NEC Storage

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NEC Storage Manager

User's Manual

IS004-13E

Preface

This manual describes the usage of NEC Storage Manager. NEC Storage Manager centrally operates/manages NEC Storage disk array subsystems connected to server machines. To do so, it manages the configurations and statuses of the NEC Storage disk array subsystems and issues alert messages according to performance and fault information. 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

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
BaseProduct	NEC Storage BaseProduct
AccessControl	NEC Storage AccessControl
CachePartitioning	NEC Storage CachePartitioning
DynamicDataReplication	NEC Storage DynamicDataReplication
PerformanceMonitor	NEC Storage PerformanceMonitor
PerformanceOptimizer	NEC Storage PerformanceOptimizer
ReallocationControl	NEC Storage ReallocationControl
RemoteDataReplication	NEC Storage RemoteDataReplication
RemoteDataReplication/DisasterRecovery	NEC Storage RemoteDataReplication/DisasterRecovery
ReplicationControl	NEC Storage ReplicationControl

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

Description	Corresponding Manual
Configuration Setting Tool User's Manual (GUI)	NEC Storage Manager Configuration Setting Tool User's Manual (GUI) (IS007)
Messages Handbook	NEC Storage Manager Messages Handbook (IS010)
Data Replication User's Manual (Function Guide)	NEC Storage Manager Data Replication User's Manual (Function Guide) (IS015)
Data Replication User's Manual (Installation and Operation Guide for Windows)	NEC Storage Manager Data Replication User's Manual (Installation and Operation Guide for Windows) (IS016)
PerformanceMonitor User's Manual	NEC Storage PerformanceMonitor User's Manual (IS025)
Snapshot User's Manual (Function Guide)	NEC Storage Manager Snapshot User's Manual (Function Guide) (IS030)
Manual Guide	NEC Storage Manager Manual Guide (IS901)

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   - Linux is a trademark or a registered trademark of Mr. Linus Torvalds in the United States and other countries.

   Other product names and company names, etc. are trademarks or registered trademarks of the associated companies.
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.

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Contents

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Part I Installation and Setting

Chapter 1 Server Installation

1.1 Operating Environment

Table 1-1 Operating Environment

Operating systems	Microsoft Windows 2000 Server (SP2 or later) Microsoft Windows 2000 Advanced Server (SP2 or later) Microsoft Windows Server 2003, Standard Edition Microsoft Windows Server 2003, Enterprise Edition (64-bit) Microsoft Windows Server 2003, Enterprise Edition
Memory	OS required memory capacity + 50MB (+ 200MB for 64-bit) or more
Disk capacity	Program capacity: 20MB Required capacity for operation: 100MB or more
Recommended software	IIS FTP Publishing Service
Indispensable hardware	Storage series

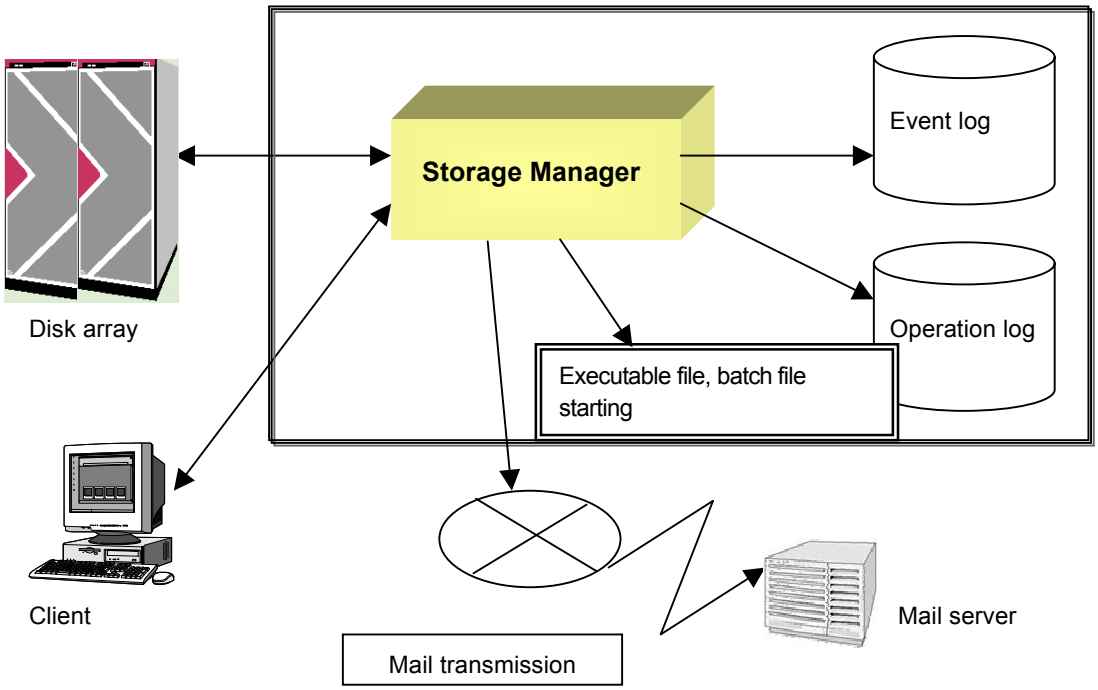

Figure 1-1 System Configuration Image

When managing a disk array via FC, a fibre channel controller, a fibre channel cable and a driver of fibre channel controller are necessary as peripheral equipments. And a fibre channel hub and a fibre channel switch should be installed if necessary.

1.2 Installation

1.2.1 Storage Manager Server Installation

To install the iSM server, follow the procedure below.

1. To use the ESMPRO link function, install ESMPRO Agent ahead of the iSM server. If Alert Manager Main Service has been started before the iSM server is installed, terminate this service once to register the link function securely and then execute the following operations for installation.
2. When you install the iSM server to a server machine in which ESMPRO Manager is installed, a screen for confirming link with ESMPRO Alert Manager appears. Make setting as needed on the screen. For details, refer to 3.7.4 “Link between ESMPRO Manager and ESMPRO Alert Manager”.
3. iSM server creates many files, while it is operating, in the folder where iSM itself is installed. If the program is uninstalled, all files and subfolders, not including the iSM server setting file, in the folder where the program is installed are deleted. Therefore, default folder setting is recommended to use for installing the program. If you want to install the program into a folder other than the default folder, you have to create a new folder or be sure to install into an existing folder where other files are not installed. In addition, never save important files in the folder.
4. The target folder where Win.ini file is stored cannot be selected for a folder where the program is to be installed.

(1) Log on as the Administrator.

(2) Select the following installation program from [Add/Remove Programs] ([Add or Remove Programs] for Windows Server 2003) in [Control Panel].
CD-ROM drive:\SERVER\WINDOWS\SETUP.EXE

(3) Follow the directions of the installer.
Perform environment setting in the install process. For the information of the environment setting, refer to 1.3 “Environment Setting”.

(4) Reboot the operating system.
To prevent iSM server from being automatically started during restart of the operating system, refer to 5.1 “Server Start/Stop”.

1.2.2 Storage Manager Server Uninstallation

To uninstall the iSM server, follow the procedure below.

(1) Log on as the Administrator.

(2) Close [Services] and [Event Viewer].

(3) Remove "Storage Manager Server" by using [Add/Remove Programs] ([Add or Remove Programs] for Windows Server 2003) in [Control Panel]. When the Storage Manager service is running, it will be automatically stopped. Even after iSM has been uninstalled, the environment definition files, operation log files, performance statistical information history files, performance statistical information summary files, performance optimization log files, and license-related files are not deleted. All the other files and subfolders under the folder where the program is installed are deleted when iSM is uninstalled.

1.2.3 Storage Manager Server Update

To update iSM server, uninstall the existing iSM before installing the updated program.

Please refer to 1.2.1 "Storage Manager Server Installation" and 1.2.2 "Storage Manager Server Uninstallation" for the procedures.

1.2.4 Volume List Installation and Uninstallation

The iSMvollist command is a tool for reporting disk information such as the disk array name or logical disk name of a disk array connected via the fibre channel (FC). This command can be operated independently even on a server machine where iSM has not been installed.

To install iSMvollist, follow the procedure below.

When iSMvollist is already installed, uninstall it and then install it again.

(1) Log on as the Administrator.

(2) Select the following installation program from [Add/Remove Programs] ([Add or Remove Programs] for Windows Server 2003) in [Control Panel].
CD-ROM drive:\VOLLIST\WINDOWS\SETUP.EXE

(3) Follow the directions of the installer.

To uninstall iSMvollist, follow the procedure below.

(1) Log on as the Administrator.

(2) If the iSMvollist command and/or [Volume List Display] have been started, terminate all. If [Event Viewer] is open, close it.

(3) Remove "Storage Manager Volume List" by using [Add/Remove Programs] ([Add or Remove Programs] for Windows Server 2003) in [Control Panel].

If you uninstall iSMvollist while iSMvollist and/or [Volume List Display] have been started, a message prompting to restart the system may appear. In this case, follow the instruction and be sure to restart the system.

1.3 Environment Setting

Environment settings are required to start up the iSM server. This document describes how to perform environment settings.
Perform environment settings when installing the iSM server or changing the settings because of the addition of the disk arrays to be monitored or users after the installation.

1.3.1 Setting Disk Array Information

Disk array information is set in the following screen. Disk array information includes identification of disk arrays monitored by the iSM server and how to connect disk arrays.
To start the Setting Utility screen, select [Start] → [Programs] ([All Programs] for Windows Server 2003) → [Storage Manager Server] → [Setting Utility], or select [Server Menu] → [Setting Utility]. If having changed the environment setting, restart the iSM server. Information set on each screen is saved by clicking the [OK] button.
When iSM server is installed before the connection of disk arrays or the IP address and/or disk number of a disk array is unknown, first select [Automatic detection of Disk Array Subsystems connected by FC] and make other setting (such as 1.3.2 “Setting User Information”). In such a case, change the setting with the IP address and disk number determined.

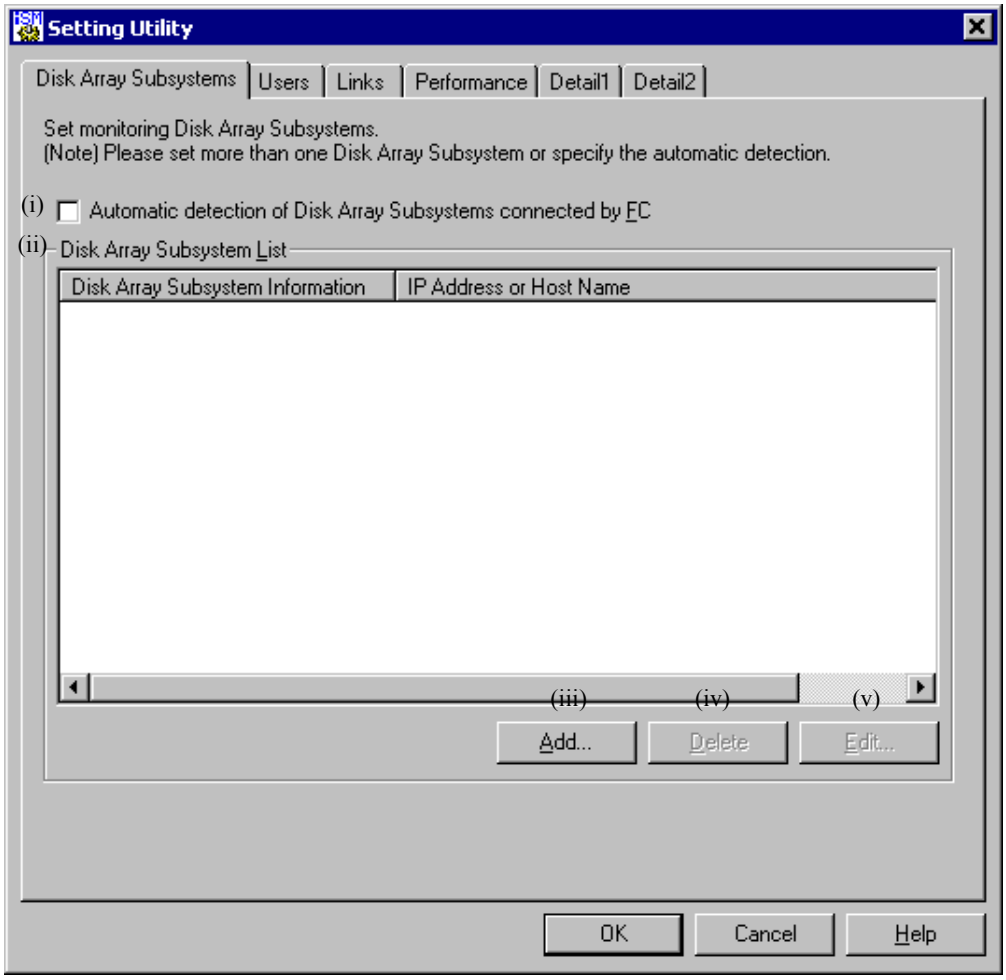

Figure 1-2 Disk Array Subsystem List Screen

(i) [Automatic detection of Disk Array Subsystems connected by FC]

When you select [Automatic detection of Disk Array Subsystems connected by FC], disk arrays with the FC connection are automatically detected and monitored.

(ii) [Disk Array Subsystem List]

[Disk Array Subsystem List] displays the disk array information currently registered.

(When a disk array specified by the disk number is selected, the column heading [IP Address or Host Name] in the figure above appears as [Disk].) Up to 32 disk arrays can be registered in the [Disk Array Subsystem List].

(iii) [Add] button

To add a disk array, use the [Add] button to open the Add screen.

(iv) [Delete] button

To delete a disk array, select a disk array you want to delete, and click the [Delete] button.

(v) [Edit] button

To modify a disk array, select a disk array you want to edit and click the [Edit] button, or double-click the disk array and edit it on the Edit screen (Figures 1-4 and 1-5).

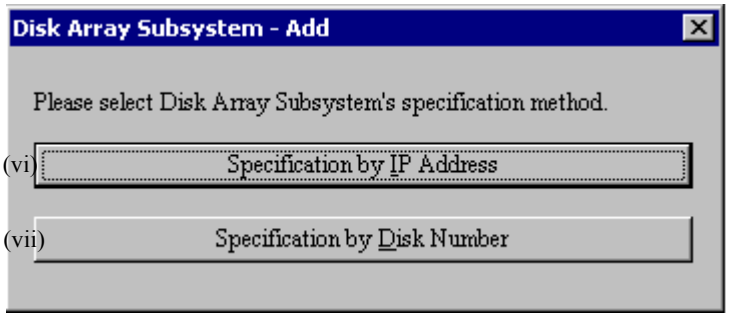

Figure 1-3 Disk Array Subsystem - Add Screen - 1

(vi) [Specification by IP Address]

To monitor a disk array in TCP/IP connection, select [Specification by IP Address] to display the IP address addition screen (Figure 1-4).

(vii) [Specification by Disk Number]

To monitor a disk array in FC connection, select [Specification by Disk Number] to display the disk addition screen (Figure 1-5). Disk number is a number assigned by Windows to manage logical disks. The setting is generally not required since the disk arrays connected by FC are automatically detected by checking [Automatic detection of Disk Array Subsystems connected by FC].

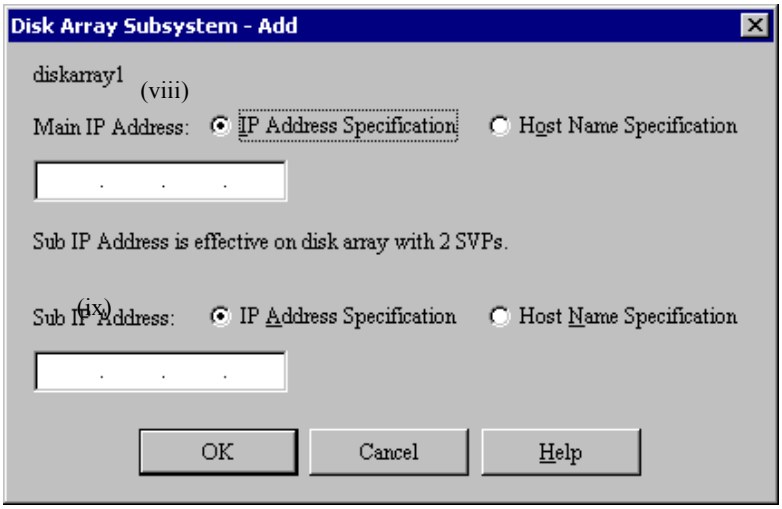

Figure 1-4 Disk Array Subsystem - Add Screen - 2

(viii) [Main IP Address]

In [Main IP Address], specify an IP address or host name. Up to 63 characters can be used for a host name. Non-ASCII code characters, control characters, double quotation mark, and space cannot be used for a host name.

iSM connects to the IP address or that specified for the host name (port number: 2730) to conduct monitoring.

(ix) [Sub IP Address]

In [Sub IP Address], up to two IP addresses can be specified for the disk arrays with two SVPs.

iSM connects to the IP address or that specified for the host name (port number: 2730) to conduct monitoring.

