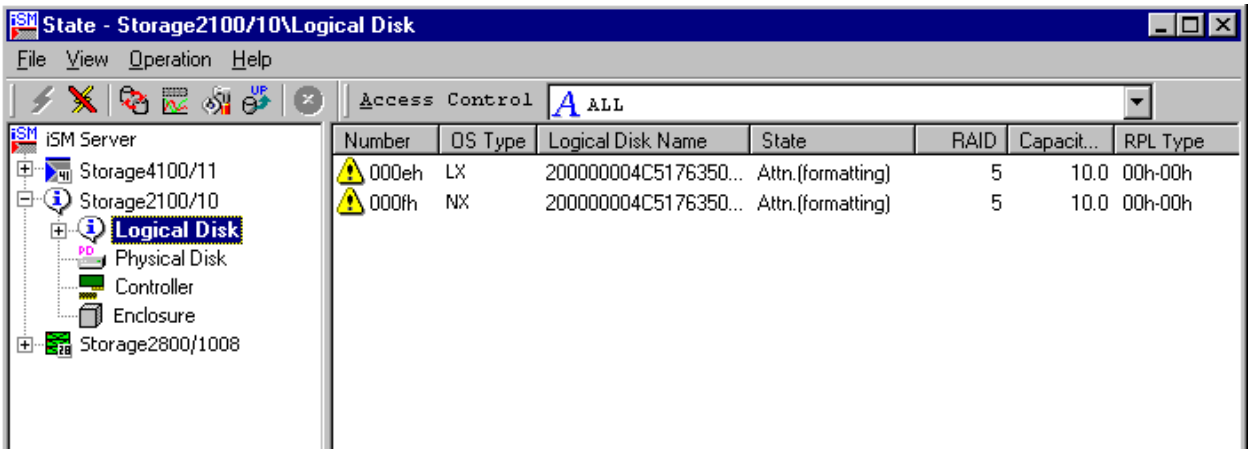


Figure 8-26 LD Formatting Screen

Even during LD formatting, it is possible to unbind LDs. Therefore, even after LD Batch Binding can be performed again without waiting for completion of an error binding.

The LD Format Time is set to 0 hours. To change this format time, use "Change Format Time" on 8.2.3 "Setting Logical Disk Bind Time".

When LD Batch Binding fails, a message box appears as shown below.

Figure 8-27 Failure Message Box

Possible causes of an LD batch binding failure may be a communication error between the iSM server and the iSM client, a problem in the disk array, and so forth. When there is a communication error, the binding instruction may have been correct; therefore, reconnect the iSM client and check the state. If the disk array is in error, the failure factor is recorded in the application log of the iSM server. In this case, take appropriate measures while referring to the application log of the iSM server and then re-execute the binding.

8.3 Binding a Spare

To bind spares, refer to the following descriptions.

Spare Bind (8.3.1)

Spare Unbind (8.3.2)

Spare Rebuilding Mode (8.3.3)

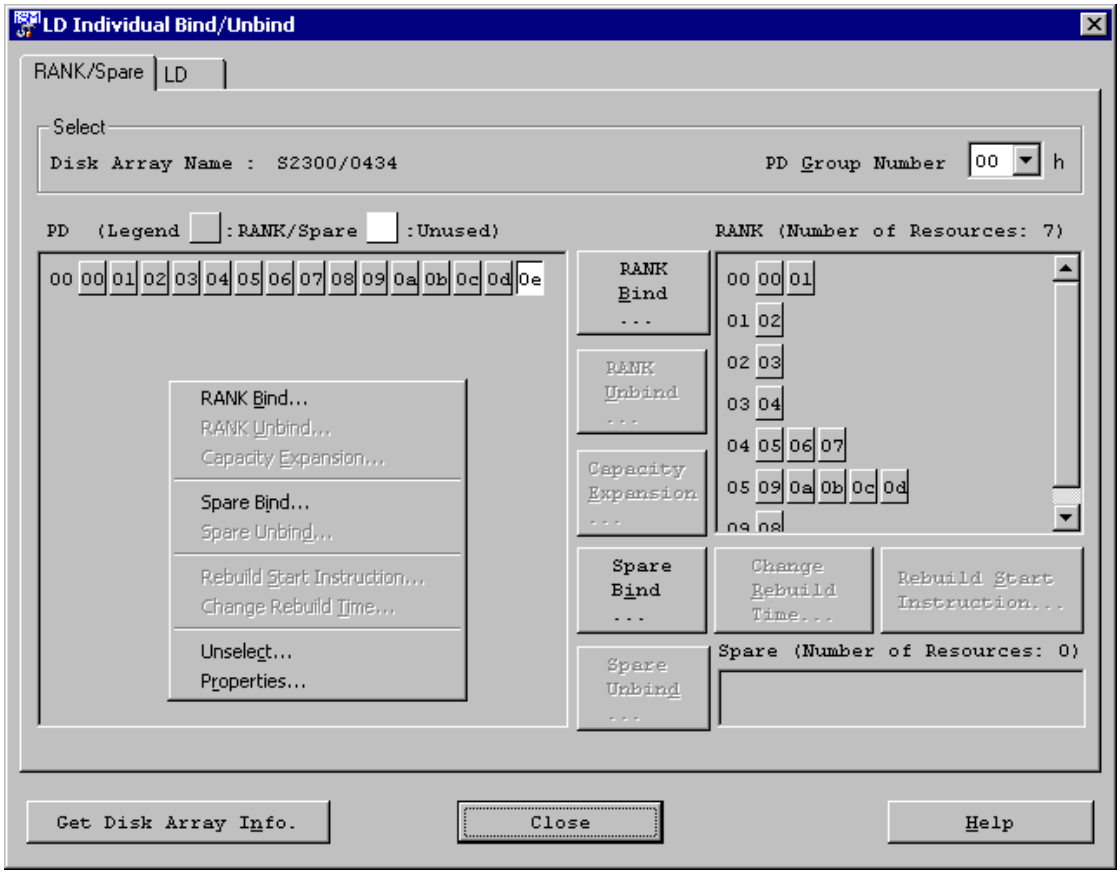


Figure 8-28 RANK/Spare Tab Screen Menu and Buttons

8.3.1 Spare Bind

On the RANK/Spare Tab screen (Figure 8-28), spare can be bound/unbound by using the popup menu (right-click) or the buttons on the screen after selecting PDs and RANKs, etc.

Selecting only a single unused PD enables this button, thus making it possible to bind a spare.

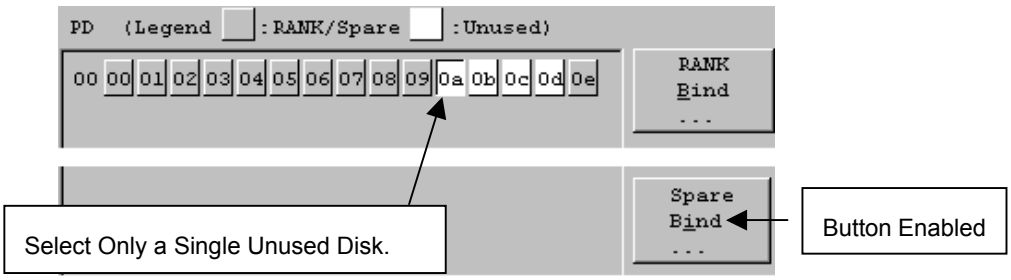


Figure 8-29 Spare Bind

Click the [Spare Bind] button to display a message as follows.

Figure 8-30 Spare Bind Confirmation

Select [Yes] to bind a spare.

8.3.2 Spare Unbind

Select Spare on the RANK/Spare Tab screen (Figure 8-28) to enable [Spare Unbind].

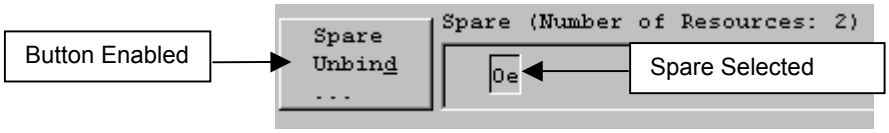


Figure 8-31 Spare Unbind

Click the [Spare Unbind] button to display a message as shown below.

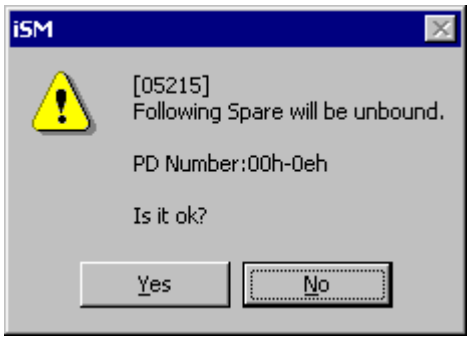


Figure 8-32 Spare Unbind Confirmation

Select [Yes] to unbind the spare.

8.3.3 Spare Rebuilding Mode

(1) Special screen

The screen shown below (Configuration setting menu → Setting Disk Array → Special) can be used to set the spare rebuilding mode.

You can also make various settings by activating each checkbox (such as Cross Call, Spare, and Expand LUN) to enable them and then clicking the [Apply] button at lower right. Moreover, immediately after the screen has been displayed or after the setting has been made, current settings for the disk array are activated through radio buttons.

For S400/S1400/S2400/S2800 disk array, refer to Figure 8-34.

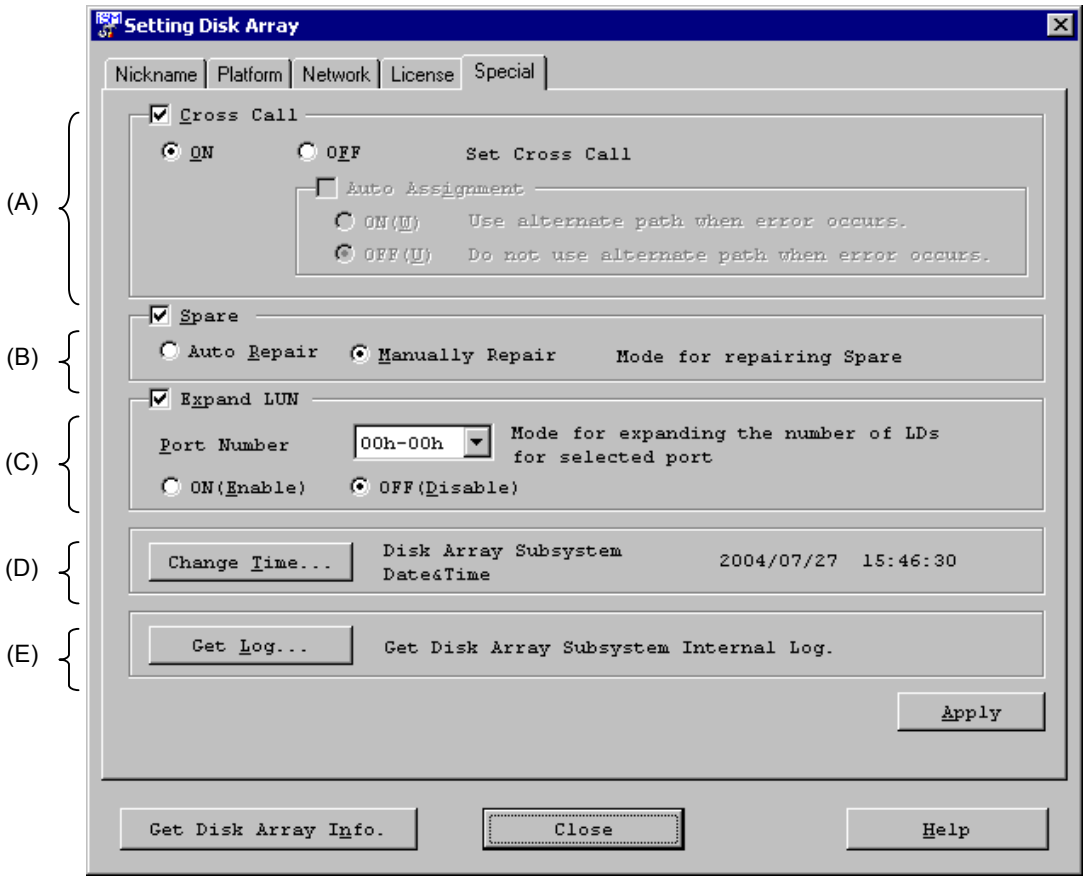


Figure 8-33 Special Screen

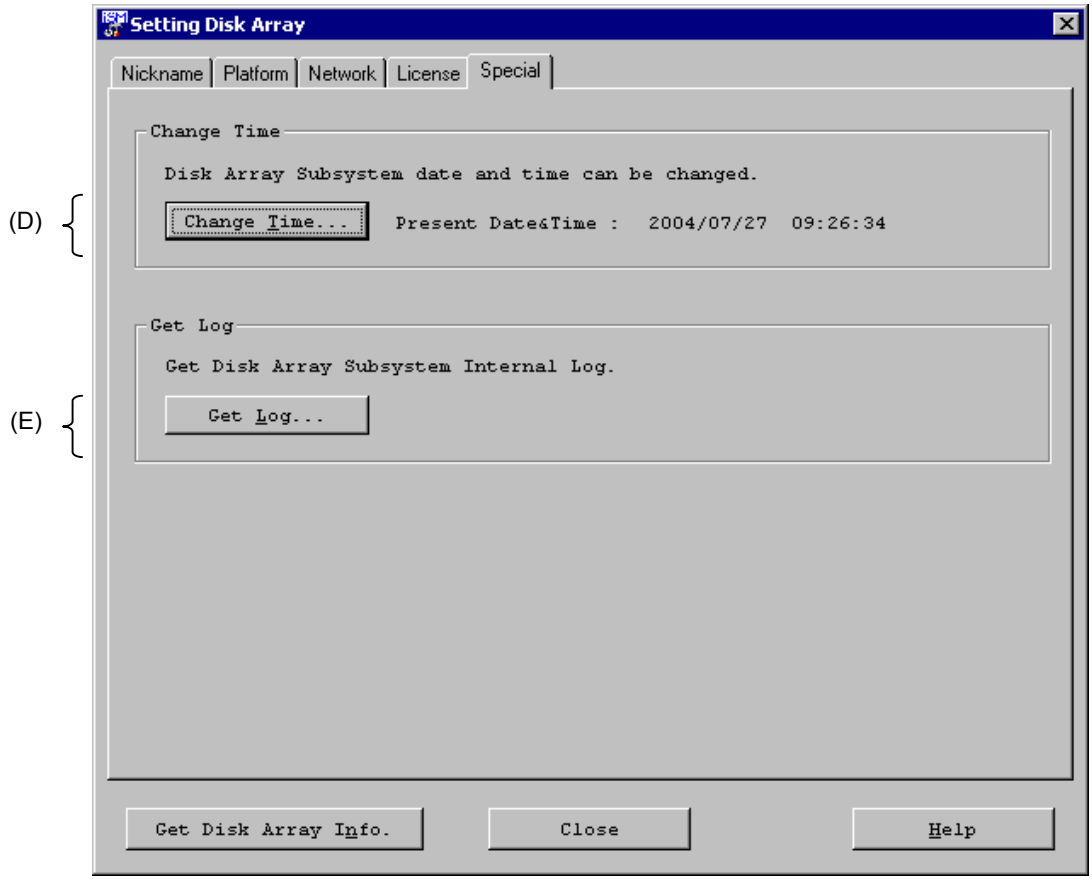


Figure 8-34 Special Screen (S400/S1400/S2400/S2800)

(A) Cross Call

Refer to 8.5.1 "Cross Call and Auto Assignment".

(B) Spare

Can set the data rebuild operation when one of the physical disks configuring logical disks fails.

- Auto Repair: The repair operation is automatically started when unused spare disks exist.
- Manually Repair: Placed in the rebuild wait state without automatically performing repair operations.

When placed in the rebuild wait state, the repair start instruction can be given on the RANK/Spare Screen.

(C) Expand LUN

Refer to 0 "

Expand LUN".

(D) Change Time

Refer to 9.5 "Setting Disk Array Time".

(E) Get Log

Refer to 9.6 "Getting Log in the Disk Array".

Even when Manually Repair is set during repair operation, the repair operation is not stopped. The setting applies only from the next repair operation.

Even when Auto Repair is set in the rebuild wait state, the repair operation does not start. The setting applies only from the next repair operation.

8.4 Setting the Port

8.4.1 Expand LUN

When connecting to HP-UX, it is possible to expand the number of logical disks which can be detected from the OS in terms of each port.

Select the Port Number from the pull-down menu on the Special screen in Figure 8-33 and then select ON or OFF from the radio button located below to be able to set them by clicking the [Apply] button at lower right.
The Port Number is represented in terms of the “directory number - port number”.

As a result of changing this setting, the disk array may stop being accessible from OS. Careful attention needs to be directed in changing the setting. For details, refer to the disk array user’s manual.

8.5 Special Settings

To make special settings, refer to the following descriptions.

Cross Call and Auto Assignment (8.5.1)

Ownership (8.5.2)

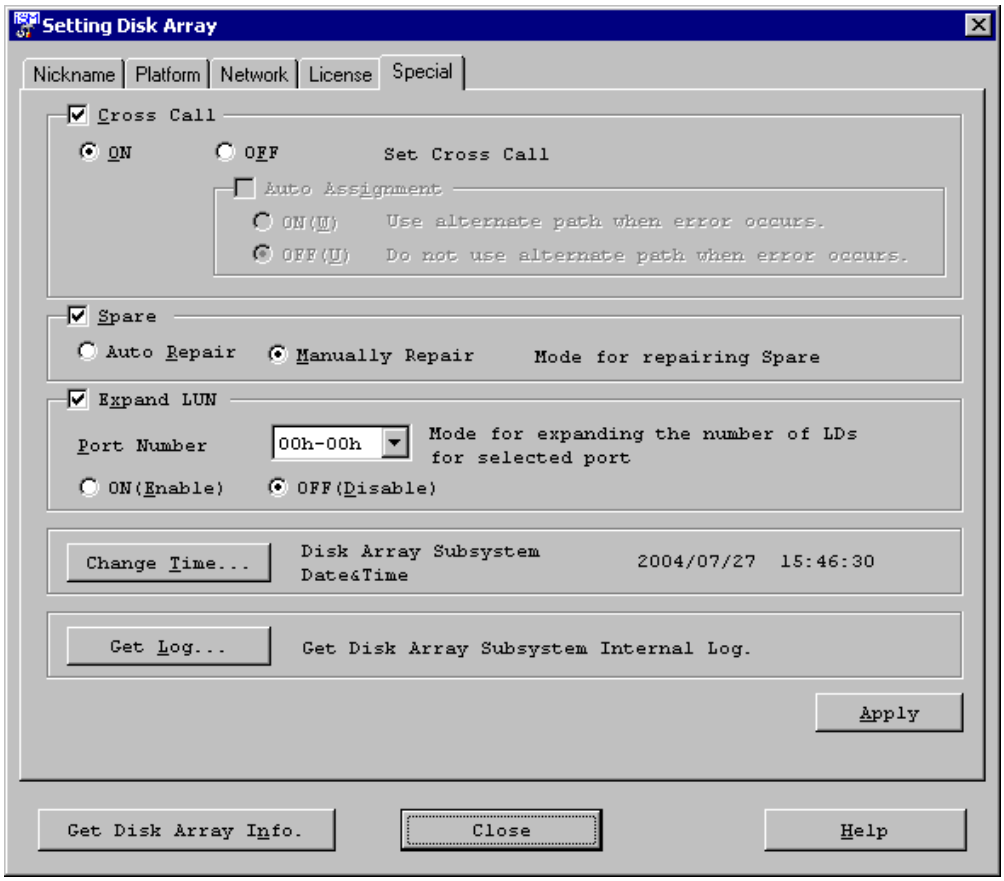


Figure 8-35 When Selecting the [Special] Tab on the Setting Disk Array Screen

8.5.1 Cross Call and Auto Assignment

Can set Cross Call function ON/OFF.

- Cross Call ON state

  This can be set when two controllers exist. In this state, all the logical disks can be accessed from the two controllers. The Auto Assignment function is disabled.

- Cross Call OFF state

  Refers to the disk array's initial state. The logical disk can be accessed only from the controller which has the Ownership.

  In this case, it becomes possible to set the Auto Assignment function.

- Auto Assignment function

  Enabled when two controllers are available. The purpose of this function is automatically switching to the access to another controller when the primary controller goes down.

When the Cross Call is set to OFF, there may exist logical disks which can no longer be accessible from OS, according to the Ownership and the connected controller. In this case, please change the Ownership.

8.5.2 Ownership

On the LD Individual Bind/Unbind screen (Figure 8-14), LD binding/unbinding can be performed. The operation can be performed by using the popup menu (right-click) or the buttons on the screen after selecting a logical disk or free space of RANK.

Changes the LD Ownership.

When a logical disk exists in the selected PD group, clicking this button displays the dialog shown in the figure below, making it possible to change the ownership.

When selecting multiple logical disks, perform operation as described below.

Select continuous logical disks: Select the first and the last logical disks while holding down the Shift key.

Select an Individual logical disk: Select a logical disk while holding down the Ctrl key.

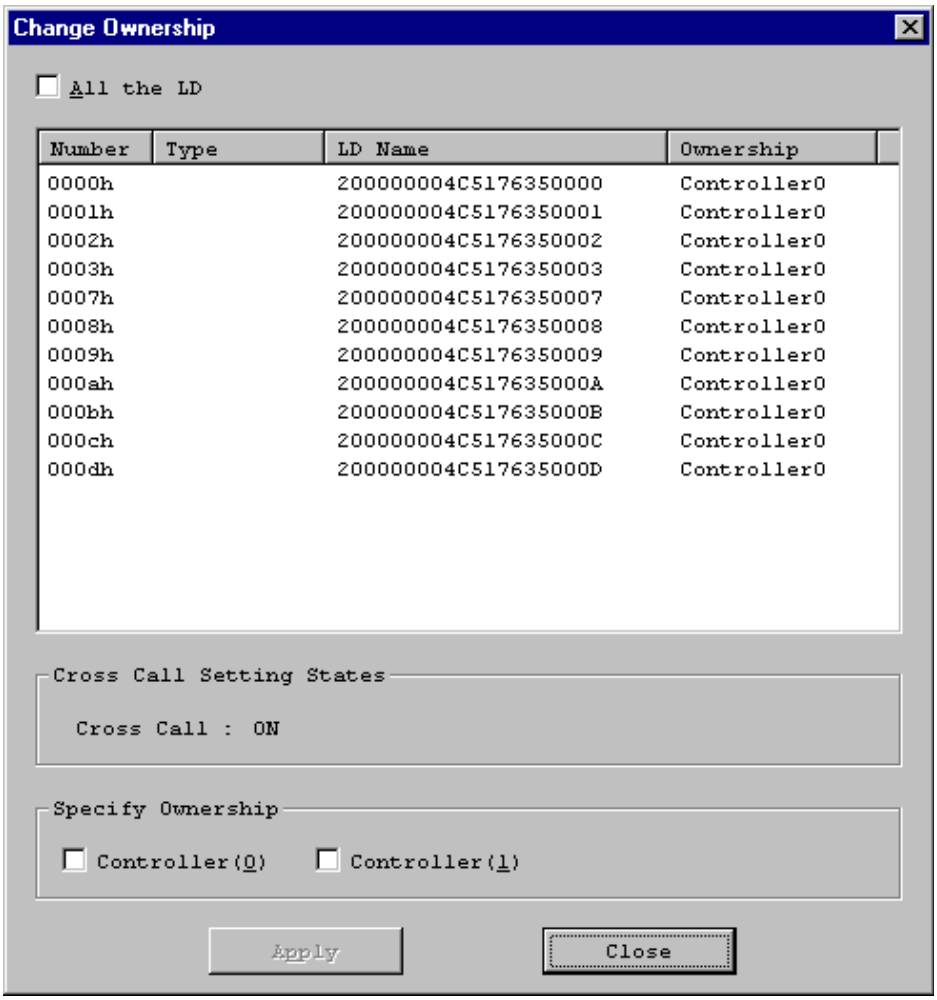


Figure 8-36 Change Ownership Dialog

The display order of the numbers and logical disk names in the list can be changed. For information on the settings, refer to “Client Start/Stop” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with the OS in use.

8.6 Explanation of Configuration Setting Screen

Bind or unbind LDs or RANKs individually in accordance with the following procedure.

On S400/S1400/S2400/S2800 disk array, refer to 7.4 “Explanation of Configuration Setting Screen”.

(1) Click “LD Bind/Unbind” from the “Configuration- [Setting Mode]” screen.

(2) RANK Binding or settings related to Spare disks are performed by selecting “RANK/Spare” with a tab (refer to 8.6.1 “RANK/Spare Screen” for details).

(3) Settings for LD bind/unbind are performed by selecting “LD” with a tab (refer to 8.6.2 “Logical Disk Screen” for details).

When binding logical disks having the same capacity as an already bound logical disk for such a purpose as replication, refer to Appendix D “Notes on Use for Data Replication”.

8.6.1 RANK/Spare Screen

(1) Description

The RANK/Spare screen, which is shown in Figure 8-37, describes the content based on its encircled numbers. Refer to (2) "Operation" to know how to operate the screen.

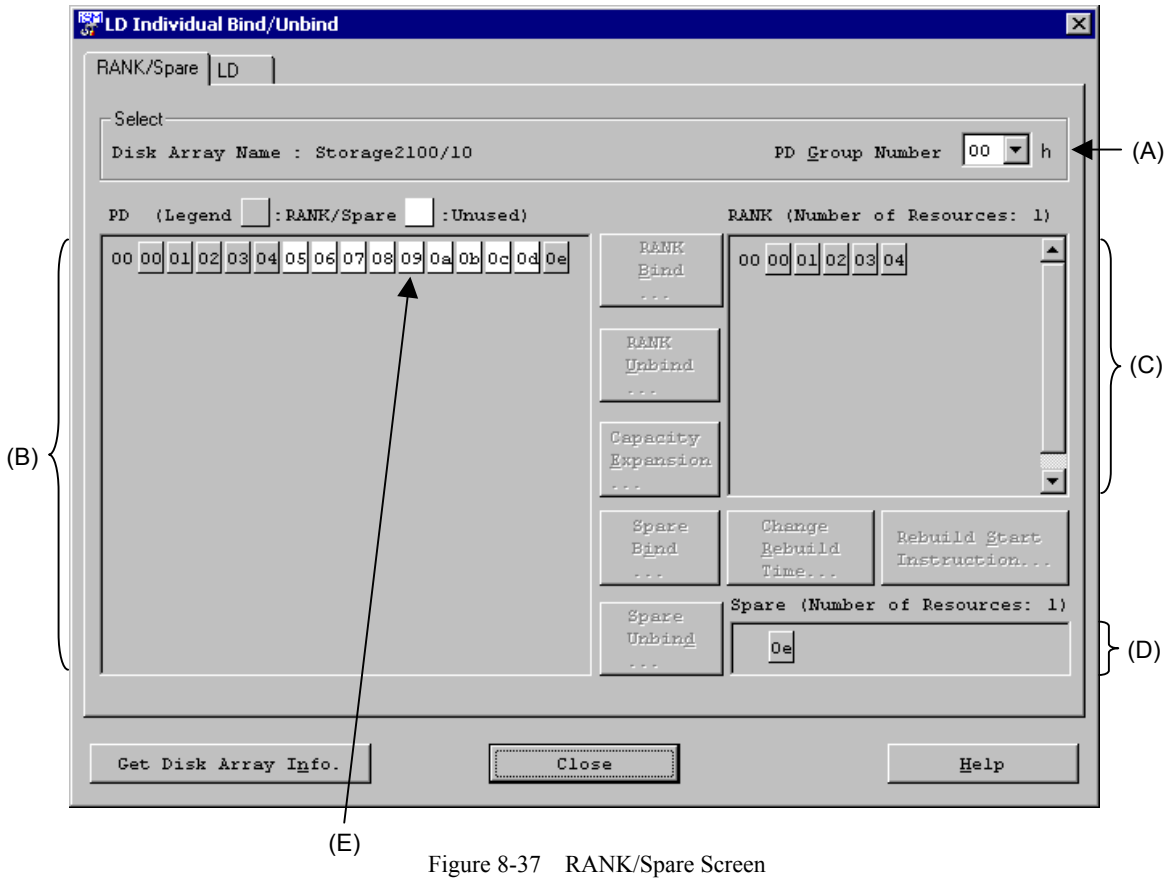


Figure 8-37 RANK/Spare Screen

(A) PD Group Number

The PD group for performing the RANK/Spare Bind/Unbind is specified here. The PD groups existing in the disk array are displayed in the pull-down list; select one from among them.

The PD group refers to a management aggregate of PDs; therefore, it is impossible to form a configuration spanning two or more PD groups. RANK/Spare Bind/Unbind shall be set within this PD group.

(B) PD window

PDs existing in the selected PD group are displayed in terms of each DE. For details of the display, refer to the diagram below.

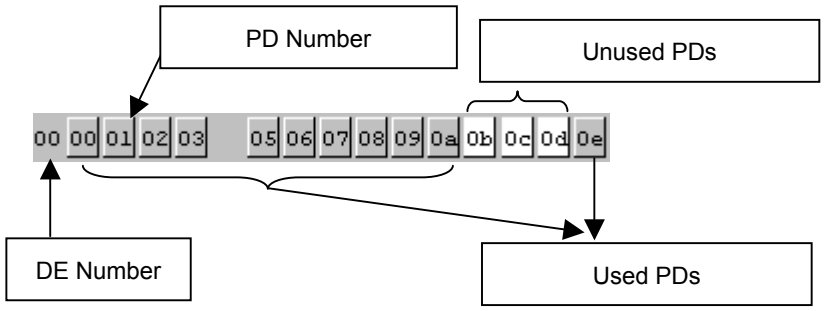


Figure 8-38 PD Window

(C) RANK window

RANKs bound within the PD group are displayed.

For details of the display, refer to the diagram below.

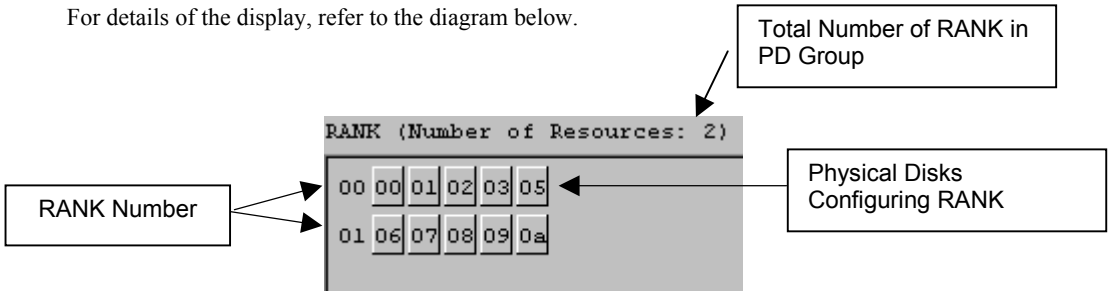


Figure 8-39 RANK Window

(D) Spare window

Spare disks bound within the selected PD group are displayed.

For details of the display, refer to the diagram below.

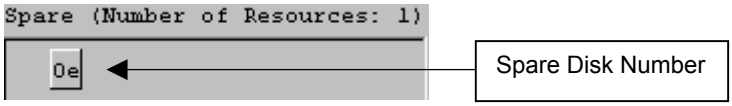


Figure 8-40 Spare Window

(E) Shape of selected button

PDs and RANKs are displayed with button shapes. Select/Deselect are performed by clicking the relevant buttons. The selected state has the concave shape, whereas the deselected state is the convex shape. These are alternated by clicking the left button of the mouse. Clicking again on what is already selected will change it to Deselect (or vice versa).

The states of RANKs and unused PDs are as follows.

* Select an unused PD when a RANK is already selected. → Both the RANK and the unused PD are placed in the selected state.

Figure 8-41 RANKs and Unused PDs

* Select another unused PD when an unused PD is already selected. → Multiple unused PDs are placed in the selected state.

Figure 8-42 Multiple Unused PDs

(2) Operation

In this dialog, RANK Bind/unbind can be performed by using the popup menu of the right button or the buttons on the screen after selecting PDs and RANKs, etc. The encircled alphabets on the screen are described.

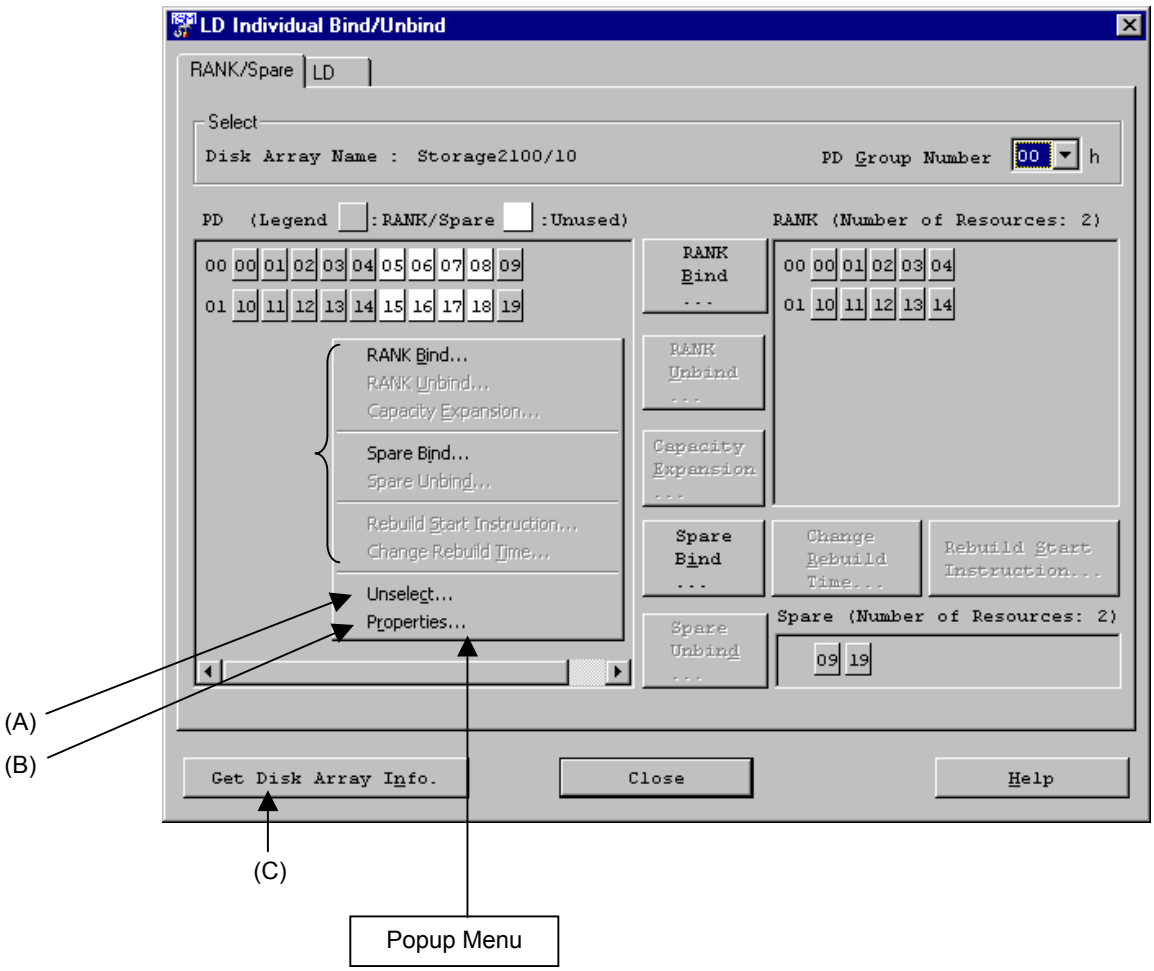


Figure 8-43 RANK/Spare Tab Screen Menu and Buttons

(A) Unselect

Deselects the selected RANKs, unused PDs or Spares.