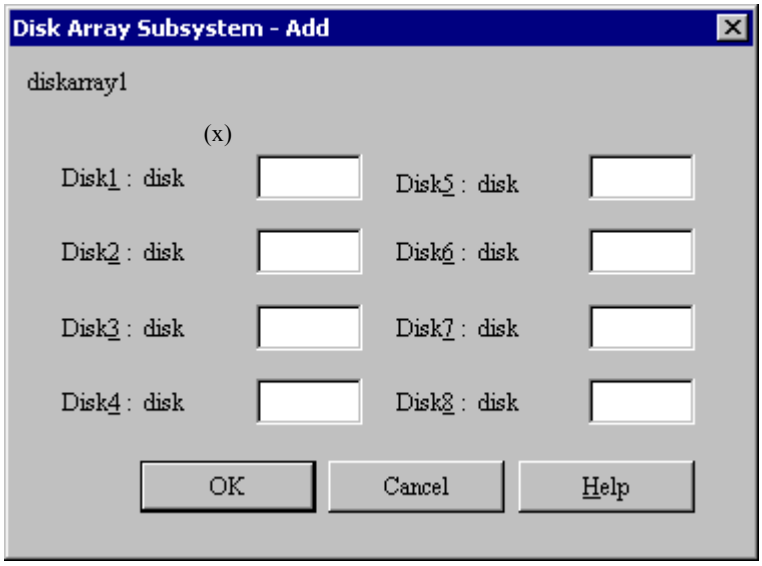

Figure 1-5 Disk Array Subsystem - Add Screen - 3

(x) Disk Number Entry field

In an entry field on the screen as shown in the figure above, specify a disk number. A value from 0 to 9999 can be specified for a disk number. Check the disk number of the disk array to be monitored, using the Volume List (iSMvollist -dl) command in advance. For details, refer to 5.3 “Volume List Command (iSMvollist)”.

1. Without any disk number being specified, disk arrays can be monitored via FC by specifying [Automatic detection of Disk Array Subsystems connected by FC].
   Specification of a disk number is not recommended because the disk number may change when the OS is rebooted or an FC fault occurs.
2. For Windows Server 2003, disks in disk arrays may not be accessed when, for example, the access control setting is changed. Therefore, it is strongly recommended that disk arrays be monitored through TCP/IP connection when iSM server is installed and used under Windows Server 2003.

1.3.2 Setting User Information

User information is set in the following screen. iSM server uses user information as an account. iSM server uses this information in order to identify the user who connects by iSM client. This information is composed of user names, passwords, and user levels (refer to explanation of the "User-Add" screen given later for details). As a default, a user is registered having the user name of iSM, password of iSM and user level of L1 (only reference to the information is allowed). Add, as required, users of the user level L3 who can change configuration of disk arrays. For the iSM client, refer to 5.2 "Client Start/Stop".

Set user information on the Setting Utility screen shown below.
To start the Setting Utility screen, select [Start] → [Programs] ([All Programs] for Windows Server 2003) → [Storage Manager Server] → [Setting Utility], or select [Server Menu] → [Setting Utility]. If having changed the environment setting, restart the iSM server. Information set on each screen is saved by clicking the [OK] button.

Setting of one or more pieces of user information is required. Note that user information of iSM set on this screen is independent of the OS user or password.

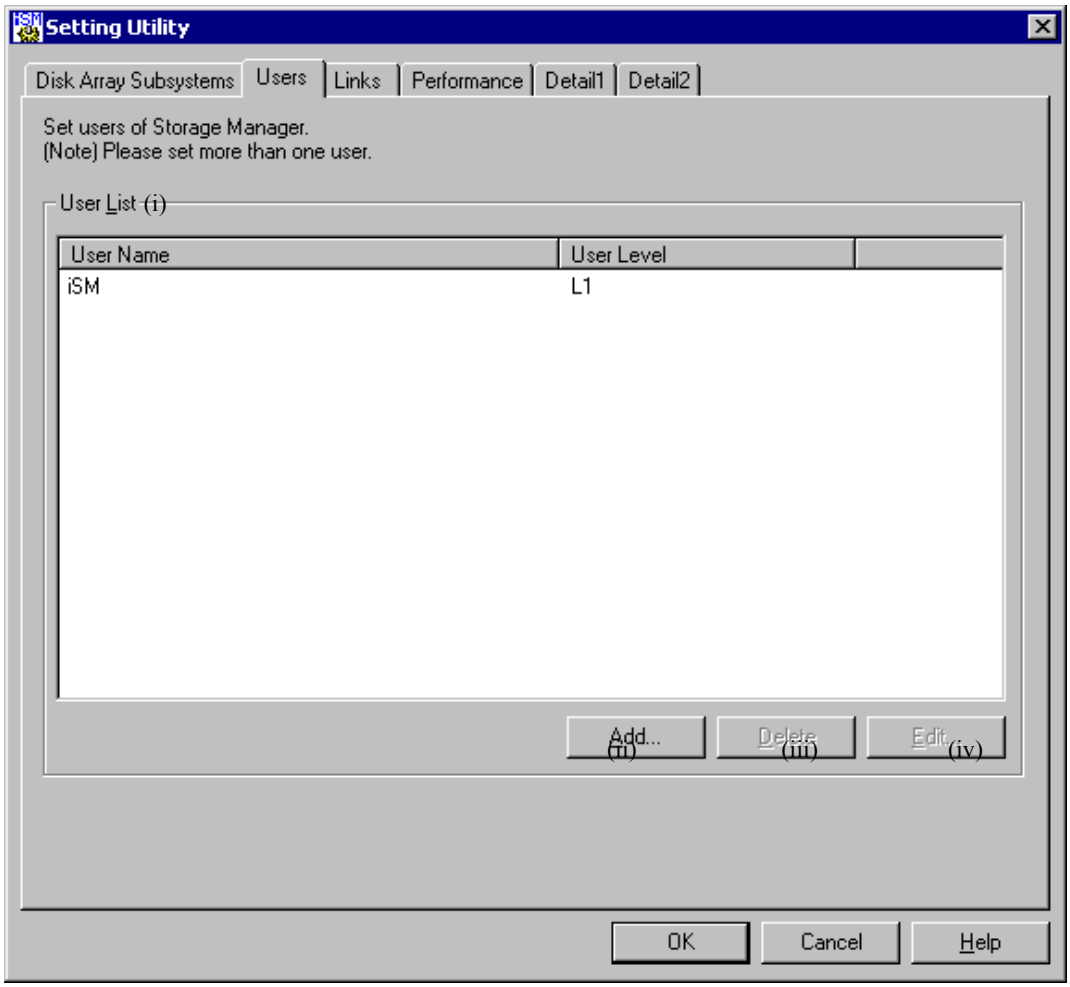

Figure 1-6 User List Screen

(i) [User List]

[User List] displays the list of users currently registered. This user name is used for obtaining authorization to connect with an iSM server from an iSM client, and display and control the disk array information form the iSM client. Up to 100 user names can be registered in the User List.

(ii) [Add] button

To add a user, use the [Add] button to open the Add screen (Figure 1-7).

(iii) [Delete] button

To delete a user, select a user you want to delete, and click the [Delete] button.

(iv) [Edit] button

To modify a user, select a user you want to edit and click the [Edit] button, or double-click the user and edit it on the Edit screen (Figure 1-7).

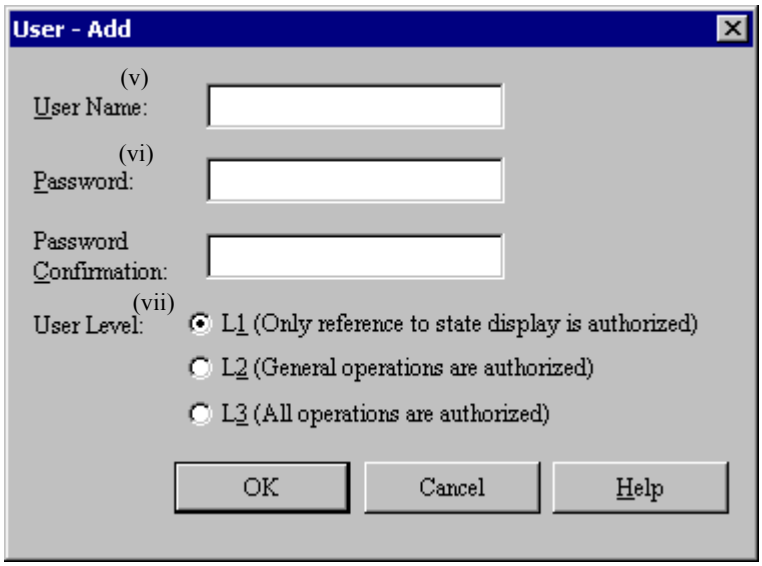

Figure 1-7 User - Add Screen

(v) [User Name]

In [User Name], specify a user name within 20 characters. User Name is case-sensitive. Non-ASCII code characters, control characters, double quotation mark, and space cannot be used for a user name.

(vi) [Password]

In [Password], specify a password of the user within 14 characters. Password is case-sensitive. Enter the same password in [Password Confirmation] for confirmation. The character you enter is displayed as a "*". Non-ASCII code characters, control characters, and double quotation mark cannot be used for a password. A password cannot consist of all spaces.

(vii) [User Level]

In [User Level], specify the operation authorization level of the user. iSM defines the three kinds of user levels that set/refer information of disk arrays by iSM client. An upper level (L3>L2>L1) allows all operations of a lower level.

L1(Level 1): Only reference to state display is authorized.

L2(Level 2): Operations at the level of the replication, performance monitoring, performance optimization, and snapshot functions are authorized.

L3(Level 3): All operations are authorized, such as changing the disk array configuration.

1.3.3 Setting Link Information

Set link information to use the event link function. For details on the event link function, refer to 3.6 “Event Link”.

Set link information on the Setting Utility screen shown below.

To start the Setting Utility screen, select [Start] → [Programs] ([All Programs] for Windows Server 2003) → [Storage Manager Server] → [Setting Utility], or select [Server Menu] → [Setting Utility].

(1) Setting Utility screen

Even while the iSM server is operating, event link operation can be dynamically changed by clicking the [Update Event Link Operation] button on the Setting Utility screen. At this time, information set on this screen is saved. Restart the iSM server if not clicking the [Update Event Link Operation] button.

Information set on each screen is saved by clicking the [OK] button.

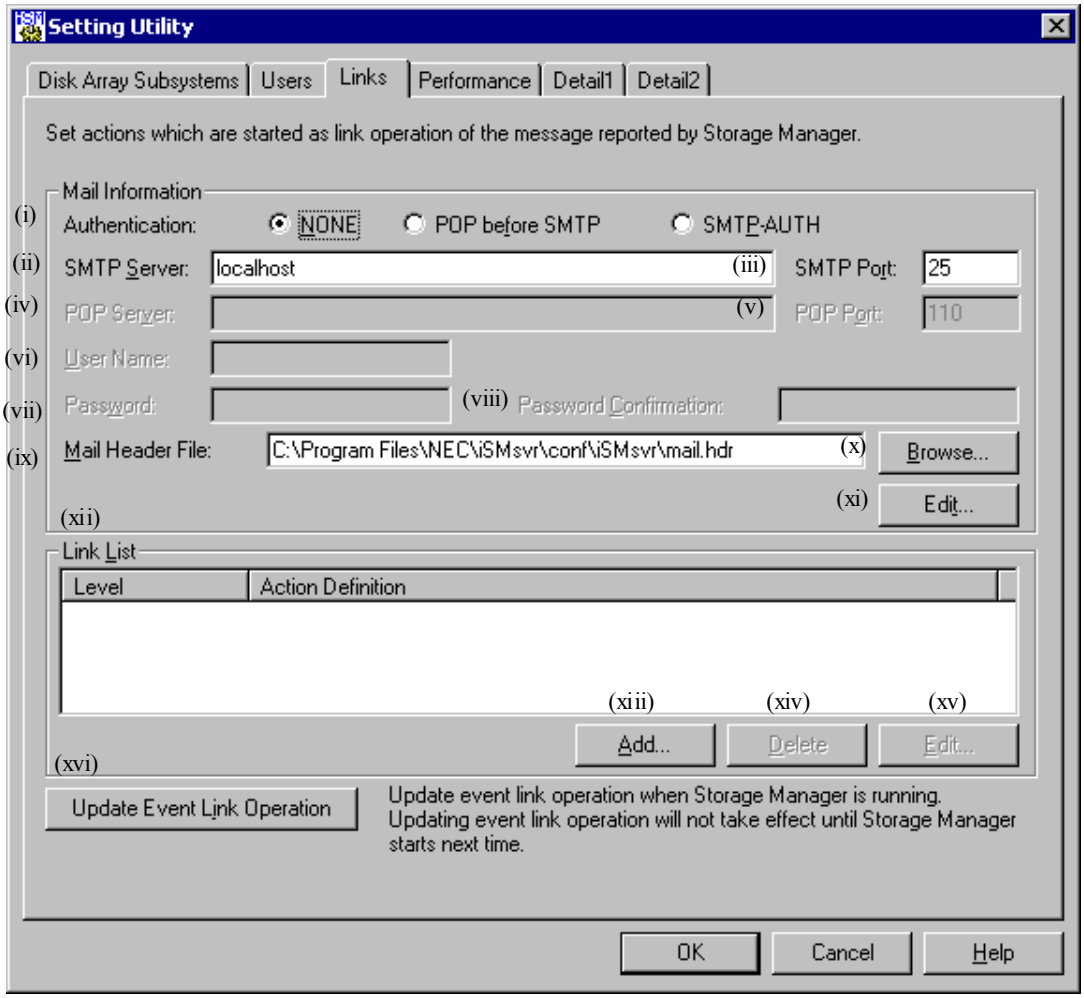

Figure 1-8 Screen for Setting Link Information

(i) Authentication

NONE:	Does not perform user authentication.
POP before SMTP:	Performs user authentication using POP before SMTP.
SMTP-AUTH:	Performs user authentication using SMTP Authentication.

(ii) SMTP Server

In [SMTP Server], specify the SMTP server to which mails are sent within 235 characters.

(iii) SMTP Port

In [SMTP Port], specify the port number of the SMTP server to which mails are sent.

A value from 1 to 65535 can be specified. The default value is 25.

(iv) POP Server

In [POP Server], specify the POP server to access for authentication when sending mails within 235 characters.

This item is effective if you specify [POP before SMTP] for (i) [Authentication].

(v) POP Port

In [POP Port], specify the port number of the POP server to access for authentication when sending mails.

A value from 1 to 65535 can be specified. The default value is 110.

This item is effective if you specify [POP before SMTP] for (i) [Authentication].

(vi) User Name

In [User Name], specify the user name for authentication within 32 characters.

This item is effective if you specify either [POP before SMTP] or [SMTP-AUTH] for (i) [Authentication].

(vii) Password

In [Password], specify a password of the user name for authentication within 58 characters.

This item is effective if you specify either [POP before SMTP] or [SMTP-AUTH] for (i) [Authentication].

(viii) Password Confirmation

Enter the same password in [Password Confirmation] for confirmation.

This item is effective if you specify either [POP before SMTP] or [SMTP-AUTH] for (i) [Authentication].

(ix) Mail Header File

In [Mail Header File], specify the header file which is a template for sending a mail within 235 characters.

(x) [Browse] button

Displays the file selection screen on which you can specify an existing mail header file.

(xi) [Edit] button

Enables the creation of a new mail header file or the editing of an existing mail header file. Enter the path in the [Mail Header File] field and click the [Edit] button. The Mail Header File Setting screen (Figure 1-9) appears. Edit the contents and click the [Save] button or [Save as] button.

(xii) Link List

Displays the list of currently set link items.

(xiii) [Add] button

Displays the Link - Add screen (Figure 1-10) on which you can add link items.

(xiv) [Delete] button

To delete a link item, select the one you want to delete and click the [Delete] button.

(xv) [Edit] button

Select a link item and click the [Edit] button, or double-click the link item. The Link - Add screen (Figure 1-10) appears for changing link items.

(xvi) [Update Event Link Operation] button

A message is displayed asking if you want to apply new settings. If iSM is operating, selecting the [Yes] button immediately applies the new settings. If iSM is not operating, only event link information is updated, and the new settings become valid when iSM is started next time.

(2) Mail Header File Setting screen

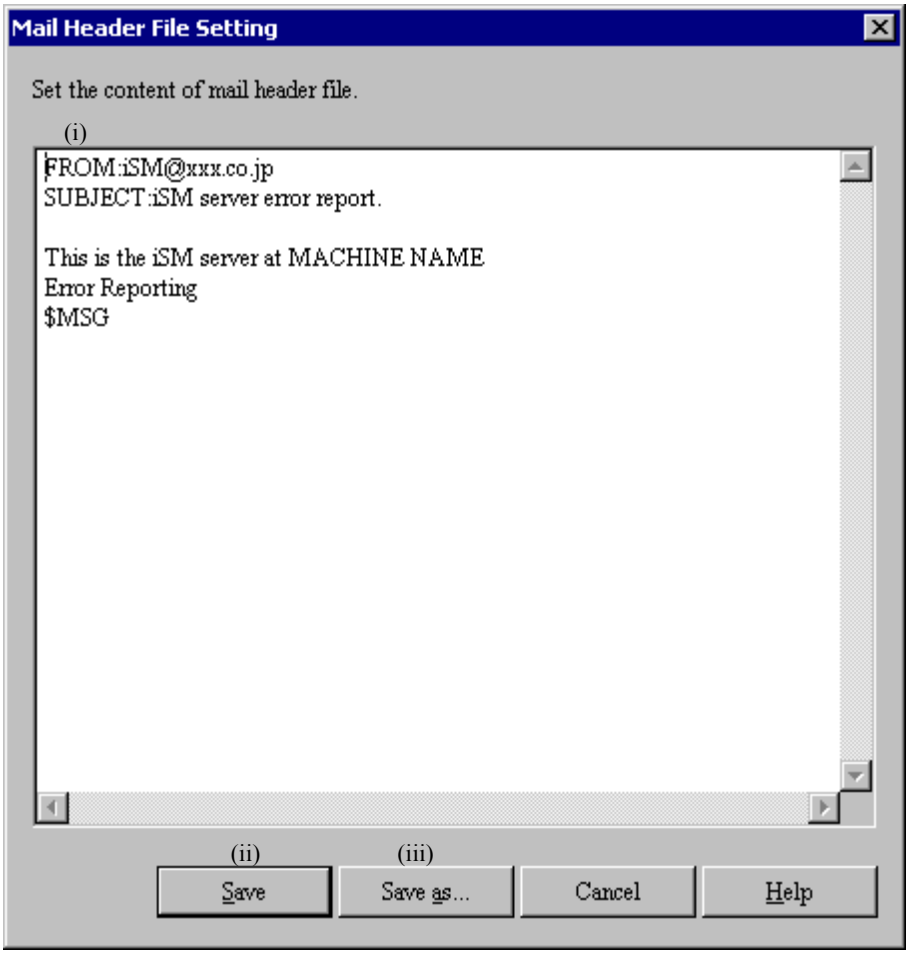

Figure 1-9 Mail Header File Setting Screen

(i) Mail header file contents

Write the mail header file contents. For details, refer to Appendix B “Environment Definition Language”.

(ii) [Save] button

Saves the mail header file with the displayed contents and returns to the Link Information Setting screen (Figure 1-8).

(iii) [Save as] button

Newly saves the mail header file with the displayed contents, and returns to the Link Information Setting screen (Figure 1-8). The path name of a newly created file is entered in the [Mail Header File] field.

(3) Link-Add screen

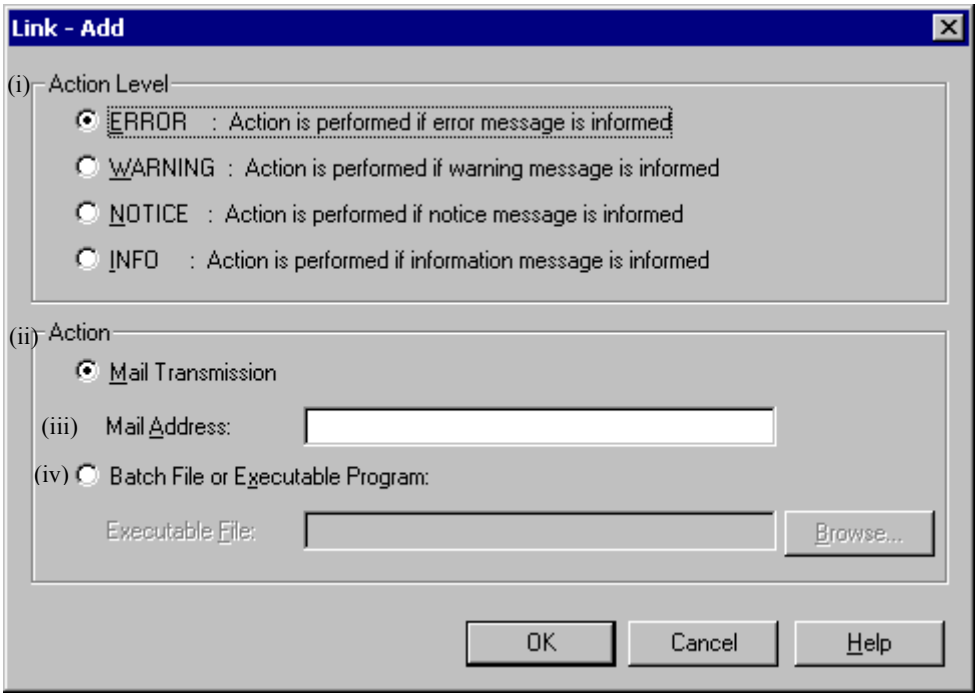

Figure 1-10 Link Item Addition Screen

(i) Action Level

Select the execution level of the action performed for the message of iSM.

(ii) Action

Select the action (the sending of mail or the execution of a batch file or program) to be taken for the message of iSM.

(iii) Mail Address

If [Mail Transmission] is selected, specify the mail address of the destination. Do not use parentheses in specifying the mail address. The mail address can be specified with up to 235 characters.

(iv) Executable File

If [Batch File or Executable Program] is selected, click the [Browse] button and specify the path name of the batch file or program. In this case, specify an executable file which does not require any interaction with the screen. Do not use parentheses in specifying the executable file. The executable file can be specified with up to 235 characters.

1. The [Browse] button is available only when [Batch File or Executable Program] is selected in the [Action] field.
2. Do not register actions of the same contents repeatedly in the same action level.

1.3.4 Setting Performance Information

Set performance information on the Setting Utility screen shown below. Since the default values are recommended for the information, it is not necessary to make any settings on this screen in ordinary operation.

To start the Setting Utility screen, select [Start] → [Programs] ([All Programs] for Windows Server 2003) → [Storage Manager Server] → [Setting Utility], or select [Server Menu] → [Setting Utility]. If having changed the environment setting, restart the iSM server. Information set on each screen is saved by clicking the [OK] button.

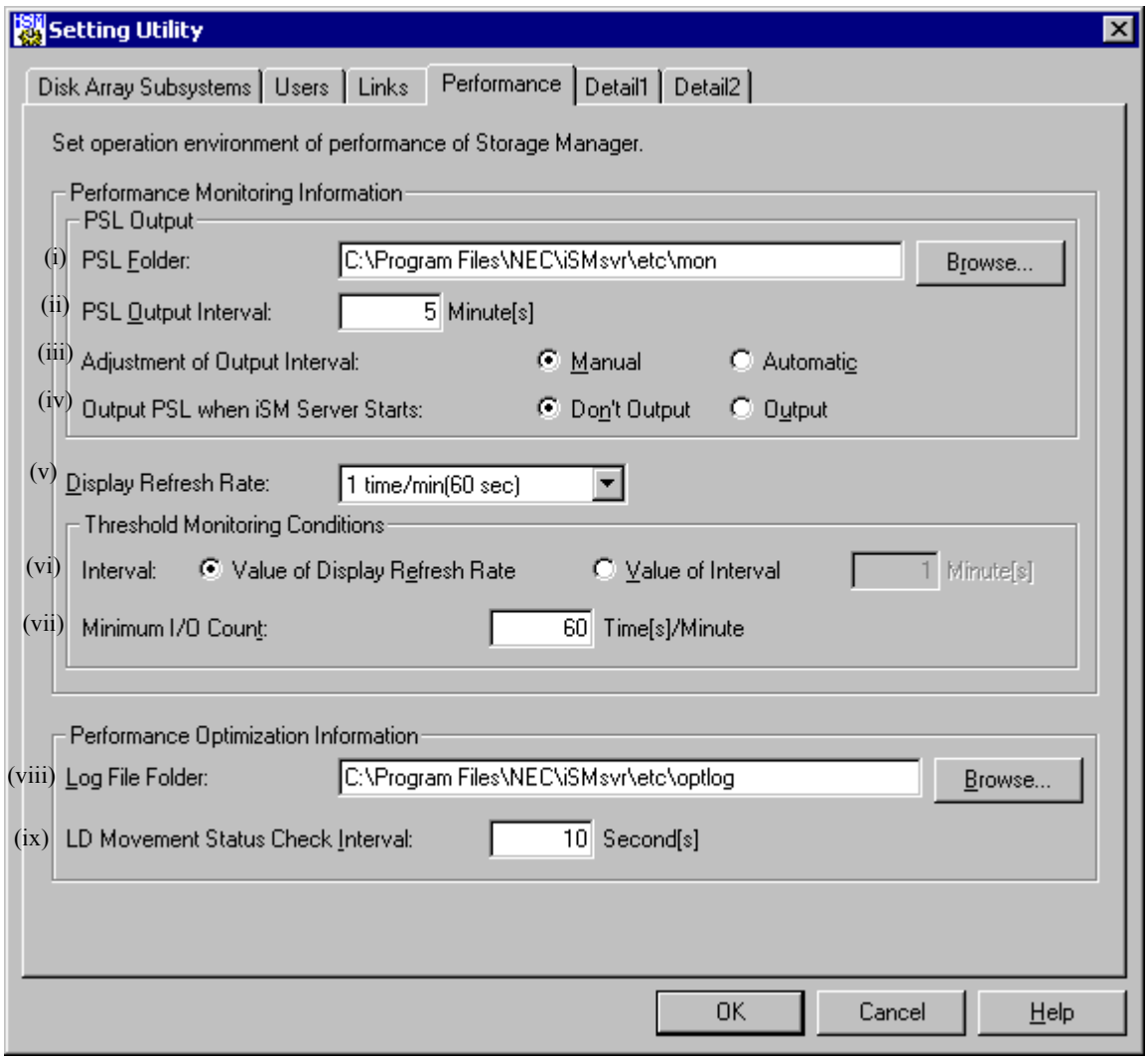

Figure 1-11 Screen for Setting Performance Information

• In [Performance Monitoring Information], set information about the monitoring of disk array performance.

(i) PSL Folder

Specify the folder for containing the statistical information history file. The folder name can be specified with up to 210 bytes.

For details, refer to the “PerformanceMonitor User’s Manual”.

The default folder is [installation destination folder]\etc\mon. If changing the folder, click the [Browse] button and specify an existing folder.

(ii) PSL Output Interval

Specify the interval at which statistical information is collected and output to the statistical information history file. The default interval is 5 minutes. If changing the interval, specify a value from 1 to 60.

(iii) Adjustment of Output Interval

Statistical information may not be output at the currently specified interval if there are too many disk array components. Specify this item to determine whether to automatically change to an interval at which statistical information can be output.

Manual: The currently specified interval is not changed automatically to an interval at which statistical information can be output.

Automatic: The currently specified interval is changed automatically to an interval at which statistical information can be output.

(iv) Output PSL when iSM Server Starts

Determine whether to automatically start the output of statistical information for all the disk arrays that can use PerformanceMonitor when the iSM server starts.

Don't Output: Statistical information output is not automatically started.

Output: Statistical information output is automatically started. However, statistical information output is not automatically started for disk arrays for which statistical information output was stopped in the previous operation, and the previous operation state is retained instead.

(v) Display Refresh Rate

Specify the number of times data updated per minute in the numeric value table and the time-series graph on the performance monitoring screen. For details, refer to the "PerformanceMonitor User's Manual". The default number of times is 1 per minute. If changing the number of times, specify a value from 1 to 6.

(vi) Interval

Specify the monitoring interval as a threshold monitoring condition.

A value 1 to 60 (minutes) can be specified. The default monitoring interval is identical to the display refresh rate.

(vii) Minimum I/O Count

Specify the minimum number of I/O operations as a threshold monitoring condition.

A value 1 to 120 (the number of times/minute) can be specified. The default minimum I/O count is 60 (times per minute).

• In [Performance Optimization Information], specify information about the performance optimization of disk arrays.

(viii) Log File Folder

Specify the folder for containing the performance optimization log file. The folder name can be specified with up to 192 bytes.

The default folder is "[installation destination folder]\etc\optlog". If changing the folder, click the [Browse] button and specify an existing folder.

(ix) LD Movement Status Check Interval

Specify the interval at which the logical disk moving status is to be checked. The default interval is 10 seconds. If changing the interval, specify a value from 5 to 30.

1.3.5 Setting Detailed Information

(1) Detailed information screen - 1

Set agent information, client information, state monitoring information, log information, and configuration information on the Setting Utility screen shown below. Since the default values are recommended for the information, there is no need to make any settings on this screen in ordinary operation.

To start the Setting Utility screen, select [Start] → [Programs] ([All Programs] for Windows Server 2003) → [Storage Manager Server] → [Setting Utility], or select [Server Menu] → [Setting Utility]. If having changed the environment setting, restart the iSM server. Information set on each screen is saved by clicking the [OK] button.

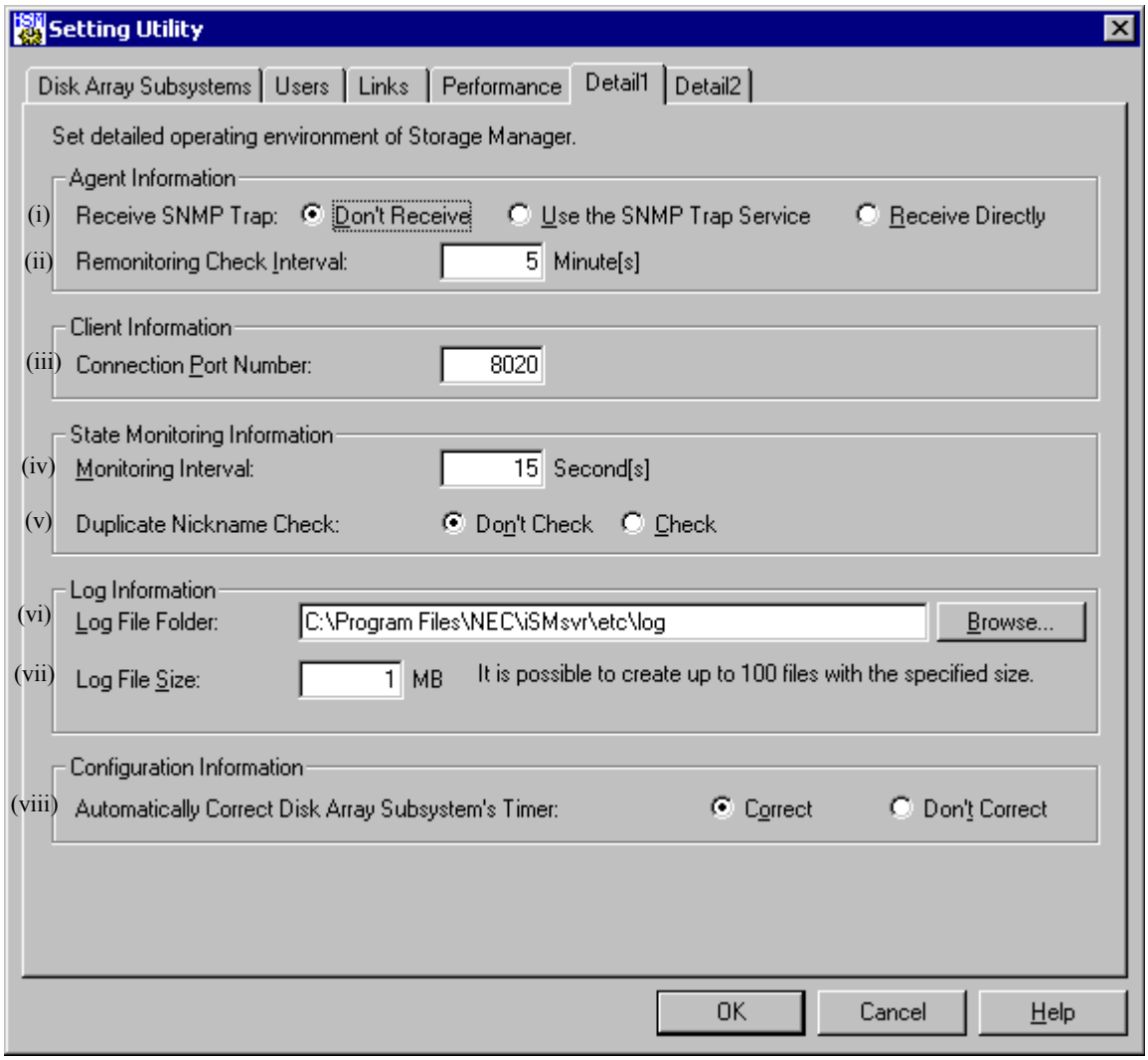

Figure 1-12 Detailed Information Screen - 1

• In [Agent Information], set information regarding agent management

(i) Receive SNMP Trap

Select the receiving method in [Receive SNMP Trap]. SNMP trap is information sent from the disk array to notify the iSM server of state transition of hardware, etc. It is enabled only for disk arrays monitored by TCP/IP connection.

Don't Receive: SNMP trap is not received.

Use the SNMP Trap Service: SNMP trap is received via the SNMP trap service.

Receive Directly: The iSM server receives it by using the port 162.

1. When you select [Use the SNMP Trap Service], SNMP Trap Service must be installed. When you select [Receive Directly], a conflict with application collecting SNMP trap as SNMP Trap Service occurs. In this case, don't select [Receive Directly].
2. Disk arrays can be monitored even without SNMP trap being received. Performance may be degraded if network security is compromised. Therefore, [Don't Receive] should be selected.

(ii) Remonitoring Check Interval

When a trouble occurs in the connection between iSM server and the disk arrays, iSM server will stop the monitoring of the disk arrays for a time, and later it will restart monitoring automatically.

In [Remonitoring Check Interval], specify an interval for checking whether the monitoring of disk arrays can be restarted. The default value is 5 (minutes). A value from 1 to 60 can be specified.