(B) Properties

The properties of selected RANKs, unused PDs and Spares are displayed as shown below.

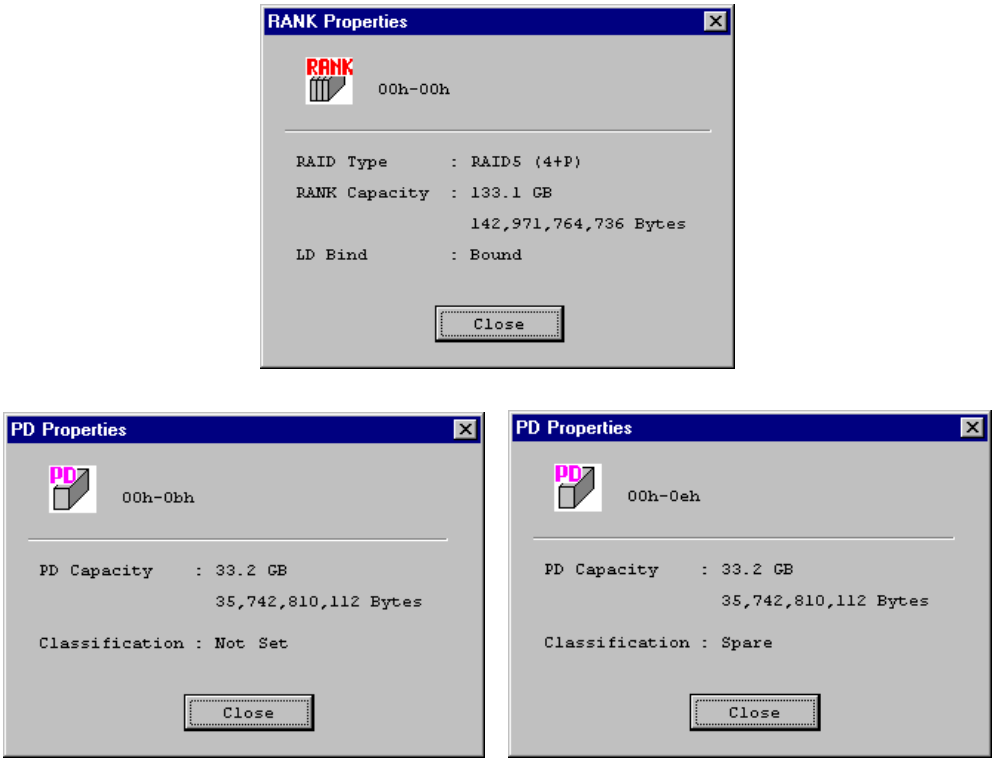


Figure 8-44 RANK/PD/Spare Properties

(C) [Get Disk Array Info.]

This button is used to read the current values which are set in the disk array. In the event of communication errors or some changes in the disk array, this button can be used to update the information.

8.6.2 Logical Disk Screen

(1) Description

The LD screen is shown in Figure 8-45. The encircled alphabets in the screen are described below. To know how to manipulate the screen, refer to (2) “Operation”.

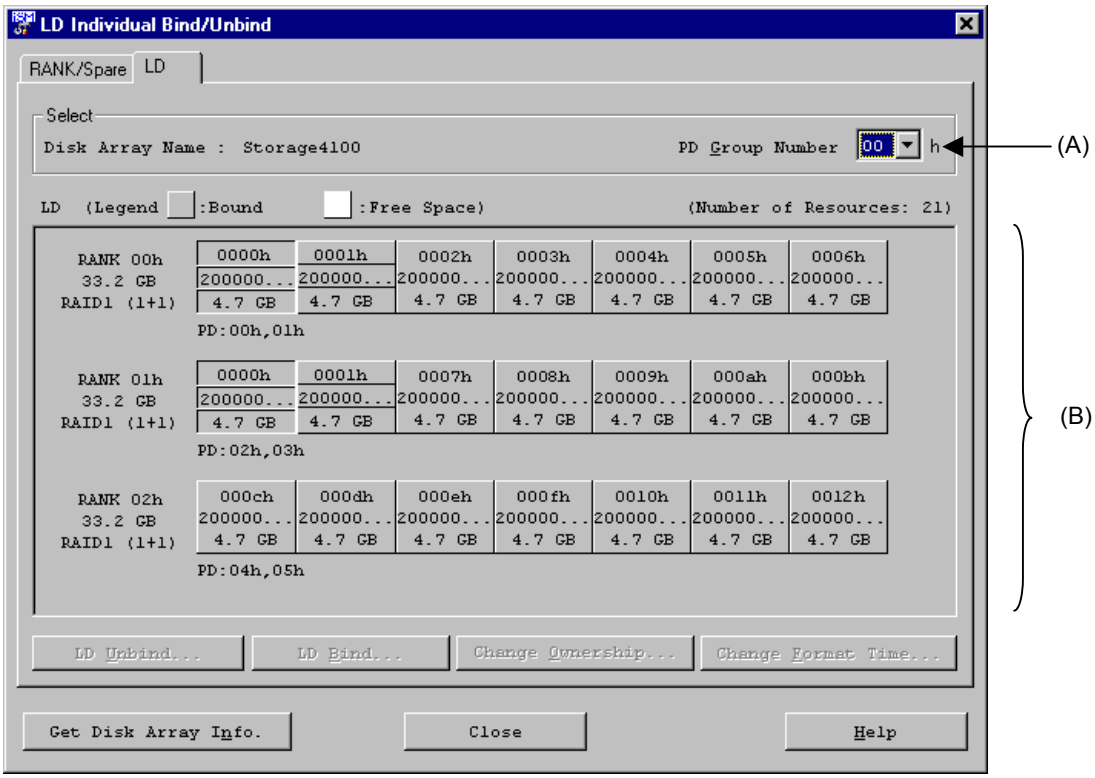


Figure 8-45 LD Screen

(A) PD Group Number

The PD group for performing the LD bind/unbind is specified here. The PD groups existing in the disk array are displayed in the pull-down list; select one from among them.

The PD group refers to a management aggregate of PDs; therefore, it is impossible to form a configuration spanning two or more PD groups. LD bind/unbind shall be set within this PD group.

(B) LD window

RANKs existing in the selected PD group and the LDs bound in the RANK are displayed. For details of the display, refer to the diagram below.

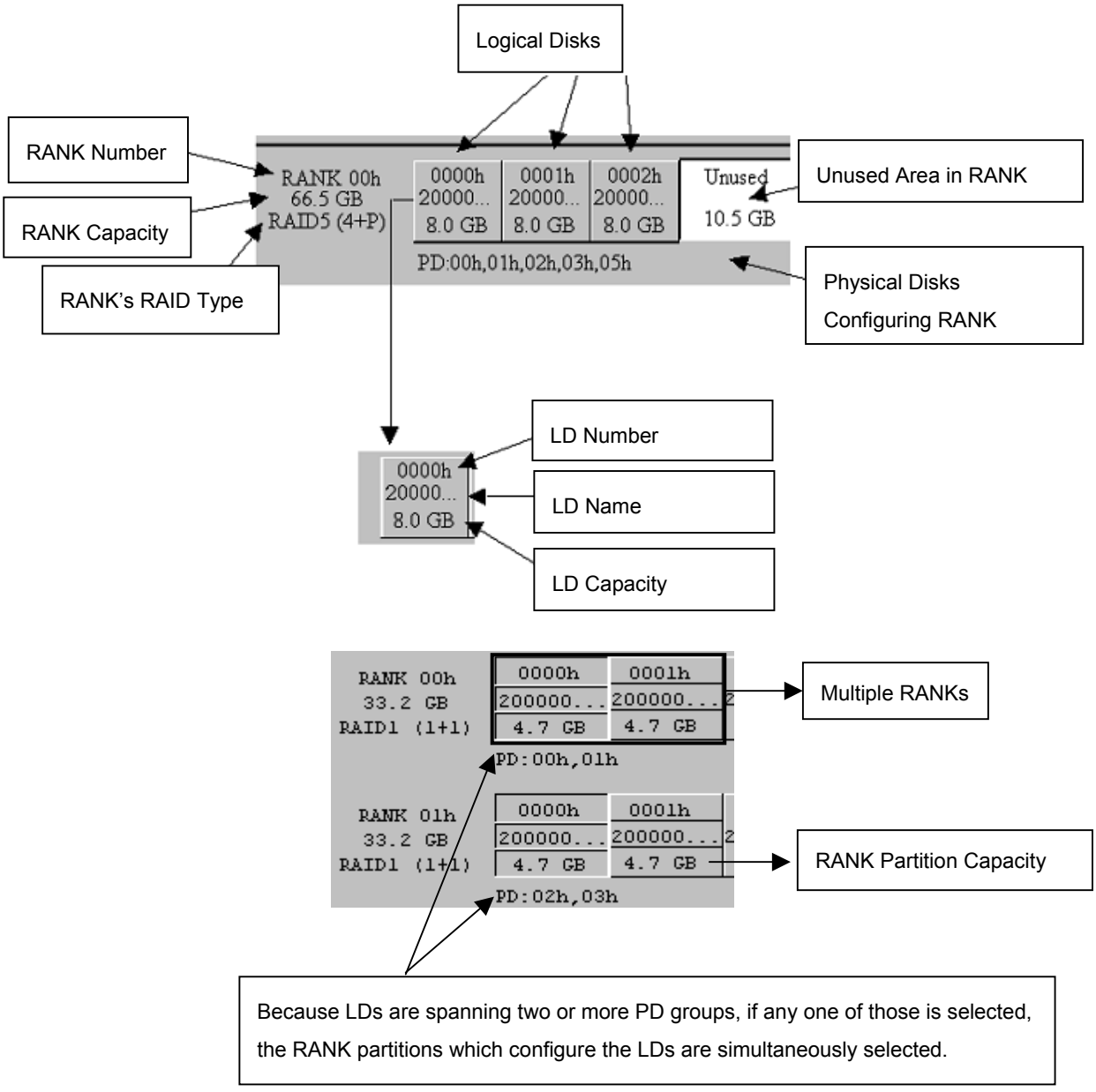


Figure 8-46 LD Window

Selecting a logical disk and then displaying the properties will result in outputting the detailed information. For details of the display, refer to (A) "Properties" of (2) "Operation".

(2) Operation

In this dialog, LD binding/unbinding can be performed. The operation can be performed by using the popup menu (right-click) or the buttons on the screen after selecting a logical disk or free space of RANK. The encircled alphabets in the screen are described below.

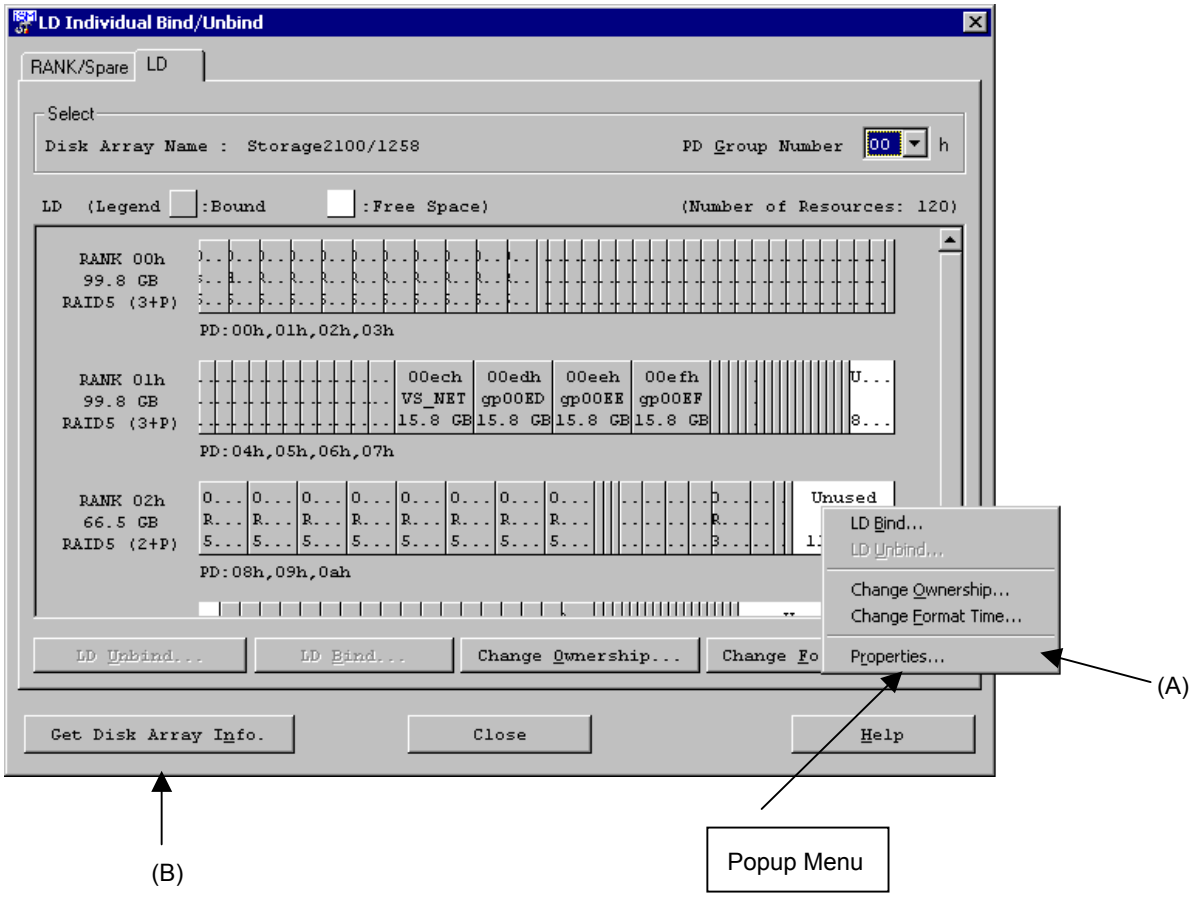


Figure 8-47 LD Individual Bind/Unbind

(A) Properties

Select a logical disk to display its properties. A dialog box as shown below will appear.

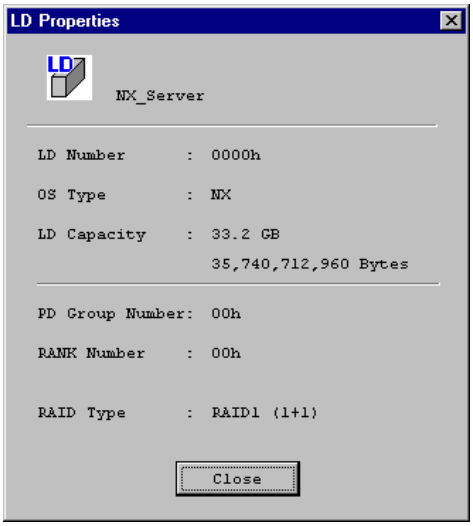


Figure 8-48 LD Properties

(B) [Get Disk Array Info.]

This button is used to read the current values which are set in the disk array. In the event of communication errors or some changes in the disk array, this button can be used to update the information.

Chapter 9 Configuration Setting (Common to All Units)

This chapter describes configuration settings common to all units.

9.1 Nickname Setting

In this section, nicknames are given and settings affecting the entire disk array, etc. Can be performed with regard to the disk array.

The Nickname screen appears by clicking the [Setting Disk Array] button of the “Configuration - [Setting Mode]” screen. (The disk array name, port name, and logical disk name can also be changed on the main screen of the iSM client though this section describes the method using the configuration setting screen. For the method using the main screen, refer to the "User's Manual" or "User's Manual (UNIX)".)

The screen contains five tabs, [Nickname], [Platform], [Network], [License], and [Special]. This section describes usage of the [Nickname] tab.

Note that some tabs may not be displayed because the support function varies depending on the disk array series. For information on differences in supported functions between the disk array series products, refer to 6.1 “Parameters”.

9.1.1 Setting a Disk Array Name

(1) Nickname screen

The screen below (Configuration setting menu → Setting Disk Array → Nickname) can change the disk array name and the port name.

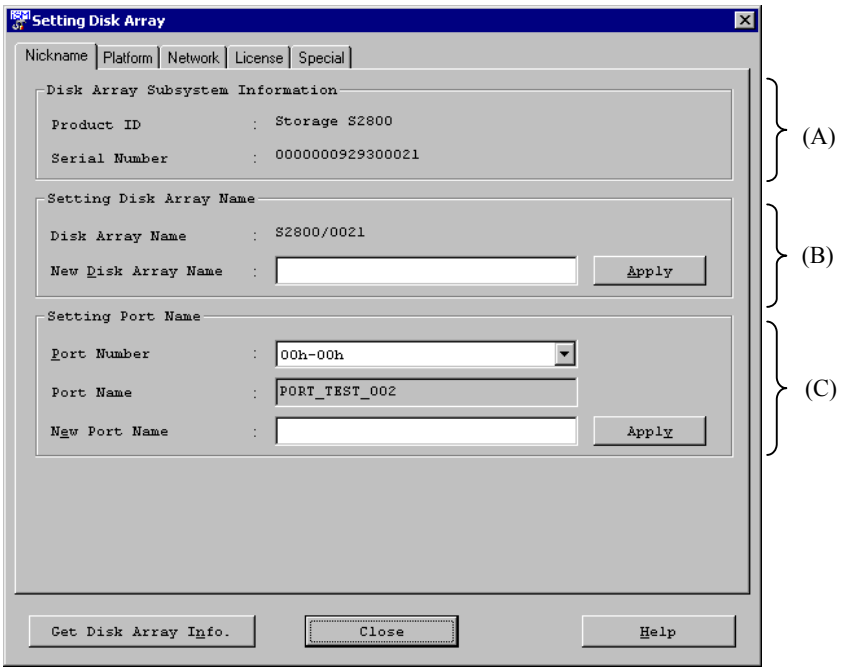


Figure 9-1 Nickname Screen

(A) Disk Array Subsystem Information

Product ID: The disk array's product ID is displayed.

Serial Number: The disk array serial number is displayed.

(B) Setting Disk Array Name

Disk Array Name: The current disk array name is displayed.

New Disk Array Name: Refers to the field for entering the disk array name to change.

(C) Setting Port Name

Refer to 9.1.2 "Setting a Port Name".

Enter a new name into the [New Disk Array Name] and then click the [Apply] button to output a message as shown below to change the disk array name.

Figure 9-2 Setting Disk Array Name Success Screen

Unless the disk array name and the port name to enter abide by the rules below, settings cannot be made.

Number of available characters: 1 to 32 characters

Available characters:
- Alphabet: A to Z (a to z)
  * Upper- and lower-case characters are distinguished.
- Numerals: 0 to 9
- Underbar: _
- Slash: /

* All the characters must be 1-byte characters.

9.1.2 Setting a Port Name

(1) Nickname screen

The Nickname screen, which is as shown below, can change the disk array name and the port name.

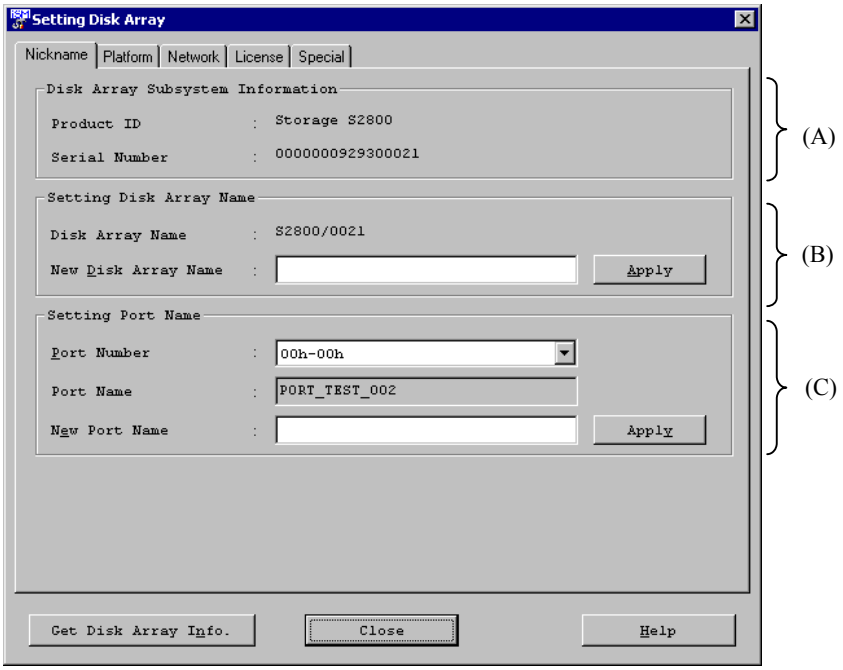


Figure 9-3 Nickname Screen

(A) Disk Array Subsystem Information

Refer to 9.1.1 "Setting a Disk Array Name".

(B) Setting Disk Array Name

Refer to 9.1.1 "Setting a Disk Array Name".

(C) Setting Port Name

Port Number: The port existing in the disk array is output to the pull-down menu. Only the port for the host can have a name specified. The port number list shows only the port number of the port for the host subordinate to Host Director.

The displayed format is the “director number - port number (port name)”.

Port Name Displays the current port name of the port selected for “Port Number”.

New Port Name Refers to the field for entering the port name to change.

Enter a new name and then click the [Apply] button with regard to the port selected from the Port Number to output a message as shown below to change the port name.

Figure 9-4 Setting Port Name Success Screen

Unless the disk array name and the port name to enter abide by the rules below, settings cannot be made.

Number of available characters: 1 to 32 characters

Available characters:
- Alphabet: A to Z (a to z)
  * Upper- and lower-case characters are distinguished.
- Numerals: 0 to 9
- Underbar: _
- Slash: /

* All the characters must be 1-byte characters.

9.1.3 Renaming a Pool

The pool can be renamed on the "LD Individual Bind/Unbind" screen. Refer to 7.1.4 "Renaming a Pool".

9.1.4 Renaming a Logical Disk

The logical disk can be renamed on the "LD Individual Bind/Unbind" screen. Refer to 7.2.4 "Renaming a Logical Disk".

9.1.5 Nickname Batch Setting

Nickname Batch Setting refers to name batch setting (disk array name, port name, LD type/name) based on the definition file.

(1) Execution procedure

Perform the name batch setting (disk array name, port name, LD type/name) based on the definition file in accordance with the following procedure.

(A) Click the [Setting Nickname] button from the "Configuration- [Setting Mode]" to display the Nickname Batch Setting dialog.

(B) When making settings based on the user definition file, select [Read from text file] and then select any file from the dialog that opens up to read files. For information on formatting the user definition file for batch setting, refer to (a) "Formatting the user definition file". The settings can be made without reading the user definition file, by entering them directly in the edit box. In that case, enter the settings in accordance with the file format description example. Note that each line of such a description must begin with a ",".

(C) After file reading, the data that has been read appears in the edit box. Modification, if necessary, can be made on this screen.
The format which appears in the edit box comes with "," at the head of the file records that are read. Make sure to keep this because it is used as the state area for storing individual set results to be described later.

(D) If the check box for [Execute From Cursor Line] is activated, execute the setting from the cursor line in the edit box.

Nickname Batch Setting is executed from the key information of the disk array which comes after the cursor line. The lines above the key information of the disk array cannot identify the disk array and are therefore not executed.

(E) After content verification, click [Set disk array].

(F) Individual set results (see below) are displayed in the state area. If in error, take measures appropriate to the displayed content.

success:	Execution results are normal.
success (already):	Execution results are normal (Already set to the same name)
failure (invalid):	Parameter error
failure (i/o error):	Access error
failure (same name):	The same name exists.
failure (RPL pair):	Format change of LDs for which replication pairs are set

failure (busy):	Executing other processing
failure (communication):	Communication error
failure (protected):	ACOS-4 resource protection error
failure (SDV):	Format setting of a snapshot data volume
failure (BV/SV/LV):	Format change of BV, SV, or LV
failure (RPL Port):	Setting of the replication port
failure (nnh):	Other error(s) (nn: Internal error code)

If “failure (communication)” or “failure (nnh)” is displayed in the batch setting process, error may have been detected after I/O to/from the disk array is ended. Check the iSM client’s main screen to see if settings have been made for the disk array or not.

(1) For information on the ACOS-4 resource protection error, refer to Appendix G “ACOS-4 Resource Operation Guard”.

(2) SDV, BV, SV, and LV are volumes used for snapshots. For information about these volumes, refer to the “Snapshot User's Manual (Function Guide)” (IS030).

(G) By clicking the [Extract Error Line] button after completing the process, only the settings in error are extracted in the edit box.

(H) In the event of saving the definition file, select [Save As] from the dialog and then save it by specifying any file name from the save dialog.
Output to a file can be made except the state area at the head of the record

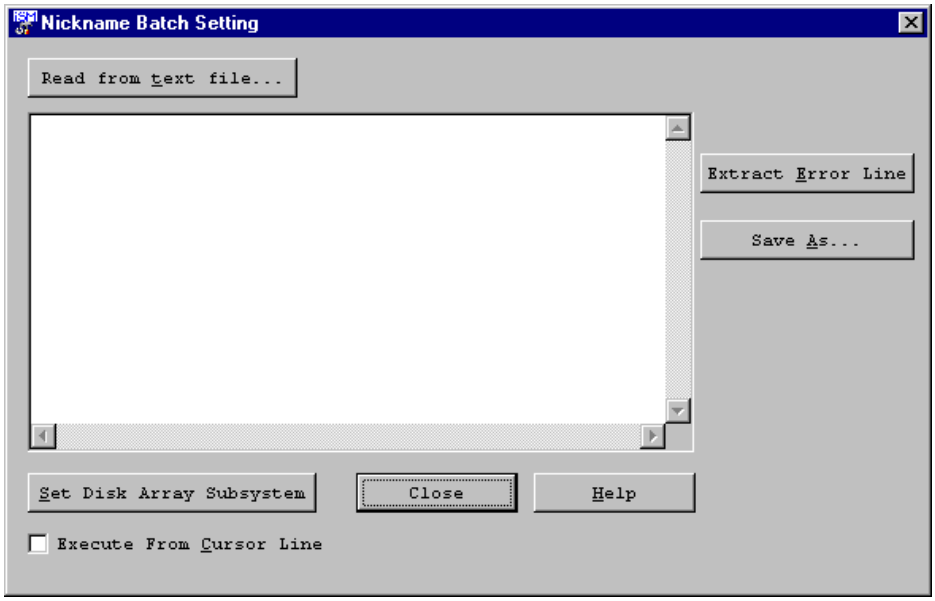


Figure 9-5 Nickname Batch Setting Dialog

9.2 Platform

The screen shown below (Configuration setting menu → Setting Disk Array → Platform) can be used to change the platform settings of the port.

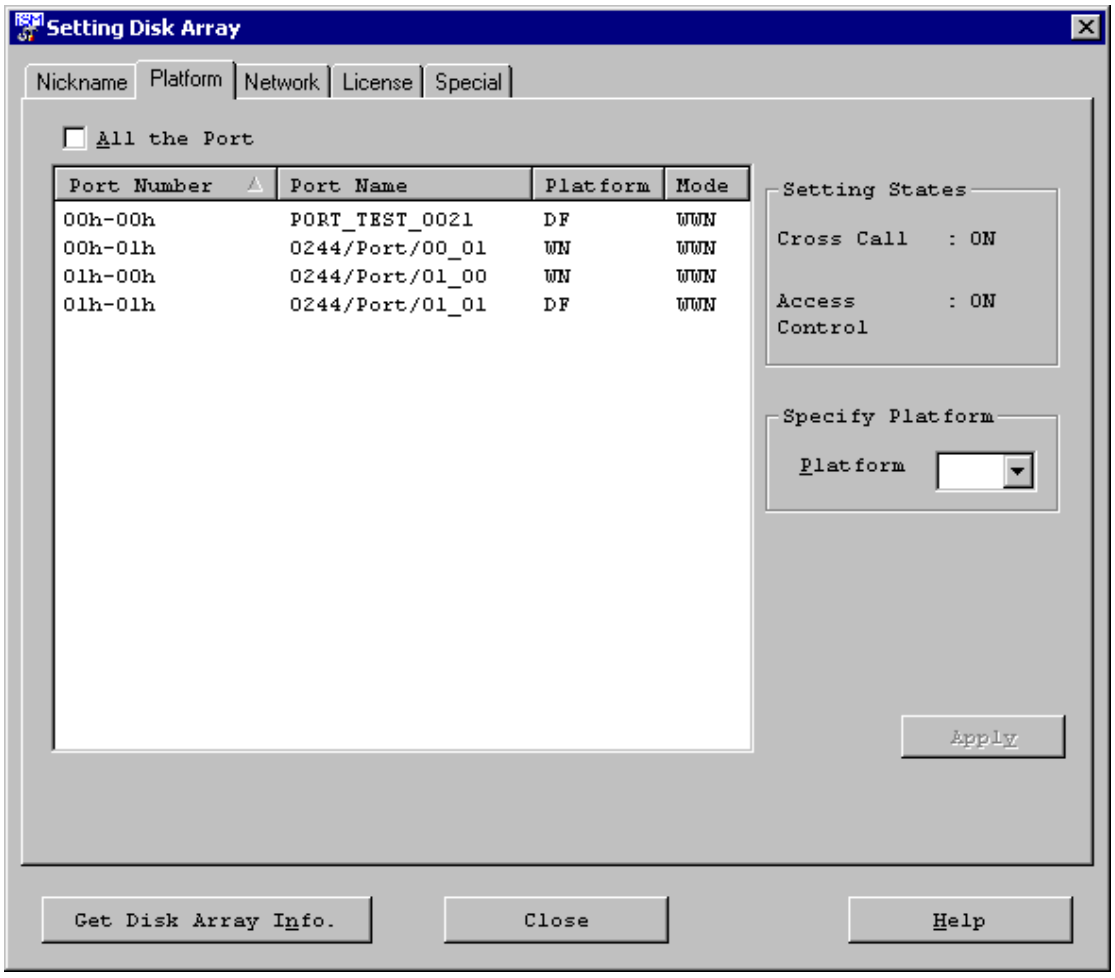


Figure 9-6 Setting Disk Array Dialog Box (With [Platform] Tab)

(1) Platform screen

The “Platform” pull-down menu displays a list of platforms that can be set for the disk array.

If a platform, which cannot be set for the target disk array, is specified, the system displays the following message and prompts you to enter a registered platform.

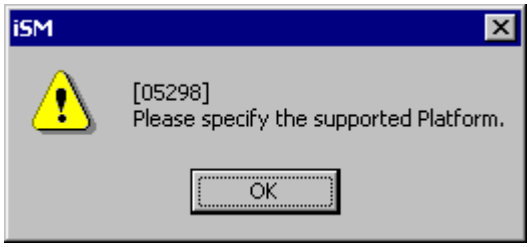


Figure 9-7 Message for Specification of Unsupported Platform

The initial value of the “Platform” pull-down menu is blank. If the [Apply] button is clicked in blank state, the system displays the following message and prompts you to specify a platform.

Figure 9-8 Message for No Specification of Platform

Up to two characters can be entered for the “Platform” pull-down menu.

9.3 Network

The screen shown below (Configuration setting menu → Setting Disk Array → Network) can be used to make various network settings

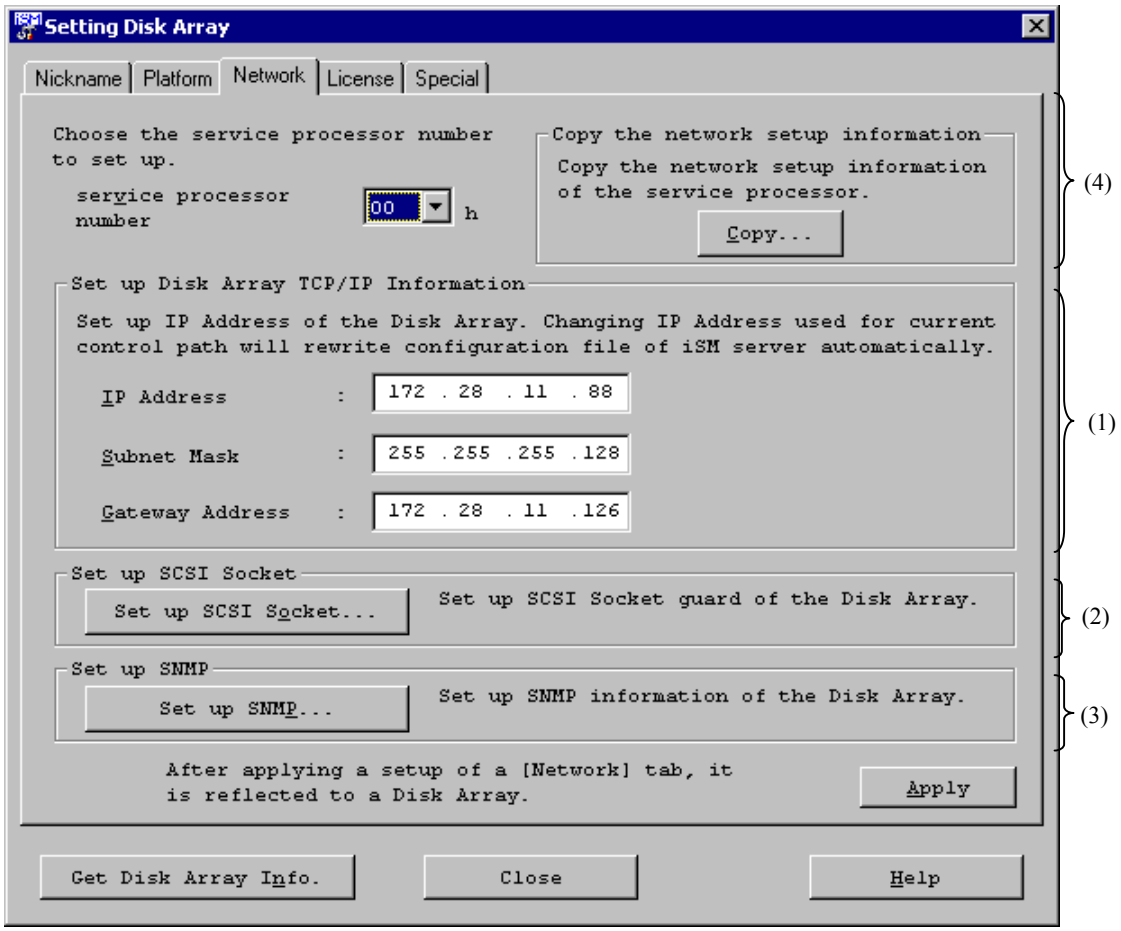


Figure 9-9 Setting Disk Array Dialog Box ([Network] Tab)

The warning dialog box in Figure 9-10 appears when the [Apply] button is clicked after the current IP Address is changed.