• In [Client Information], specify information regarding the iSM client.

(iii) Connection Port Number

In [Connection Port Number], specify the port number of the iSM server to which the iSM client connects. For the iSM client, refer to 5.2 "Client Start/Stop" in Part III "Operations". The default value is 8020. A value from 1 to 65535 can be specified.

• In [State Monitoring Information], specify information regarding the monitoring of the disk array status.

(iv) Monitoring Interval

In [Monitoring Interval], specify an interval for requesting status monitoring of disk arrays. The default value is 15 (seconds). A value from 1 to 3600 can be specified.

For status monitoring, refer to 3.2 "State Monitoring" in Part II "Functions".

(v) Duplicate Nickname Check

Determine whether to make a duplication check on identifiers that are assigned to components in the disk arrays to be managed by iSM.

In [Duplicate Nickname Check], specify whether or not to execute the duplicated check for the identification names of the components in the disk arrays that are targets of the iSM management.

Components to be checked in a duplicated manner are as follows:

- Disk Array Name
- Logical Disk Name

- Port Name

  Don't Check: does not execute duplicated check.

  Check: executes duplicated check.

• In [Log Information] specify information regarding logs.

(vi) Log File Folder

In [Log File Folder], specify a folder that saves a file for outputting operation logs of iSM server. To change the folder, use the [Browse] button to specify an existing folder. Specification uses up to 245 bytes.

For operation logs, refer to 3.5 "Log Output".

(vii) Log File Size

In [Log File Size], specify the size (upper limit) of the file for outputting operation logs. The default value is 1 (MB). A value from 1 to 10 can be specified.

A serial number is assigned to each log file. Up to 100 files with the specified size are created.

• In [Configuration Information], specify the information about configuration setting function

(viii) Automatically Correct Disk Array Subsystem's Timer

In [Automatically Correct Disk Array Subsystem's Timer], specify whether or not to correct the time in the disk array by using the server automatically.

Correct: corrects the time in the disk array automatically.

Don't Correct: does not correct the time in the disk array automatically.

(2) Detailed information screen - 2

File transfer information, replication information, and snapshot information settings are set in the following setting screen. To use the file transfer function, items in [File Transfer Information] must be specified. In normal operation, no settings are required in this screen since these items are set to the recommended default values.

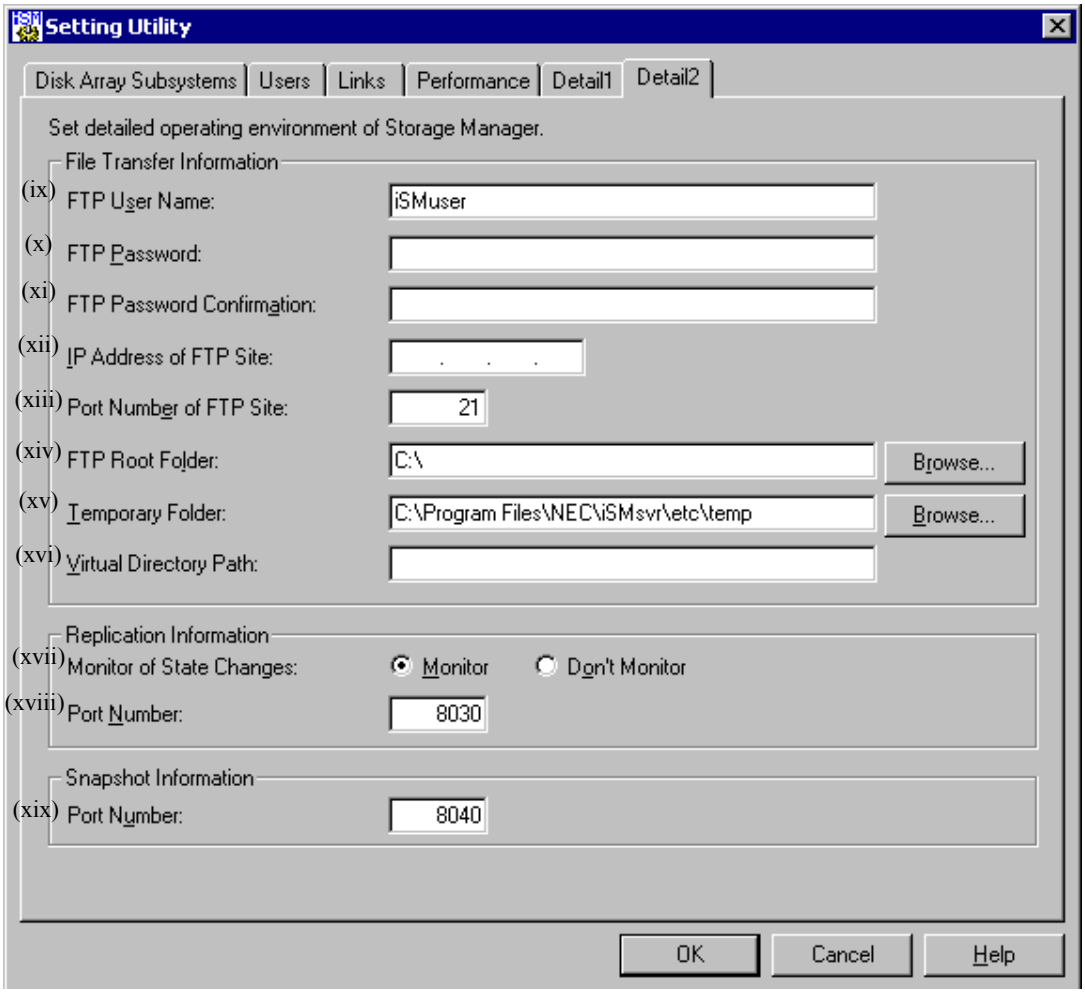

Figure 1-13 Detailed Information Screen - 2

- In [File Transfer Information], specify information regarding the file transfer function.

  To transfer files between the iSM server and iSM client, the iSM internally uses the FTP through the following operations of the iSM client.

  Therefore, the FTP site environment (installation of IIS FTP Publishing Service and building of the FTP site) must be built on the iSM server node before the iSM server is operated.

  - Selecting [Get Configuration Setting Info.] on the configuration setting screen
  - Selecting [Download Statistic Information files] on the performance screen
  - Selecting [Busy Ratio Graph] and [Replacement Effect Prediction] on the performance optimization screen
  - Selecting [Difficulty Information Gather] on the main screen (iSM client)

  When these functions are not used, settings for file transfer are unnecessary.

(ix) FTP User Name

Specify the name of an FTP user who is to make FTP connection from the iSM client to the iSM server node.

You can specify only an FTP user who is permitted to use the FTP and authorized to read from and write to the folder specified for [Temporary Folder].

The default user name is iSMuser. The FTP user name can be specified with up to 32 bytes.

(x) FTP Password

Specify the password of the user specified for [FTP User Name].

If using “anonymous” or “ftp” as the FTP user, specify the mail address. The FTP user password can be specified with up to 58 bytes.

(xi) FTP Password Confirmation

For confirmation, enter the same value as for [FTP Password].

(xii) IP Address of FTP Site

Specify the IP address to be used as the FTP connection destination from the iSM client. If the IP address of the FTP site is not specified, the system automatically gets the IP address of the iSM server node and uses it as the FTP connection destination.

Set a suitable IP address in the following cases:

- An IP address is explicitly written in the specification of the IP address of the FTP site.
  (Select [Properties] of the FTP site used by iSM → [FTP Site] → [Identification] → [IP Address], in which an IP address has been specified.)
- The iSM server is used in cluster environment.
  In particular, to operate the FTP service in cluster environment, place the iSM server and the FTP service in the same failover group, and specify a floating (virtual) IP address. To operate the FTP service starting as a service in cluster environment, specify the real IP address.
  * Do not specify “127.0.0.1”, “0.0.0.0”, or “255.255.255.255” as an IP address.

(xiii) Port Number of FTP Site

Specify the port number of the FTP site to be used by iSM.

Select [Properties] of the FTP site used by iSM → [FTP Site] → [Identification] → [TCP Port], in which a port number has been specified. The port number must be specified here. The default port number is 21.

(xiv) FTP Root Folder

Specify the root folder of the FTP site to be used by iSM.

Select [Properties] of the FTP site used by iSM → [Home Directory] → [FTP Site Directory] → [Local Path], in which a path has been specified. The path must be specified here. The default root folder is the drive in which the iSM server is installed. The root folder can be specified with up to 192 bytes.

* If not specifying a virtual directory path:

Select [Properties] of the FTP site used by iSM → [Home Directory] → [FTP Site Directory], in which check permission for both read and write.

(xv) Temporary Folder

Specify the folder (the local directory of the computer on which the iSM server operates) that is to be used as a temporary folder when the iSM uses the FTP. If a network resource or network directory is specified, the file transfer function may not operate correctly.

This folder (drive) needs a free space of 300MB × the number of files concurrently transferred or more. If the drive containing the iSM server does not have a free space large enough, specify the folder of a drive having a free space large enough.

If not using the default folder, give the group administrators “Full Control” access authority to the specified folder and the high-level folders.

Also authorize the user specified for [FTP User Name] to read from and write to the folder specified here.

The default folder is “installation destination folder\etc\temp”. The folder can be specified with up to 192 bytes.

* In particular, to operate the FTP service under cluster control in cluster environment, you should place the iSM server and the FTP service in the same fail over group on the local disk.

(xvi) Virtual Directory Path

If using a virtual directory, specify the path for the user, specified for [FTP User Name], to access [Temporary Folder] through the FTP. The path can be specified with up to 192 bytes.

If [FTP Root Folder] is at a higher level than [Temporary Folder] (or if the folders are identical), [Virtual Directory Path] need not be specified. The following shows examples:

Example 1: FTP Root Folder: C:\
Temporary Folder: C:\Program Files\NEC\iSMsvr\etc\temp
In this case, the temporary folder can be accessed through the path "/Program Files/NEC/iSMsvr/etc/temp" in the FTP. Thus, a virtual directory path need not be specified.

Example 2: FTP Root Folder: C:\Program Files\NEC\iSMsvr\etc\temp
Temporary Folder: C:\Program Files\NEC\iSMsvr\etc\temp
In this case, the temporary folder can be accessed through the path "/" that is to the temporary folder. Thus, a virtual directory path need not be specified.

In other cases, a virtual directory needs to be created and a virtual directory path needs to be specified. The following shows examples:

Example 3: FTP Root Folder: C:\InetPub\FTPRoot
Temporary Folder: C:\Program Files\NEC\iSMsvr\etc\temp
If a virtual directory is created under the conditions below, specify "/iSMftp" for [Virtual Directory Path]. In this case, the temporary folder is accessed through the path "/iSMftp" in the FTP.
Alias: "iSMftp"
Path: "C:\Program Files\NEC\iSMsvr\etc\temp"

Example 4: FTP Root Folder: C:\InetPub\FTPRoot
Temporary Folder: D:\iSM\temp
If a virtual directory is created under the conditions below, specify "/iSMftp2" for [Virtual Directory Path]. In this case, the temporary folder is accessed through the path "/iSMftp2" in the FTP.
Alias: "iSMftp2"
Path: "D:\iSM\temp"

Example 5: FTP Root Folder: C:\InetPub\FTPRoot
Temporary Folder: D:\iSM\temp
If a virtual directory is created under the conditions below, specify "/iSMftp3/temp" for [Virtual Directory Path]. In this case, the temporary folder is accessed through the path "/iSMftp3/temp" in the FTP.
Alias: "iSMftp3"
Path: "D:\iSM"

* For the path to be specified in creating a virtual directory, be sure to specify the local directory of the computer on which the iSM server operates. If a network resource or network drive (or a directory under the drive) is specified, the file transfer function may not operate correctly.
* If specifying a virtual directory path (using a virtual directory), give access permission for both read and write during creation of the virtual directory.

The file transfer function of iSM is operated with FTP. An FTP command of Windows is used on the iSM client side and an FTP server of each OS is used on the iSM server. In this case, only active mode (PORT mode) is used as FTP data transfer function. Therefore, if there is a firewall or NAT in the network between the iSM client and the iSM server, the file transfer function may not be available.
Before attempting to operate iSM, be sure to connect the FTP (and perform get and put processing) through the command prompt on the computer on which the iSM client operates, and confirm that the items in [File Transfer Information] are set correctly.

• In [Replication Information], specify information regarding the replication function.

(xvii) Monitor of State Changes

Determine whether to monitor the transition of the replication states.

Monitor: The replication state transition is monitored.

Don't Monitor: The replication state transition is not monitored.

(xviii) Port Number

Specify the number of the port to be used when the ReplicationControl command is issued via iSM. A value from 1 to 65535 can be specified. The default value is 8030.

• In [Snapshot Information], specify information regarding the snapshot function.

(xix) Port Number

Specify the port number to be used when the SnapControl command is issued via iSM. A value from 1 to 65535 can be specified. The default value is 8040.

Chapter 2 Client Installation

2.1 Operating Environment

(1) Network Environment Setting

Because TCP/IP socket communication is used between the iSM server and iSM client, which are operated on the PC, TCP/IP connection environment with the concerned server should be bound for network environment definitions of personal computer.

(2) Operating environment

The iSM client operates on the personal computer that has Windows 2000 (SP2 or later)/Windows XP/Windows Server 2003 operating system.

Table 2-1 Required Memory Capacity -1

Main screen	21 (41) MB or more
Configuration setting screen	13 (22) MB or more
Replication screen	16 (29) MB or more
Performance monitoring screen	9 (17) MB or more
Performance optimization screen	7 (15) MB or more
Fault information gathering screen	10 (16) MB or more
Snapshot screen	7 (15) MB or more

* Memory capacity in addition to those for main memory is required for displaying a screen other than main screen. The memory capacity is required when operating iSM client.
A value enclosed in parentheses indicates the memory capacity required when the iSM client operates under the 64-bit version of the operating system.

Table 2-2 Required Memory Capacity -2

Performance analysis supporting tool	9 (18) MB or more

* In addition to the memory capacity for operating the iSM client, the above memory capacity is necessary for operating the performance analysis supporting tool.
A value enclosed in parentheses indicates the memory capacity required when the iSM client operates under the 64-bit version of the operating system.

Table 2-3 Required disk capacity

For only basic functions	21 MB or more
For basic+extended functions	37 MB or more

* The values above do not include file size for CSV output, etc.

2.2 Installation and Setting

2.2.1 iSM Client Installation

The iSM client should be pre-installed on the personal computer. To install the iSM client, follow the procedure below.

(1) Log on as the Administrator.

(2) Select an installation program by using [Add/Remove Programs] ([Add or Remove Programs] for Windows XP or Windows Server 2003) in [Control Panel]. Installation programs are stored in the following location.

<If the client is to be installed on Windows 2000>

CD-ROM drive:\CLIENT\2000\

<If the client is to be installed on either Windows XP or Windows Server 2003>

CD-ROM drive:\CLIENT\XP\

(3) Follow the instruction of the installer.

The default destination of installation is “Program files\NEC\iSMClient” in the system drive.

(4) During installation, the Setup Type selection screen is displayed.

You can select the basic function (including configuration setting) or the basic+extended function (including performance monitoring, replication, access control, LD Administrator, performance optimization, cache partitioning, and snapshot) on this screen. Select either one that matches the server. (You can change the setup type easily by reinstalling the client.)

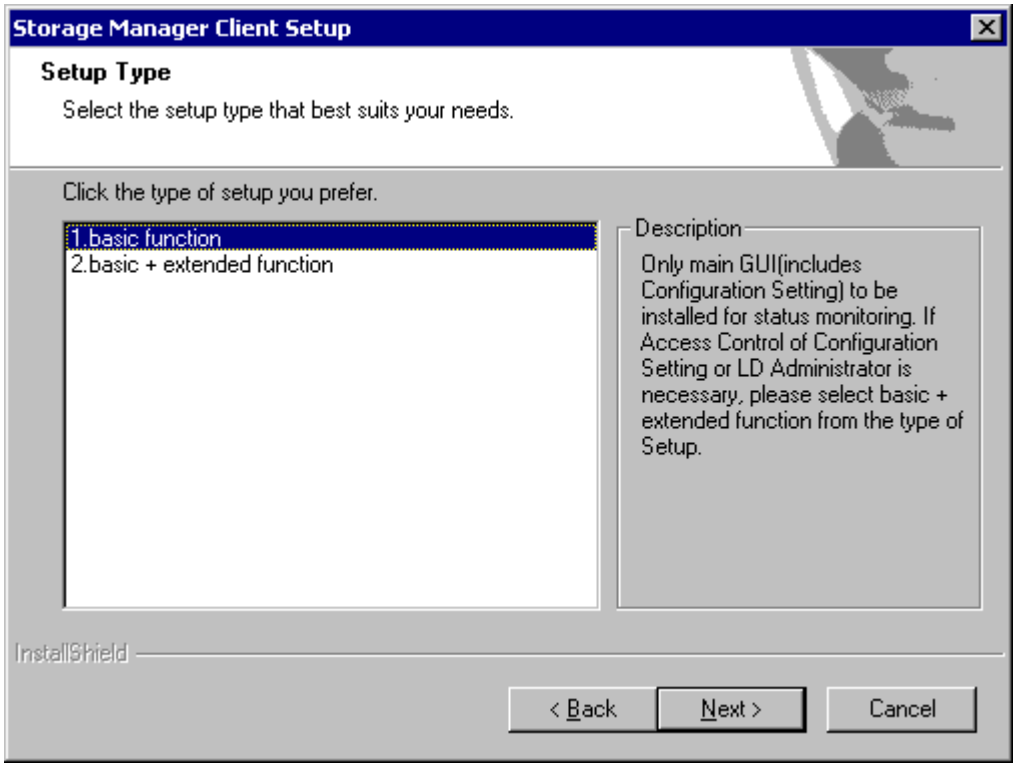

Figure 2-1 Setup Type Selection Screen

(5) If the iSM client is installed in the environment in which ESMPRO Manager has been installed, a screen for confirming link with ESMPRO Alert Manager appears. Make setting on the screen as needed. For details, refer to 3.7.4 “Link between ESMPRO Manager and ESMPRO Alert Manager”.

(6) After installation, various settings are needed on the Environment Settings screen. For details, refer to 5.2.1 “Client Start” and Help of the iSM client. To register menus in the operation window of ESMPRO Manager, install ESMPRO Manager first. Since this operation is executed automatically, you do not need to execute specific operation.

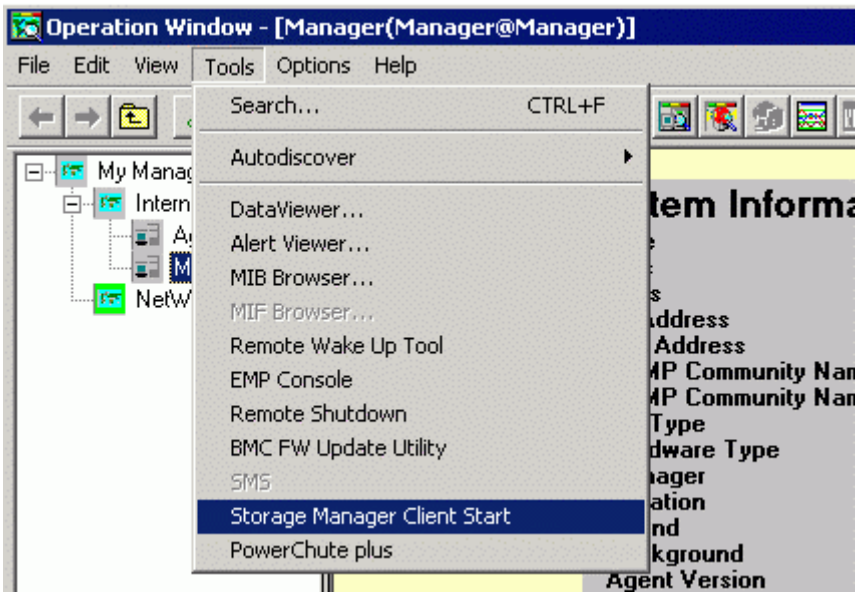

Figure 2-2 Registered iSM Client Start Menu

Only a single iSM client can be installed in a PC. Multiple clients, however, can be activated simultaneously by defining an environment for each iSM server to be connected. For details, refer to 5.2.1 “Client Start” and iSM client help.

2.2.2 iSM Client Uninstallation

To uninstall the iSM client, follow the procedure below.

(1) Log on as the Administrator.

(2) Remove “Storage Manager Client” by using [Add/Remove Programs] ([Add or Remove Programs] for Windows XP/Windows Server 2003) in [Control Panel]. Because setting information etc. is not deleted, reinstallation is easy.

Uninstalling the iSM client deletes all of the icons on the desktop and the menu items. If you are to re-install the iSM client after uninstalling it, copy the icon on the desktop to an appropriate folder before uninstalling it.
After re-installing it, copy the saved icon to the following folder on the system drive.
<Desktop icon>
\Documents and Settings\All Users\Desktop
<[Start] menu icon> * When the default value is the program folder
\Documents and Settings\All Users\Start Menu\Program\iSM Client
To restore the icon to the state where uninstallation was not made, copy it to the folder above.
Re-install the iSM client in the folder from which the client was uninstalled. Otherwise, the icon reference will be nullified.

2.2.3 iSM Client Update

To update the iSM client, uninstall the software and then install it.
For details on the procedure, refer to 2.2.1 “iSM Client Installation” and 2.2.2 “iSM Client Uninstallation”.

2.3 Relationship between Server and Client Versions

In general, connecting the iSM client to the other version of iSM server is not allowed. (The value of x.y. of x.y.z. of a version is compared here. z should be disregarded.)
However, during operations while waiting for subsystem and in other temporarily unavoidable circumstances, use it temporarily in an environment where the version of the iSM client is newer than the version (V1.5 or later) of iSM server. The functions which can be used are limited to the functional range of the version of the iSM server at this time.

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Part II Functions

Chapter 3 Basic Functions

Chapter 3 explains the function that can be used when the iSM is introduced. The basic function provides the following function necessary for disk array operations such as the display function of physical disk configuration in the disk array and logical disk configuration that can be recognized from the business server.

- Configuration display: A function that displays the configuration information of physical and logical components (resources) that configure the disk array.
- Status monitoring: A function that displays the status of components (resources) that configure the disk array.
- Configuration setting: A function that configures the disk array and implements logical components.
- Fault monitoring: A function that informs the fault information in the disk array in real time.
- Log output: A function that outputs the fault information and the operating information as the operation history for system log file and exclusive log file.
- Event link: A function that executes the action on the notice to the operator and server upon the occurrence of operating information and fault information.

The basic function is composed of the above-mentioned 6 functions, and the efficient operation of disk array is possible by using these functions. The detail functions are described in the following section.

3.1 Configuration Display

Configuration display function displays the physical resource configuration that configures the disk array and the logical disk recognized from the business server. The configuration management of two or more disk arrays is possible in the iSM. Two or more disk arrays can be centrally monitored on the same view from the iSM client.

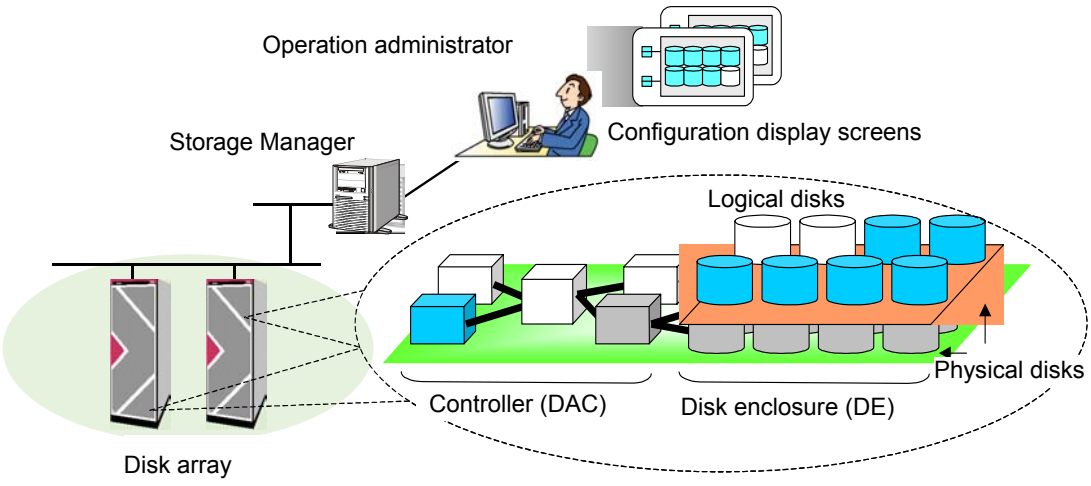


Figure 3-1 Operation Image

3.1.1 Summary of Function

(1) Display Function

The display function shows the information of the disk array, physical resource configuration that configures the disk array and the information of logical disk recognized by a business server through an iSM client. (Table 3-1)

Table 3-1 Display Information List

Section		Display Information
Disk array related		Disk Array Name Monitoring state (by iSM/Server) (Operating) Status Operating status for each component Product ID Product FW REV Serial Number SAA (SubsystemAbsoluteAddress) World Wide Name Total capacity (data physical disk) Control Path Cross Call information Cache partitioning function state User system code Revision of storage control software Access Control information Product status
Logical components	Pool related (*1)	Pool Name Type Pool Number (Operating) Status Expansion State Progress Ratio RAID type Capacity Used capacity Snapshot capacity Snapshot control capacity Snapshot used capacity Snapshot threshold Snapshot reserve area list Configuration logical disk list Configuration physical disk list
	Logical disk related	Logical disk name (including OS type) Number (Operating) status RAID type Capacity RANK number (*2) Pool Number (*1) Pool Name (*1) Existence of cache resident Progress ratio (At Formatting/Rebuilding/Copy back/ Expanding) RPL type Snapshot type Link Logical disk information during link Group Purpose Cache segment name Ownership Physical disk list Access Control information

Section		Display Information
Physical components	Physical disk related	Number (Group number - Position number) (Operating) status Capacity Rotation speed Product ID Product Rev Serial number RANK number (*2) Pool Number (*1) Pool Name (*1) Section (Rebuilding) Progress ratio Configuration logical disk list
	Controller related	Component type (*3) (Operating) status Information of each component (*4)
	Disk enclosure related	Component type (*5) (Operating) status Information of each component (*4)

*1 Displayed if the disk array to be monitored is a disk array with pool.
*2 Displayed if the disk array to be monitored is other than a disk array with pool.
*3 Director, Cache module, Service processor, Power supply, Battery, Fan, Temperature, Backboard, Junction box, Panel, Maintenance PC, Power control card
*4 The displayed contents vary depending on the component.
*5 Adapter, Power Supply, FAN, Temperature, Back Board, and EC Junction Box

(2) Configuration information Output Function

Outputs the configuration information of the disk array to a CSV format file.

Select [File] → [CSV Output of Information List Display] from menu and specify the storage place and filename from dialog.

3.1.2 Screen composition of iSM main window

This subsection describes about the screen composition of the main window in iSM client.

Figure 3-2 is a main window of iSM client displayed right after logging in to iSM server.

The iSM main window consists of the “configuration display area”, “information list display area”, and “message display area”.

Refer to 5.2.1 “Client Start” for how to start the main window.

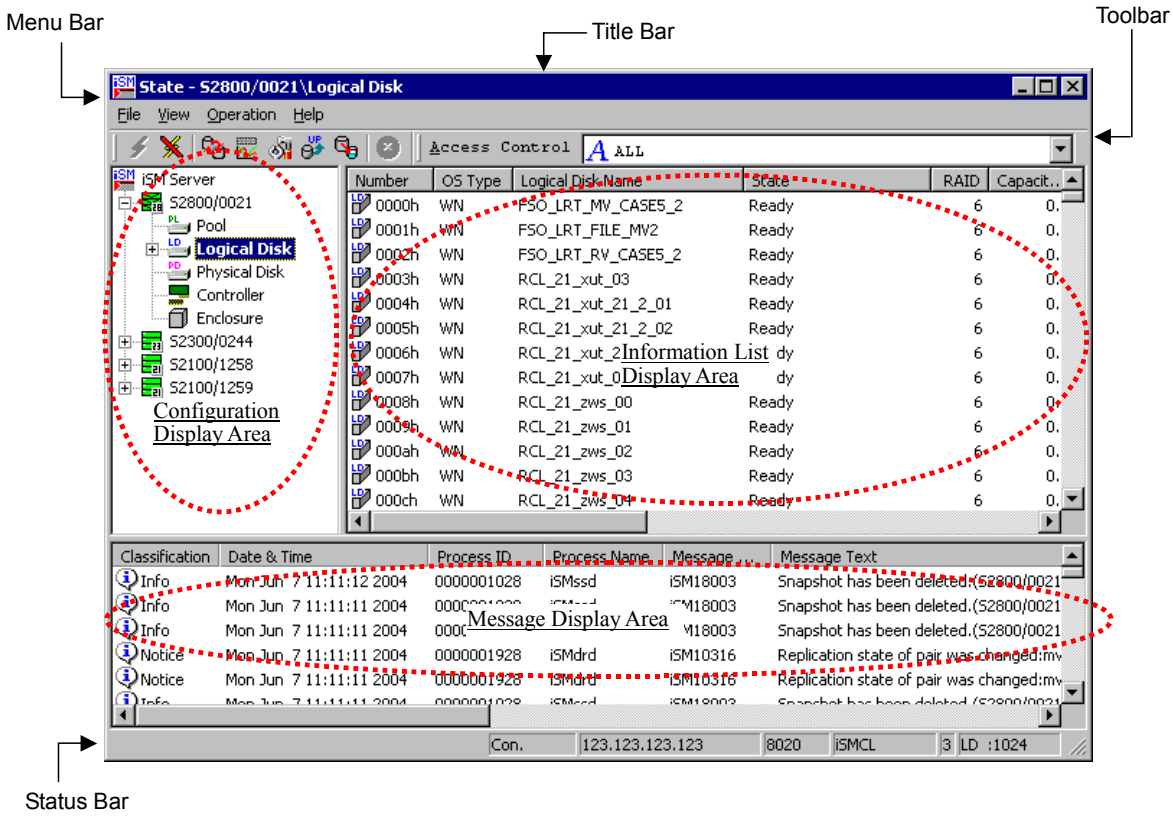


Figure 3-2 iSM Main Window

(1) Title Bar

Displays the element name currently selected in the configuration display area, in the following format:

State - (element name)

If more than one connection is defined, the Title Bar displays the nickname of a connection and the element name currently selected in the configuration display area, in the following format:

nickname : State - (element name)

(2) Menu Bar

Performs various operations by selecting necessary item from menu.

Refer to Help about the details.

(3) Toolbar

Includes the buttons which are used frequently among menu function such as [Connection], [Disconnection], [Replication], [Performance], [Configuration], [Optimizer], [Snapshot] and [Stop Alarm]. The [Replication], [Performance], [Optimizer] and [Snapshot] buttons are displayed when the iSM client is installed with “basic + extended function”.

Refer to Help about the details.

(4) Status Bar

The Status bar in the lowest line is the area that displays the current status of the iSM client. During the establishment of session, [Con.]/IP address or DNS name of server/port number of server/client name/user level/Types of display components and number of display items are displayed.

(5) Configuration display area

Displays the configuration (physical/logical) of the disk array as a management object in a configuration display area. The disk array as a management object is a disk array that is defined inside the iSM server that the iSM client connects to, and also displays the following configuration information of the disk array in a Tree View form divided into “Disk array layer”, “Component layer“, and “Individual Component layer“ in the configuration display area.

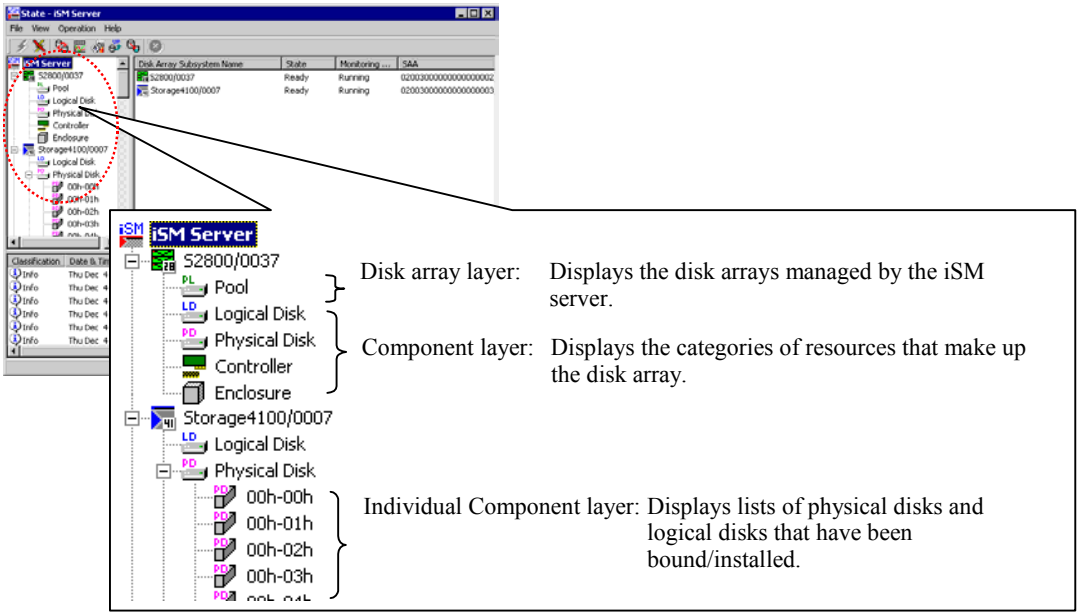


Figure 3-3 Configuration Information Display in Tree View

The configuration display area displays the management target’s status, which is expressed by the shape and shade (dark/light) of the icon.

Refer to the explanation of icons on each information list screen for details on the icons.

(a) Disk array layer

The disk array list and operating status/monitoring state that the iSM server manages are displayed through the icons.

(b) Component layer

The category of resource that configures the disk array is classified and displayed into the following 5 categories.

- Pool: The assembly of pool bound in the disk array (*1)
- Logical disk: The assembly of logical disk bound in the disk array
- Physical disk: Physical disk filed in the disk array
- Controller: The assembly of control system resource in the disk array and composed of director, cache module, adapter, power supply, fan, etc.
- Enclosure: A disk enclosure unit that stores physical disk and is composed of adapter, power supply, fan and etc. Enclosure is not provided depending on your system configuration

The component layer displays a list of components and each component's operating/monitoring state with the icon.