Figure 9-10 Warning Dialog Box

The setting change confirmation dialog box in Figure 9-11 appears when the [Apply] button is clicked without the current IP Address being changed in the dialog box in Figure 9-9 or when the [OK] button is clicked in the warning

dialog box in Figure 9-10.

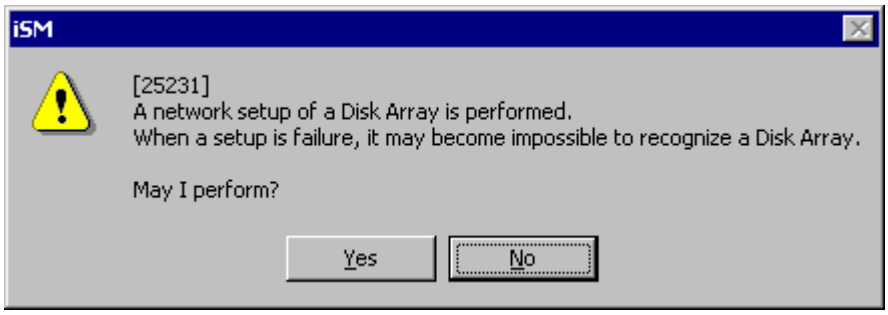


Figure 9-11 Setting Change Confirmation Dialog Box

Be careful that if the network setting of a disk array is changed incorrectly, the disk array becomes invisible from iSM.

After making a change of an IP address unused for a control path, you need to modify (re-set) the settings according to the change by using Environment Settings on the iSM server.

(1) Set up Disk Array TCP/IP Information

Specify the IP (Internet Protocol) of the disk array. The current value is displayed before the IP Address is changed.

(2) Set up SCSI Socket

Specify the iSM server that monitors the target disk array through the Ether path.

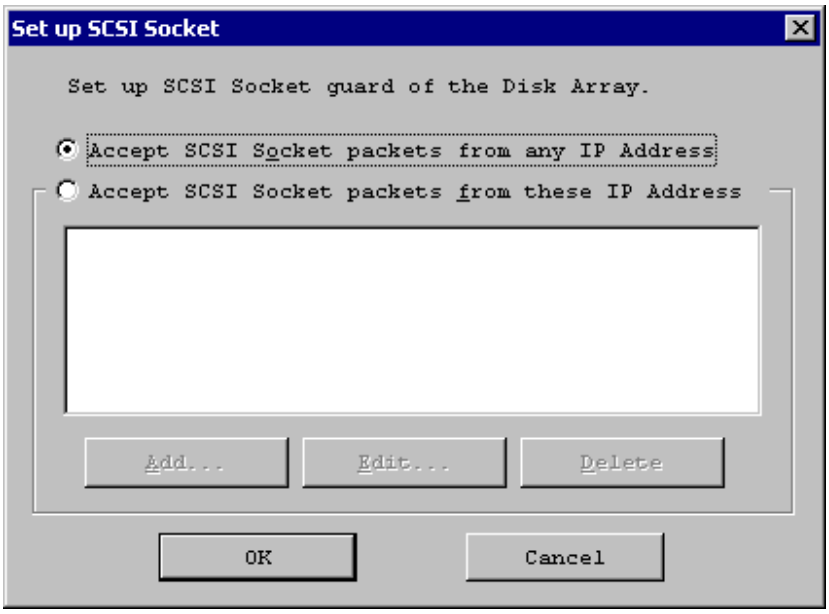


Figure 9-12 Set up SCSI Socket Screen

- Accept SCSI Socket packets from any IP Address
  The target disk array can be monitored by any of the iSM servers connected on the network on which the disk array is connected.

- Accept SCSI Socket packets from these IP Address
  The target disk array can be monitored by only the IP-address-registered one of the iSM servers connected on the network on which the disk array is connected.

To specify the IP Address of an iSM server, click the [Add] button. The Add IP Address screen in Figure 9-13 appears.

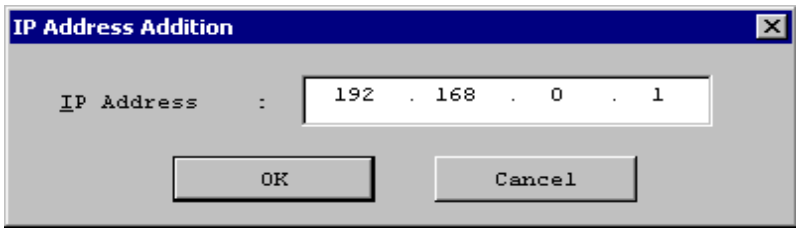


Figure 9-13 IP Address Addition Screen

To edit an IP Address, select the IP Address of an added iSM server from the list on the “Set up SCSI Socket Screen”, and click the [Edit] button. The Edit IP Address screen in Figure 9-14 appears.

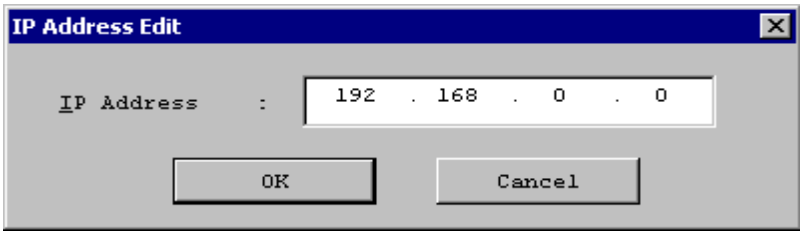


Figure 9-14 IP Address Edit Screen

To delete an IP Address, select the IP Address of an added iSM server from the list on the “Set up SCSI Socket Screen”, and click the [Delete] button.

(3) Set up SNMP

Set the SNMP (Simple Network Management Protocol) information of the disk array.

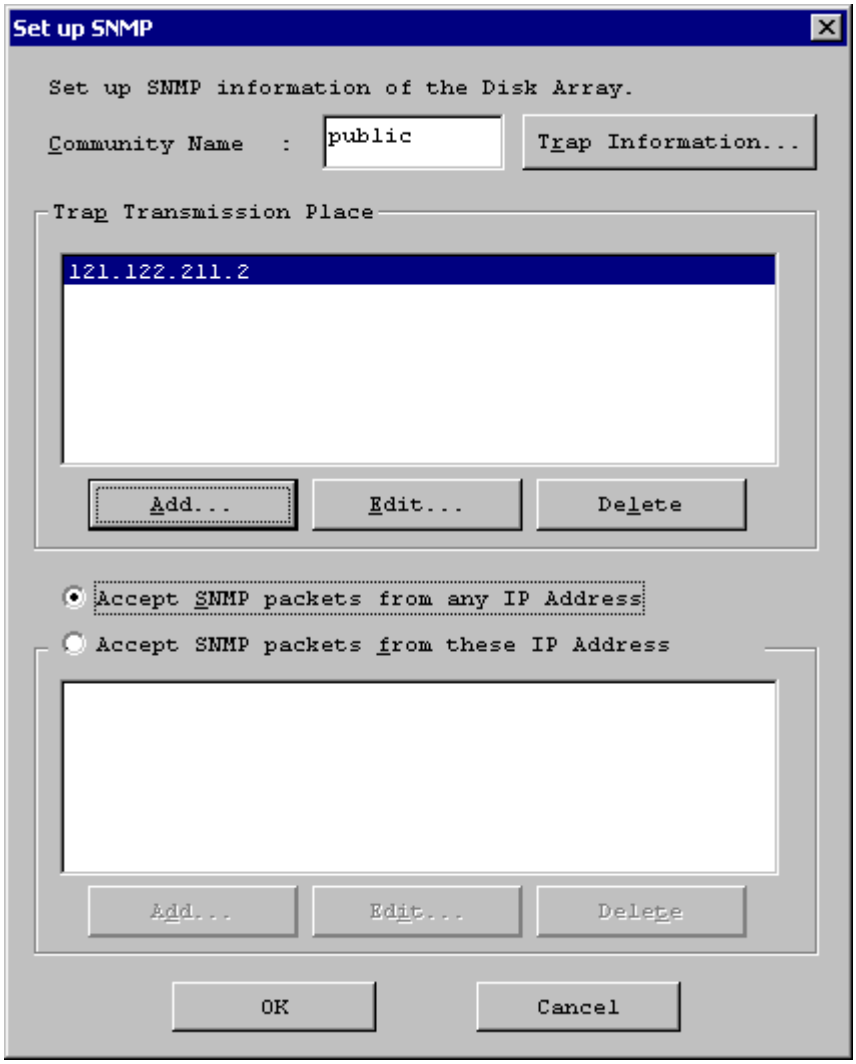


Figure 9-15 Set up SNMP Screen

- Community Name

  Specify a community name with up to 62 characters (ASCII characters).

- Trap Information button

  "Trap Information screen (Figure 9-16)" appears. Register trap information on the screen. Enter each trap information item with up to 79 characters (ASCII characters).

- Trap Transmission Place

  The system sends trap information to the registered IP Address.

- Accept SNMP packets from any IP Address

  The system accepts SNMP requests from all hosts having requests.

- Accept SNMP packets from these IP Address

  The system accepts SNMP requests from the registered IP Address.

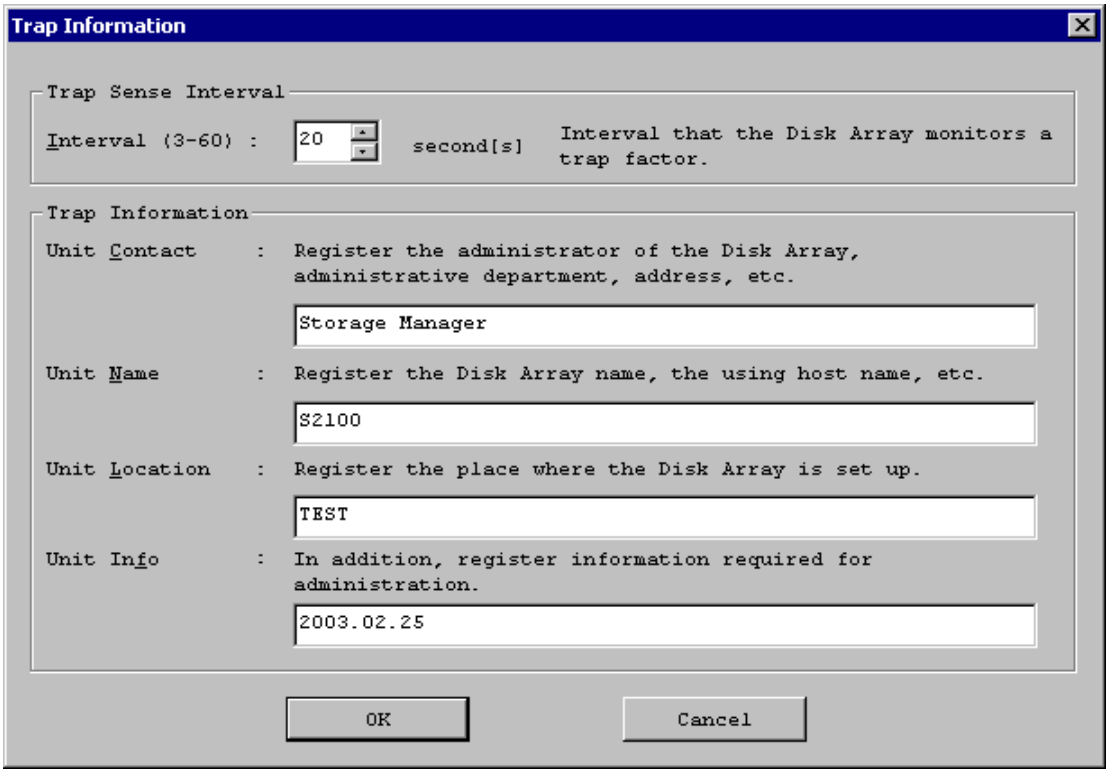


Figure 9-16 Trap Information Screen

Trap Sense Interval: Set an interval at which the disk array monitors the causes of traps.

Unit Contact: Enter administrator's information such as the disk array's administrator, management department, or where to contact.

Unit Name: Enter the disk array name or the name of the host to be used.

Unit Location: Enter the location where the disk array is installed.

Unit Info: Enter other information necessary for management.

For the S100/S1200/S1300/S2200/S2300 disk array, set the following values with up to 40 characters.

- Community Name
- Unit Contact
- Unit Name
- Unit Location
- Unit Info

(4) Copy the network setup information

If the disk array contains more than one Service Processor, the network settings of a Service Processor can be copied into a selected Service Processor.

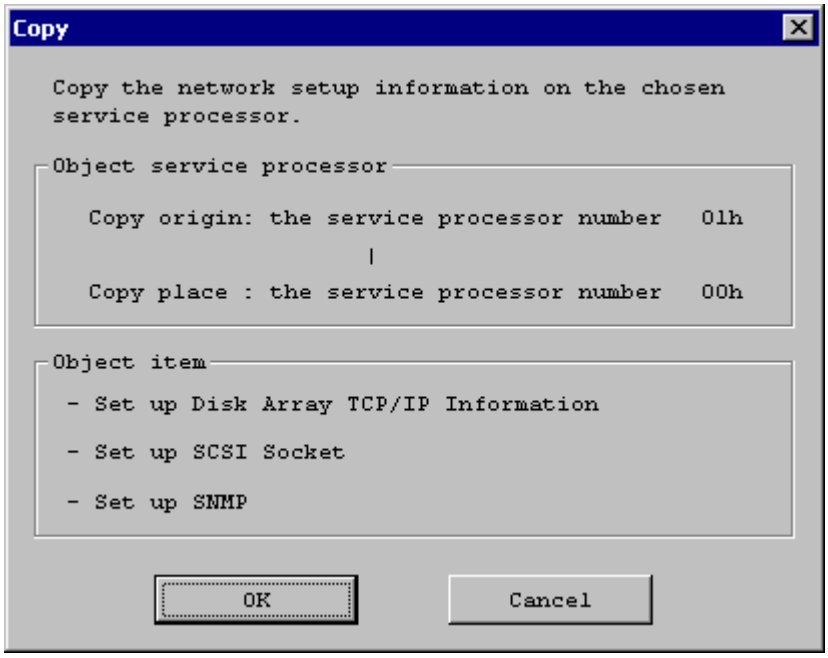


Figure 9-17 Copy Screen

9.4 License

The screen below is provided to unlock the license of a purchased product.

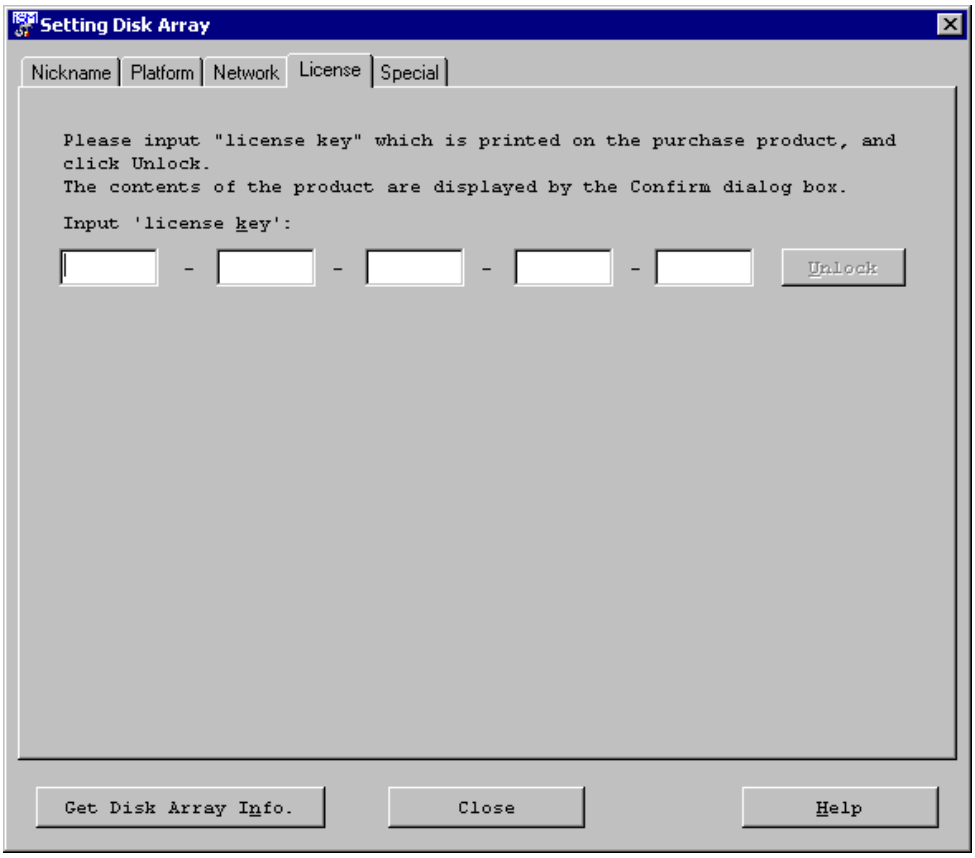


Figure 9-18 Setting Disk Array Dialog Box (License)

Enter the license key, which is provided with the purchased product, with 30 characters (6-6-6-6-6) in half size, and click the [Unlock] button.

The contents of the product of which license is to be unlocked are displayed.

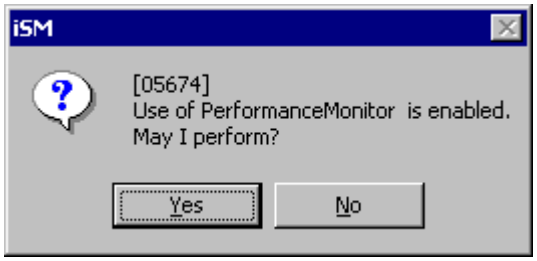


Figure 9-19 Product Contents Confirmation Screen

Click the [Yes] button to unlock the license.

If the license has been unlocked, the message in Figure 9-20 is displayed.

Figure 9-20 Message Indicating that the License Has Already Unlocked

If the license for DynamicDataReplication is unlocked for the first time in the 2000 series disk array (not including S2400), the disk array needs to be restarted. If it is upgraded, the disk array does not need to be restarted.

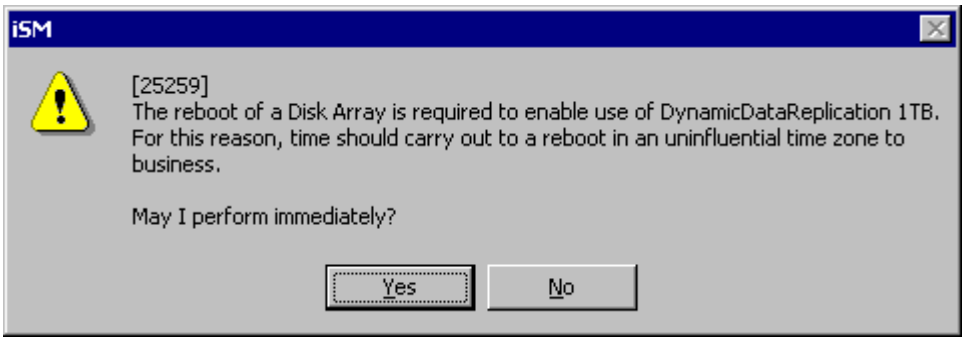


Figure 9-21 Disk Array Restart Message

9.5 Setting Disk Array Time

(1) Special screen

The screen shown below (Configuration setting menu → Setting Disk Array → Special) can be used to set the disk array time.

You can also make various settings by activating each checkbox (such as Cross Call, Spare, and Expand LUN) to enable them and then clicking the [Apply] button at lower right. Moreover, immediately after the screen has been displayed or after the setting has been made, current settings for the disk array are activated through radio buttons.

For S400/S1400/S2400/S2800, refer to Figure 9-23.

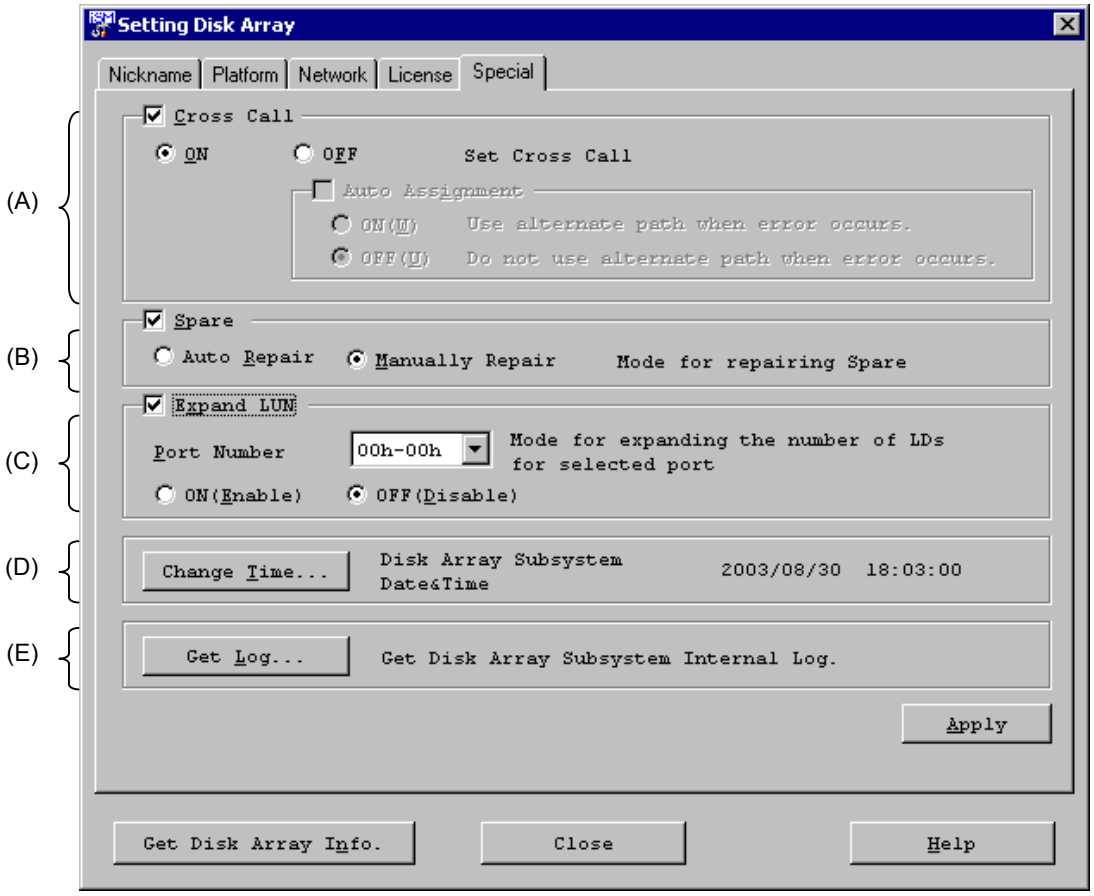


Figure 9-22 Special Screen

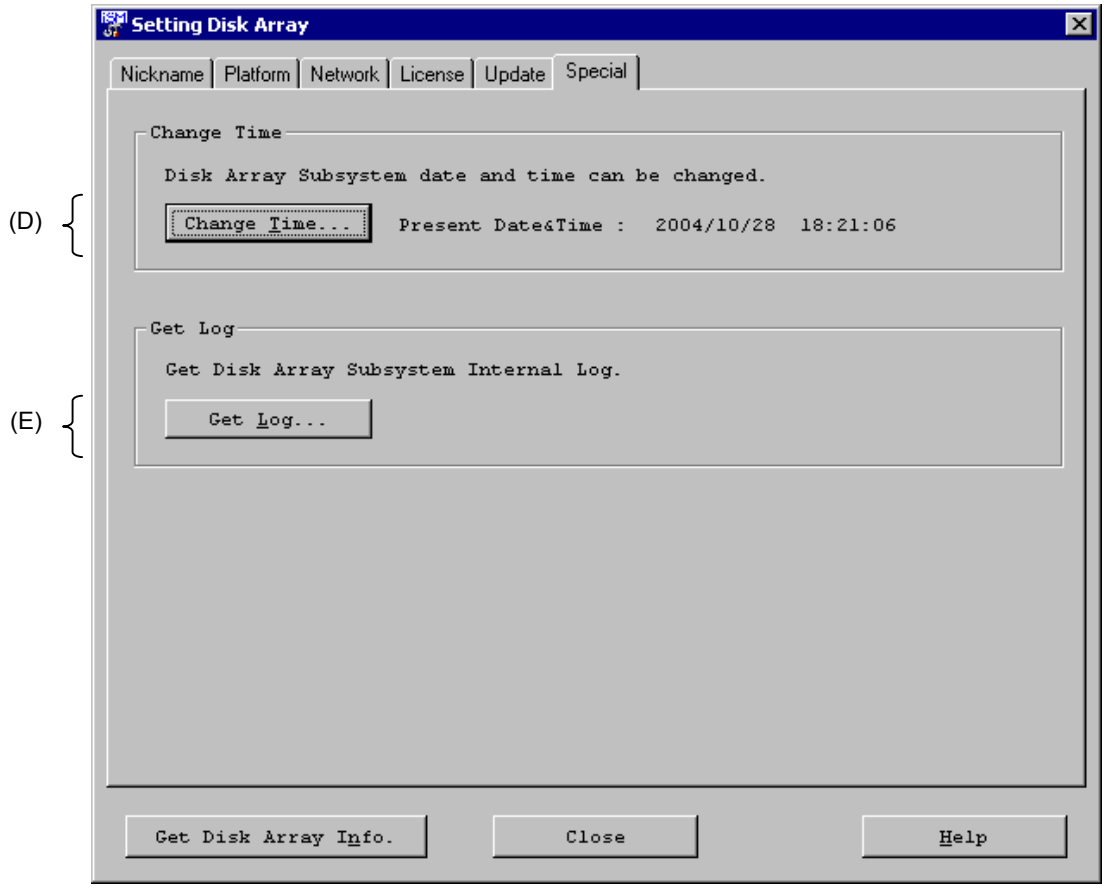


Figure 9-23 Special Screen (S400/S1400/S2400/S2800)

(A) Cross Call

Refer to 8.5.1 "Cross Call and Auto Assignment".

(B) Spare

Refer to 8.3.3 "Spare Rebuilding Mode".

(C) Expand LUN

Refer to 0 "

Expand LUN".

(D) Change Time

Can change the disk array time.

If “Set the Date and Time of Disk Array Subsystem according to server Date&Time of Server” is selected, the date/time of the iSM server monitoring the disk array is set. When “Set the Date and Time of Disk Array Subsystem manually” is activated, the disk array date can be changed to arbitrary date. However, this is not possible for automatic setting.

Moreover, for the information on Auto/Manual setting change, refer to the “User's Manual” or “User’s Manual (UNIX)” in accordance with your OS.

(E) Get Log

Refer to 9.6 "Getting Log in the Disk Array".

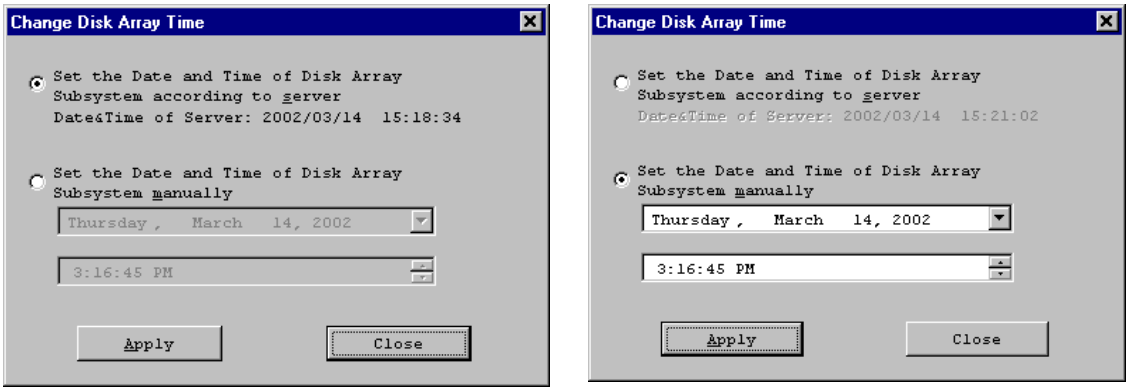


Figure 9-24 Change Disk Array Time Dialog

9.6 Getting Log in the Disk Array

Outputs the internal log data in the disk array to any file.

Click this button to output the check message as shown below.

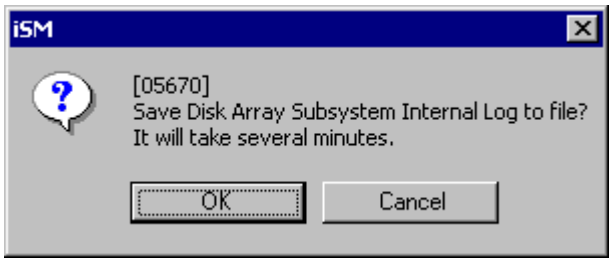


Figure 9-25 Internal Log Data Output Check Message

Here, click the [OK] button to display the output destination Save As dialog as shown below.

Specify any file name and then click the [Save] button to start saving file.

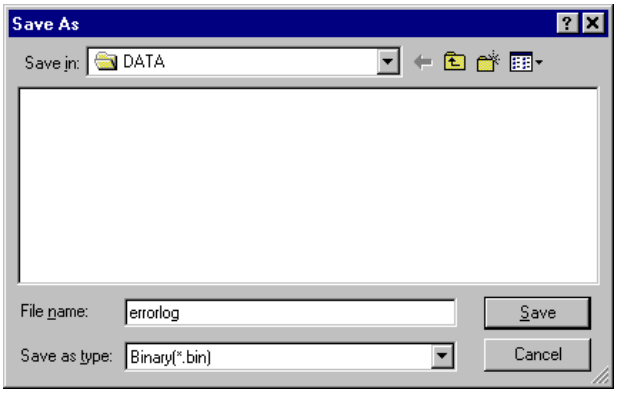


Figure 9-26 Save As Dialog

9.7 Getting Configuration Information

The configuration information can be acquired in either text or CSV format.

9.7.1 Getting Configuration Information in Text Format

Acquire the configuration information in text format. To acquire the configuration information in text format, follow the procedure described below.

(1) Operation

Clicking [Get Configuration Setting Info.] button in the Configuration [Setting Mode] menu (Figure 8-21) displays the get configuration information confirmation dialog.

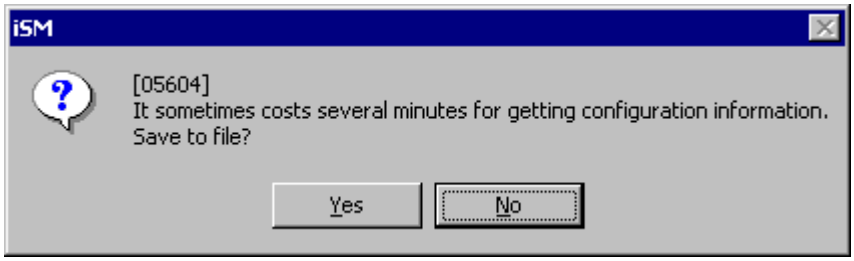


Figure 9-27 Get Configuration Information Confirmation Dialog

Clicking the [Yes] button in the get configuration information confirmation dialog displays the file format selection dialog.

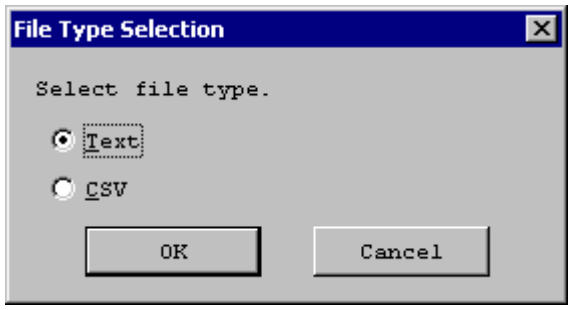


Figure 9-28 File Format Selection Dialog

Check that the [Text] radio button (default) is checked in the file format selection dialog, and click the [OK] button. The save file confirmation dialog is displayed.

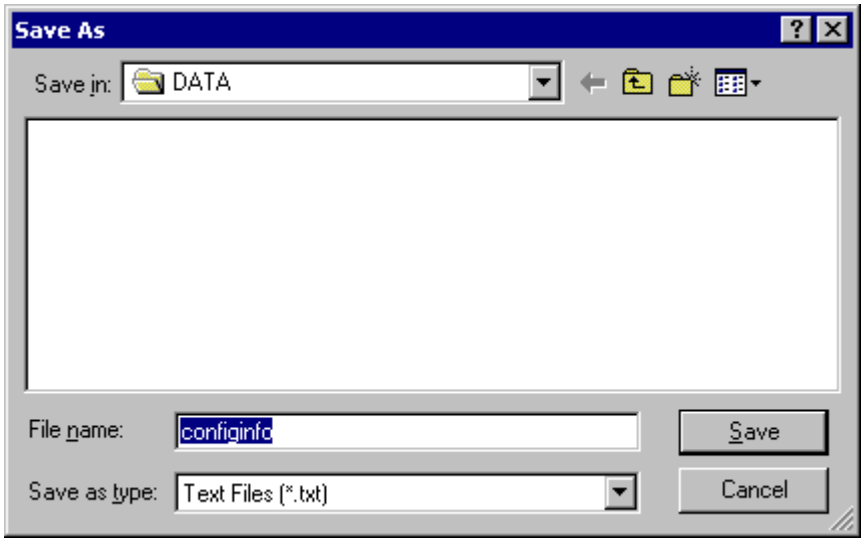


Figure 9-29 Save File Confirmation Dialog

Specify a file name and click the [Save] button.

The configuration information is acquired from the disk array and saved in text format. During the acquisition of the configuration information, the following dialog is displayed.

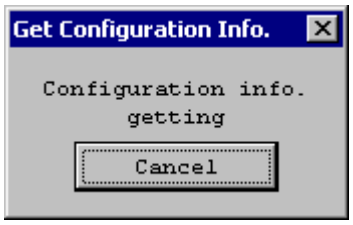


Figure 9-30 Get Configuration Information Progress Dialog

When the information has been saved to the file, a message is displayed notifying you of the completion of the acquisition of the configuration information.

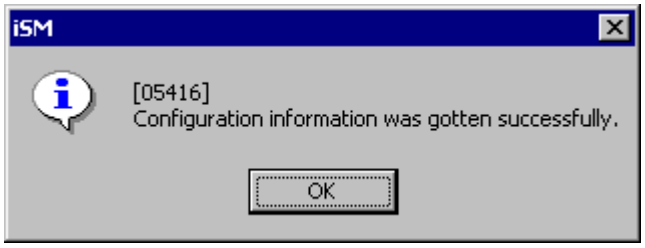


Figure 9-31 Get Configuration Information Completion Message

9.7.2 Getting Configuration Information in CSV Format

Acquire the configuration information in CSV format. To acquire the configuration information in CSV format, follow the procedure described below.

(1) Operation

Clicking [Get Configuration Setting Info.] button in the Configuration [Setting Mode] menu (Figure 8-21) displays the get configuration information confirmation dialog (Figure 9-27).

Clicking the [Yes] button in the get configuration information confirmation dialog displays the file format selection dialog (Figure 9-28).

Check the [CSV] radio button in the file format selection dialog, and click the [OK] button. The Save As dialog is displayed.

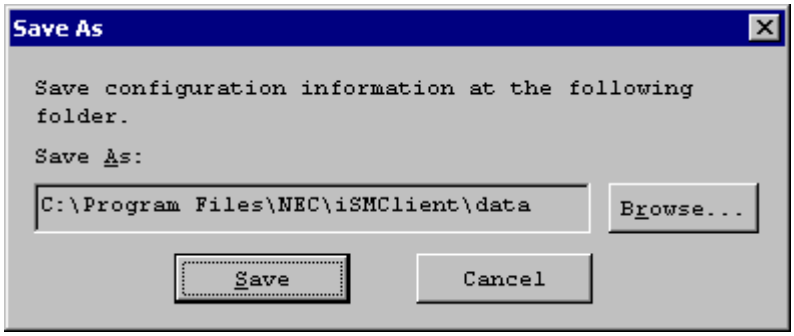


Figure 9-32 Save As Dialog

Specify the destination folder and click the [Save] button.

The default destination folder is the DATA folder immediately below the client installation folder. Because you will get several files of CSV information, create a folder whose name indicates the date and time and save the files immediately below that folder.

Example: April 8, 2003, 8:00 p.m.
File name: 200304082000

To change the destination folder, click the [Browse] button and use the Browse for Folder dialog.

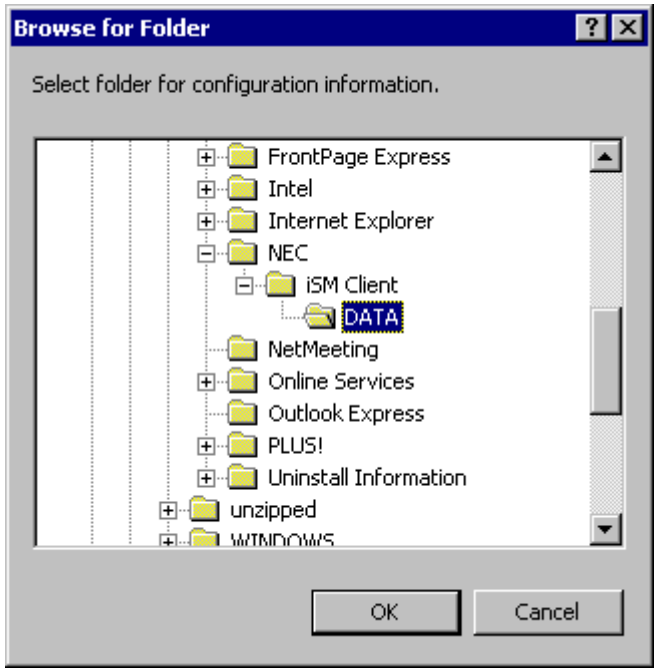


Figure 9-33 Browse for Folder Dialog

When the [Save] button is clicked, the configuration information is acquired from the disk array and saved in CSV format. During the acquisition of the configuration information, a message dialog (Figure 9-30) is displayed indicating that the configuration information is being acquired.

When the information has been saved to the file, a message is displayed notifying you of the completion of the acquisition of the configuration information

Figure 9-34 Get Configuration Information Completion Message

9.8 Replication Pair Batch Setting

Replication Batch Setting refers to setting replication, which is used for replications, collectively using the definition file. For information on the replication functions, refer to the "Data Replication User's Manual (Function Guide)".

(1) Execution procedure

When Replication Batch Setting, click the [Replication Setting] button from "Configuration- [Setting Mode]" to display the Replication Batch Setting dialog. An example of the Replication Batch Setting screen is shown in Figure 9-35.

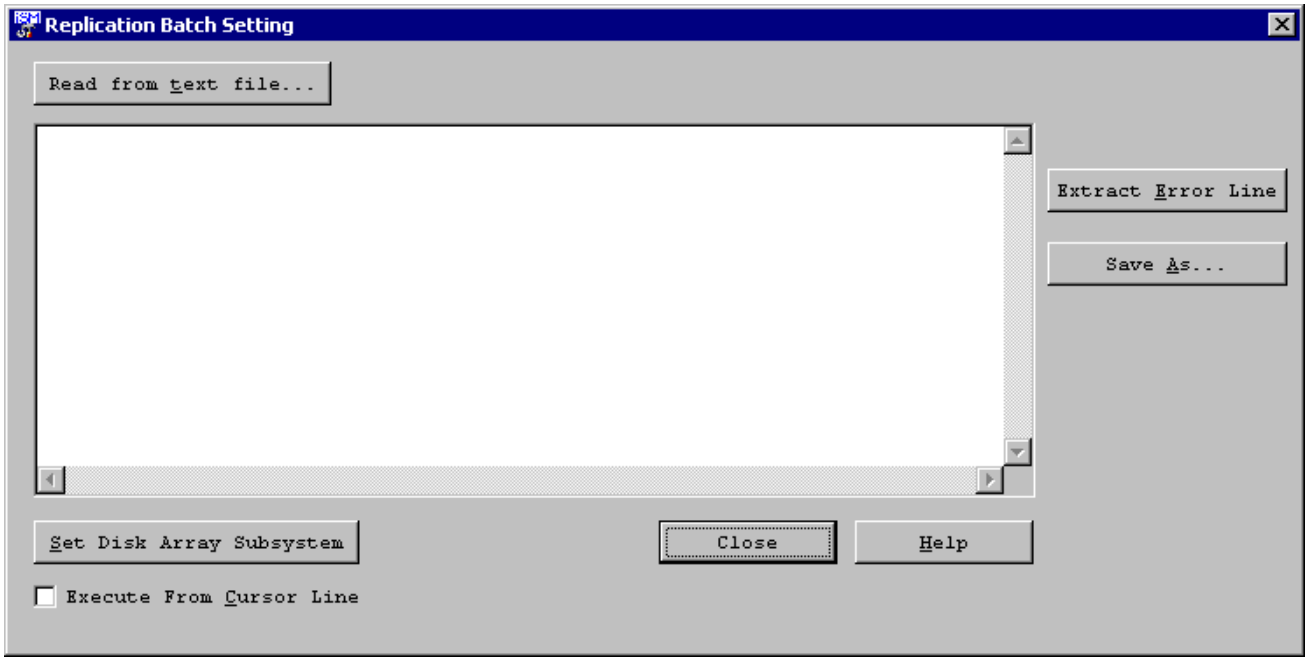


Figure 9-35 Example of Replication Batch Setting Screen

The screen above is operated in the same manner as described in 9.1.5 "Nickname Batch Setting". However, the detailed definitions of the file format and execution results are different.

For information on the file format, refer to Appendix F.2 "Pair Setting File". The execution results are listed below.

success:	Successfully completed.
success(already):	Already set.
failure(already):	Failed, because the volume is already registered with another ATgroup.
failure(already RV):	Failed, because this is already paired with another MV as an RV.
failure(ATgroup invalid):	Failed, because the ATgroup name is invalid.
failure(ATgroup not exist):	Failed, because this ATgroup does not exist.
failure(ATgroup not separated):	Failed, because this ATgroup is not separated.
failure(ATgroup over):	Failed, because no more ATgroup can be defined.

failure(DDR license locked):	Failed, because the DynamicDataReplication license is not canceled.
failure(DDR not supported):	Failed, because the DynamicDataReplication is not supported.
failure(Disk array not exist):	Failed, because the disk array does not exist.
failure(DR not supported):	Failed, because RemoteDataReplication/DisasterRecovery is not supported.
failure(DR license locked):	Failed, because the RemoteDataReplication/DisasterRecovery license is not canceled.
failure(Freeze):	Failed, because the disk array is freezing.
failure(invalid):	Failed, because the description of the batch setup file is invalid.
failure(LINK path):	Failed, because all link paths between units are faulty.
failure(MV is dRV):	Failed in paring the DDR, because the MV is already the RV of the DDR.
failure(MV is freeze):	Failed, because the MV is freezing.
failure(MV is LV):	Failed, because the MV is classified as LV.
failure(MV is monitoring stop):	Failed, because the MV is monitoring stop.
failure(MV is reserved vol):	Failed, because the MV is a reserve group.
failure(MV is SDV):	Failed, because the MV is classified as SDV.
failure(MV is SV):	Failed, because the MV is classified as SV.
failure(MV not exist):	Failed, because the volume (MV) does not exist.
failure(MV not managed):	Failed, because the MV is not managed.
failure(MV not pair):	Failed, because the volume is not paired.
failure(MV not primary vol):	Failed, because the specified MV is not a PV (MV).
failure(MV not RDR):	Failed, because the specified MV is not RDR-paired.
failure(monitoring stop):	Failed, because the disk array is monitoring stop.
failure(not link):	Failed, because the disk arrays of the MV and RV are not linked.
failure(not separated):	Failed, because the status is not separated.
failure(not managed):	Failed, because the disk array is not managed.
failure(Pair loop):	Failed, because the pair layer will serve as a loop.
failure(Pair over):	Failed, because the MV cannot accept pair setting any more.
failure(RDR license locked):	Failed, because the RemoteDataReplication license is not canceled.
failure(RDR not supported):	Failed, because the RemoteDataReplication is not supported.
failure(RV is BV):	Failed, because the RV is classified as BV.
failure(RV is DDR MV):	Failed, because the RV is already the MV of the DDR.
failure(RV is freeze):	Failed, because the RV is freezing.
failure(RV is LV):	Failed, because the RV is classified as LV.
failure(RV is monitoring stop):	Failed, because the RV is monitoring stop.
failure(RV is reserved vol):	Failed, because the RV is a reserve group.
failure(RV is SDV):	Failed, because the RV is classified as SDV.
failure(RV is SV):	Failed, because the RV is classified as SV.
failure(RV not exist):	Failed, because the volume (RV) does not exist.
failure(RV registered ATgroup):	Failed, because the RV is already registered with an ATgroup.
failure(several same ATgroups):	Failed, because there are multiple ATgroups.
failure(different diskarray(RV)):	Failed, because the pair setting does not correspond to the RDR pair that is already registered with the ATgroup.
failure(same name):	Failed, because the same ATgroup name already exists.

failure(Vol capacity unmatch):	Failed, because the volume capacity does not match.
failure(Vol not exist):	Failed, because the volume does not exist.
failure(Vol not pair):	Failed, because the pair is already forcibly deleted.
failure(Vol OS type unmatch):	Failed, because the volume format does not match.
failure(Vol to ATgroup over):	Failed, because no more volumes can be registered with the ATgroup.
failure(nnh):	Other error (nnh: Internal error code)
failure(several RDR pairs):	Failed, because the volumes registered with the ATgroup cannot accept new disk array pair setting, or because a volume having multiple RDR pairs cannot be registered with the ATgroup.

As a replication setting file, it is possible to use the file which is output by using the “Save the pair setup information” function in “Replication Management”.

Chapter 10 Access Control Operations

This chapter describes Access Control operations.

10.1 Changing the Port Mode

Change the port mode on the following screen.

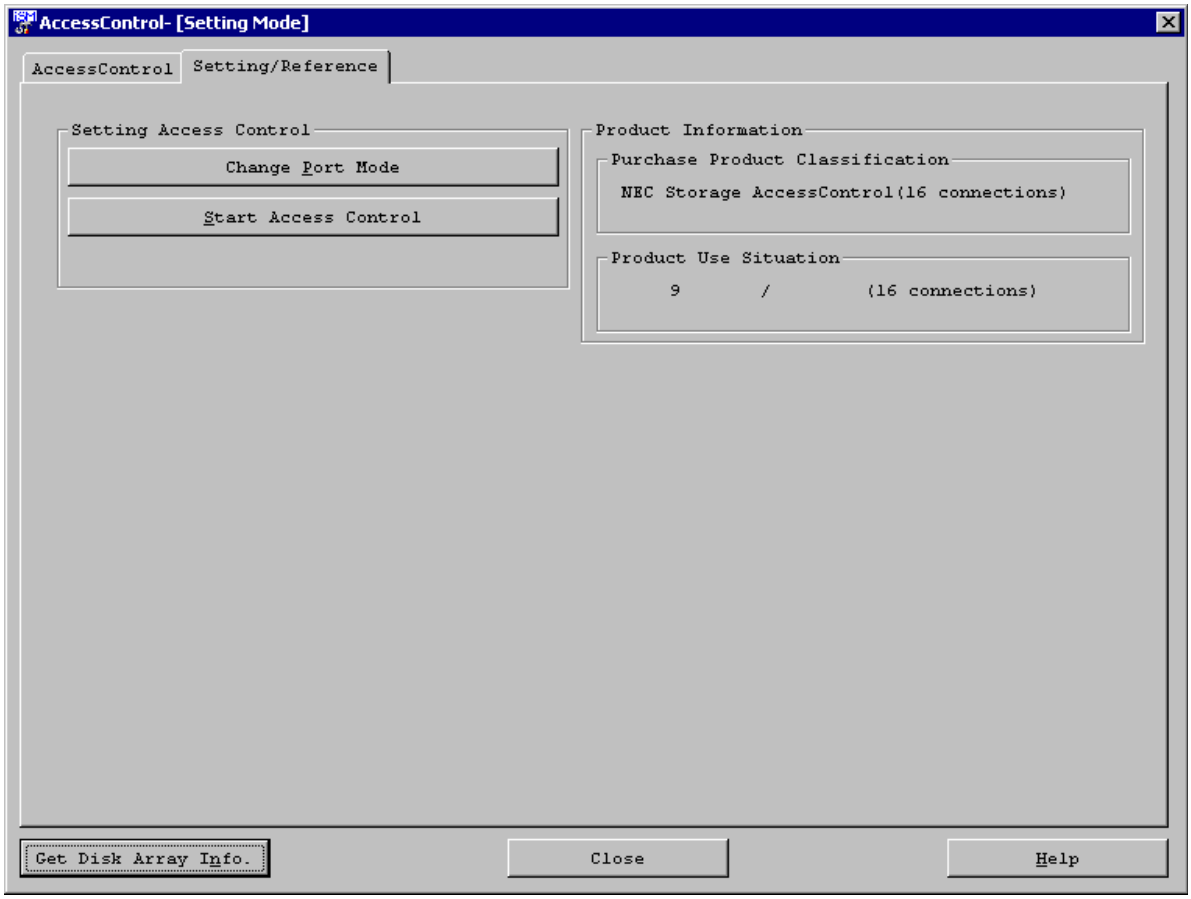


Figure 10-1 [Setting/Reference] Tab Screen

(1) [Change Port Mode] button

Clicking this button will display the mode of each port of the disk array on the "Change Port Mode" dialog screen, and change to the WWN mode and Port mode becomes possible. If you want to change a port in Port mode, which is already linked with an LD Set, into WWN mode, unlink the port from the LD Set and then change to the WWN mode.

The port number indicates "Director Number - Port Number".

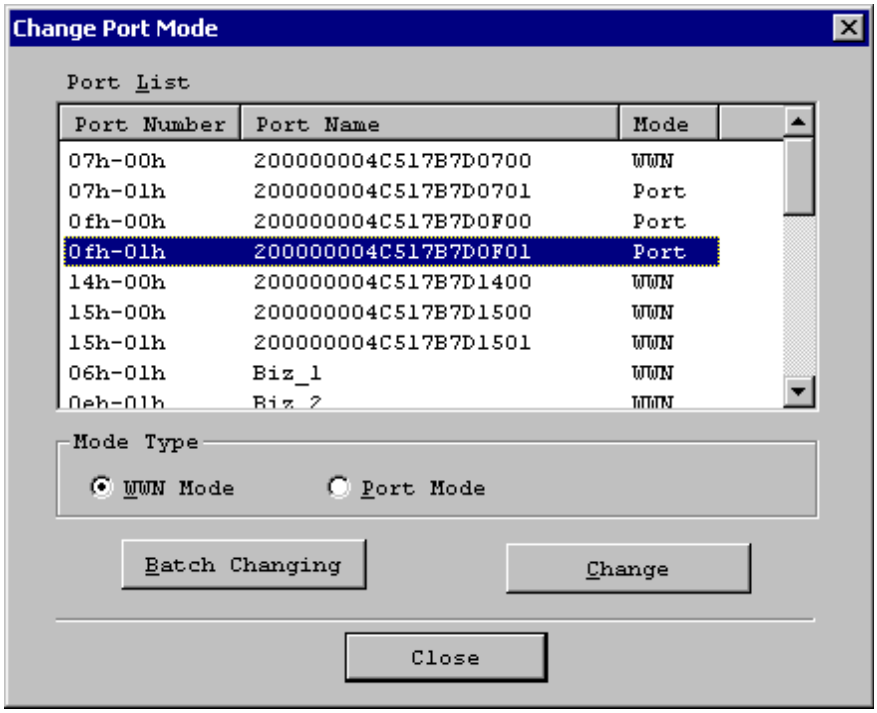


Figure 10-2 Change Port Mode

[Mode Type] Select a new port mode.
Ports cannot be changed from the WWN mode into Port mode in AccessControl(WWN)-applied disk arrays. (If the change is necessary, consult the maintenance person about it.)
- WWN Mode: Changes the port into WWN mode.
- Port Mode: Changes the port into Port mode.

[Batch Changing] Clicking this button sets all the ports into the mode selected in [Mode Type]. In this case, it is not necessary to select ports from the Port List.

[Change] Select a target port and click the [Change] button. The selected port is set into the mode selected in [Mode Type]. Multiple ports can be selected and set if the port list screen shows the same mode for them. In addition, a preliminary confirmation dialog appears to confirm the previous port mode and new port mode.

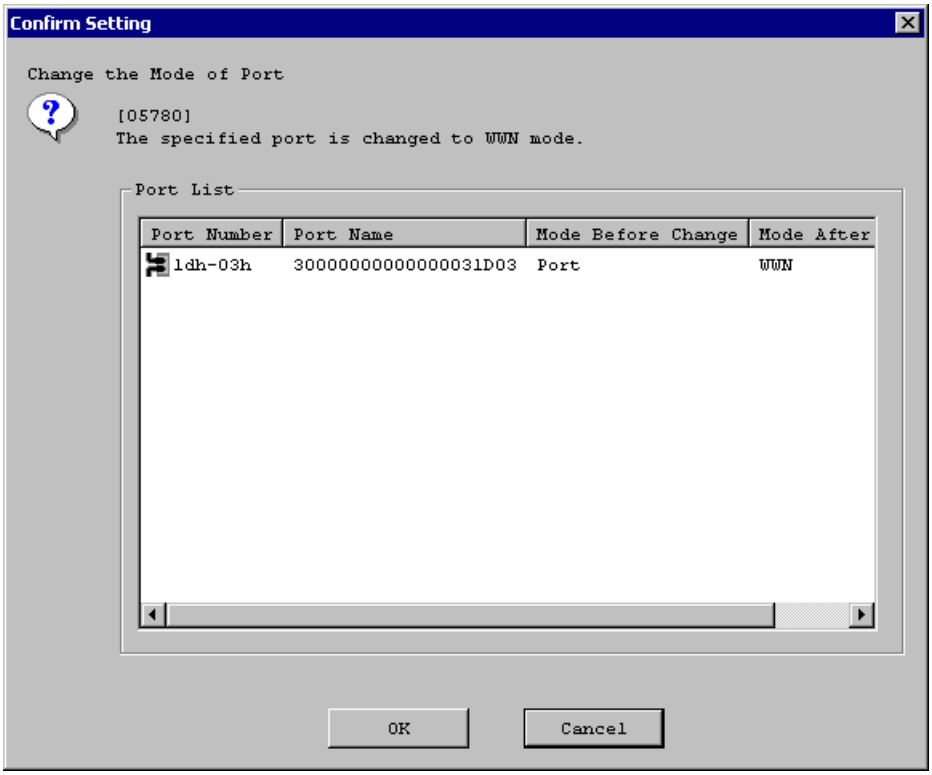


Figure 10-3 Preliminary Confirmation Dialog

The Change Port Mode operation immediately reflects on the Disk Array. Therefore, if settings are wrong, there is a possibility that accessing from the business server to the LD may not be possible. It is necessary to perform operation after checking the operation state. Furthermore, stop business or the business server according to the necessity.

10.2 Setting LD Sets

To set LD Sets, refer to the following descriptions.

Setting an LD Set (10.2.1)

Linking an LD Set and Path (10.2.2)

Changing the LD Set Name (10.2.3)

Deleting an LD Set (10.2.4)

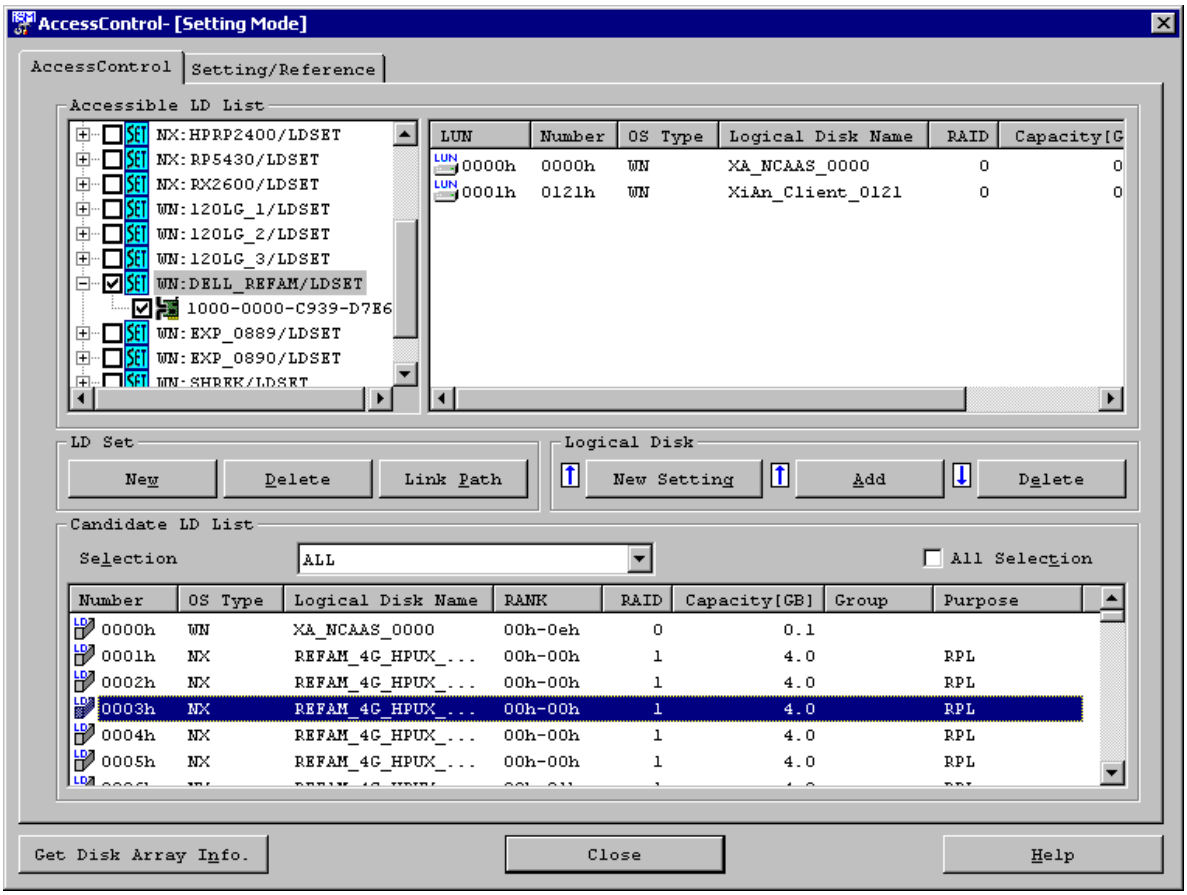


Figure 10-4 [AccessControl] Tab Screen

10.2.1 Setting an LD Set

Clicking the [New] button on the AccessControl tab screen (Figure 10-4) will display the following dialog screen, thereby a new LD Set can be created.

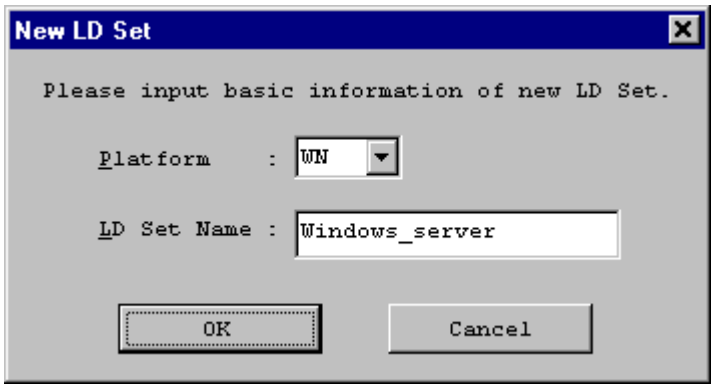


Figure 10-5 New LD Set

For LD Set, specify the platform of the business server that accesses a logical disk via the LD set.
A list of specifiable platforms is displayed.

The following platforms can be specified:

Table 10-1 Platforms

Platform	Description
A2	ACOS-2 system
AX	AIX system
CX	Solaris system
LX	Linux system
NX	HP-UX system
WN	Windows system

Furthermore, the LD Set name can be set by using arbitrary 16 characters including alphanumeric characters, "/" and "_".

However, when the combination of the Platform and the LD Set name have already been set to other LD Set, new settings are not possible.

Only a Platform and a name are set for a newly created LD Set. For the business server to recognize logical disks, it is necessary to set actual path information through [Link Path] and also assign logical disks.
A single LD Set is linked with each business server. Thus, the name of the business server to be connected to the port of the disk array to be linked or the name of a business server having WWPN should be specified for the LD Set name.

If the [New] operation fails, the error dialog screen showing the failure will be displayed.
When an operation request is in error, there is a possibility of inconsistency between the disk array setting information and the information administrated on the iSM client. Therefore, click [Get Disk Array Info.].

10.2.2 Linking an LD Set and Path

Selecting an LD Set and clicking the [Link Path] button on the AccessControl tab screen (Figure 10-4) will display the following dialog screen.

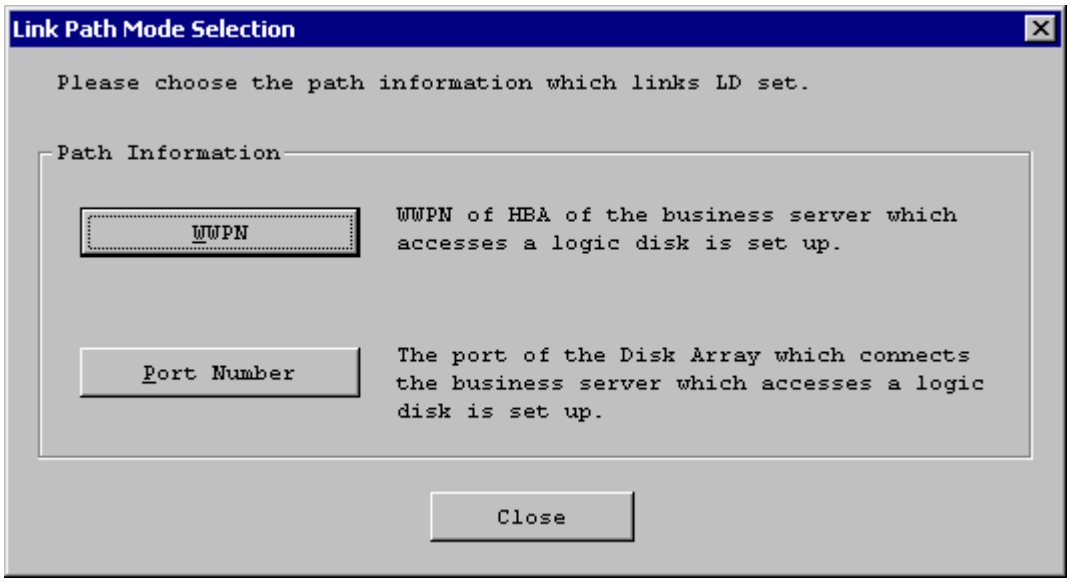


Figure 10-6 Path Information Selection

The [Link Path] button is enabled only when a single LD Set is selected from the tree view located in the Accessible LD List display area.

The linking of path information with an LD Set means the setting of the HBA's WWPN of the business server that actually accesses logical disks or the setting of the port (in the Port mode) of the disk array to which the business server is connected.

The WWPN (World Wide Port Name) set for the HBA of the business server is necessary for determining whether to permit access in the WWN mode in the [Path Link] dialog box.
The WWN (World Wide Name) consists of the WWNN (World Wide Node Name) and the WWPN (World Wide Port Name), and is allocated to the HBA (Host Bus Adaptor; also called FC controller) as ID code information inherent to the HBA. For information on the acquisition method, refer to the "Access Control User's Guide" for this disk array series.

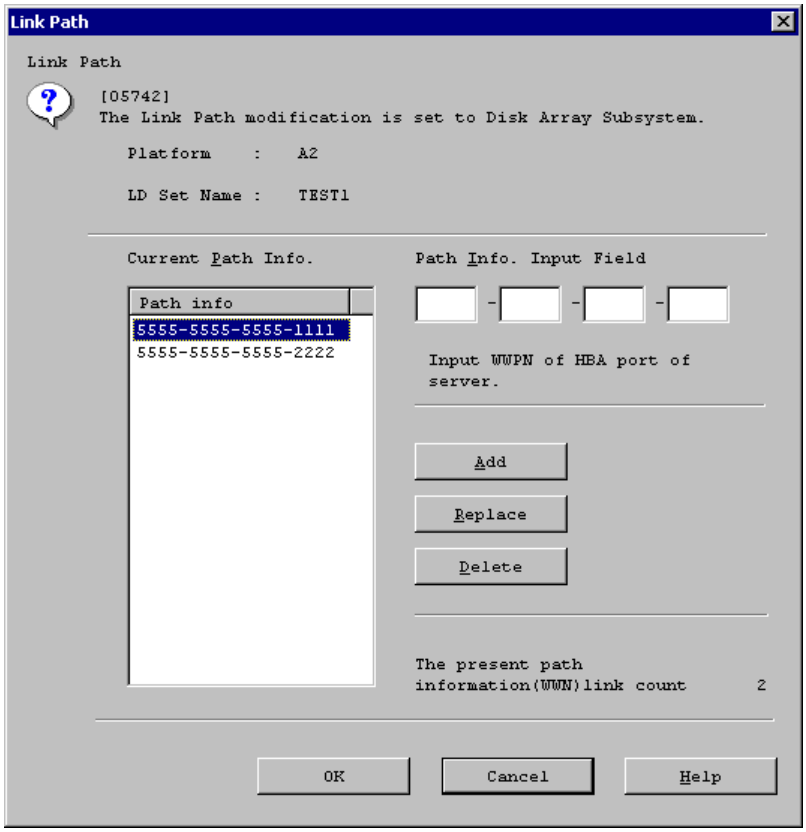


Figure 10-7 Linking of Path Information (WWPN)

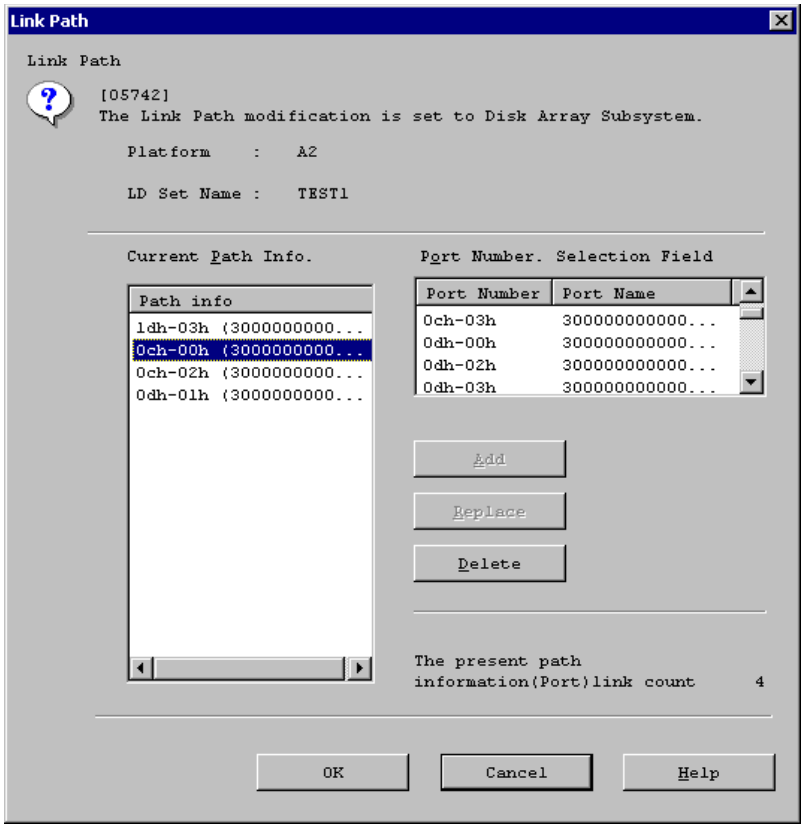


Figure 10-8 Linking of Path Information (Port Number)

On this dialog screen, the following operations are possible.