*1 Pool-related information is displayed if the disk array to be monitored is a disk array with pool.

(c) Individual component layer

It displays the logical disk and physical disk list, and each operating status/monitoring state through icons.
Depending on the environmental setting, the logical disk number or logical disk name is indicated as the identification information of logical disk. For details on the setting method, refer to 5.2 "Client Start/Stop".
For the logical disk list, when the snapshot function is used, snapshot-volume (SV) and link-volume (LV) can be set to non-display. For details on the setting method, refer to 5.2 "Client Start/Stop".
To display the selected information of a component, right-click on the component and select [Properties].

(6) Information list display area

It displays information on components that is one class lower than the selected class (with left click) in the configuration display area. If selecting the disk array in the configuration display area, it displays the resource ("Pool" (*1), "Logical Disk", "Physical Disk", "Controller", "Disk Enclosure") information composed of the disk array in the list, and if selecting the logical disk, it displays the information of logical disk in the list.
Displays the following screen according to selected component in the configuration display area.

- Disk Array Subsystem list screen: displays disk array name and operating status
- Component list screen: displays the operating status for each component
- Pool list screen: displays pool name, operating status, and various attribute information. (*1)
- Logical Disk list screen: displays logical disk name, operating status, and various attribute information
- Physical Disk list screen: displays operation state of physical disk and various attribute information
- Controller list screen: displays the operation state by component
- Disk Enclosure list screen: displays the operation state for each component

*1 Pool-related information is displayed if the disk array to be monitored is a disk array with pool.

(7) Message display area

Messages that indicate the fault and operating status of the disk array and iSM itself are displayed in this area.
Double-clicking on a message displays the Help information of the message. Refer to the "Messages Handbook" for the contents of the messages.

3.1.3 Disk Array Information Display

Disk array information is displayed in both “Disk Array Subsystem list screen” which is displayed in the configuration display area and information list display areas, and “Disk Array Subsystem details information screen” which is displayed as disk array property information.

In this section, each item displayed as disk array information is described.

(1) Disk Array Subsystem list screen

A screen (Figure 3-4) displayed in configuration display area when [iSM server] is selected and it displays the disk array name and operating status.

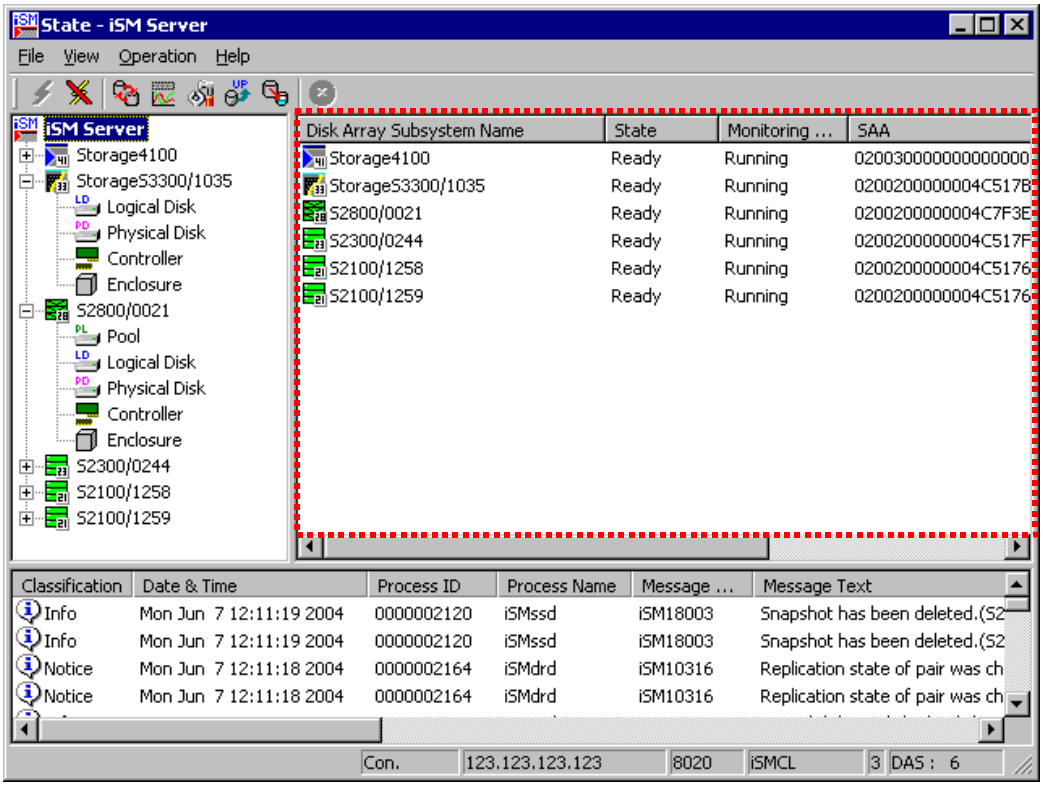
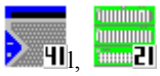


Figure 3-4 Disk Array Subsystem List Screen

(i) Icon (operating state/monitoring state of the disk array)

It displays the integrated operating state of disk array component and monitoring state from iSM server to the disk array by using the icon next to disk array name.

Table 3-2 Display Icons

Icon	Status
	These icons are monitoring state where all disk array components are in normal status. The icon's shape differs by disk array type.
	This icon is a monitoring state where an event or fault (except critical fault) that needs "maintenance" occurred in any disk array components. (Note 1 and 2)
	This icon is a monitoring state where a critical fault occurred in any disk array components. (Note 2)
	This icon is a monitoring state where "threshold excess" occurred in any pool for snapshot. (Note 3)
	These icons show that the disk array is in monitoring stop status or under configuration setting. The icon's shape differs by disk array type.
	This shows monitoring stop status or under configuration setting. If this icon is displayed, an event or fault (except critical fault) that needs "maintenance" occurred in any disk array components just before stopping monitoring.
	This shows monitoring stop status or under configuration setting. If displaying this icon, a critical fault has occurred in any disk array components just before stopping monitoring.
	This shows monitoring stop status or under configuration setting. If displaying this icon, "threshold excess" has occurred in any pool for snapshot just before stopping monitoring.
	This icon indicates that disk array components are not being monitored. If this icon is displayed, the SVP settings of the target disk array include an incorrect IP address setting, or the target disk array could not be connected to the iSM server.

Note 1 If an event or fault (except critical fault) that needs "maintenance" occurred, the disk array icon can be switched between "  " and "  ". Switching is executed at [Display Maintenance State] in environment setting dialog by selecting [File] → [Environment Settings] from the menu. Refer to 5.2 "Client Start/Stop" for details.

Note 2 Although a component fault is displayed by "  ", whether this icon deserves the critical fault or not is decided at a higher layer, and the icon according to the status is displayed. Please refer to 3.2.2 "Description of screen and operation" about the component status icon and display in higher layer.

Note 3 If a threshold excess occurred in pool for snapshot, the icon "  " is displayed. If, however, the integrated operating state of a disk array component is faulty or an event or fault (except critical fault) that needs "maintenance" occurred, the icon displays the integrated operating state. For details on actions to be taken when a threshold excess occurred, refer to the "Snapshot User's Manual (Function Guide)" (IS030).

Note 4 The shade of icon indicates the monitoring state of target disk array. If icon is gray, the monitoring of target disk array stops.

(ii) Disk Array Subsystem Name

Names for identifying disk arrays uniquely.

An optional name can be set to the disk array. Refer to 3.3 “Nickname Setting” for setting method.

(iii) State

Displays integrated operating state in the whole disk array at “State” column.

Ready:	All disk array components are in normal operation.
Ready (Maintenance):	An event that needs “maintenance” occurs in any disk array.
Fault:	“Fault” occurs in any disk array component.

(iv) Monitoring State

Displays the monitoring state to the disk array at “Monitoring State” column.

Running:	Status that monitoring is executing to the target disk array
Starting demand:	Status that monitoring to the target disk array is starting
Configuration:	Status that Configuration setting of the target disk array is under way
Stopping demand:	Status that monitoring stop processing to the target disk array by user specification is executing
Stop:	Status that monitoring to the target disk array by user specification is stopping
Stop(Maintenance):	Status that monitoring to the target disk array is stopping because of maintenance operation such as configuration change
Stop(Fault):	Status that monitoring to the target disk array is stopping because of fault detection
Wait Recovery:	Status that monitoring on disk array was disabled due to disk array failure or control path failure, and therefore recovery of the monitoring on the disk array is waited for
Unknown:	Status in which disk array components are not being monitored. This state includes that the SVP settings of the target disk array include an incorrect IP address setting, or the target disk array could not be connected to the iSM server.

(v) SAA

Subsystem Absolute Address (56 hexadecimal digits) of the identification information of disk array is displayed at the “SAA” column.

(2) Disk Array Subsystem details information screen

These screens (Figures 3-5, 3-6, and 3-7) are displayed if selecting (click the left button) optional disk array and selecting by right clicking → [Properties] (or [View]→ [Properties] from menu) in configuration display area and information list display, displaying detailed information of the disk array.

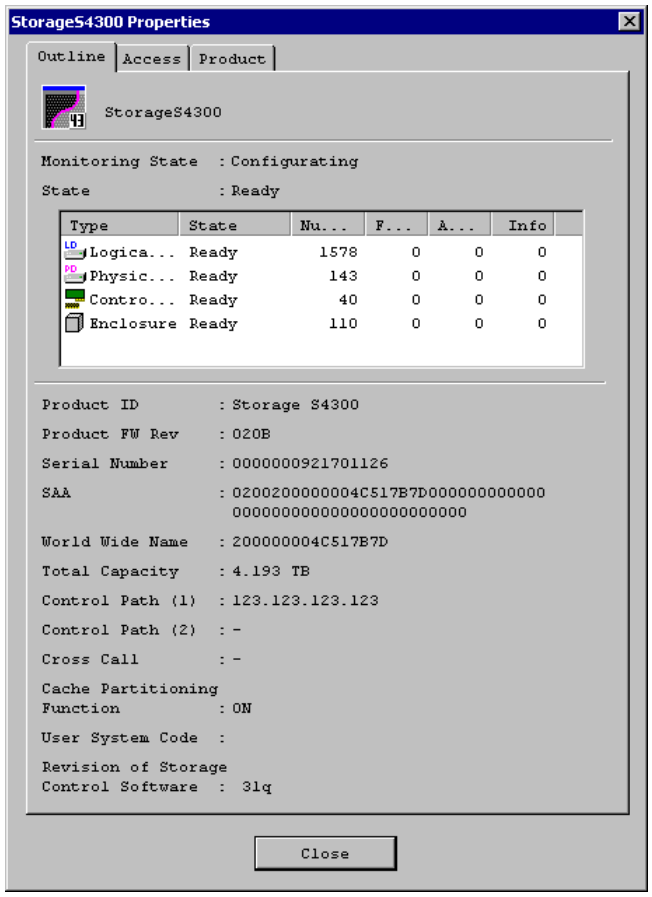


Figure 3-5 Disk Array Subsystem Details Information-1

(i) Name

The identification information of disk array. The display contents are the same as (1) “Disk Array Subsystem list screen”.

(ii) Monitoring State

The monitoring state for the disk array. The display contents are the same as (1) “Disk Array Subsystem list screen”.

When monitoring is waiting for recovery or stopping (failure), unknown causes of the failure on monitoring on disk array are classified and displayed into the following three.

- Control path failure: Failure caused by control path (network failure, etc.)
- Disk array failure: Internal failure in disk array
- Others: Failure caused by management server

* For details of failures, refer to messages of operation log, etc. output upon a failure.

(iii) State

The integrated operating state for the entire disk array and disk array component. The display contents are the same as (1) “Disk Array Subsystem list screen”.

(iv) Product ID

Displays the product model name (maximum of 16 characters) in the disk array.

(v) Product FW Rev

Displays the Product Revision (4 characters) in the disk array.

(vi) Serial Number

Displays the product number (16 characters) in the disk array.

(vii) SAA

The identification information of disk array. The display contents are the same as (1) "Disk Array Subsystem list screen"

(viii) World Wide Name

Displays the WWNN (World Wide Node Name) of the disk array.

This item is not displayed if the iSM of the server is Ver1.5 or earlier.

(ix) Total Capacity

Displays the total capacity of physical disk (total capacity of data disk) of the disk array in Gigabyte units (1 G byte=1,073,741,824 byte) and Terabyte units. (1 T byte = 1,024 G byte).

(x) Control Path

Displays the control path to the disk array in the iSM server by the IP Address (in the case of LAN connection) or FC pathname (disk information). Displays the path currently controlled (upper layer) and the path for switching on the fault (lower layer), and displays "  " which indicates a fault next to the control pathname when a fault occurs in switching paths on the fault.

Example 1) LAN connection:

Control Path (1): 123.123.123.1

Control Path (2): 123.123.123.2 

Example 2) FC-AL connection

Control Path (1): disk9 (Port6 Bus0 Target40 Lun4)

Control Path (2): disk10 (Port6 Bus0 Target40 Lun5) 

If switching path on the fault does not exist, display "-" in Control Path (2).

(xi) Cross Call

Displays any of the following as setting information for Cross Call function.

ON:	Cross Call is valid
OFF (Auto Assignment OFF):	Cross Call is invalid and Auto Assignment function is invalid
OFF (Auto Assignment ON):	Cross Call is invalid and Auto Assignment function is valid
-:	Cross Call function is not supported

(xii) CachePartitioning Function

As information about CachePartitioning function, either of the status below is displayed. This column does not appear when CachePartitioning is not purchased.

ON	CachePartitioning function is applied
OFF	CachePartitioning function is not applied

(xiii) User System Code

If the user has made a contract for the maintenance service, the 10-digit user system code is displayed. If not, "0000000000" is displayed.

Even if a user has made a contract for the maintenance service, “0000000000” may be displayed depending on the combination of iSM and the disk array.

(xiv) Revision of Storage Control Software

Displays the revision of storage control software.

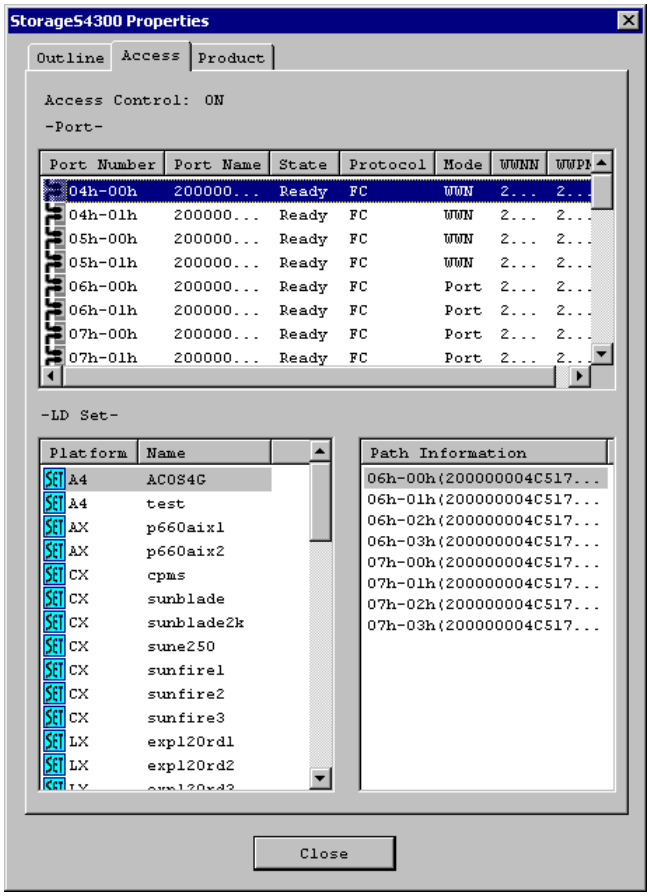


Figure 3-6 Disk Array Subsystem Details Information-2

(xv) Access Control information

Displays information on Access Control of the disk array. Displayed information includes Access Control ON/OFF, information on port, and information on LD.

For details, refer to the “Configuration Setting Tool User’s Manual (GUI)”.

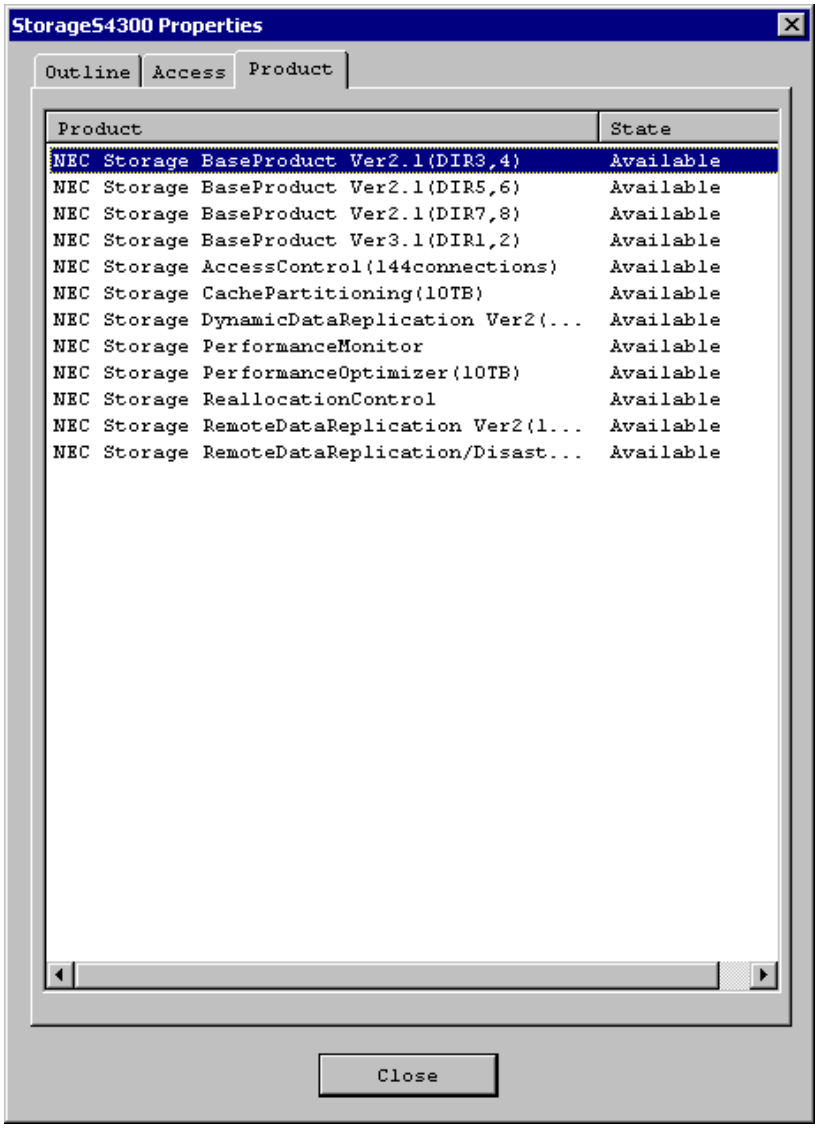


Figure 3-7 Disk Array Subsystem Details Information-3

(xvi) Product state

Displays the product information of the disk array.

3.1.4 Component Information Display

When selecting (click the left button) the disk array in configuration display area, the screen (dashed line in Figure 3-8) is displayed and the operating state in each component is displayed.

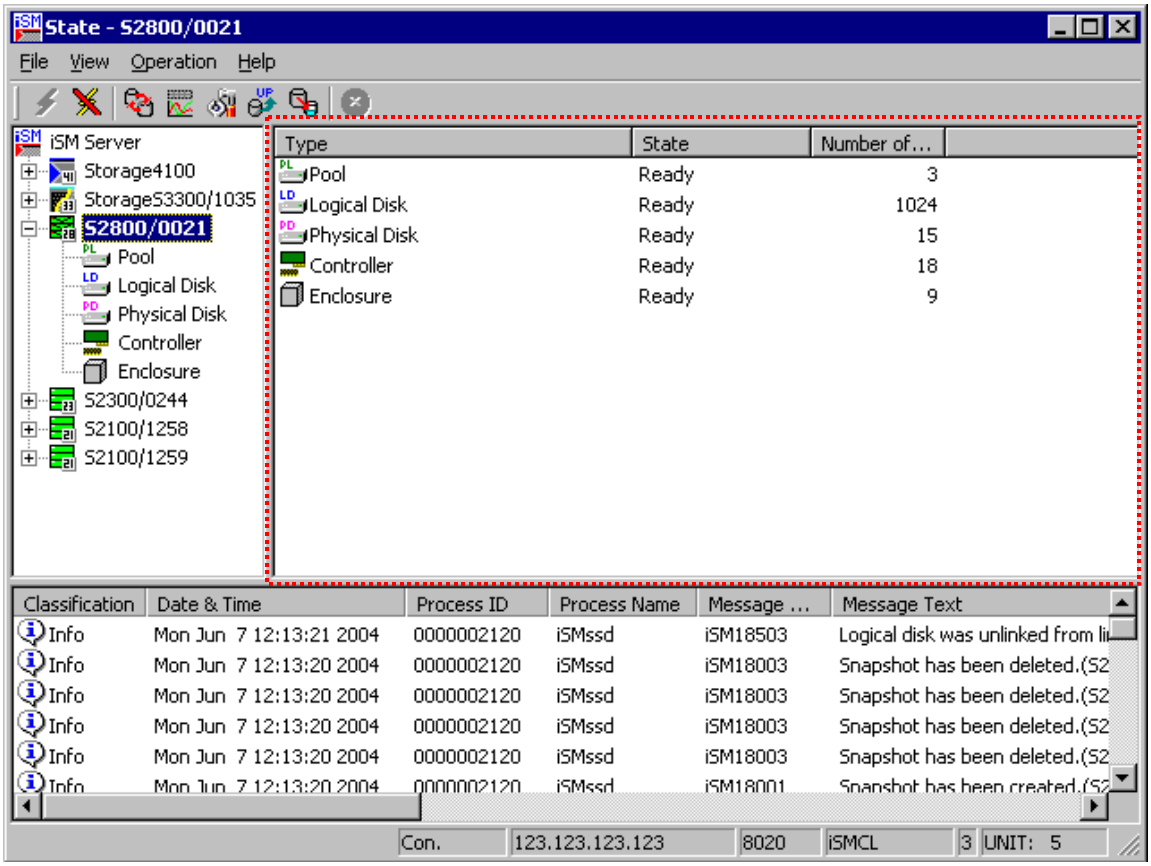


Figure 3-8 Component List Screen

(i) Icon (operating state/monitoring state of disk array component)

Displays the operating state/monitoring state in each component with the icon next to component (pool (*1)/logical disk/physical disk/controller/disk enclosure). (Enclosure is not provided depending on your system configuration.)

Table 3-3 Display Icons

Icon	Status
	Component (pool) is in normal operation (*1)
	Component (logical disk) is in normal operation
	Component (physical disk) is in normal operation
	Component (controller) is in normal operation
	Component (disk enclosure) is in normal operation
	The event or fault (except critical fault) that needs “maintenance” in any component occurs (Note 1 and Note 2)
	“Critical fault” occurs in any component (Note 2)
	This shows that “threshold excess” occurred in any pool for snapshot (Note 3).
 etc.	These icons show that the disk array is in monitoring stop status or under configuration setting.
	This shows monitoring stop status or under configuration setting. If this icon is displayed, an event or fault (except critical fault) that needs “maintenance” occurred in any component just before stopping monitoring.
	This shows monitoring stop status or under configuration setting. If displaying this icon, a critical fault has occurred in any component just before stopping monitoring.
	This shows monitoring stop status or under configuration setting. If this icon is displayed, “threshold excess” has occurred in any pool for snapshot just before stopping monitoring.

Note 1. When the event or fault (except critical fault) that needs “maintenance” in any component occurs, whether icon displays as “  ” or not, is based on the environment setting of the client. Switch in “Display Maintenance State” in the environment setting dialog by selecting [File] → [Environment Settings] from menu. Refer to 5.2 “Client Start/Stop” for details.

Note 2. Although a fault is displayed in “  ”, whether it deserves the critical fault is according to the determination by the higher layer, and the specified icon is displayed. Refer to 3.2.2 “Description of Screen and Operation” for status icon of component and display in the higher layer.

Note 3. If a threshold excess occurred in pool for snapshot, the icon “  ” is displayed. If, however, the integrated operating state of pool is faulty or an event or fault (except critical fault) that needs “maintenance” occurred, the icon displays the integrated operating state. For details on actions to be taken when a threshold excess occurred, refer to the “Snapshot User's Manual (Function Guide)”.

Note 4. The shades of gray of icon indicate the monitoring status of a target disk array. When an icon is dimmed, the monitoring of the corresponding disk array stops.

(ii) Type

Displays the disk array component such as “Pool (*1)”, “Logical Disk”, “Physical Disk”, “Controller” and “Enclosure” at “Type” column.

(iii) State

Displays the integrated operating state by the disk array component in “State” column.

Ready: Entire disk array component is in normal operation.

Ready (Maintenance): An event whereby “maintenance” is needed occurs in any disk array component.

Fault: “Fault” occurs in any disk array component.

(iv) Number of Elements

Displays the number of components included by type.

For the number of logical disk components, the number of all logical disks is always displayed regardless of display setting of snapshot-volume (SV) and link-volume (LV) on the Environment Setting screen. For details on the setting method, refer to 5.2 “Client Start/Stop”.

*1 Pool-related information is displayed if the disk array to be monitored is a disk array with pool.

3.1.5 Pool Information Display

If the disk array to be monitored is a disk array with pool, pool information is displayed in “pool list screen” which is displayed in the configuration display area and information list display area, and “pool details information screen” which is displayed as pool property information.

In this section, each item indicated as pool information is described.

(1) Pool list screen

A screen (dashed line in Figure 3-9) displayed by selecting (click the left button) [Pool] in configuration display area. It displays various attribute information such as pool name, operating state, and capacity.

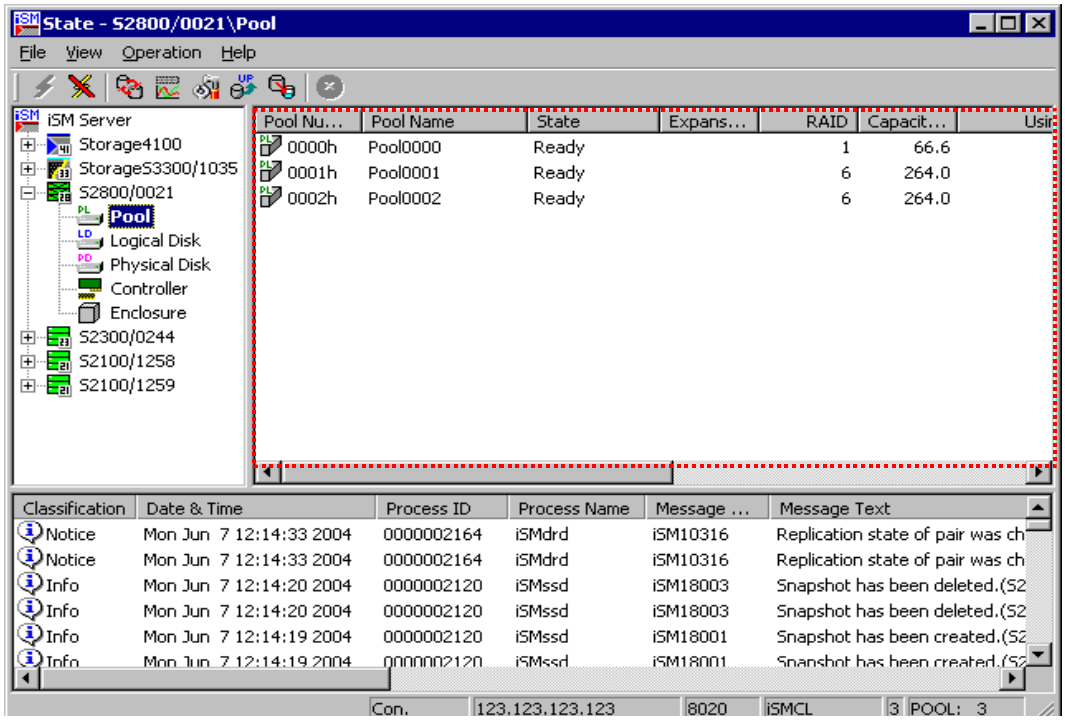


Figure 3-9 Pool List Screen

(i) Icon (Pool Operating state/Monitoring state)

Displays the operating state/monitoring state of pool with the icon next to pool number.

Table 3-4 Display Icons

Icon	Status
	Pool is in normal operation
	An event whereby “caution” is needed occurs in pool
	“Fault” occurs in pool
	This shows that “threshold excess” occurred in pool.
	This icon shows that the disk array is in monitoring stop status or under configuration setting.
	This shows monitoring stop status or under configuration setting. If this icon is displayed, an event that needs “caution” occurred in any pool just before stopping monitoring.
	This shows monitoring stop status or under configuration setting. If displaying this icon, a fault has occurred in any pool just before stopping monitoring.
	This shows monitoring stop status or under configuration setting. If this icon is displayed, “threshold excess” has occurred in pool just before stopping monitoring.

If a threshold excess occurred in pool for snapshot, the icon "  " is displayed. If, however, the integrated operating state of pool is faulty or an event or fault (except critical fault) that needs "maintenance" occurred, the icon displays the integrated operating state. For details on actions to be taken when a threshold excess occurred, refer to the "Snapshot User's Manual (Function Guide)" (IS030).

(ii) Pool Number

Displays pool number (4 hexadecimal digits).

(iii) Pool Name

Displays pool name (maximum of 32 characters). The optional name for pool name can be set. Refer to the "Configuration Setting Tool User's Manual (GUI)" for setting method.

(iv) State

Displays the operating state of pool and occurrence of event in any of the following at "State" column.

Ready:	Pool is in normal operation.
Attn.(reduce):	Reduction (RAID configuration redundancy disappears.)
Attn.(rebuilding):	While rebuilding (while rebuilding data within pool)
Attn.(preventive copy):	While copying data to spare disk (redundancy maintained by RAID configuration)
Attn.(copy back):	While writing back from the spare disk (redundancy maintained by RAID configuration)
Fault:	"Fault" occurs in pool.

(v) Expansion State

Displays the expansion state of pool in any of the following at "Expansion State" column.

(blank):	Pool expansion is not in progress or expansion terminated normally.
Expanding:	During pool expansion.
Expand-Fail:	Fails in pool expansion.

(vi) RAID

Displays RAID type of pool in any of the following at "RAID" column.

"0": RAID 0
"1": RAID 1
"5": RAID 5
"6": RAID 6
"10": RAID 10
"50": RAID 50

(vii) Capacity

Displays the capacity of pool in Gigabyte units (1 G byte=1,073,741,824 bytes) to 1 decimal place. (Truncate it at the second decimal place. However, displays 1 byte to 100 Megabytes as 0.1.)

(viii) Used Capacity

Displays the used capacity of pool in Gigabyte units (1 G byte=1,073,741,824 bytes) to 1 decimal place. (Truncate it at the second decimal place. However, displays 1 byte to 100 Megabytes as 0.1.)

(ix) Snapshot Capacity

Displays the capacity of the snapshot reserve area in Gigabyte units (1 G byte=1,073,741,824 bytes) to 1 decimal place. (Truncate it at the second decimal place. However, displays 1 byte to 100 Megabytes as 0.1.)

(x) Snapshot Used Capacity

Displays the used capacity of the snapshot reserve area in Gigabyte units (1 G byte=1,073,741,824 bytes) to 1 decimal place. (Truncate it at the second decimal place. However, displays 1 byte to 100 Megabytes as 0.1.)

If a threshold excess has occurred, " * " is displayed at the left of snapshot used capacity.

(xi) Snapshot Threshold

Displays the snapshot threshold in Gigabyte units (1 G byte=1,073,741,824 bytes) to 1 decimal place. (Truncate it at the second decimal place. However, displays 1 byte to 100 Megabytes as 0.1.)

(2) Pool details information screen

This screen (Figure 3-10) is displayed if selecting (click the left button) optional pool and selecting by right clicking → [Properties] (or [View]→[Properties] from menu) in configuration display area or information list display area, displaying detailed information of the pool.

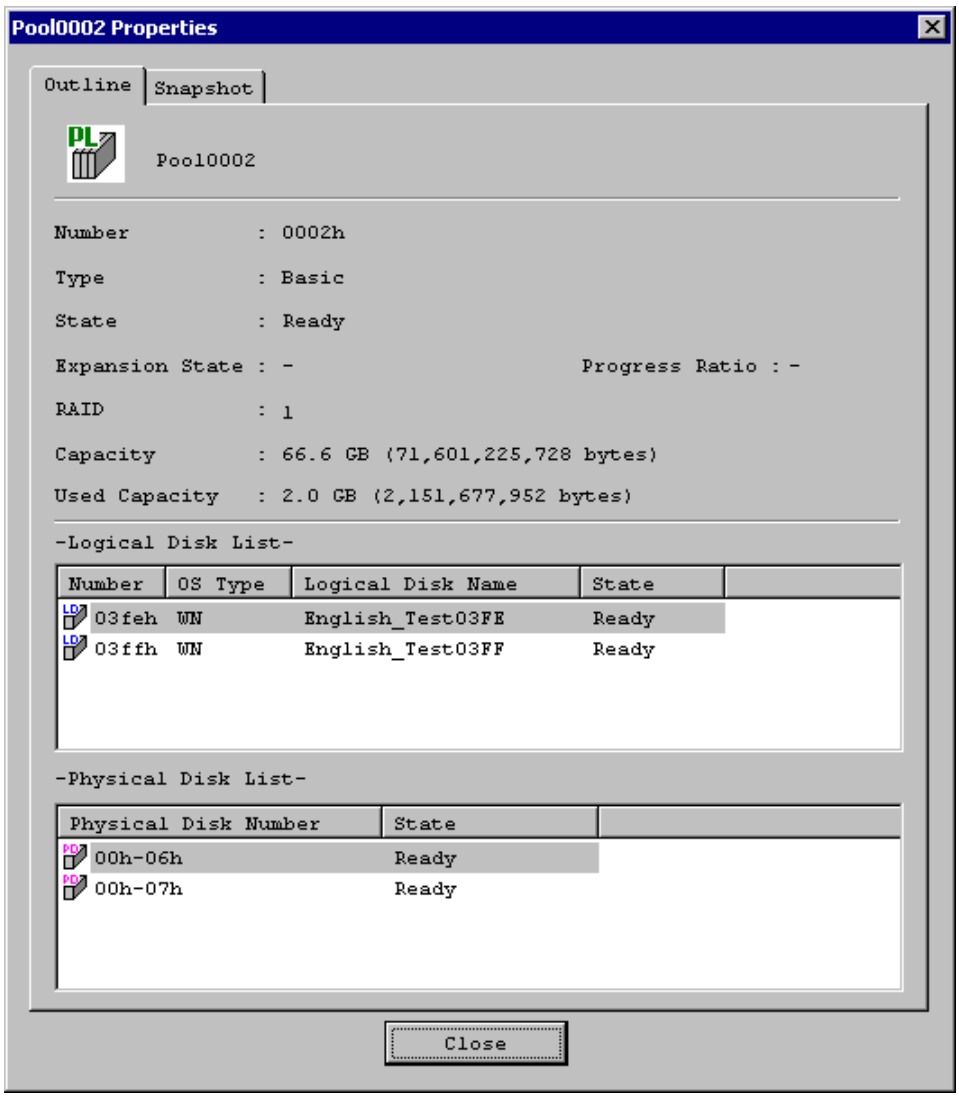


Figure 3-10 Pool Details Information

(i) Name

Displays the pool name.