- Path Info Input Field
  Newly added or replaced path information is entered into this area. It is necessary to enter 16 single-bit, hexadecimal digit characters into this input field.

- Port Number Selection Field
  The port number to be newly added or to be replaced is selected in this field. Only ports in port number are displayed in the field.

- Current Path Info
  Displays path information current set for the disk array and path information which has been changed by operating each button on this dialog screen.

- [Add] button
  When new path information is entered into the "Path Info Input Field", clicking this button will add the entered path information to the last line of the "Current Path Info" display area.

  Select a target port number from "Port Number Selection Field" and click the [Add] button. The path information of the selected port number is added to the last line of the "Current Path Info" display area.

  Up to 64 pieces of path information can be set for one LD Set.

  To apply settings for the disk array, click the [OK] button.

When the [Add] button is clicked, the product purchase situation is checked. If the upper limit of the Path Count permitted for the product is reached in the Disk Array as a whole, an error dialog screen appears in this stage, which makes the linking impossible. Furthermore, a WWPN or port number linked with another LD Set cannot be registered dually for another LD Set. If an error message showing the situation, specify a different WWPN or port number.

- [Replace] button
  After entering new path information into "Path Info Input Field" and selecting Replace target path information from the "Current Path Info" display area, clicking this button will replace the path information selected in the "Current Path Info" display area with newly entered path information.

  Select a target port number from "Port Number Selection Field", select Replace target path information from the "Current Path Info" display area, and then click the [Replace] button. The path information of the selected port number is replaced by the path information selected from the "Current Path Info" display area.

Only a piece of path information can be selected at a time from the “Current Path Info” display area.
To apply settings for the disk array, click the [OK] button.

- [Delete] button
  Selecting Delete target path information from the “Current Path Info” display area and clicking this button will delete the selected path information from the “Current Path Info” display area.

  Only a piece of path information can be selected at a time from the “Current Path Info” display area.

  To apply settings for the disk array, click the [OK] button.

- [OK] button
  Clicking this button will display the operation confirmation message, and path information shown in the “Current Path Info” display area will be applied to the disk array.

The WWPN of path information can be set even when the set value is different from the WWPN of the business server HBA which actually accesses logical disks. Therefore, pay careful attention not to set a wrong value.

Application of path information immediately reflects on the Disk Array. Therefore, if setting information is wrong, there is a possibility that accessing from the business server may not be possible. Pay careful attention to this. Especially, when settings are wrong for deleting or replacing path information, the business server may suddenly stop recognizing the logical disk in use. It is necessary to perform operation after checking the operation state. Furthermore, stop business or the business server according to the necessity.

- [Cancel] button
  When changes made on this dialog screen are not set for the disk array, the following dialog screen will appear and the execution of the operation will be confirmed.

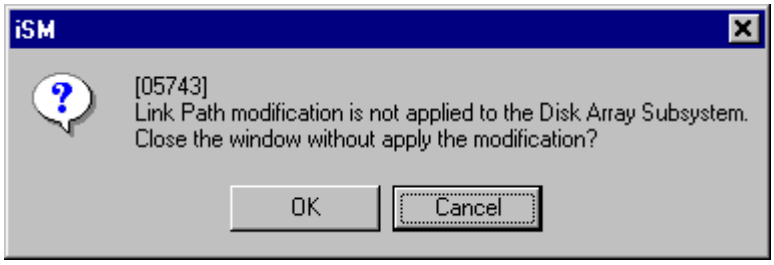


Figure 10-9 Confirmation Dialog Screen 4

- [Help] button
  Clicking this button will display the Help screen concerning the “Link Path” screen.

  If the [Link Path] operation fails, the error dialog screen showing the failure will be displayed.
  When an operation request is in error, there is a possibility of inconsistency between the disk array setting information and the information administrated on the iSM client. Therefore, click [Get Disk Array Info.].

10.2.3 Changing the LD Set Name

By clicking right-button after selecting LD Set, the pop-up menu appears allowing selection of name change of LD Set. Selecting the menu displays the LD Set name change screen.

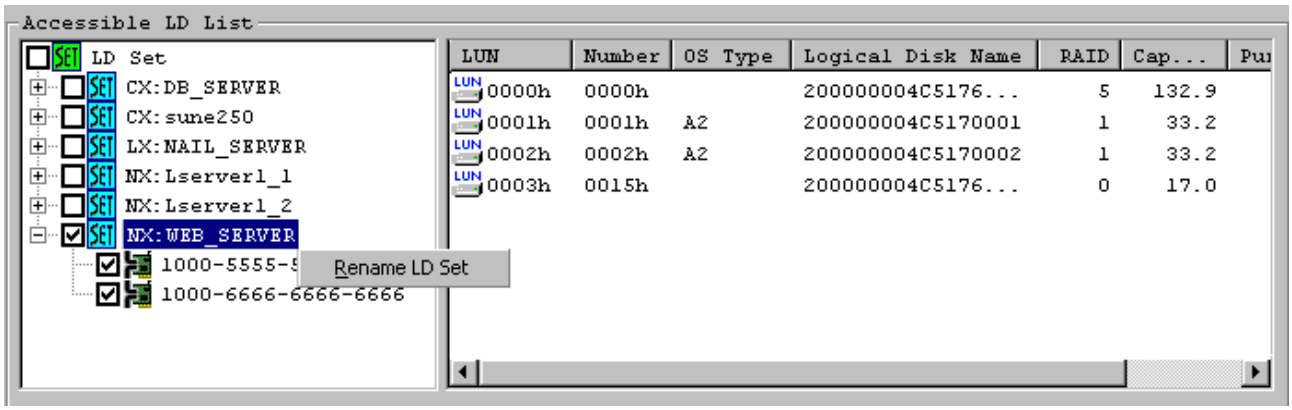


Figure 10-10 LD Set Pop-up Menu Screen

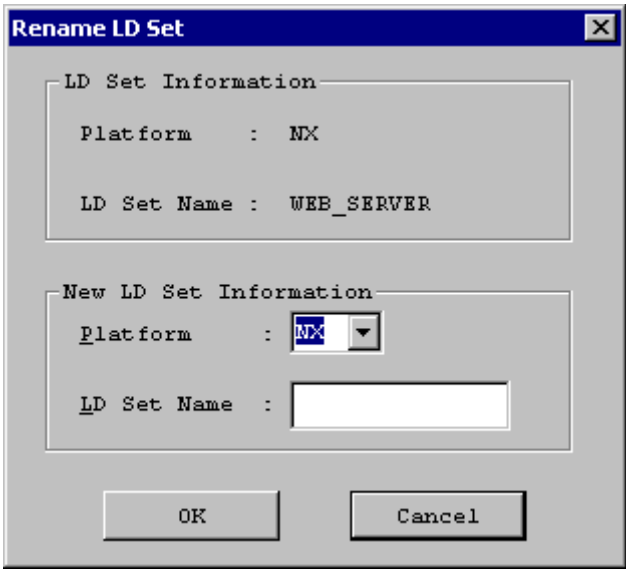


Figure 10-11 Rename LD Set Screen

For LD Set, specify the platform of the business server that accesses logical disks via the LD Set. Refer to Table 10-1 “Platforms” for the platforms that can be specified.

LD Set name can be specified with 16 characters including arbitrary alphanumeric characters, “/”, and “_”. However, if a combination of Platform and LD Set name has been set, new setting can no longer be made.

Clicking the [OK] button displays a dialog for preliminarily confirming the change. Clicking the [OK] button again on the dialog sets the new platform and LD set name to the disk array.

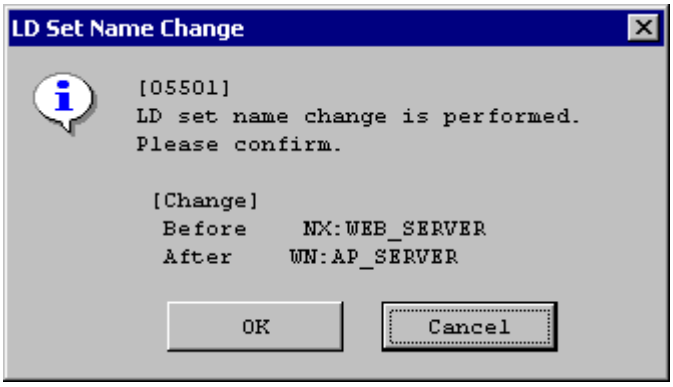


Figure 10-12 Preliminary Confirmation Dialog

When an LD Set is renamed, the disk array dynamically changes individual response control for each OS according to the platform information. Therefore, it is necessary to perform operation after checking the operation state. Furthermore, stop business or the business server according to the necessity.

10.2.4 Deleting an LD Set

Select an LD Set from the tree view located in the Accessible LD List display area and then click [Delete] button to delete the LD Set.

The following selection is available for the LD Set.

- Selection of treetop LD Set item
- Selection of single LD Set
- Selection of multiple LD Sets

Clicking the [Delete] button displays the following dialog for confirming the deletion:

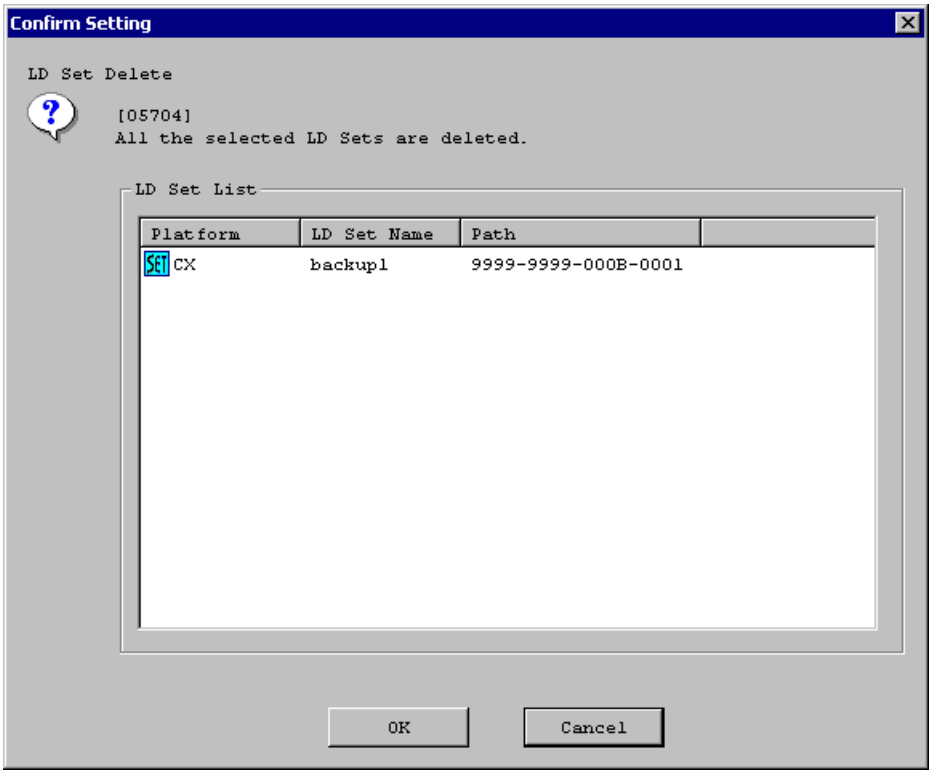


Figure 10-13 Preliminary Confirmation Dialog

By deleting an LD Set, the LD Set, logical disk information assigned to the LD Set and path information linked to the LD Set are deleted.

Deletion of the LD Set immediately reflects on the Disk Array. Therefore, if Delete operation is wrong, the business server suddenly stops recognizing the logical disk in use. It is necessary to perform Delete operation after checking the operation state. Furthermore, stop business or the business server according to the necessity

If the [Delete] operation fails, the error dialog screen showing the failure will be displayed.

When an operation request is in error, there is a possibility of inconsistency between the disk array setting information and the information administrated on the iSM client. Therefore, click [Get Disk Array Info.].

10.3 Assigning a Logical Disk

10.3.1 Assigning a Logical Disk Newly

When setting permission of access from the business server to logical disks, select LD Sets of a desirable business server from the tree view in the Accessible LD List display area. Then, select New Setting target logical disks from the [Candidate LD List] display area, and click [New Setting] button.

Assignment of logical disks by using the [New Setting] button invalidates the current assignment state of logical disks assigned to the LD Set and newly assigns the logical disks.

Logical disks can be assigned to multiple LD Sets.

A link-volume cannot be assigned to LUN 0.

Clicking the [New Setting] button will display the “LD Setting” dialog screen shown below.

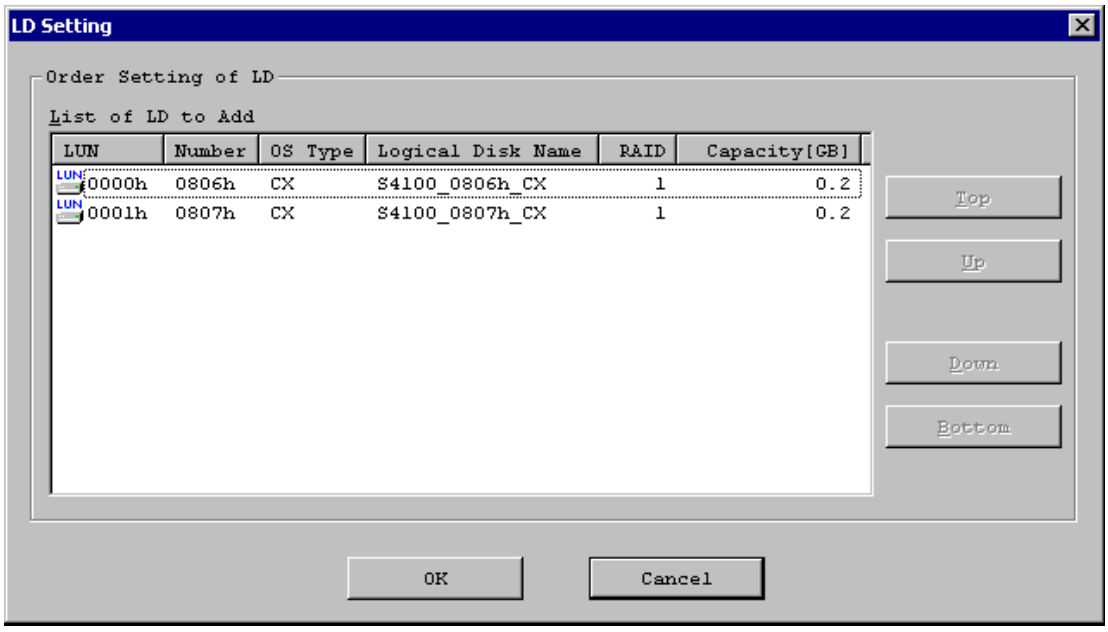


Figure 10-14 LD Setting

Logical disks to be modified are listed in the [Candidate LD List] display area.

Logical disk information displayed on the “LD Setting” dialog screen is as follows:

LUN
: LUN to which newly added, movable logical disks are assigned

Number

OS Type

Logical Disk Name

RAID

Capacity

On the “LD Setting” dialog screen, the following buttons are operable.

Moreover, one logical disk can be selected at a time to move the logical disk on this dialog screen. The logical disks in the list can be sorted into a different order according to an item other than LUN.

[Top] Moves a selected logical disk to the top line of the logical disk group.

[Up] Moves a selected logical disk to the previous line.

[Down] Moves a selected logical disk to the following line.

[Bottom] Moves a selected logical disk to the end line of the logical disk group.

[OK] Clicking this button displays a dialog for confirming the new settings. If the new settings delete logical disks from the LD set, a dialog for confirming the logical disks to be deleted is displayed, and then a dialog appears to confirm the new settings.

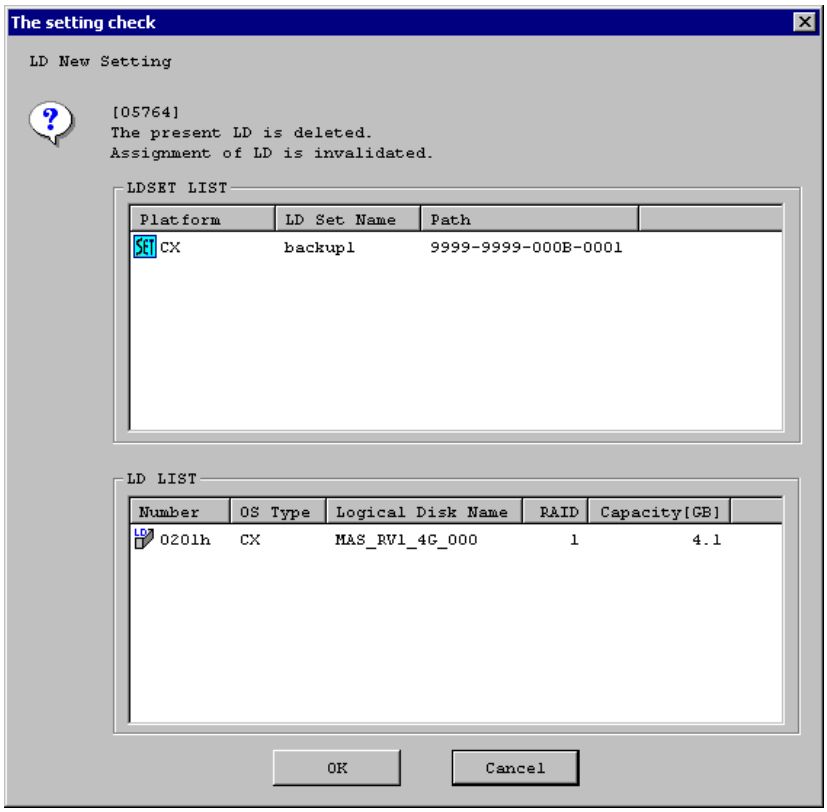


Figure 10-15 Preliminary Confirmation Dialog (for Logical Disks Deleted)

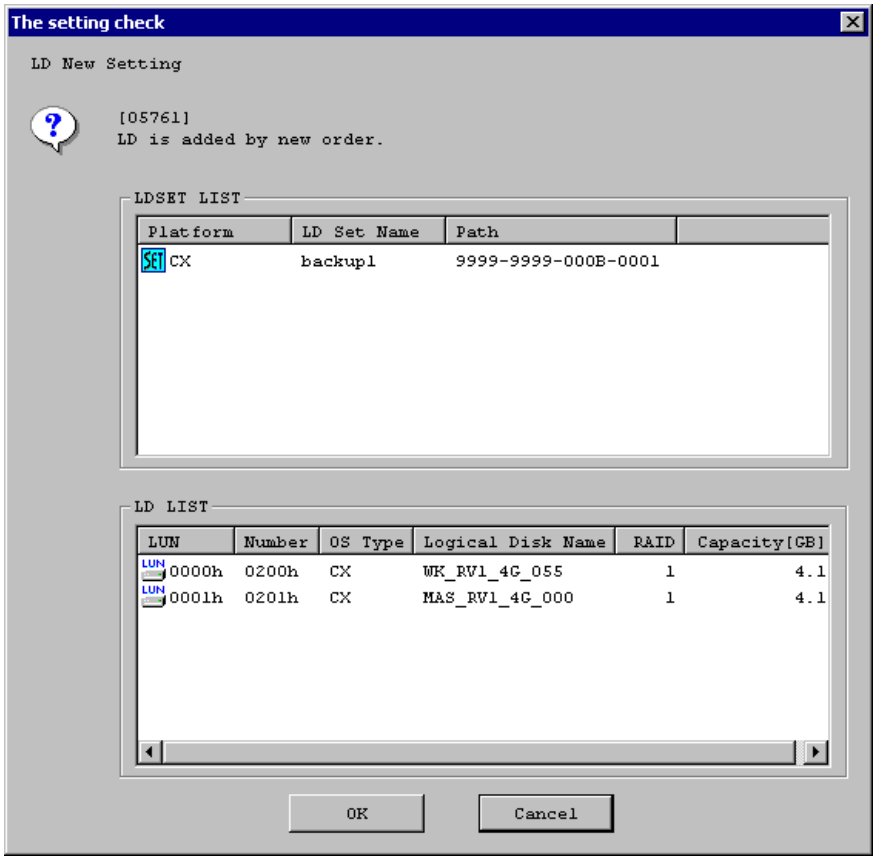


Figure 10-16 Preliminary Confirmation Dialog (for Logical Disks Newly Assigned)

[Cancel] Clicking this button will close the “LD Setting” dialog screen. Furthermore, the following dialog screen will be displayed and confirmation will be made about whether to close the “LD Setting” dialog screen or not by considering the settings invalid.

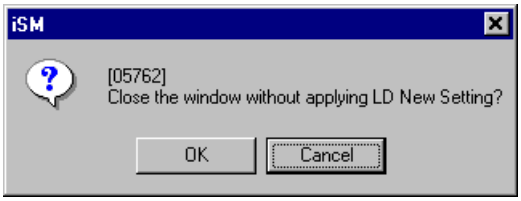


Figure 10-17 Confirmation Dialog Screen 3

The logical disk display item order can be changed. For information on the settings, refer to “Client Start/Stop” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with the OS in use.

Application of the New Setting invalidates all of the current assignment settings for the logical disks and new assignment settings for the logical disk immediately reflect on the Disk Array. Therefore, if setting information is wrong, the business server suddenly stops recognizing the logical disk in use. It is necessary to perform this operation after checking the operation state. Furthermore, stop business or the business server according to the necessity.

If the [New Setting] operation fails, the error dialog screen showing the failure will be displayed.
When an operation request is in error, there is a possibility of inconsistency between the disk array setting information and the information administrated on the iSM client. Therefore, click [Get Disk Array Info.].

10.3.2 Assigning an Additional Logical Disk

When setting permission of access from the business server to logical disks, select LD Sets of a desirable business server from the tree view of the Accessible LD List display area. Then, select logical disks to be added from the [Candidate LD List] display area, and click the [Add] button.

Logical disks will be added to all of the path information linked with the selected LD Sets. Furthermore, Logical disks can be added to the LD Sets which are not linked with path information.

Logical disks to be added need to satisfy the following conditions.

- Logical disks must be the following disks.
  Ordinary disk
  Replication volume set in pairs
  Volume with snapshot setting (BV)
  Link-volume (LV)

Clicking the [Add] button will display the "LD Setting" dialog screen shown below.

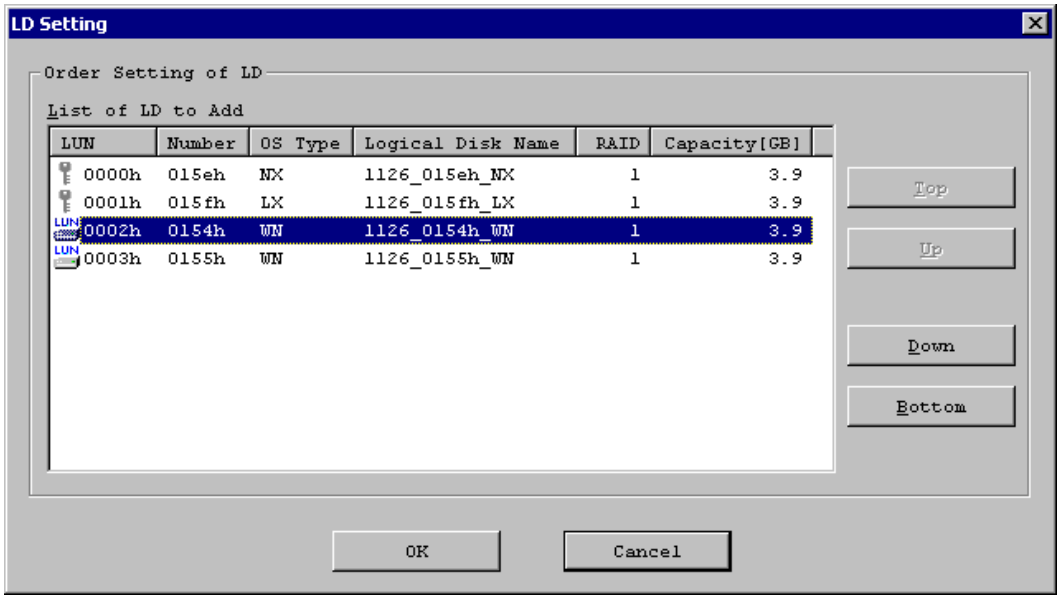


Figure 10-18 LD Setting

The logical disk to be newly added is displayed at the end of the logical disk group which has been assigned on the "LD Setting" dialog screen, and LUN can be changed by button operation. However, in the states (1) and (2) stated below, logical disks to be newly added will be displayed after the selected LUN line:

(1) The LUN selected in the Accessible LD List display area has not assigned logical disks.
(2) The number of selected logical disks coincides with the number of lines of the LUN which has not assigned logical disks or less.

Furthermore, when selecting multiple LUNs which have not assigned logical disks, the selected LUNs must be sequential.

Only a newly added logical disk group can be moved on this dialog screen. Logical disks cannot be moved to the LUN displayed as the  icon. Furthermore, the LUN to which logical disks have been assigned cannot be changed.

Logical disk information displayed on the “LD Setting” dialog screen is as follows:

LUN

: LUN to which newly added, movable logical disks are assigned


: LUN whose logical disks cannot be moved

Number

OS Type

Logical Disk Name

RAID

Capacity

On the “LD Setting” dialog screen, the following buttons are operable.

[Top] Moves a selected logical disk in a newly added logical disk group to the top line of the newly added logical disk group.

[Up] Moves a selected logical disk in a newly added logical disk group to the previous line of the newly added logical disk group.

[Down] Moves a selected logical disk in a newly added logical disk group to the following line of the newly added logical disk group.

[Bottom] Moves a selected logical disk in a newly added logical disk group to the end line of the newly added logical disk group.

[OK] Clicking this button displays a dialog for preliminarily confirming the addition:

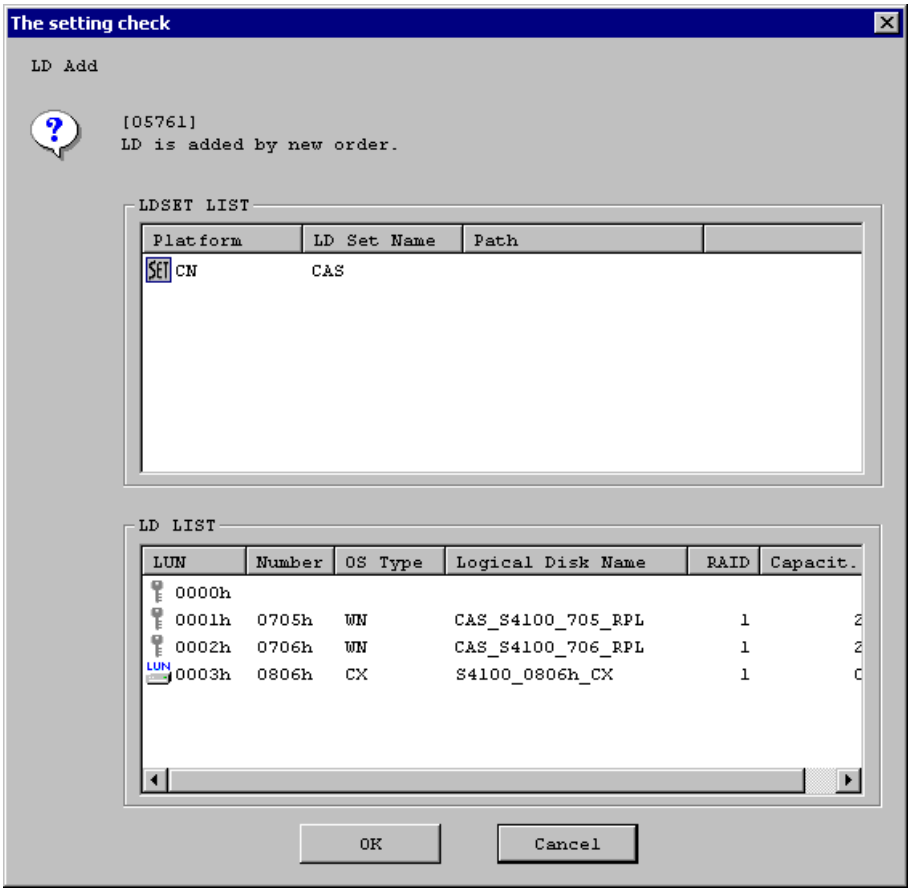


Figure 10-19 Preliminary Confirmation Dialog

[Cancel] Clicking this button will close the “LD Setting” dialog screen. Furthermore, the following dialog screen will be displayed and confirmation will be made about whether to close the “LD Setting” dialog screen or not by considering the settings invalid.

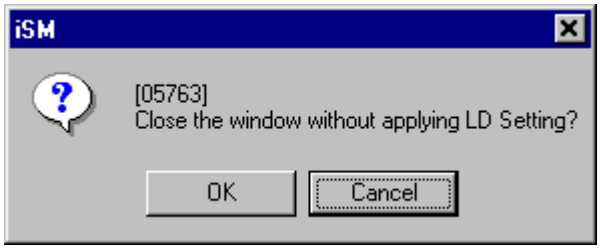


Figure 10-20 Confirmation Dialog Screen 1

The logical disk display item order can be changed. For information on the settings, refer to “Client Start/Stop” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with the OS in use.

- When performing [Add], logical disks which have been assigned to an Add target LD Set cannot be doubly added to the LD Set.
- Logical disks can be assigned to multiple LD Sets.

A link-volume cannot be assigned to LUN 0.

If the [Add] operation fails, the error dialog screen showing the failure will be displayed.

When an operation request is in error, there is a possibility of inconsistency between the disk array setting information and the information administrated on the iSM client. Therefore, click [Get Disk Array Info.].

10.3.3 Deassigning a Logical Disk

When setting inaccessibility from the business server to logical disks, stop the assignment. In this case, select logical disks or LD Sets of a desirable business server from the Accessible LD List display area, and then click the [Delete] button.

Logical disks that can be deleted are as follows:

- Ordinary disk
- Replication volume set in pairs
- Volume with snapshot setting (BV)
- Link-volume (LV)

Clicking the [Delete] button displays the following dialog for confirming the deletion:

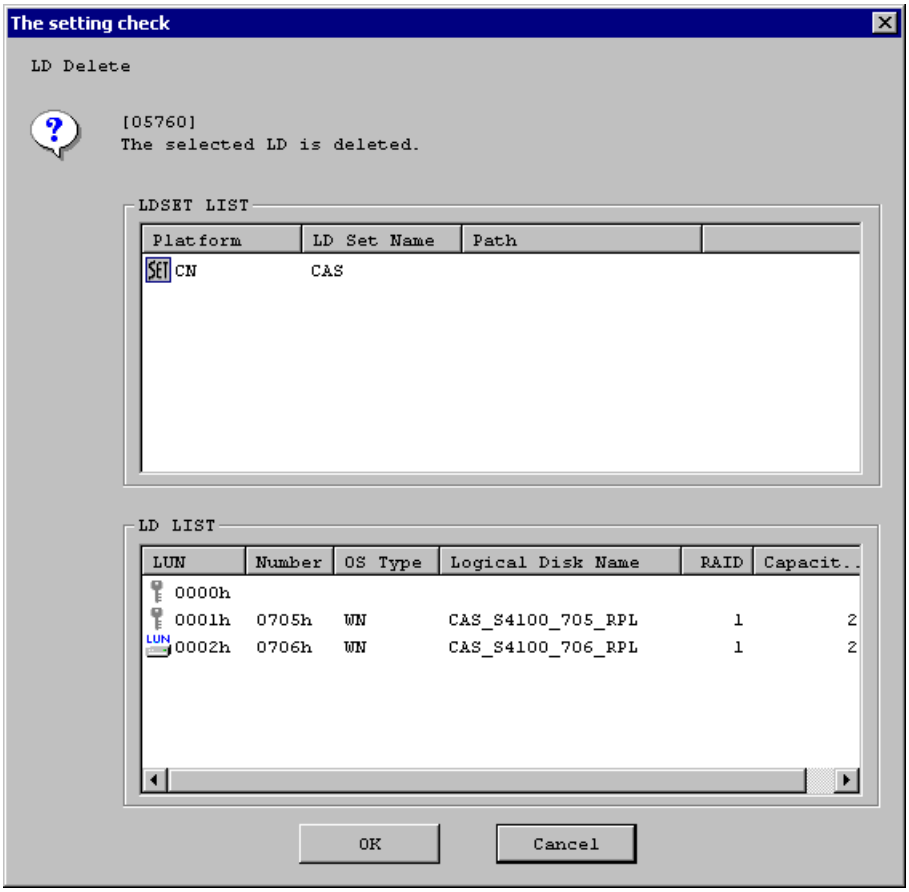


Figure 10-21 Preliminary Confirmation Dialog

When selected logical disks are assigned to multiple LD Sets, the following dialog screen is displayed and the execution of the Delete operation to multiple LD Sets is reconfirmed.

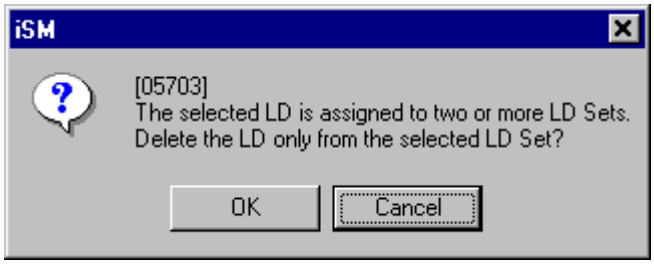


Figure 10-22 Confirmation Dialog Screen 2

This operation deletes logical disks from the target LD Set only which has been selected through its check box. Logical disks which have been deleted from all of the LD Sets belong to the Preserve Group.

The Delete operation deletes explicitly selected logical disks or the logical disks assigned to the explicitly selected LD Set. Therefore, logical disks assigned to the unselected LD Set are not deleted.

Deletion of the logical disk from the LD Set immediately reflects on the Disk Array. If Delete operation is wrong, the business server suddenly stops recognizing the logical disk in use. It is necessary to perform Delete operation after checking the operation state. Furthermore, stop business or the business server according to the necessity.

If the [Delete] operation fails, the error dialog screen showing the failure will be displayed.

When an operation request is in error, there is a possibility of inconsistency between the disk array setting information and the information administrated on the iSM client. Therefore, click [Get Disk Array Info.].

10.4 Starting the Access Control

Start the Access Control on the following screen.

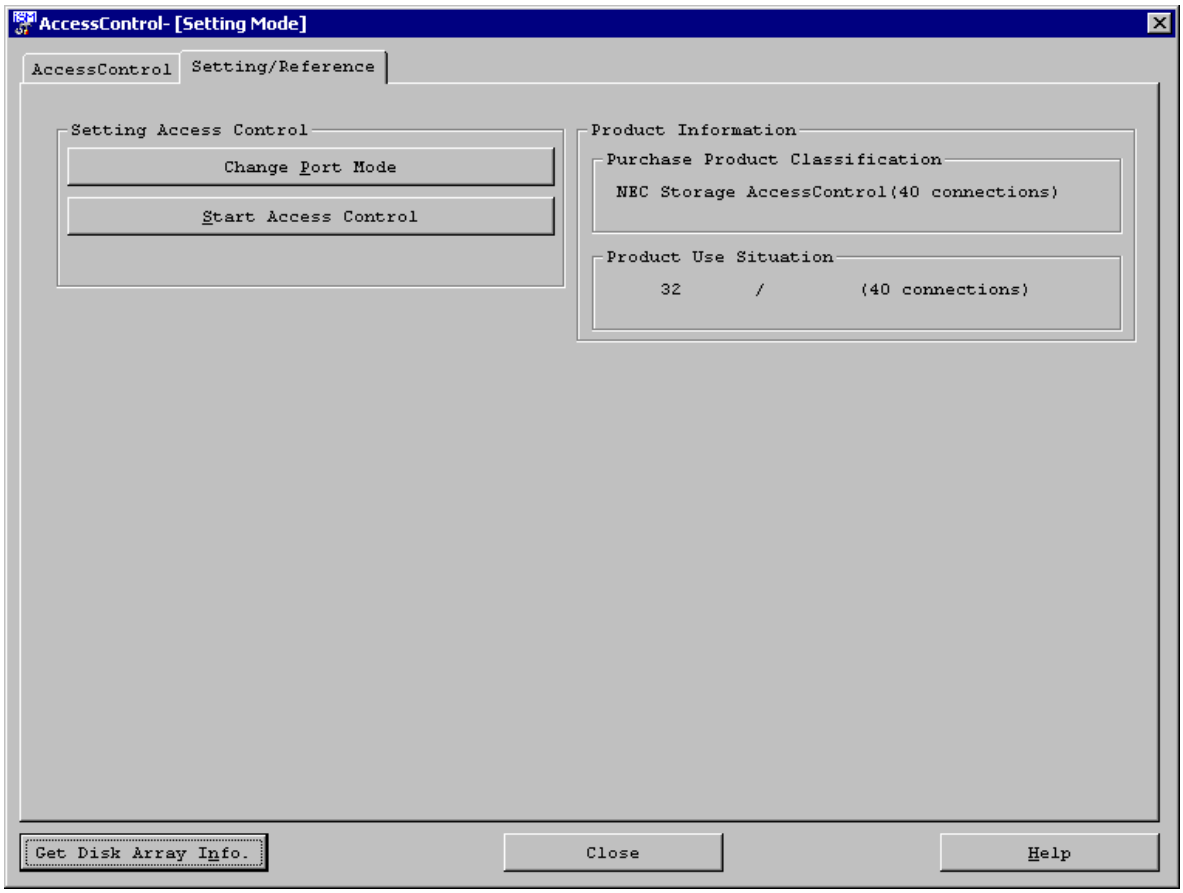


Figure 10-23 [Setting/Reference] Tab Screen

(1) [Start Access Control] button

Clicking this button will validate Access Control settings from the business server to logical disks.

Clicking the [Start Access Control] button displays the following confirmation message:

Figure 10-24 Start Access Control

In the iSM client, once Access Control has been started, Access Control cannot be stopped. (If necessary, consult with a maintenance engineer.)

If Access Control is already in operation, the [Start Access Control] button is inoperable.

The Start Access Control operation immediately reflects on the Disk Array. Therefore, if assignment of logical disks to LD Sets or Link Path settings is wrong, there is a possibility that accessing from the business server to logical disks may not be possible. It is necessary to perform operation after checking the operation state. Furthermore, stop business or the business server according to the necessity.

10.5 Access Control Screen

This section describes functions available when you purchase program product "AccessControl".
The Access Control is optional software.

The Access Control provides functions to set and unset information on accessibility from the business server to logical disks.

10.5.1 Access Control Setting Screen

Clicking the [Setting Access Control] button from the Configuration - [Setting Mode] screen of the iSM client will display the following setting screen.

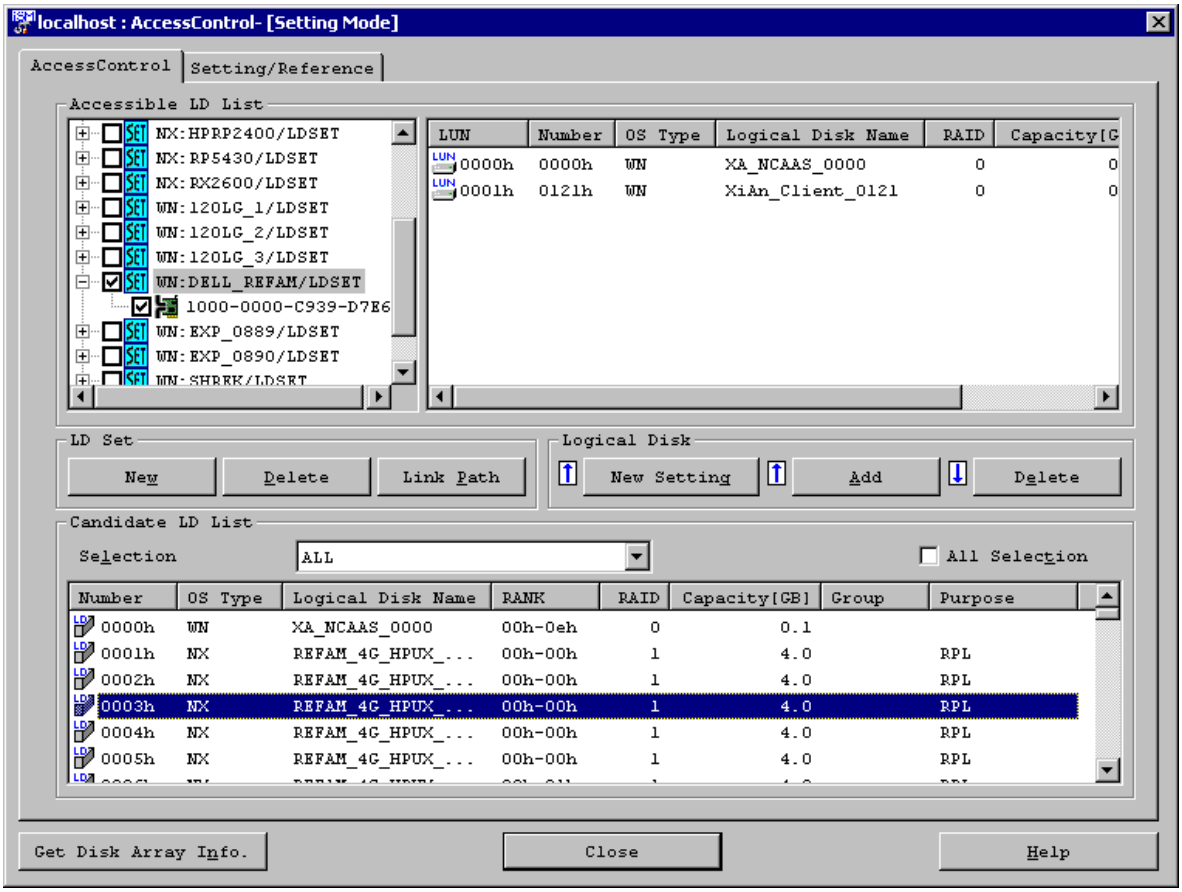


Figure 10-25 [AccessControl] Tab Screen

(1) Accessible LD List

Consists of a tree view showing the relation between the LD Set and the path information and a list view of the Logical disk List assigned to the LD Set or path information.

(a) Tree view

In the tree view, LD Sets can be selected by activating their check boxes and various types of information can be

listed in the list view by clicking tree items.

- In the tree view, LD Sets and path information linked with the LD Sets are displayed.

   : Item that shows all LD Sets

   : LD Set linked with path information

   : LD Set unlinked with path information

  The following two icons indicate abnormal settings. If these icons are displayed, it is necessary to change the setting to the normal setting.

   : LD Set in which a port in the WWN mode and a port in the Port mode are mixed

   : LD Set in which the assignment of logical disks is different for each path information item

- By clicking right-button after selecting LD Set, the pop-up menu appears allowing selection of name change of LD Set. Selecting the menu displays the LD Set name change screen.

- Check boxes are displayed for the “LD Set” item that shows all LD Sets in the tree item, each LD Set name, and path information linked with the LD Sets in the tree item.

  Furthermore, a check box for path information is activated associated with a check box for the linked LD Set.

Check boxes are used for the following purposes:

- Select [Add], [New Setting] logical disks target LD Set
- Select [Link Path] target LD Set
- Select [Delete] target LD Set
- Select LD Set to [Delete] assigned logical disks

However, when selecting multiple LD Sets simultaneously to [Add]/[Delete] logical disks, the assignment states of logical disks for all the LD Sets must coincide.

When activating the check boxes, display contents of the list view are switched as follows:

- When selecting an LD Set, the list of the logical disks assigned to the selected LD Set is displayed.
- When selecting multiple LD Sets, if the assignment states of logical disks for all the selected LD Sets are the same, the list of logical disks is displayed.
- If the assignment states of logical disks for the selected LD Sets do not coincide, the list of the selected LD Sets is displayed.

(b) List view

• Items displayed in the list of logical disks are as follows:

LUN

Order in which logical disks are recognized by the business server

: LUN to which logical disks are assigned

: LUN to which logical disks are not assigned

Number

OS Type

Logical Disk Name

RAID

Capacity

Purpose

RPL	Logical disks set in pairs only for replication
snapshot	Logical disks with snapshot setting (BV)
Link-volume	Logical disks set as a link-volume (LV)
RPL/snapshot	Logical disks set in pairs for replication and snapshot setting
(Blank)	Ordinary disk with no special purpose settings

Port (Displayed when using a disk array to which “AccessControl (WWN)” is applied)

yes	Logical disk assigned to a Port mode port
(Blank)	Logical disk which is not assigned to a Port mode port

However, the port items are automatically displayed only when a Port mode port exists.

The logical disk display item order can be changed. For information on the settings, refer to “Client Start/Stop” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with the OS in use.

When LD Sets are not selected by using check boxes in the tree view, the list view is displayed in gray background color and LUN selection is not possible. Furthermore, when LD Sets are selected by using check boxes, the list view is not displayed by clicking the “LD Set” item which shows all the LD Sets or by clicking an individual LD Set.

• When clicking the “LD Set” item which shows all the LD Sets, items displayed in the list of LD Sets are as follows:

Platform

: LD Set linked with path information

: LD Set unlinked with path information

The following two icons indicate abnormal settings. If these icons are displayed, it is necessary to change the setting to the normal setting.

: LD Set in which a port in the WWN mode and a port in the Port mode are mixed

: LD Set in which the assignment of logical disks is different for each path information item

LD Set Name

Path Count

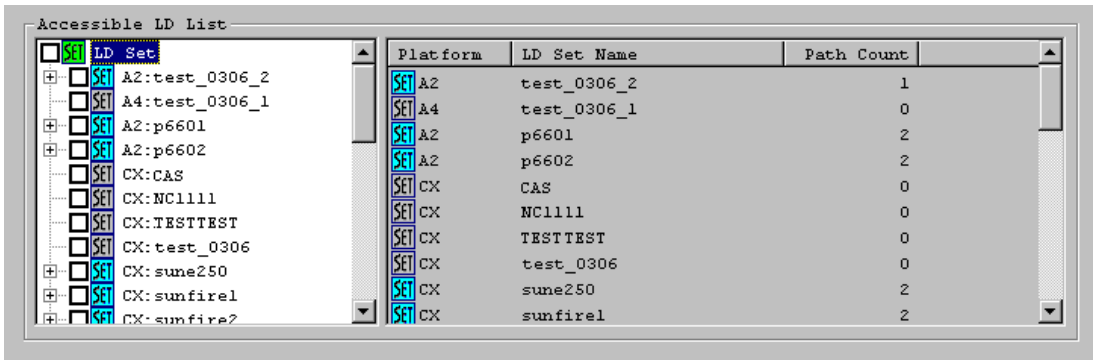


Figure 10-26 Accessible LD List 1

- If LD Sets which have different assignment of logical disk are checked, items displayed in the list are as follows:

Platform

: LD Set linked with path information

: LD Set unlinked with path information

The following two icons indicate abnormal settings. If these icons are displayed, it is necessary to change the setting to the normal setting.

: LD Set in which a port in the WWN mode and a port in the Port mode are mixed

: LD Set in which the assignment of logical disks is different for each path information item

LD Set Name

Pattern

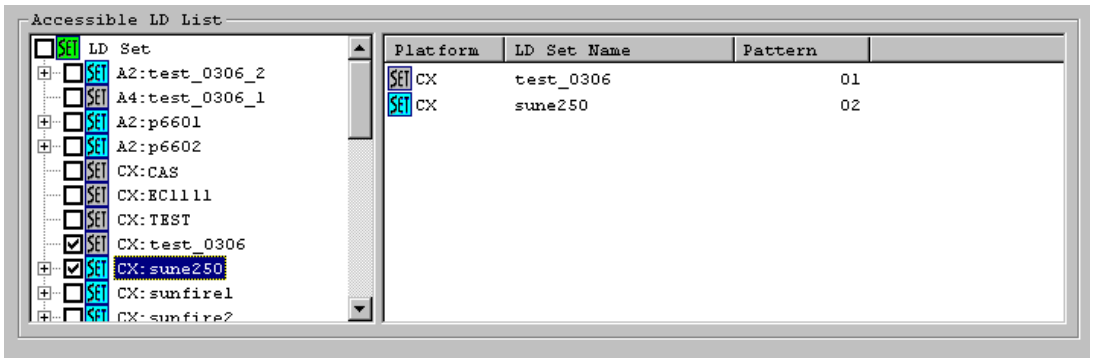


Figure 10-27 Accessible LD List 2

- If a port in the WWN mode and a port in the Port mode are mixed in a checked LD Set, the display items in the list are as follows:

  <Mixed mode list display>

  Path (port numbers and names are displayed together.)

  Mode

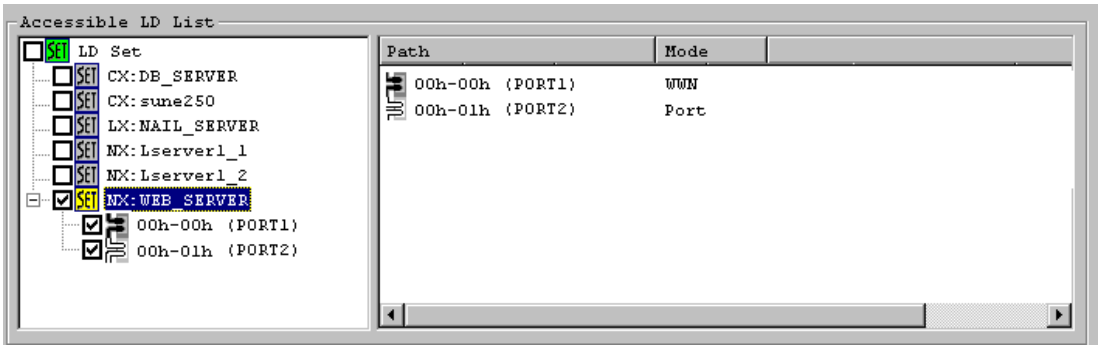


Figure 10-28 Accessible LD List - Mixed Mode List Display

- If the assignment of logical disks for each path information (port) of a checked LD Set does not match, the display items in the list are as follows:

  <Port information list display>

  Path (port numbers and names are displayed together.)

  Pattern

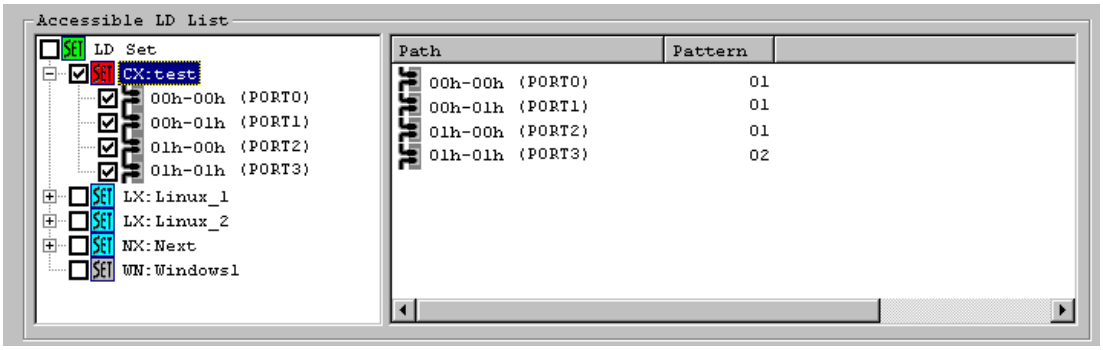


Figure 10-29 Accessible LD List - Port Information List Display

- If the assignment of logical disks for each path information (WWPN) of a checked LD Set does not match, the display items in the list are as follows:

<Path information list display>

Path

Pattern

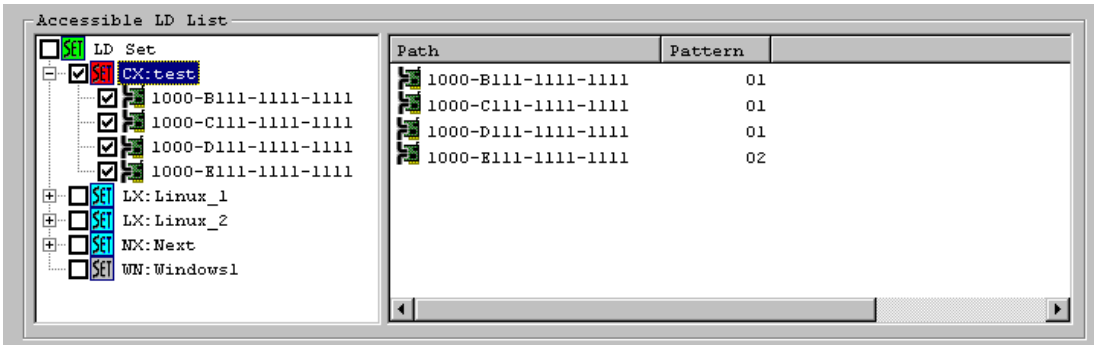


Figure 10-30 Accessible LD List - Path Information List

- When the assignment states of logical disks of the check-marked LD Sets for each path information item do not coincide, items displayed in the list are as follows:

<Logical disk list display>

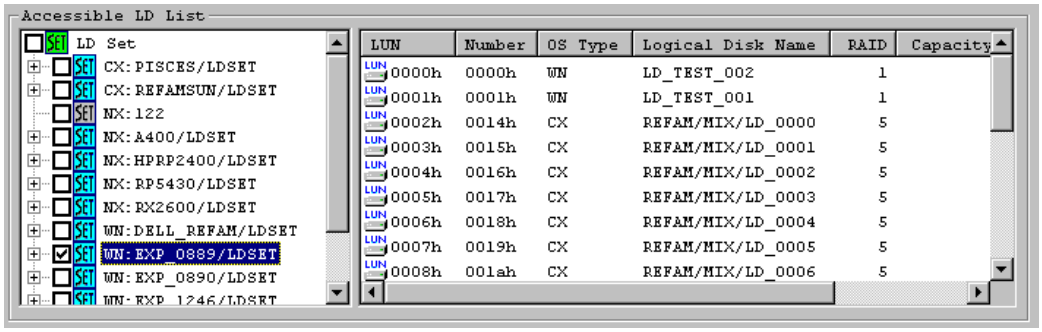


Figure 10-31 Accessible LD List - Logical Disk List

An LD Set is a virtual concept that shows the aggregate of logical disks bound by the iSM. However, there is a possibility that the assignments of logical disks for each path may not coincide due to communication failures during setting.
Ensure consistency according to the following procedure.
Take a note of a path to which wrong logical disks are assigned (the same characters are displayed for the same contents in the Pattern column). Next, after deleting wrong paths once from the Link Path screen, click the [Get Disk Array Info.] button. Check that the LD Set icon is returned from Red to Blue in the Accessible LD List, restore necessary link paths on the Link Path screen again.
Rebuilding is also possible by assigning logical disks again by using [New Setting].

- Display items can be sorted, but their order cannot be changed.
- LUN to which logical disks are not assigned is made blank.
- When selecting delete target logical disks, one logical disk or multiple logical disks can be simultaneously selected.

(c) Various Operation Buttons

Operation buttons shown below can be used for logical disks in the Accessible LD List.

Each button is enabled under defined conditions. For details, refer to the explanation of operation.

- Logical Disk [Add] button
- Logical Disk [Delete] button

Furthermore, LD Set related operation buttons shown below can be used regardless of logical disk selection.

- LD Set [New] button
- LD Set [Delete] button
- LD Set [Link Path] button
- Right button after LD Set selection

(2) Candidate LD List

This is a list view of logical disks which can be assigned to LD Sets. Selective display is possible by entering keywords in the combo box.

(a) List view

• Display items are as follows:

Number
OS Type
Logical Disk Name
RANK/Pool No. (The pool number is displayed only on the disk array with pool (in hexadecimal and with four digits.)
Pool Name (displayed only on the disk array with pool.)
RAID
Capacity
Group
- Preserve — Logical disk assigned to an LD Set
- (Blank) — Logical disks in the Preserve Group

Purpose
- RPL — Logical disks set in pairs only for replication
- snapshot — Logical disks with snapshot setting (BV)
- Link-volume — Logical disks set as link-volume (LV)
- RPL/snapshot — Logical disks set in pairs for replication and snapshot setting
- (Blank) — Ordinary disk with no special purpose settings

Port (Displayed when using a disk array to which “AccessControl(WWN)” is applied)
- yes — Logical disk assigned to a port mode port
- (Blank) — Logical disk which is not assigned to a port mode port

However, the port items are automatically displayed only when a Port mode port exists.

The logical disk display item order can be changed. For information on the settings, refer to “Client Start/Stop” in the “User’s Manual” or “User’s Manual (UNIX)” in accordance with the OS in use.

- Display items can be sorted, but their order cannot be changed.
- Logical disks assigned to LD Sets are also displayed.
- When selecting logical disks which are to be assigned to business, one logical disk or multiple logical disks can be simultaneously selected.

(b) Display Selection Combo Box

Using the following keywords makes it possible to narrow down the display of logical disks in the [Candidate LD List].

Table 10-2 Display Selection of Logical Disk

Selection Information	Display of Logical Disks
"LD Set Name" (Ex. "NX:UNIX_Server01")	Displays only logical disks which have already been assigned to the LD Set
"Platform: *" (Ex. "NX: *")	Displays only logical disks of the Platform
" : *"	Displays only logical disks whose Platform has not been set
"**h-**h (*)" (Ex. "04h-00h (Server01)")	Displays only logical disks that are assigned to ports in the Port mode.
"Preserve Group"	Displays logical disks in the Preserve Group. Target logical disks include logical disks with no special purpose settings, logical disks set in pairs for replication, logical disks for snapshots (BV only displayed. SV and SDV are not displayed), and logical disks set as link-volume.
"ALL"	Displays all logical disks in the [Candidate LD List]. (Default settings)

(c) Various Operation Buttons

Operation buttons shown below can be used for logical disks in the [Candidate LD List].

Each button is enabled under defined conditions. For details, refer to the explanation of operation.

- Logical Disk [Add] button
- Logical Disk [New Setting] button
- All Selection check box

Furthermore, LD Set related operation buttons shown below can be used regardless of logical disk selection.

- LD Set [New] button
- LD Set [Delete] button
- LD Set [Link Path] button
- Right button after LD Set selection

Perform individual operations for LD Sets on the following screen

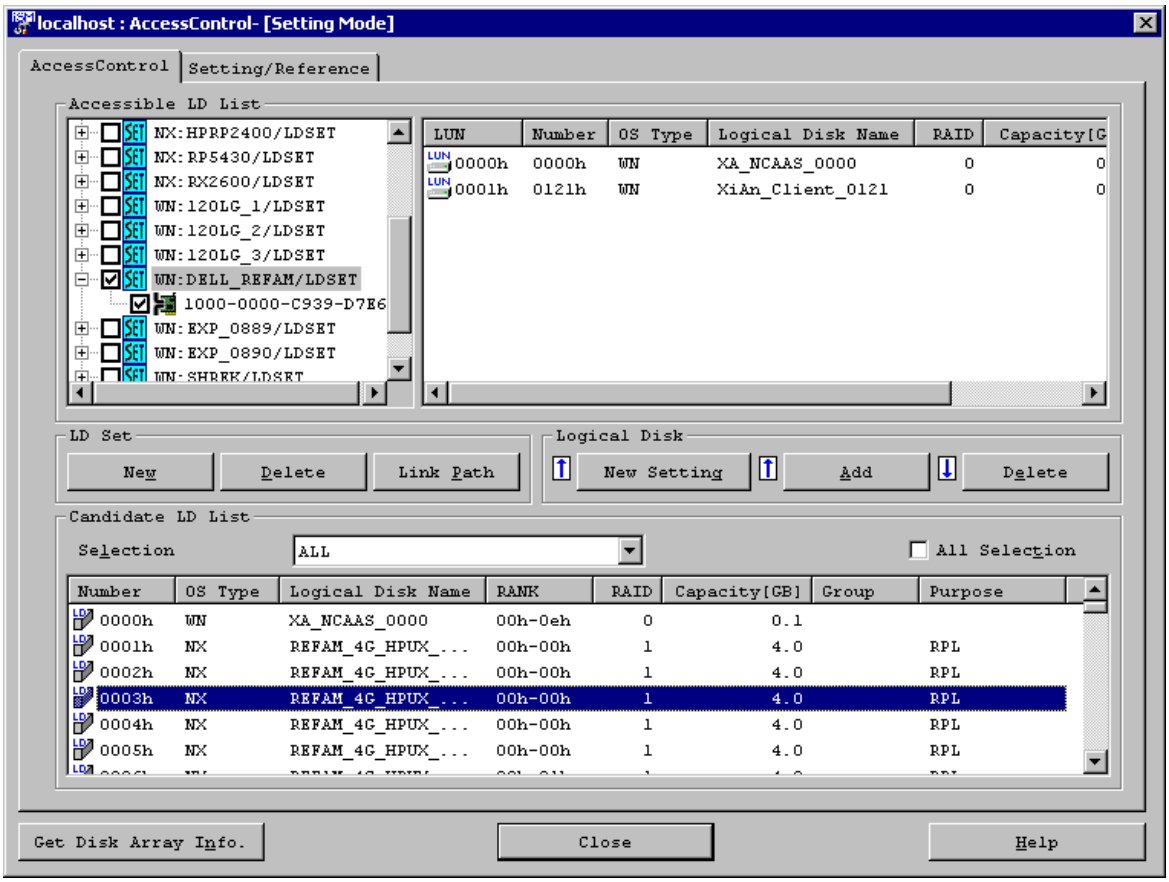


Figure 10-32 [AccessControl] Tab Screen

(3) [Get Disk Array Info.] button

Clicking this button will re-acquire information from the disk array necessary for operations on the AccessControl screen.

Normally, it is not necessary to use this button to re-acquire information from the disk array. If operations for the disk array on this screen fail, causing inconsistency between the disk array setting information and the information administrated on the iSM client and making normal operation impossible, use this button.

After clicking this button and while information is being acquired from the disk array, the following dialog screen will be displayed.

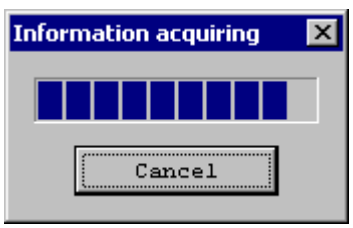


Figure 10-33 Information Being Acquired

When canceling the acquisition of information by clicking the [Cancel] button while the information is being acquired, or the acquisition of information fails, there is a possibility that disk array information administrated by the iSM client may be wrong. Therefore, re-acquire information from the disk array through [Get Disk Array Info.].

(4) [All Selection] check box

This check box is used to perform auxiliary operation to select logical disks from the [Candidate LD List] display area.

This check box enables the auxiliary selection operation as shown below.

- Activate the check box
  Selects all logical disks displayed in the [Candidate LD List].
- Deactivate the check box
  Unselect logical disks currently selected and displayed in the [Candidate LD List].

10.5.2 Access Control Start/Mode Change Screen

Items that can be set on the [Setting/Reference] tab screen are as follows:

- Setting Access Control
- Product Information (reference only)

Contents of each item and setting information are described below.

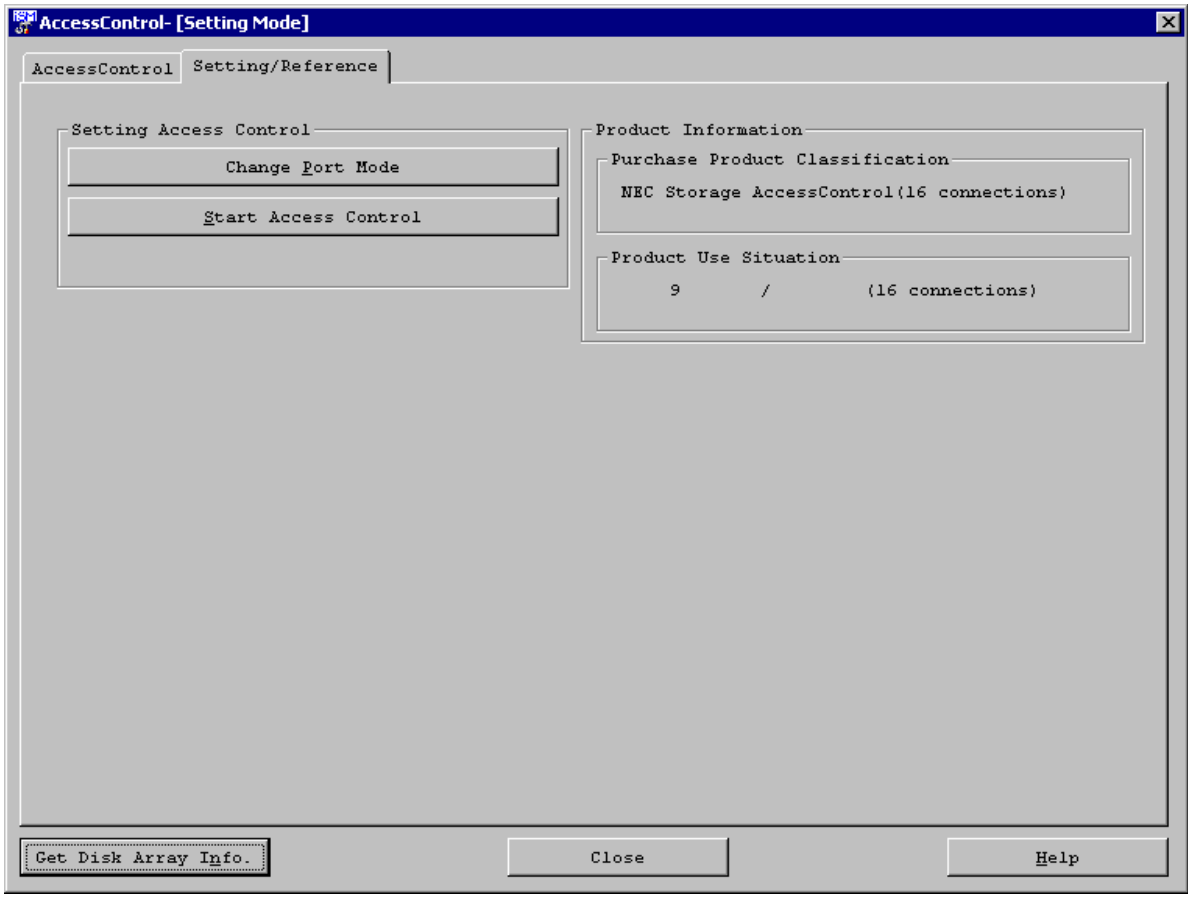


Figure 10-34 [Setting/Reference] Tab Screen

(1) "Setting Access Control" field

The following setting can be performed in this field.

- Change Port Mode
- Start Access Control

(2) "Product Information" field

This field displays information on the AccessControl product required for setting information on accessibility to logical disks.

- Purchase Product Classification: Displays the type of the purchased AccessControl product.
- Product Use Situation: Displays the maximum number of path information links permitted for the AccessControl product and the current number of path information links.

10.5.3 Access Control Setting Confirmation Screen

Starting Access Control in setting mode displays the following warning dialog box to warn the users:

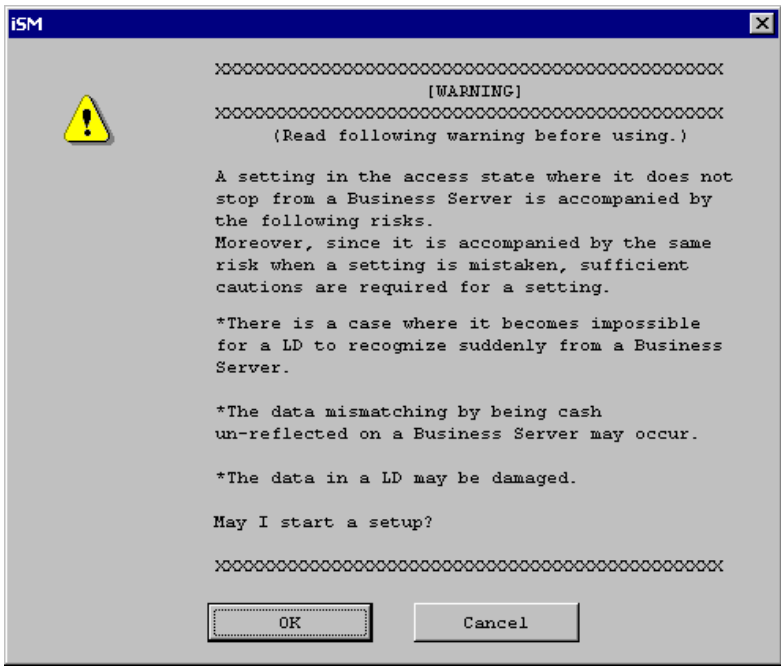


Figure 10-35 Warning Dialog Box at Start

Clicking the [Cancel] button in the warning dialog box at start returns to the Configuration- [Setting Mode] screen below.

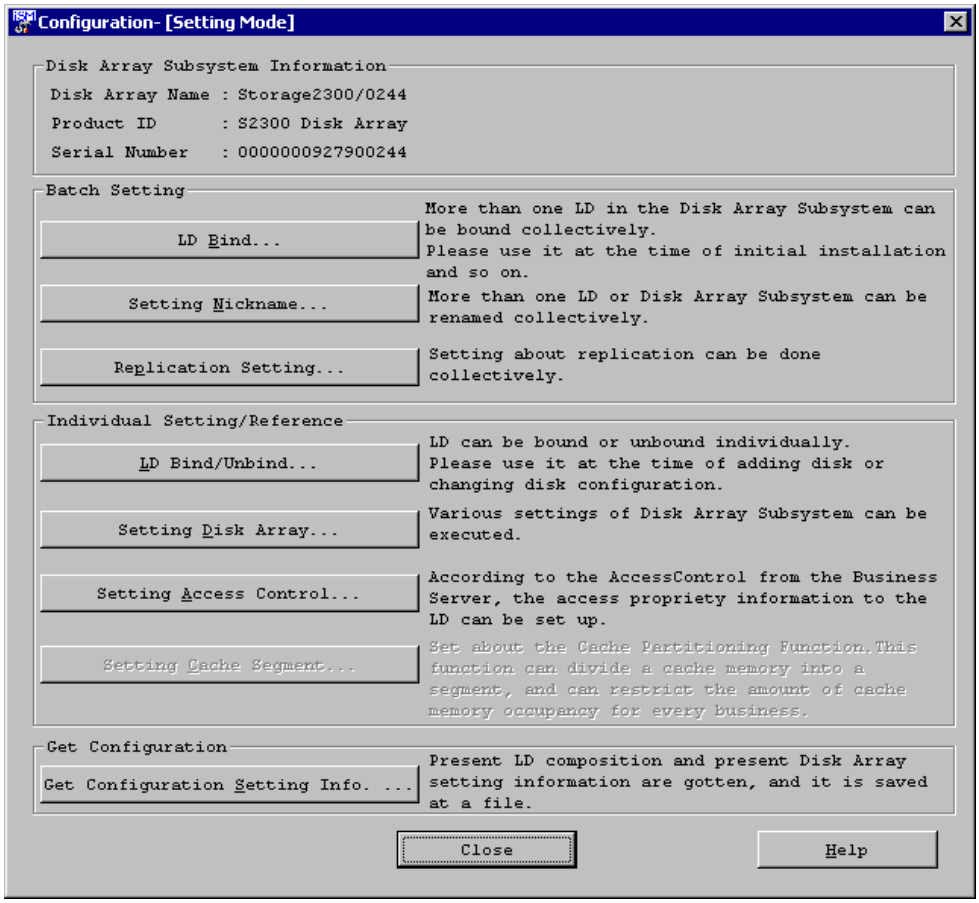


Figure 10-36 Configuration- [Setting Mode] Screen

Similarly, the following dialog boxes also display a warning message when an attempt is made to perform operation: [05317], [05318], [05319], [05325], [05326], [05327], [05373], [05384], and [05385]

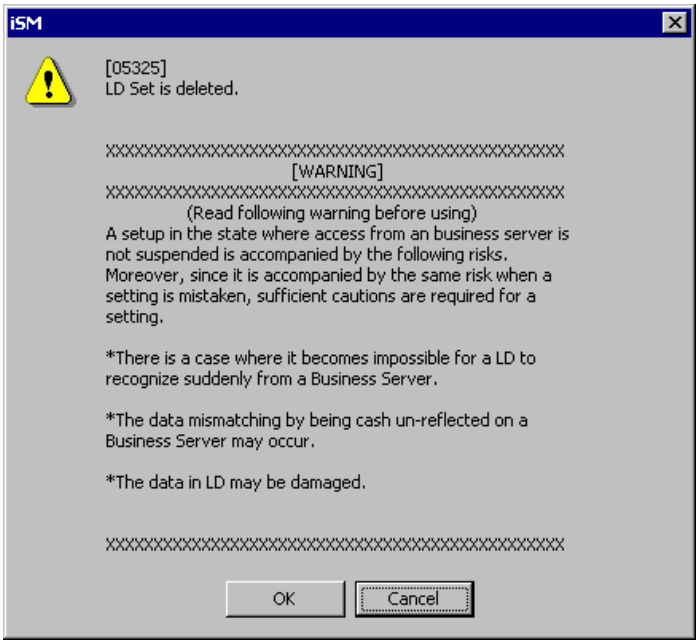


Figure 10-37 Sample of Warning Message Display

For any operation which displays this warning dialog, a message appears to ask you whether you really want to make setting changes to the disk array.

Figure 10-38 Confirmation Message

Appendix A Specifications

A.1 Specified Number of Disk Arrays to Be Set

At most one disk array can be set from the iSM client simultaneously (not including LD Batch Binding and Pair Batch Setting).

A.2 Number of LD Sets Locatable in One Disk Array

Table A-1 shows the maximum number of LD Sets locatable in one disk array.

Table A-1 Max. No. of LD Sets Locatable in One Disk Array

Disk Array Series	Max. No. of LD Sets*
1000 series	128
2000 series	128
3000 series	256
4000 series	256

* Calculate the number of new LD Sets you can create 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 locatable.

A.3 Specified Number of Paths to Be Set for LD Set

At most 64 paths can be set for a LD Set.

A.4 Number of LDs Locatable in One LD Set

Table A-2 shows the maximum number of LDs and LUNs locatable in one LD Set.

Table A-2 Specifications for LDs Locatable When Access Control Is ON

Access Control	License Required	Access Mode	Disk Array	Max. No. of Locatable LDs	Specifiable LUN
ON	AccessControl (WWN)	Port mode (to be set by maintenance personnel)	1000/2000 series	1024	0000h to 03ffh
			3000/4000 series	4096	0000h to 0fffh
	AccessControl	WWN mode	100/1000/2000 series	512	0000h to 01ffh
			3000/4000 series	512	0000h to 01ffh
		Port mode, WWN mode	100/1000/2000/2800 series	512	0000h to 01ffh
			3000/4000 series	512	0000h to 01ffh
		Port mode for ACOS-4 resources (to be set by maintenance personnel)	2000 series	1024	0000h to 03ffh
			4000 series	4096	0000h to 0fffh
OFF	None	None	100/1000/2000/2800 series	1024	0000h to 03ffh
			3000/4000 series	4096	0000h to 0fffh

Note: The number of LDs you can actually use depends on the operating system on the business server.

A.5 Notes on Binding a Pool

Although you can bind dynamic pools with up to 120 physical disks on S2400 disk array and up to 240 physical disks on S2800 disk array, you can use up to 60 physical disks when you bind a pool. Thus, to use 61 or more physical disks, you need to expand dynamic pools by adding physical disks.

In addition, when you expand a dynamic pool, you can add up to 60 physical disks at a time.

Appendix B Configuration Setting Command

This chapter explains how to operate the configuration setup command that is performed through the Command Line Interface (CLI) from the iSM server.

B.1 Network Relief Setting Command (iSMnetconf)

The iSMnetconf command sets the IP Address, Subnet Mask, and Gateway Address of a target disk array's Service Processor, limits permission for access from the monitoring server, and refers to the information. The iSMnetconf command operates on a host that is connected with the disk array through FC. Make Service Processor settings for general operation through iSM client's configuration setting (GUI), 9.3 "Network". Use the iSMnetconf command if monitoring via the Ether path is disabled due to wrong operation or the like. The iSMnetconf command is installed at the same time the "Storage Manager Volume List", "ReplicationControl", or "SnapControl" is installed.

B.2 Start and Stop of Network Relief Setting Command

(1) Start of the iSMnetconf command

To start the command, enter iSMnetconf in the command line. If options are omitted, the program version and the usage are displayed as shown below.

```
iSMnetconf      Version x.x

Usage :  iSMnetconf     {-arrayname <Array Name> | -specialfile <Special File>}
                        [-number <Resource Number>]
                        {[-ipaddress <IP Address>] | [-subnetmask <Subnet Mask>] |
                        [-gateway <Gateway Address>] |
                        [-addscsivalidaddress <Add Address>] |
                        [-chgscsivalidaddress <Original Address> <Change Address>] |
                        [-delscsivalidaddress <Delete Address>] |
                        [-scsiguardinvalid {on | off}]}
                        [-ipcheckinvalid {on | off}] [-force]
         iSMnetconf     {-arrayname < Array Name> | -specialfile <Special File>}
                        [-number <Resource Number>] -view
         iSMnetconf     -file <File Name> [-ipcheckinvalid {on | off}] [-force]
```

* The above is a display sample. The actual program version is displayed for Version.

(2) iSMnetconf command options

The following explains the functions of the iSMnetconf command and the corresponding options:

-addscsivalidaddress option: Adds the IP address of the monitoring server for which access is permitted. The IP address added with this option takes effect when the access restriction function is enabled (scsiguardinvalid is off). Up to eight of this option, including the chgscsivalidaddress and delscsivalidaddress options, can be specified simultaneously. The total number of IP addresses that can be added per disk array is 8 when SCSI Socket Valid IP addresses, SNMP Trap Transmission IP addresses, and SNMP Valid IP addresses are all combined.

-arrayname option:	Specifies the name of the target disk array. Since the relationship between the disk array name and the special file name (UNIX version) or disk number (Windows version) is obtained from the "volume information data", it is necessary to confirm that the "volume information data" has been updated to the latest version. For information on how to update the "volume information data", refer to "volume list command" in the "User's Manual" or "User's Manual (UNIX)" in accordance with the OS in use.
-chgscsivalidaddress option:	Changes the IP address of the monitoring server for which access is permitted. The IP address changed with this option takes effect when the access restriction function is enabled (scsiguardinvalid is off). Up to eight of this option, including the addscsivalidaddress and delscsivalidaddress options, can be specified simultaneously.
-delscsivalidaddress option:	Deletes the IP address of the monitoring server for which access is permitted. The IP address changed with this option takes effect when the access restriction function is enabled (scsiguardinvalid is off). Up to eight of this option, including the addscsivalidaddress and chgscsivalidaddress options, can be specified simultaneously.
-file option:	Reads the file storing the settings and sets the service processor. The settings can be made for multiple disk arrays simultaneously.
-force option:	Forcibly makes settings even during configuration setting by another configuration setup command.
-gateway option:	Sets a Gateway Address. Specify the Gateway Address in the input format of "aaa.bbb.ccc.ddd" (in decimal).
-ipaddress option:	Sets the IP Address of the target disk array. Specify the IP Address in the input format of "aaa.bbb.ccc.ddd" (in decimal).
-ipcheckinvalid option:	Enables the omission of a check on if the IP Address specified in the ipaddress option is already used by another network equipment. The option also enables the omission of a check conducted to see whether any of the IP addresses specified with the ipaddress, subnetmask, gateway, addscsivalidaddress,

	chgscsivalidaddress, and delscsivalidaddress options is invalid.
-number option:	Specifies the target Service Processor number.
-scsiguardinvalid option:	Determines whether to validate/invalidate the limit for access from monitoring servers connected through Ether. If "off" is specified, the limit for access from monitoring servers becomes valid, and only monitoring servers at registered IP Addresses are permitted to make access. If "on" is specified, the limit for access from monitoring servers becomes invalid, and monitoring servers at any IP Addresses are permitted to make access. Therefore, be careful in specifying "on" for this option.
-specialfile option:	Specifies the special file name of the target disk array. The special file name is displayed by the "volume list command". For details on the command, refer to the "volume list command" explained in the "User's Manual" or "User's Manual (UNIX)" in accordance with the OS in use.
-subnetmask option:	Sets a Subnet Mask. Specify the Subnet Mask in the input format of "aaa.bbb.ccc.ddd" (in decimal). The subnet of the disk array's IP Address is set by specifying this option.
-view option:	Displays Service Processor information. If a Service Processor number is specified in the "number" option, the information of only the specified Service Processor is displayed. If the "number" option is omitted, the information of all the Service Processors is displayed.

(3) Termination of the iSMnetconf command

When the iSMnetconf command terminates normally, a message is displayed indicating successful operation if a setting option is specified. If a reference option is specified, the item for the option is displayed.

B.2.1 Example of Displaying Options

(1) Setting of a Service Processor

The following shows the setting of the Service Processor of a target disk array.

```
>iSMnetconf -arrayname Storage2300 -number 00h -ipaddress 192.168.0.1 -scsiguardinvalid off

iSMnetconf 001 : Command Complete Successfully.
```

(2) Reference to various types of Service Processor information

The following shows reference to various types of Service Processor information of a target disk array. If the -number option is omitted, the information of all the Service Processors in the target disk array is displayed.

```
>iSMnetconf -arrayname Storage2300 -number 00h -view

--- Service Processor Information ---                … (a)
Number(h) : 00
State        : ready

--- Disk Array TCP/IP Information ---                … (b)
IP Address          : 192.168.0.1
Subnet Mask         : 255.255.255.0
Gateway Address : 192.168.0.254

--- SCSI Socket Information ---                      … (c)
SCSI Socket Guard Invalid     : off
SCSI Socket Valid IP Address : 192.168.0.5

--- SNMP Information ---                             … (d)
Community Name                        : public
SNMP Trap Transmission IP Address  : 192.168.0.5
                                      : 192.168.0.6
SNMP Valid                 : off
SNMP Valid IP Address   : 192.168.0.5
                          : 192.168.0.7

--- Trap Information ---                             … (e)
Trap Sense Interval        : 5 second(s)
Unit Contact               : XXX, Manager Name, 8-23-xxxxx
```

Unit Name	: Storage2300
Unit Location	: Fuchu-shi
Unit Info	: Setting Date 2003/01/01

The display items are as follows:

(a) Service Processor Information

Displays the information of a target Service Processor.

Number(h): Service Processor number

State: Service Processor state

(b) Disk Array TCP/IP Information

Displays the TCP/IP information of a target disk array.

IP Address: IP Address of the disk array

Subnet Mask: Subnet Mask of the disk array

Gateway Address: Gateway Address of the disk array

(c) SCSI Socket Information

Displays the information of monitoring servers.

SCSI Socket Guard Invalid: Indicates that the limit for access from monitoring servers connected through Ether is valid/invalid.

- on: The limit for access from monitoring servers connected through Ether becomes invalid, and monitoring servers at any IP Addresses are permitted to make access.
- off: The limit for access from monitoring servers connected through Ether becomes valid, and only monitoring servers at registered IP Addresses are permitted to make access.

SCSI Socket Valid IP Address: IP Address of a monitoring server that is permitted to make access. "---" is displayed if no IP Addresses are registered.

(d) SNMP Information

Displays the SNMP-related information

Community Name:	Displays the community name.
SNMP Trap Transmission IP Address:	IP address to which trap messages are to be transmitted. If no IP address is registered, "---" is displayed.
SNMP Valid:	Indicates whether the SNMP request restriction is valid or invalid. on: The SNMP request restriction is invalid, accepting SNMP requests from any host. off: The SNMP request restriction is valid, accepting SNMP requests only from registered hosts.
SNMP Valid IP Address:	IP address from which SNMP requests are accepted. If no IP address is registered, "---" is displayed.

(e) Trap Information

Displays the trap-related information.

Trap Sense Interval:	Displays the SNMP trap sense interval.
Unit Contact:	Displays the management information transmitted in the SNMP trap.
Unit Name:	Displays the system name transmitted in the SNMP trap.
Unit Location:	Displays the installation location information transmitted in the SNMP trap.
Unit Info:	Displays the other information transmitted in the SNMP trap.

B.2.2 Setting File

(1) File header

When the following identifier line is written at the beginning of a file, that file can be identified as the setting file of this command.

```
# iSMnetconf Configuration File Version x.x.
```

(2) Sections and items

In the setting file, specify parameters using sections and items.

- [Target Disk Array] section

  Specify the disk array and service processor number to be set. This section is always required.

array name item:	Specify the disk array name.
special file item:	Specify the special file name (UNIX version) or disk number (Windows version).
number item:	Specify the service processor number.

- [Disk Array TCP/IP Information] section

  Specify the network-related items for the disk array.

ip address item:	Specify the IP address of the disk array.
subnet mask item:	Specify the subnet mask of the disk array.
gateway address:	Specify the gateway address of the disk array.

- [SCSI Socket Information] section

  Specify the items related to the restriction of access from the monitoring server.

scsi socket guard invalid item:	Specify whether the restriction of access from the monitoring server is valid or invalid.
scsi valid address item:	Specify the IP address of the monitoring server for which access is permitted.

(3) Example of the setting file

An example of the setting file is shown below.

```
# iSMnetconf Configuration File Version x.x
[Target Disk Array]
array name = Storage2300
number = 00h

[Disk Array TCP/IP Information]
ip address = 192.168.0.1
subnet mask = 255.255.255.0
gateway address = 192.168.0.254

[SCSI Socket Information]
scsi guard invalid = off
scsi valid address = 192.168.0.5
```

(4) Notes

- A line beginning with "#" is treated as a comment.
- Space and horizontal tab characters are ignored.
- It is necessary to specify either the array name item or special file item in the [Target Disk Array] section. If neither or both of them are specified, an error occurs.
- When the target disk array has only one service processor, the number item can be omitted.
- Up to eight scsi valid address items can be specified simultaneously.
- When more than one scsi valid address item is specified, only the IP addresses that are specified with this option are registered as IP addresses for which access is permitted.
- It is necessary to specify the sections and items in the order shown in (2) "Sections and items".
- By repeating the sequence of sections and items, beginning with the [Target Disk Array] section, more than one disk array can be specified as the setting target.

Appendix C RAID

C.1 RAID

The word RAID was first introduced in the thesis "A Case for Redundant Arrays of Inexpensive Disks" released by professors of the University of California at Berkeley of the U.S.A. in 1987.

The initials RAID of "Redundant Arrays of Inexpensive Disks" mean literally "a set of redundant and inexpensive disks". However, RAID has been generally explained with "Inexpensive" 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, RAID5, RAID10, RAID50, and RAID6 only. 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 can keep redundancy by its double-parity feature even if one physical disk becomes faulty.

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
RAID 0	None	1 or more *1, *3	None	Quick access	Inaccessible when even a single disk fails
RAID 1	Dual configuration	2	50%	High reliability No performance deterioration in reduced state	Costly
RAID 5	Parity	3 or more *4	Equivalent to capacity of 1 disk	Concurrent processing for multiple R/W commands	Parity data read required for writing Performance deterioration in reduced state
RAID6	Double parity	6 or more*5	Equivalent to capacity of 2/6 or 2/10 disks	The most reliable (redundancy secured on a failure of one physical disk)	It is necessary to read parity when writing data. The accessibility to data drops on degradation.
RAID10	Dual configuration	4 or more *2, *6	50%	Quick access High reliability No performance deterioration in reduced state	Costly
RAID50	Parity	10 or more*7	Equivalent to capacity of 1/5 disks	Concurrent processing for multiple R/W commands Quick access	It is necessary to read parity when writing data. The accessibility to data drops on degradation.

*1: 100/1000/2000 series disk array: 1, 3, 5, 10, or 15 disks

*2: 100/1000/2000 series disk array: 4, 6, 8, 10, 12, or 14 disks

*3: S400/S1400/S2400/S2800 disk array: Not available for configuration

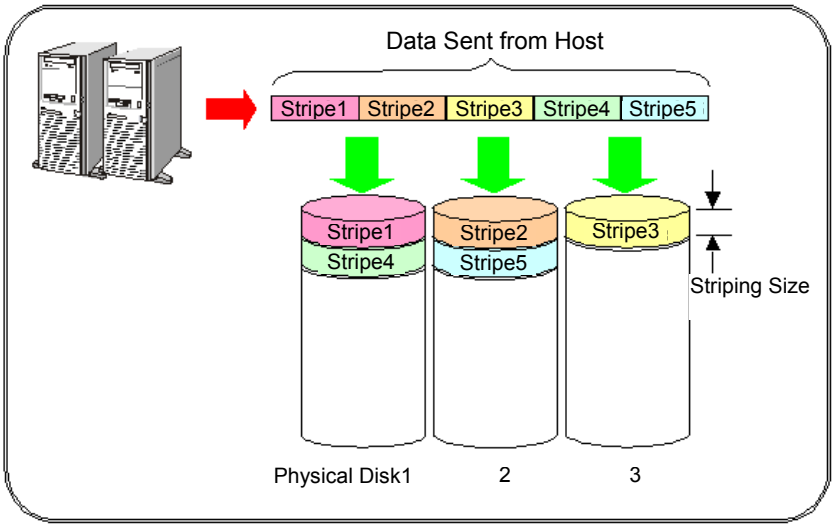
*4: S400/S1400/S2400/S2800 disk array: 5 disks

*5: S400/S1400/S2400/S2800 disk array: 6 or more disks (4+PQ) and 10 or more (8+PQ)

*6: S400/S1400/S2400/S2800 disk array: 4, 8, or 16 disks

*7: S400/S1400/S2400/S2800 disk array: 10 or 20 disks

(1) RAID0



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, data cannot be accessed when even a single disk fails.

<Advantage>

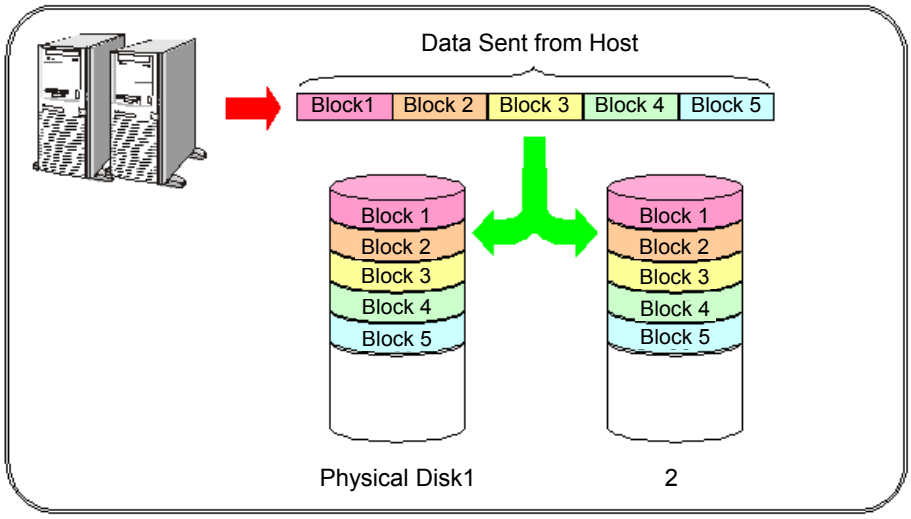
- Quick access
- Highest availability of the disk capacity

<Disadvantage>

- 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. iSM does not recommend RAID0. Use another RAID configuration.

(2) RAID1



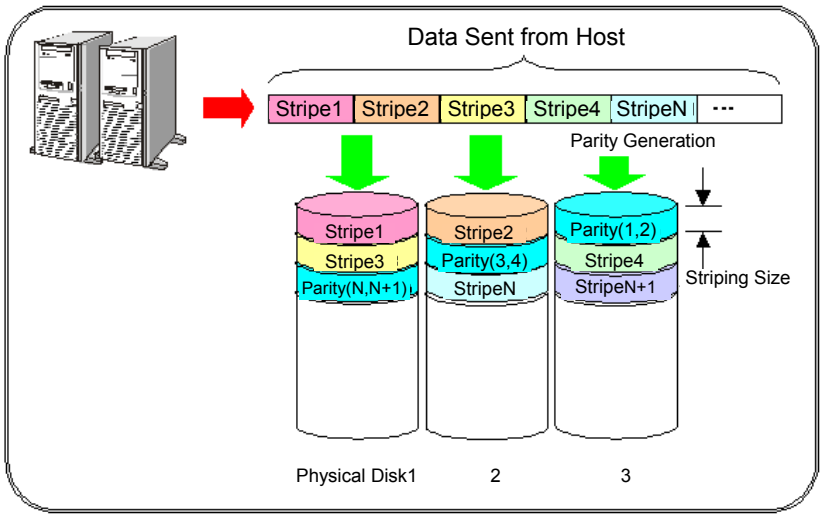
This method writes data (sent from the host) onto two disks (or into 2 disk groups). (Mirroring)

RAID1 has the same data in dual configuration. Thus, even if one disk fails, the other disk enables access to the data.
In comparison with a single disk, RAID1 achieves the equivalent performance in write operation, and up to the double throughput as performance in read operation 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.

<Advantage>
• High reliability
• No performance deterioration when a single disk fails
• Performance in read operation can be up to twice as high as the throughput of a single disk.

<Disadvantage>
• Redundant data takes up a half of the disk capacity.

(3) RAID5



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 concurrent 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, performance in read operation lowers in this case.

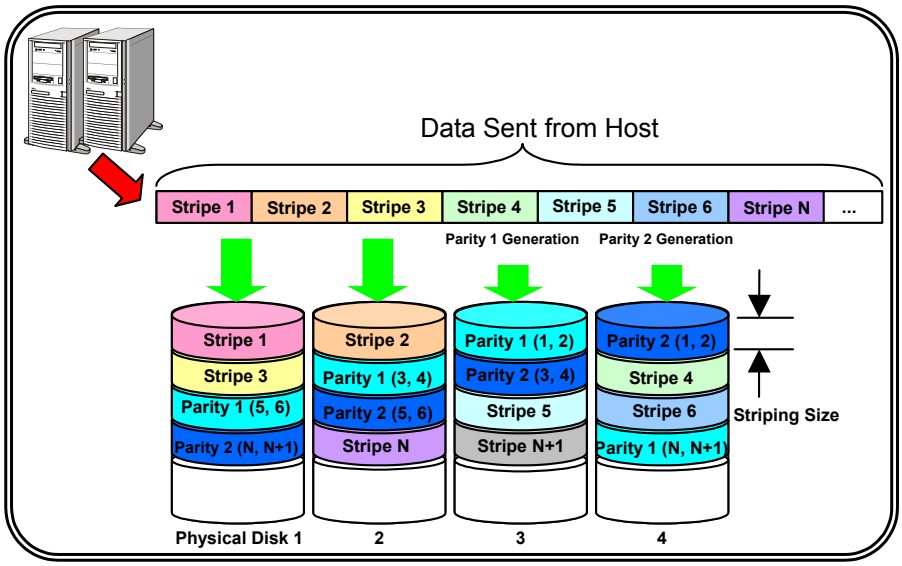
<Advantage>

- Concurrent processing by using distributed parity data
- Availability of processing which often makes random access

<Disadvantage>

- If one of the physical disks constituting logical disks fails, performance in read operation lowers.

(4) RAID6



This method slices data sent from the host in certain striping size and distributes the slices into the physical disks of the RAID. While doing that, it generates two parity data per block and distributes the respective parities into the 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 in case of a disk failure.

In addition to that, RAID6 distributes parity data to multiple disks, it enables concurrent processing for access to the disks. Thus, RAID6 is suitable for random access to small files in size of several kilobytes.

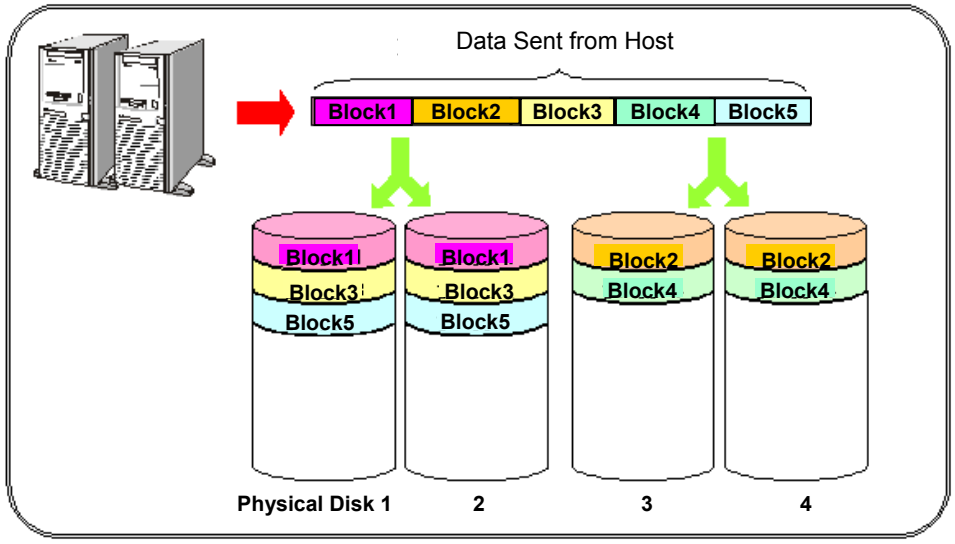
<Advantage>

- Redundancy secured if one physical disk becomes faulty, and high reliability and availability if two disks become faulty.
- Concurrent processing by using distributed parities
- Suitable for random access

<Disadvantage>

- If two physical disks used for the logical disks fail, the capability for reading data degrades.

(5) RAID10



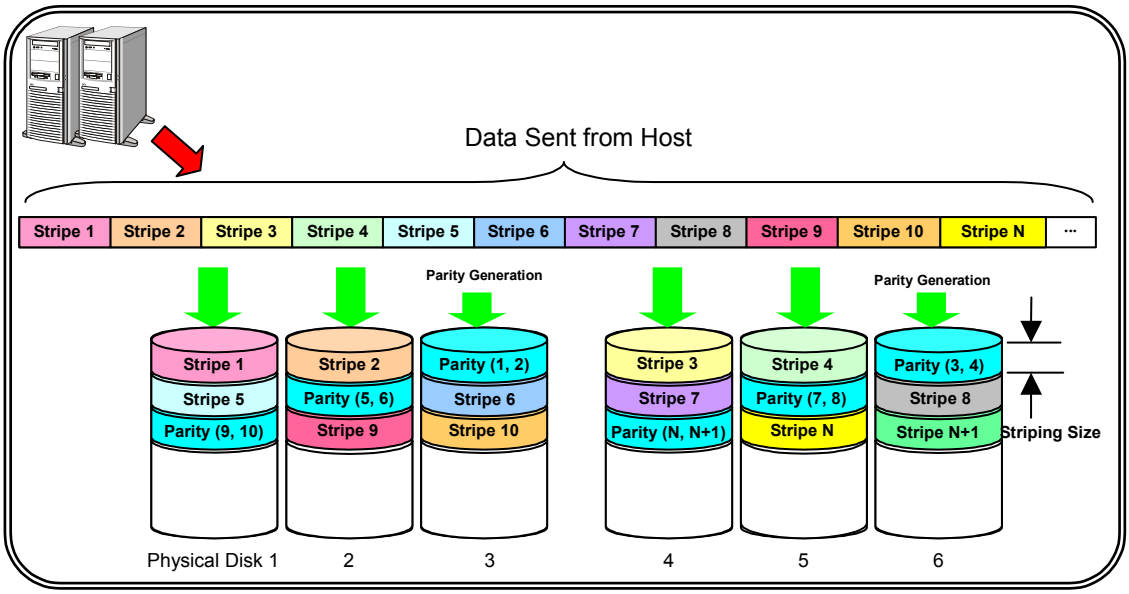
This method slices data (sent from the host) and distributes (RAID0) the data to pairs of mirrored disks (RAID1).

Since RAID10 distributes data to multiple disks, it enables concurrent processing and makes 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: number of paired sets of RAID1 disks) of RAID1 consisting of two disks. Reliability is lower than that of a single RAID1, but it is still high enough.

<Advantage>
- High reliability
- Quick access
- No performance deterioration when a single disk fails

<Disadvantage>
- Redundant data takes up a half of the disk capacity.

(6) RAID50



This method, based on RAID0, slices data sent from the host and distributes the slices into multiple sets of RAID5 physical disks.

Since RAID50 distributes data to multiple sets of RAID5 disks, it enables further concurrent processing and provides quicker access.

<Advantage>

- Concurrent processing for multiple R/W commands
- Quick access

<Disadvantage>

- If one of the physical disks constituting logical disks fails, performance in read operation lowers.

C.2 List of RANK-Configurable RAID Types

The table below shows the number of physical disks and the number of RANKs available by the RAID type on the 100/1000/2000 series (not including S400/S1400/S2400).

RAID Type	Disk Array	Number of Physical Disks														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RAID0	100/1000/2000 series	○	-	○	-	○	-	-	-	-	○	-	-	-	-	○
RAID1		-	○	-	-	-	-	-	-	-	-	-	-	-	-	-
RAID5		-	-	○	○	○	○	○	○	○	○	○	○	○	○	○
RAID10		-	-	-	○	-	○	-	○	-	○	-	○	-	○	-

○: Available -: Unavailable

C.3 List of Pool-Configurable RAID Types

The tables below show the number of physical disks and the number of pools available by the RAID type on S400/S1400/S2400/S2800.

• Basic pool

RAID Type	Disk Array	Number of Physical Disks						
		2	4	5	8	10	16	20
RAID1	S400/S1400/ S2400/S2800	○	-	-	-	-	-	-
RAID5		-	-	○	-	-	-	-
RAID10		-	○	-	○	-	○	-
RAID50		-	-	-	-	○	-	○

○: Available -: Unavailable

• Dynamic pool

RAID Type	Disk Array	Number of Physical Disks
RAID6 (4+PQ)	S400/S1400/ S2400/S2800	6 to 60 (120 or 240)*1
RAID6 (8+PQ)		10 to 60 (120 or 240)*1

*1: The maximum number of physical disks is 60 when pools are in use.
To use 61 or more physical disks, you need to add physical disks by extending dynamic pools.

Appendix D Notes on Use for Data Replication

D.1 Notes on Binding Logical Disks

(1) S400/S1400/S2400/S2800

S400/S1400/S2400/S2800 disk array allows the user or the system engineer to bind logical disks.

1. Specify the capacity of one logical disk in units of 1 GB*1.

2. Now you can select a recommended capacity (already used in the 3000/4000 series disk array) from a pull-down list.
   The table below shows the recommended capacities. (A logical disk's capacity smaller than 0.1 GB*1 is shown rounded*2 on the configuration setting summary display.):

View on iSM	Logical disk capacity (including control region)
2.0 GB	2128 MB
4.1 GB	4256 MB
8.3 GB	8512 MB
16.6 GB	17024 MB
33.2 GB	34048 MB
66.4 GB	68096 MB
132.9 GB	136190 MB
162.0 GB	165984 MB
265.9 GB	272384 MB
531.9 GB	544768 MB
1063.9 GB	1089536 MB

3. On S400/S1400/S2400/S2800 disk array, you can bind logical disks of the same capacity regardless of pool type and RAID configuration. (On the 100/1000/2000 series disk array (not including S400/S1400/S2400), capacities of logical disks you can use are different depending on the RAID configuration.)

4. The real capacity of each logical disk includes additional 2 MB region for disk control, which makes it available for the user. On S400/S1400/S2400/S2800, binding a pool may cause the capacity assigned to a pool (pool used capacity) to exceed the capacity of the logical disks.

*1: iSM handles 1024 KB as 1 MB.

*2: When the total capacity of logical disks is less than 0.1 GB, it is represented as 0.1 GB.

(2) S series (not including S400/S1400/S2400/S2800 and 3000/4000 series)

The user or the system engineer can bind logical disks of the disk arrays (except for S400/S1400/S2400/S2800 and 3000/4000 series). The capacities of logical disks to be bound vary depending on the RAID configuration.

If you want to bind logical disks which are to be used with DataReplication, the disks to be paired must have the same capacity. If having purchased or planning to purchase the products such as DataReplication, keep in mind that the following assists in easily updating the system configuration later:

- Binding logical disks having the same capacity
- Selecting RAID configuration in which logical disks having the same capacity are easy to be bound

iSM can also bind logical disks through the CLI (Command Line Interface). However use of GUI is recommended. This appendix mainly explains how to bind logical disks through the GUI. If use of DataReplication is not for binding logical disks, read the description of "RV"[*1] as "logical disks having the same capacity" in the explanation below.

A logical disk's capacity smaller than 0.1GB[*2] is shown rounded on the configuration setting summary display[*3]. Note that different capacities may appear to be identical.

*1: RV (Replication Volume) is a copy volume in using DataReplication.
*2: iSM processes data with 1MB = 1024KB.
*3: When the total capacity of logical disks is less than 0.1 GB, it is represented as 0.1 GB.

D.2 Recommended RAID Configuration

Table D-1 shows RAID configurations recommended if you want to get logical disks to have the same capacity when using DataReplication.

Table D-1 Recommended Combinations of RAID Configurations

MV \ RV	RAID1 (1+1)*1	RAID5 (4+P)*1	RAID5 (6+P)*1	RAID5 (8+P)*1	RAID5 (2+P)*2
RAID1(1+1)	⊙	⊙	–	⊙	⊙
RAID5(4+P) *1	⊙	⊙	–	⊙	⊙
RAID5(6+P)	–	–	⊙	–	–
RAID5(8+P)	⊙	⊙	–	⊙	⊙
RAID5(2+P) *2	⊙	⊙	–	⊙	⊙

*1: Can be specified through both Batch Setting and Individual Setting.

*2: Can be specified through only Individual Setting.

[How to read the table]

The table shows RAID configurations in which RV having the same capacity as for MV can be bound. The symbols in the table are as follows:

⊙: RV can be bound.

–: RV (= a logical disk having the same capacity as for MV) may not be bound if the RAID configurations of RV and MV are different.

[Supplementary information]

If operating logical disks in a configuration other than the above, bind the logical disks in combination of RAIDs in which RV can be bound. Refer to D.3 “Capacity Except Recommended RAID Configuration” for details.

D.3 Capacity Except Recommended RAID Configuration

D.3.1 Concept of Logical Disk Bind Capacity

This section explains disk array specifications and software specifications, according to which the capacities of logical disks of this disk array series are to be determined. The section mainly explains the capacities of logical disks which are to be bound in a non-recommended RAID configuration. Use "Individual Setting" of Configuration Setting (GUI) to bind logical disks in a non-recommended RAID configuration.

(1) Disk array specifications

This disk array series requires that the capacity of a logical disk of the RAID type (RAID0, RAID10, or RAID5) using the striping feature is a multiple of "striping size × number of data disks*".

The striping size for of this disk array series is defined as 128KB. Thus, "128KB × number of data disks" is the capacity unit of logical disks to be bound, as shown in Figure D-1.

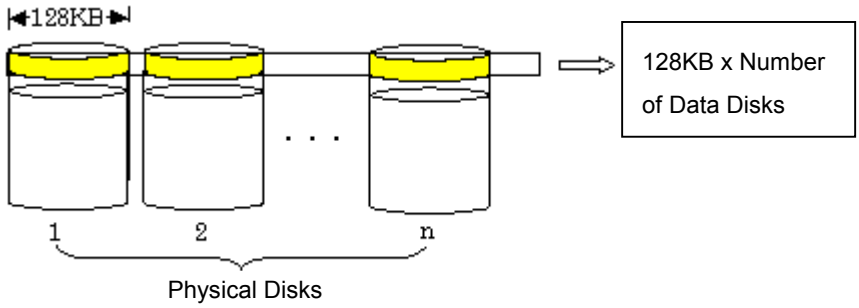


Figure D-1 Capacity Unit in Binding

*: A data disk is a physical disk, which is used to save data in RAID configuration. The number of data disks is 1 in configuration of RAID1(1+1); it is 4 in configuration of RAID5(4+P). In other words, if a RAID configuration is expressed as RAID5(n+P) or RAID10(n+n), "n" is equal to the number of data disks.

(2) Specifications common to Configuration Settings (GUI and CLI)

Configuration Settings (GUI and CLI) process logical disk capacities in megabytes. According to "(1) Disk array specifications" and common specifications in combination, the capacity unit of logical disks to be bound is the lowest common multiple of "128KB × number of data disks" and "1MB (= 1024KB)" as shown in Table D-2.

Table D-2 Capacity Unit of Logical Disks to be Bound

Number of Data Disks	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Capacity Unit (MB)	1	3	1	5	3	7	1	9	5	11	3	13	7	15

If RAID such as RAID1, which does not use the striping feature, is in use, data is processed in megabytes. Thus, the capacity unit is "1". If a capacity is specified, the system recognizes it as the capacity that the user can use. In this case, logical disks are bound in the specified capacity + 2MB (disk management area).

(3) Specifications specific to Configuration Setting (GUI)

Configuration Setting (GUI) specifies a capacity in units of 0.1GB. The capacity is calculated with 0.1GB = 1024MB/10. In this case, obtain the capacity as follows:

- With Capacity Specification (Individual Setting):
  Specified capacity × 1024 → (Decimal places rounded up)*1 → (+2MB)*2 → (Alignment)*3 → Capacity of LD to be bound

- With Disk Count Specification (Individual Setting):
  Free space in RANK/specified number of data disks → (Decimal places rounded up) → (Alignment)*3 → Capacity of LD to be bound

*1: The value with decimal places being rounded up ensures that the specified capacity is allocated from the free space in a selected RANK. If the RANK does not contain free space large enough, logical disks cannot be bound.

*2: A disk management area is added.

*3: Alignment means obtaining a multiple (an outer value for Capacity Specification, and an inner value for Disk Count Specification) of the capacity (in megabytes) calculated from Table D-2.

(4) Examples of obtaining capacities of LD to be bound through Individual Setting of Configuration Setting (GUI)

The following are examples of capacities obtained by specifying a capacity or the number of data disks when logical disks are bound. Refer to D.3.3 "Method of Specifying Configuration Setting" for details on "Capacity Specification" and "Disk Count Specification".

Examples 1: Binding with Capacity Specification

1. Capacity obtained when logical disks are bound with 1.1GB specified for RAID5 (4+P):
   1.1GB × 1024 = 1126.4MB → (Decimal place rounded up) → 1127MB → (+2MB)[*1] → 1129MB → (Alignment) → 1129MB
2. Capacity obtained when logical disks are bound with 1.1GB specified for RAID5 (3+P):
   1.1GB × 1024 = 1126.4MB → (Decimal place rounded up) → 1127MB → (+2MB)[*1] → 1129MB → (Alignment) → 1131MB

*1: Logical disks are bound in the user-specified capacity + 2MB as the disk array management area.

Examples 2: Binding with Disk Count Specification

1. Capacity obtained when three logical disks are bound with 266.7GB as the capacity of RAID5 (4+P):
   266.7GB × 1024/3 = 91033.6MB → (Decimal place rounded down) → 91033MB → (Alignment)[*1] → 91033MB[*2]
2. Capacity obtained when three logical disks are bound with 200GB as the capacity of RAID5 (3+P):
   200GB × 1024/3 = 68266.66MB → (Decimal places rounded down) → 68266MB → (Alignment)[*1] → 68265MB[*2]

*1: The capacity unit is aligned according to Table D-2. In RAID5, (13+P) is the greatest, and the maximum value (MB as the capacity unit) is 13MB.

*2: The capacity of the bound logical disks includes 2MB as the disk array management area.

Note that the logical disk capacity displayed by the iSM is that available to the user, not the total capacity including the disk array management area.

D.3.2 Detailed Combination of RAID Configuration

This disk array series defines that the capacity unit of logical disks to be bound depends on the RAID configuration. Therefore, RV may not be bound in RAID configuration different from that of MV. Table D-3 shows the combinations of RAID configurations in which RV having the same capacity as for MV can be bound.

Table D-3 Correspondence between the Numbers of MV and RV Data Disks in Each RAID Configuration

Number of MV Data Disks	Number of RV Data Disks*														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	⊙	⊙	Δ	⊙	Δ	Δ	Δ	⊙	Δ	Δ	Δ	Δ	Δ	Δ	Δ
2	⊙	⊙	Δ	⊙	Δ	Δ	Δ	⊙	Δ	Δ	Δ	Δ	Δ	Δ	Δ
3	○	○	⊙	○	Δ	⊙	Δ	○	Δ	Δ	Δ	⊙	Δ	Δ	Δ
4	⊙	⊙	Δ	⊙	Δ	Δ	Δ	⊙	Δ	Δ	Δ	Δ	Δ	Δ	Δ
5	○	○	Δ	○	⊙	Δ	Δ	○	Δ	⊙	Δ	Δ	Δ	Δ	Δ
6	○	○	⊙	○	Δ	⊙	Δ	○	Δ	Δ	Δ	⊙	Δ	Δ	Δ
7	○	○	Δ	○	Δ	Δ	⊙	○	Δ	Δ	Δ	Δ	Δ	⊙	Δ
8	⊙	⊙	Δ	⊙	Δ	Δ	Δ	⊙	Δ	Δ	Δ	Δ	Δ	Δ	Δ
9	○	○	○	○	Δ	○	Δ	○	⊙	Δ	Δ	○	Δ	Δ	Δ
10	○	○	Δ	○	⊙	Δ	Δ	○	Δ	⊙	Δ	Δ	Δ	Δ	Δ
11	○	○	Δ	○	Δ	Δ	Δ	○	Δ	Δ	⊙	Δ	Δ	Δ	Δ
12	○	○	⊙	○	Δ	⊙	Δ	○	Δ	Δ	Δ	⊙	Δ	Δ	Δ
13	○	○	Δ	○	Δ	Δ	Δ	○	Δ	Δ	Δ	Δ	⊙	Δ	Δ
14	○	○	Δ	○	Δ	Δ	⊙	○	Δ	Δ	Δ	Δ	Δ	⊙	Δ
15	○	○	○	○	⊙	○	Δ	○	Δ	○	Δ	○	Δ	Δ	⊙

*: The number of data disks is the number of physical disks, which are used to save data in RAID configuration. The number of data disks is 1 in configuration of RAID1(1+1); it is 4 in configuration of RAID5(4+P). In other words, if RAID is expressed as RAID0(n), RAID5(n+P), or RAID10(n+n), "n" is equal to the number of data disks shown in Table D-3.

[How to read the table]

The table shows RAID configurations (depending on the number of data disks in actual operation) in which RV having the same capacity as for MV can be bound. The symbols in the table are as follows:

⊙: RV can be bound.

○: Configuration Setting (GUI) may be unable to bind RV depending on the MV capacity. In this case, use Configuration Setting (CLI) to bind RV.

Δ: Both Configuration Setting (GUI) and Configuration Setting (CLI) may be unable to bind RV depending on the MV capacity.

Examples:

1. With MV bound in configuration of RAID5(4+P)
   Configuration Setting (GUI) can bind RV in configuration of RAID1, RAID5(2+P, 4+P, 8+P), RAID10(2+2, 4+4), or RAID0(1).
2. With MV bound in configuration of RAID5(6+P)
   Configuration Setting (GUI) can bind RV in configuration of RAID0(3), RAID5(3+P, 6+P, 12+P), or RAID10(3+3, 6+6). Configuration Setting (CLI) can bind RV in configuration of RAID1, RAID5(2+P, 4+P, 8+P), or RAID10(2+2, 4+4).

D.3.3 Method of Specifying Configuration Setting

There are two methods (Batch Setting and Individual Setting) for binding logical disks through Configuration Setting (GUI). Each method includes another three specification methods "Disk Count Specification", "Capacity Specification", and "Disk Count and Capacity Specification". There are six specification methods in total.

As a rule, bind RV by the same specification method as when binding MV. Table D-4 shows the combinations of specification methods.

Table D-4 Combinations of Specification Methods

MV \ RV		Batch Setting			Individual Setting		
		Disk Count Specification	Capacity Specification	Disk Count and Capacity Specification	Disk Count Specification	Capacity Specification	Disk Count and Capacity Specification
Batch Setting	Disk Count Specification	○	×	×	×	×	×
	Capacity Specification	×	○	○	×	○	○
	Disk Count and Capacity Specification	×	○	○	×	○	○
Individual Setting	Disk Count Specification	×	×	×	○	×	×
	Capacity Specification	×	○	○	×	○	○
	Disk Count and Capacity Specification	×	○	○	×	○	○

[How to read the table]

The table shows the combinations of specification methods that can bind RV having the same capacity as for MV. The symbols in the table are as follows:

○: RV can be bound.

×: RV cannot be bound.

If there is difference between capacities obtained by the combinations of specification methods in Table D-4, the capacity of a logical disk varies depending on the specification method. Table D-5 shows the capacities of bound logical disks for each specification method.

Table D-5 Bound LD Capacity by Specification Method

Setting Method	Specification Method	How to Obtain Capacity	Capacity Unit
Batch Setting	Disk Count Specification	Divide the recommended maximum capacity*2, which is within the RANK capacity, by the number of data disks.	1MB
	Capacity Specification*1	Specified capacity	0.1GB*3
	Disk Count and Capacity Specification*1	Specified capacity	0.1GB*3
Individual Setting	Disk Count Specification	Divide the RANK capacity by the number of data disks.	1MB
	Capacity Specification*1	Specified capacity	0.1GB*3
	Disk Count and Capacity Specification*1	Specified capacity	0.1GB*3

*1: For "Disk Count and Capacity Specification", Capacity has a higher priority than Disk Count. Thus, the capacity of the bound logical disk is the same as when it is obtained by "Capacity Specification".

*2: Recommended capacity = 2128MB × n (n = 1, 2, 3, ...)
If the RANK capacity is 266.7GB (= 273100.8MB), the recommended capacity is 2128MB × 128 = 272384MB.

*3: A capacity must be specified in units of 0.1GB (0.1GB = 1024MB/10).

Examples 1: Binding with Capacity Specification

1. Capacity obtained when logical disks are bound with 1.1GB specified for RAID5 (4+P):
   Both Batch Setting and Individual Setting can bind logical disks of the same capacity.
   1.1GB × 1024 = 1126.4MB → (Decimal place rounded up) → 1127MB → (+2MB)* → 1129MB → (Alignment) → 1129MB
2. Capacity obtained when logical disks are bound with 1.1GB specified for RAID5 (3+P):
   Only Individual Setting can bind logical disks in configuration of RAID5 (3+P).
   1.1GB × 1024 = 1126.4MB → (Decimal place rounded up) → 1127MB → (+2MB)* → 1129MB → (Alignment) → 1131MB

*: Logical disks are bound in the user-specified capacity + 2MB as the disk array management area.

Examples 2: Binding with Disk Count Specification

1. Capacity obtained when three logical disks are bound with 266.7GB as the RANK capacity of RAID5 (4+P): Batch Setting and Individual Setting bind the logical disks of different capacities.
   (With Batch Setting)
   266.7GB × 1024 = 273100.8MB > 2128MB×n → 2128MB×128 → 272384MB → 272384MB/3 = 90794.66MB → (Decimal places rounded down) → 90794MB → (Alignment) → 90794MB*
   (With Individual Setting)
   266.7GB × 1024/3 = 91033.6MB → (Decimal place rounded down) → 91033MB → (Alignment) → 91033MB*

2. Capacity obtained when three logical disks are bound with 200GB as the capacity of RAID5 (3+P): Only Individual Setting can bind logical disks in configuration of RAID5 (3+P).
   200GB × 1024/3 = 68266.66MB → (Decimal places rounded down) → 68266MB → (Alignment) →68265MB*

   *: The capacity of the bound logical disks includes 2MB as the disk array management area.

Examples 3) Binding with Disk Count and Capacity Specification

1. Capacity obtained when logical disks are bound with 1.1GB specified for RAID5 (4+P):
   Both Batch Setting and Individual Setting can bind three logical disks of the same capacity.
   1.1GB × 1024 = 1126.4MB → (Decimal place rounded up) → 1127MB → (+2MB)* → 1129MB → (Alignment) → 1129MB

2. Capacity obtained when logical disks are bound with 1.1GB specified for RAID5 (3+P):
   Only Individual Setting can bind logical disks in configuration of RAID5 (3+P). Three logical disks of the same capacity can be bound.
   1.1GB × 1024 = 1126.4MB → (Decimal place rounded up) → 1127MB → (+2MB)* → 1129MB → (Alignment) → 1131MB

   *: Logical disks are bound in the user-specified capacity + 2MB as the disk array management area.

Appendix E Logical Disk Used Capacity

The list below shows the difference between the pool used capacity and the logical disk capacity on the 100/1000/2000 series disk array (not including S400/S1400/S2400):

Disk Array Series Name	Logical Disk Capacity	Pool/RANK Used Capacity
100/1000/2000	User available capacity + 2 MB + α	Equal to disk capacity
400/1400/2400/2800	User available capacity + 2 MB	Specified capacity + 2 MB + α

The relation (formula for calculating the relation) between the pool used capacity and the associated logical disk capacity depends on the pool type:

1. Dynamic pool

The minimum unit of assigning an area in a dynamic pool is 256 MB, and the 2-MB control region is secured in another place. Therefore, when the number of disks is 128 or less, the amount of the control region secured in the pool is 256 MB, and when the number of disks is between 129 and 256, it is 512 MB.

(1) Formula

Use the following formula to calculate the pool used capacity when the capacity of logical disks (user available capacity) required is X (MB) and the number of logical disks is Y:

Pool used capacity = ([(X - 1)/256] + 1) × 256 × Y + ([(Y - 1)/128] + 1) × 256
(X,Y > 0)

[X] is a gaussian which represents an integer below X.

(2) Examples

When you bind one 2.0-GB logical disk, the pool used capacity required is:

([(2048 - 1)/256] + 1) × 256 × 1 + ([(1 - 1)/128] + 1) × 256 = 2048 + 256 = 2304 MB

When you bind one logical disk with the recommended capacity 2.0 GB, the pool used capacity required is:

([(2126 - 1)/256] + 1) × 256 × 1 + ([(1 - 1)/128] + 1) × 256 = 2304 + 256 = 2560 MB

(3) List of samples

No. of Logical Disks	Capacity	Pool Used Capacity
1	2.0 GB	2.25 GB (2.2 GB on iSM)
129	2.0 GB	258.50 GB (258.5 GB on iSM)
1	Recommended capacity 2.0 GB	2.50 GB (2.5 GB on iSM)
129	Recommended capacity 2.0 GB	290.75 GB (290.7 GB on iSM)

(4) Supplementary explanation

For the capacity of logical disks you can bind in unused space, it depends on how many logical disks are in the pool.

For example, when you bind 127 logical disks and if there is a pool whose unused space is 2.0 GB, you can locate one 2.0-GB logical disk in the pool, but you cannot locate two 1.0-GB logical disks; because the control region already assigned is used for the 128 logical disks, but a 256-MB new control region is required for 129-th and later logical disks.

2. Basic pool

A basic pool consists of multiple partitions in a RAID configuration, and the partitions are assigned by units of 1 MB. Therefore, because the partitions need to be equally used on area assignment to logical disks, the capacity occupied is a multiple of the number of partitions multiplied by 1 MB.

RAID1 - 1 partition
RAID5 - 1 partition
RAID10 (4 PDs) - 2 partitions
RAID10 (8 PDs) - 4 partitions
RAID10 (16 PDs) - 8 partitions
RAID50 (10 PDs) - 2 partitions
RAID50 (20 PDs) - 4 partitions

(1) Formula

Use the following formula to calculate the pool used capacity when the logical disk capacity (user available capacity) required is X (MB) and the number of RAID partitions is N:

$Y = (X + 2) \bmod N$

When Y = 0,

Pool used capacity = X + 2

When Y > 0,

Pool used capacity = X + 2 + N - Y

A mode N is a congruence representing the remainder of A divided by N.

(2) Examples

When you bind 1.0-GB logical disks with RAID10 (16 PDs):

Y = (1024 + 2) mod 8 = 2

Pool used capacity = 1024 + 2 + 8 - 2 = 1032 MB

When you bind 1.0-GB logical disks with RAID10 (8 PDs):

Y = (1024 + 2) mod 4 = 2

Pool used capacity = 1024 + 2 + 4 - 2 = 1028 MB

When you bind 1.0-GB logical disks with RAID5 (10 PDs):

Y = (1024 + 2) mod 2 = 0

Pool used capacity = 1024 + 2 = 1026 MB

Note that the logical disk capacity is the same in the respective cases but the pool used capacity is not.

Appendix F Batch Setup File

F.1 Nickname Setting File

You can collectively set nicknames using the nickname setting file. The following shows the format of the nickname setting file and a setting sample.

(a) Formatting the user definition file

The format for batch setting the disk array name, LD type/name and the port name from the user definition file is described below.

The user definition file contains a line starting with "#" or ";" to be handled as a comment line.

[User definition file format for batch setup]

```
# Comment line
rmon name list   (A)
[array]          (B)
Target disk array name and new disk array name    (C), (D)
[ld]             (E)
nnnnh, new LD type and new LD name        (F)
                 :
[port]           (G)
mmh-ssh, and new port name    (H)
                 :
[array]          (B)
                 :
```

(A) Key information (File identification info)

Describes "rmon name list" as the key information indicating that the following parameter is the name setting file.

(B) Key information (Disk array)

Describes key information for specifying the name of the target disk array. The information following the [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, only the first disk array name is valid.

When an invalid disk array name is specified, the settings are invalid until the next [array]

key.

(C) 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].

(D) New disk array Name

Describes the disk array name to set following the target disk array + ‘, (comma)’ when executing the disk array name setting. It is unnecessary to specify this when the disk array name is not to be set (i.e., when changing only the LD type/name or the port name).

Describing a name in excess of 32 characters for the disk array name will end in error.

(E) Key information (LD)

Describes [ld] as the key information indicating that the following parameter is the setup information for LDs. (The information following [ld] is valid until the next [array] or [ld] appears.)

(F) New LD Type/Name

Sets the format and LD names for the LDs in the target disk array ((c) above) described before describing this parameter. Describes “nnnnh (nnnn: LD number in four hexadecimal digits)” as the ID information of the target LDs. Describes the newly set format (refer to Table 15-1), “, (comma)” and LD name to continue from “, (comma)”.

Describing a name in excess of 24 characters for the LD name will end in error.

When making settings for other LDs in the same disk array, describe the information to be set in the same format on the succeeding line.

On the ACOS-4 system, make sure that the LD identifier name matches the LD name on the host.

(G) 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 [array] or [ld] appears.)

(H) New Port Name

Sets the names for the ports in the target disk array ((C) 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 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.

[An example of the user definition file for batch setting in initial introduction]

```
rmon name list
[array]
3000000000000003,Array001     Set the disk array name of
                              3000000000000003 to Array001.
                              The following indicate the name
                              settings for this disk array.
[ld]
0000h,WN,DBmaster001          Set the format of the LD number
                              0000h to WN, and the LD name to
                              DBmaster001.
                              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            Set the port name of the port
                              number 04-001 to DBServer01.
04h-01h,DBServer02            The same applies to the following.
06h-00h,DBServer03
06h-01h,DBServer04
```

[An 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.
[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
```

F.2 Pair Setting File

A pair setting file enables you to pair logical disks collectively and register AT-groups collectively. The following shows the format of the pair setting file and a setting sample.

(1) Pair setting file format

(1) A pair setting file is a text file (*.txt, *.csv) in ASCII character format.

(2) Data from a semicolon (;) or sharp (#) to the end of the line is processed as comments.

(3) Uppercase and lowercase characters are distinguished. Be careful in writing characters.

(4) Write “Pair Name List” in the first line except comment lines.

(5) In the lines following “Pair Name List”, specify the items for pair setting in the format below.

“MV DiskArrayName”,“MV Vol Type”,“MV Vol Name”,[“RV DiskArrayName”],“RV Vol Type”,“RV Vol Name”[,]

(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 Vol Type

- Specify the type of Master Volume.

MV Vol Name

- 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 omitted, the system assumes that RV belongs to the disk array of MV.

RV Vol Type

- Specify the type of Replication Volume.

RV Vol Name

- Specify the logical disk name of Replication Volume.
- The logical disk name can be specified with up to 24 characters.

(6) To create an AT-group, write “[atcreate]”.

(7) Specify the [atcreate] items in the following format:

“ATgroupName”,”DiskArrayName”

<SYNTAX>

ATgroupName

- Specify the name of the AT-group to be created.
- The At-group name can be specified with up to 32 characters.

DiskArrayName

- Specify the name of the disk array in which the AT-group is created.
- The disk array name can be specified with up to 32 characters.

(8) To register volumes to the AT-group created, write “[atadd]”.

(9) Specify the [atadd] items in the following format:

“ATgroupName”, “MV Vol Type”, “MV Vol Name”

<SYNTAX>

ATgroupName

- Specify the name of the AT-group to which the volume is created.
- The AT-group name can be specified with up to 32 characters.

MV Vol Type

- Specify the format of the master volume to be registered.

MV Vol Name

- Specify the logical disk name of the master volume to be registered.
- The logical disk name can be specified with up to 24 characters.

(10) To delete volumes already registered to an AT-group, write “[atremove]”.

(11) Specify the [atremove] items in the same manner as [atadd].

“ATgroupName”, “MV Vol Type”, “MV Vol Name”

(12) To delete an AT-group, write “[atdelete]”.

(13) Specify the [atdelete] items in the following format:

“ATgroupName”

<SYNTAX>

ATgroupName

- Specify the name of the AT-group be deleted.
- The AT-group name can be specified with up to 32 characters.

(2) Pair setting sample

```
Pair Name List                                                    ...(a)
;MV DiskArrayName,MV Vol Type,MV Vol. Name,RV DiskArrayName,RV Vol
Type,RV VolName                                                   ...(b)
#MV DiskArrayName,MV Vol Type,MV Vol. Name,RV DiskArrayName,RV Vol
Type,RV VolName                                                   ...(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                                        ...(b)
DB_atg1,DiskArrayName1                                            ...(f)
[atadd]                                                           ...(g)
#ATgroupName,OSType,ExVolName                                     ...(b)
DB_atg1,NX,DEV001                                                 ...(h)
DB_atg1,NX,DEV002                                                 ...(h)
[atcreate]                                                        ...(e)
#ATgroupName,DiskArrayName                                        ...(b)
DB_atg2,DiskArrayName1                                            ...(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 posted.

(b) A line starting with a semicolon (;) or sharp (#) in a CSV-format text file is processed as a comment line. Use a comment line mainly as the title of an item.

(c) If pairing a single MV with multiple RVs, create 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 AT-group.

(f) Create an AT-group on the specified disk array.

(g) Declare registration of volumes to the AT-group.

(h) Each specified volume must be a PV (Primary Volume) and set for one RDR pair. In addition, when you register multiple volumes to an AT-group, the volumes need to be located on the same disk array. RDR pair volumes (RVs) set for registered volumes are also need to be located on the same disk array.

(i) Declare deletion of a volume from an AT-group.

(j) Specify a volume registered to a specified AT-group.

(k) Declare deletion of an AT-group.

(l) Delete all volumes registered to the AT-group you are going to delete.

(1) Use a half-size space between characters.

(2) Do not enter a space preceding or following a character string.

(3) 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.

(4) 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.

(5) Any AT-group name that does not conform to the following rules is invalid:

- Number of available characters 1 to 32 characters
- Available characters Alphabet: A to Z (a to z)
  * Upper- and lower-case characters are distinguished.
  Numerals: 0 to 9
  Underbar: _
  Slash: /

* All the characters must be 1-byte characters.

Appendix G ACOS-4 Resource Operation Guard

It is allowed only for our maintenance personnel to specify ACOS-4 resource settings. If you need to handle ACOS-4 resources, be sure to ask our maintenance personnel first.

To protect ACOS-4 against system destruction, the work involved in setting the resources used by ACOS-4 is defined as tasks to be carried out by maintenance personnel. On the other hand, the open system resources are allowed to be set by general users, giving priority to the freedom of work in such cases as changing the settings. Note, however, that a mistake or other inappropriate operation that the general user makes when setting the Access Control in the WWN mode or in the GUI-based Port mode, which has been supported for the disk array which applies program product "AccessControl" beginning with Version 2.1, can result in the destruction of the ACOS-4 system.

Starting with Version 2.2, a reinforced guard function has been deployed that guards against Access-Control-related operation's that can lead to the destruction of the ACOS-4 system. Whenever an operation related to the ACOS-4 resources is requested, a dialog appears indicating that the operations for the ACOS-4 resources by general users are restricted and that a consultation with maintenance personnel is required.

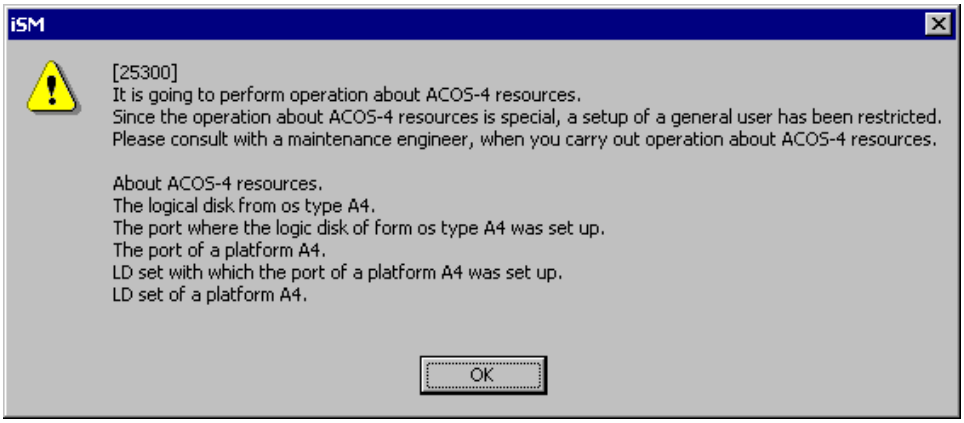


Figure G-1 ACOS-4 Resource Operation Warning Dialog

(1) ACOS-4 resources

(a) Logical disk of the “A4” type

(b) Port including any logical disk of the “A4” type

And all logical disks assigned to that port

(c) Port of the “A4” platform

And all logical disks assigned to that port

(d) LD Set including any port of the “A4” platform

And all logical disks and ports assigned to that LD Set

(e) LD Set of the “A4” platform

And all logical disks and ports assigned to that LD Set

(2) Operations related to the ACOS-4 resources

The operations related to the ACOS-4 resources are special, and general users are restricted from performing them. If any operation related to the ACOS-4 resources is required, consult maintenance personnel.

(3) Functions and operations subject to the ACOS-4 resource operation guard

Table G-1 List of Functions and Operations Subject to the ACOS-4 Resource Operation Guard (1/2)

Function	Function Details	Guarded Operation
Configuration setting	Bind logical disk	Setting “A4” as the logical disk type
	Set/change logical disk type	Setting “A4” as the logical disk type
		Changing the logical disk type from “A4”
	Set/change port platform	Setting “A4” as the port platform.
		Changing the port platform type from “A4”
Access Control	Create/delete LD Set	Creating an LD Set of the “A4” platform
		Deleting an LD Set of the “A4” platform
		Deleting an LD Set including any port of the “A4” platform
	Change LD Set name	Changing an LD Set of the “A4” platform
		Changing the platform of the LD Set including a port of the “A4” platform
	Add logical disk to LD Set	Adding a logical disk of the “A4” type to an LD Set
		Adding a logical disk to an LD Set of the “A4” platform
		Adding a logical disk to an LD Set including a port of the “A4” platform
	Delete logical disk from LD Set	Deleting a logical disk of the “A4” type from an LD Set
		Deleting a logical disk from an LD Set of the “A4” platform
		Deleting a logical disk from an LD Set including a port of the “A4” platform
	Connect WWPN link to LD Set	Connecting a WWPN link to an LD Set of the “A4” platform
		Connecting a WWPN link to an LD Set including a port of the “A4” platform
	Disconnect WWPN link from LD Set	Disconnecting a WWPN link from an LD Set of the “A4” platform
		Disconnecting a WWPN link from an LD Set including a port of the “A4” platform

Table G-1 List of Functions and Operations Subject to the ACOS-4 Resource Operation Guard (2/2)

Function	Function Details	Guarded Operation
Access Control	Connect port link to LD Set	Connecting a port link of the “A4” platform to an LD Set
		Connecting a port link to an LD Set of the “A4” platform
		Connecting a port link to an LD Set including a port of the “A4” platform
	Disconnect port link from LD Set	Disconnecting a port link of the “A4” platform from an LD Set
		Disconnecting a port link from an LD Set of the “A4” platform
		Disconnecting a port link from an LD Set including a port of the “A4” platform
	Change port mode	Changing the mode of a port of the “A4” platform
		Changing the mode of a port assigned a logical disk the “A4” type
		Changing the mode of a port linked to an LD Set of the “A4” platform
LD Administrator	Add logical disk to LD Set	Adding a logical disk of the “A4” type to an LD Set
		Adding a logical disk to an LD Set of the “A4” platform
		Adding a logical disk to an LD Set including a port of the “A4” platform
	Move logical disk to preserve group from LD Set	Moving a logical disk of the “A4” type to a preserve group from an LD Set
		Moving a logical disk to a preserve group from an LD Set of the “A4” platform
		Moving a logical disk to a preserve group from an LD Set including a port of the “A4” platform
	Move logical disk to reserve group from LD Set	Moving a logical disk of the “A4” type to a reserve group from an LD Set
		Moving a logical disk to a reserve group from an LD Set of the “A4” platform
		Moving a logical disk to a reserve group from an LD Set including a port of the “A4” platform
Configuration display/state monitoring (iSM client main window)	Set/change logical disk type	Setting “A4” as the logical disk type
		Changing the logical disk type to “A4”
		Setting/changing the type of a logical disk assigned to a port of the “A4” platform
		Changing the type of a logical disk assigned to an LD Set of the “A4” platform

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