The display contents are the same as (1) “Pool list screen”.

(ii) Pool Number

Displays the pool number.

The display contents are the same as (1) “Pool list screen”.

(iii) Pool Type

Displays the pool type.

Basic: Basic pool

Dynamic: Dynamic pool

(iv) State

Displays the operating state of pool.

The display contents are the same as (1) “Pool list screen”.

(v) Expansion State

Displays the expansion state of pool.

The display contents are the same as (1) “Pool list screen”.

(vi) Progress Ratio

Displays the progress ratio during pool capacity expansion.

(vii) RAID

Displays the RAID type of pool.

The display contents are the same as (1) “Pool list screen”.

For a dynamic pool, displays the configuration ratio of the data disk and the parity disk after the RAID type, like “6(4+PQ)”.

(viii) Capacity

Displays the capacity of pool.

The display contents are the same as (1) “Pool list screen”.

(ix) Used Capacity

Displays the used capacity of pool.

The display contents are the same as (1) “Pool list screen”.

(x) Logical Disk List

Displays information on the logical disks contained in the target pool (logical disk number, form, logical disk name, and status).

When the snapshot function is used, snapshot-volume (SV) and link-volume (LV) can be set to non-display.

For details on the setting method, refer to 5.2 “Client Start/Stop”.

Example:

Logic Disk Number	OS Type	Logical Disk Name	State
0000h	NX	LDNX00000	Ready
0001h	A4	LDA400000	Fault

(xi) Physical Disk List

Displays information on the physical disks making up the target pool (physical disk number "PD group number (2 digits in hexadecimal) - physical disk number (2 digits in hexadecimal)" and state).

If the expansion state of the pool is either Expanding or Expand-Fail, the physical disks subject to expansion are not displayed on the list.

Example:

Physical Disk Number	State
00h - 01h	Ready
00h - 02h	Fault

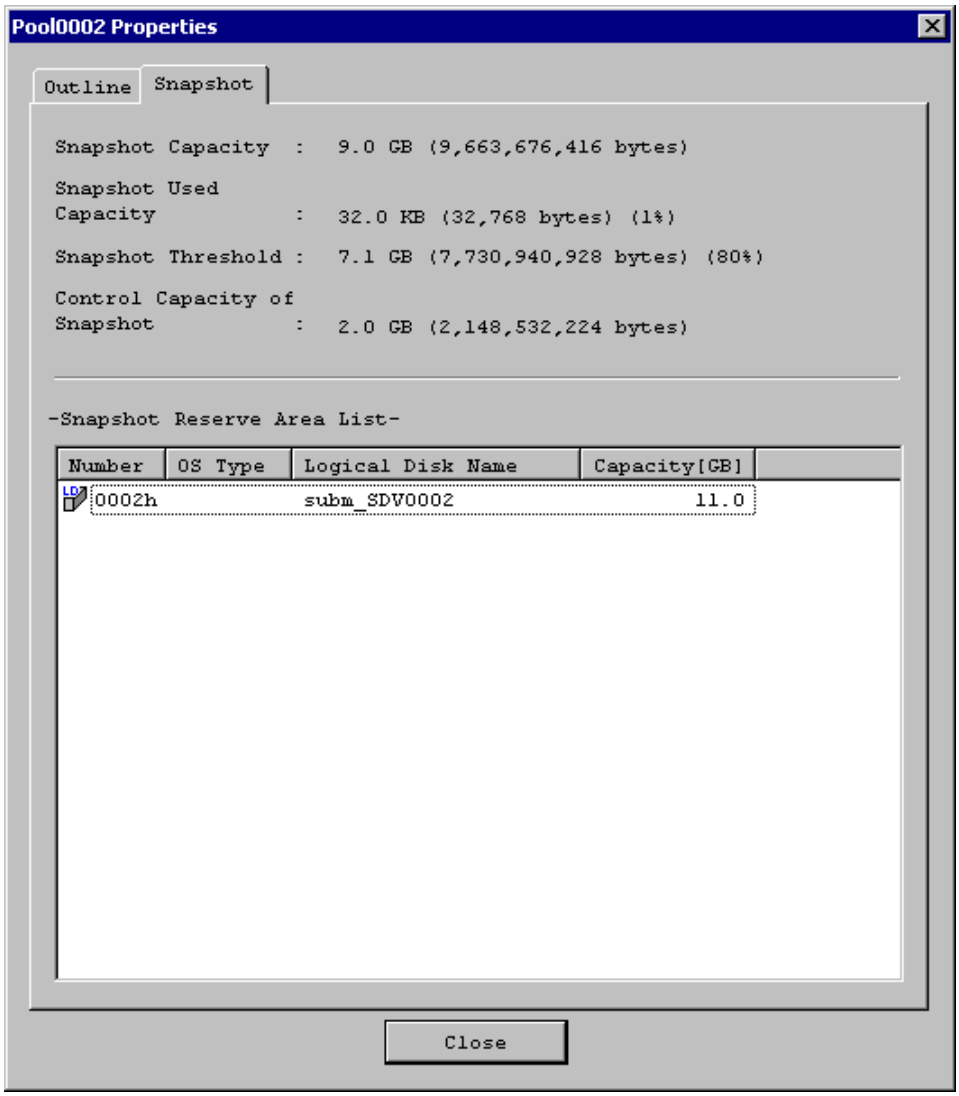


Figure 3-11 Pool Details Information-2

This screen displays information related to snapshot.

* If you do not buy snapshot (DynamicSnapVolume), the [Snapshot] tab is not displayed.

(xii) Snapshot Capacity

Displays the total snapshot capacity.

The display contents are the same as (1) “Pool list screen”.

(xiii) Snapshot Used Capacity

Displays the used snapshot capacity.

The display contents are the same as (1) “Pool list screen”.

(xiv) Snapshot Threshold

Displays the snapshot threshold.

The display contents are the same as (1) “Pool list screen”.

(xv) Control Capacity of Snapshot

Displays the snapshot control capacity.

(xvi) Snapshot Reserve Area List

Lists the information (logical disk number, logical disk name, and capacity) on snapshot reserve area in the target pool.

Example:

Logical Disk Number	Logical Disk Name	Capacity
0000h	POOL001_SDV_0001	10.0
0001h	POOL001_SDV_0002	20.0

3.1.6 Logical Disk Information Display

The logical disk information is displayed in “logical disk list screen” which is displayed in the configuration display area and information list display area, and “logical disk details information screen” which is displayed as logical disk property information.

In this section, each item indicated as logical disk information is described.

(1) Logical Disk list screen

A screen (Figure 3-11) displayed by selecting (click the left button) [Logical Disk] in configuration display area displaying various attribute information such as logical disk name, operating state and capacity.

If selecting (click the left button) optional logical disk in the configuration display area, it also displays RAID configuration physical disk list (part of related information) composed of applicable logical disk.

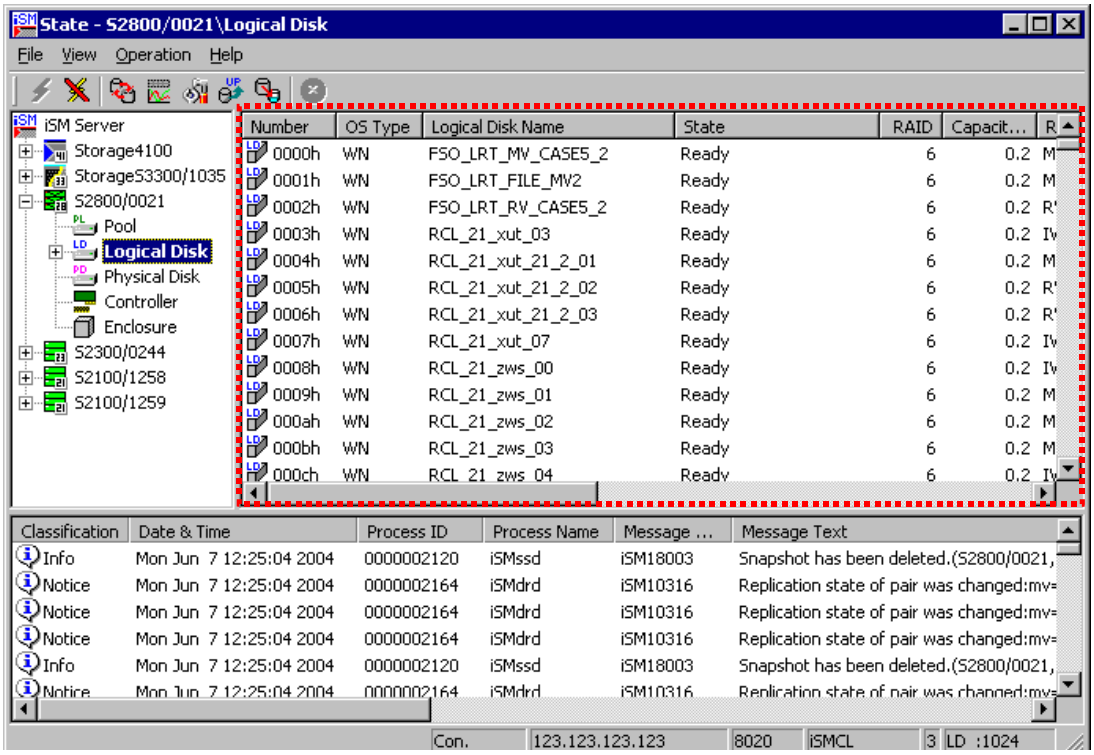


Figure 3-12 Logical Disk list screen

(i) Icon (Operating state/Monitoring state of logical disk)

Displays the operating state/monitoring state of logical disk with the icon next to logical disk number.

Table 3-5 Display Icons

Icon	Status
	Logical disk is in normal operation
	An event whereby “Caution” is needed occurs in logical disk
	“Fault” occurs in logical disk
	These icons show that the disk array is in monitoring stop status or under configuration setting.
	This shows monitoring stop status or under configuration setting. If this icon is displayed, an event that needs “caution” occurred in any logical disk just before stopping monitoring.
	This shows monitoring stop status or under configuration setting. If displaying this icon, a fault has occurred in any logical disk just before stopping monitoring.

(ii) Logical Disk Number

Displays logical disk number (4 hexadecimal digits).

(iii) OS Type/Logical Disk Name

Displays logical disk name (maximum of 24 characters) and OS type. The optional name for logical disk name can be set. Refer to 3.3 “Nickname Setting” for setting method.

For (ii) Logical Disk Number and (iii) OS Type/Logical Disk Name, the order in which the columns are displayed changes depending on the environment settings.

Number order display: Order of [Number], [OS Type], [Logical Disk Name], [State] ...

Name order display: Order of [OS Type], [Logical Disk Name], [Number, [State] ...

Refer to 5.2 “Client Start/Stop” for setting method.

(iv) State

Displays the operating state of logical disk and occurrence of event in any of the following at “State” column.

Ready: Logical disk is in normal operation.

Ready (formatting): During logic formatting

* The logical disk is available, but there may occur I/O response delay until logic formatting is completed.

Attn.(reduce): Reduction (RAID configuration redundancy disappears)

Attn.(rebuilding): While rebuilding (while rebuilding data within RANK)

Attn.(preventive copy): While copying data to spare disk (redundancy maintained by RAID configuration)

Attn.(copy back): While writing back from the spare disk (redundancy maintained by RAID configuration)

Attn.(unformatted): Not logic formatting

Attn.(formatting): During logic formatting

* The logical disk is not available until logic formatting is completed.

Attn.(format fail): Fails in logic formatting

Attn.(expanding): During RANK expansion

Attn.(expand-fail): Fails in RANK expansion

Fault: "Fault" occurs in logical disk

Fault (media error): "Media fault" occurs in logical disk

(v) RAID

Displays RAID type of logical disk in any of the following at "RAID" column.

"0": RAID 0

"1": RAID 1

"5": RAID 5

"6": RAID 6

"10": RAID 10

"50": RAID 50

(vi) Capacity

Displays the capacity of logical disk in Gigabyte units (1G byte=1,073,741,824 bytes) to 1 decimal place. (Truncate less than 2 decimal places. However, displays 0 byte to 100 Megabyte in 0.1).

(vii) RPL Type

Displays the replication type of logical disk in any of the following at "RPL Type" column. This column does not appear when none of DynamicDataReplication and RemoteDataReplication is purchased.

IV: Not used as a replication volume

MV: Used as a replication source volume

RV: Used as a replication destination volume

RV/MV: Used as both RV and MV

(Blank): Cannot be used as a replication volume

(viii) Snapshot Type

Displays the snapshot type.

If you do not buy DynamicSnapVolume, this is not displayed.

Blank: Volume not used by snapshot

BV: Base volume (original volume from which copies are made)

SV: Snapshot volume (volume as the snapshot generation)

LV: Link volume (virtual volume establishing connection with BV or SV and implementing indirect access)

SDV: Snapshot data volume (logical disk configuring snapshot reserve area (SRA))

SV*: A type of snapshot volumes (volume that is not the snapshot generation)

* SV* may exist due to an iSM abnormal end and the like, however it cannot be reused. Therefore, free it immediately by "Freeing Logical Disk" of configuration setting.

(ix) Link

Displays the connection state between BV-LV or SV-LV.

If you do not buy DynamicSnapVolume, this is not displayed.

(x) Group

Displays the group to which a logical disk belongs in any of the following at "Group" column. This column does not appear when AccessControl and ReallocationControl are not purchased.

Preserve: Preserve group

Reserve: Reserve group

(Blank): Already assigned to the LD Set

(xi) Purpose

Displays the purpose of a logical disk in any of the following at "Purpose" column. This column does not appear when ReallocationControl is not purchased.

RPL: Logical disk to which only a pair for replication is set

Snapshot: Logical disk to which only snapshot is set (BV)

Link Volume: Logical disk that is a link-volume (LV)

RPL/Snapshot: Logical disk to which a pair for replication and snapshot setting have already been set

Optimization: Work disk for performance optimization

(Blank): General logical disk to which no specific purpose is set

(xii) RANK/Pool Number

Displays RANK and pool numbers that contain the logical disk. RANK numbers are displayed in "PD group number (2 digits in hexadecimal) - RANK number (2 digits in hexadecimal)". A maximum of four RANK numbers are displayed. Numbers exceeding four are indicated by "..." at the end of line.

* The pool number (4 digits in hexadecimal) is displayed only for the disk arrays with pool.

(xiii) Pool Name

Displays the name of the pool to which the logical disk belongs.

* The name is displayed only for the disk arrays with pool.

(xiv) Cache Resident

Displays cache resident status of logical disk in "resident" column.

Resident: Cache resident

(Blank): Cache non-resident

(xv) Progress Ratio

Displays the progress ratio in logical disk where "formatting", "rebuilding", "copy back", "expanding" and "preventive copy" events occur.

For the disk arrays with pool, the progress ratio is displayed only if a "formatting" event occurs, and not displayed if other events occur.

(xvi) LD Set Name

Displays up to four LD Set Names to which the logical disk belongs (in case four names are exceeded, displayed "…" at the end of the names).

(xvii) Cache Segment Name

Displays the cache segment name to which a logical disk belongs. This column does not appear when CachePartitioning is not purchased.

(xviii) Access Control

Displays port information (Port number, Port name) and LD Set information of host director owned by disk array inside the "Access Control" list box.

By selecting an arbitrary LD Set name from the list box, only the information of logical disk included in the LD Set is displayed in information list display area. When an arbitrary port is selected, only the information of logical disk that can be accessed from the applicable port is displayed in information list display area. If "ALL" is specified from list box, the information of all logical disk in selected disk array is displayed in the information list display area.

(2) Logical Disk details information screen

These screens (Figures 3-13, 3-14, and 3-15) are displayed if selecting (click the left button) optional logical disk and selecting by right clicking → [Properties] (or [View]→[Properties] from menu) in configuration display area or information list display area, displaying detailed information of the logical disk.

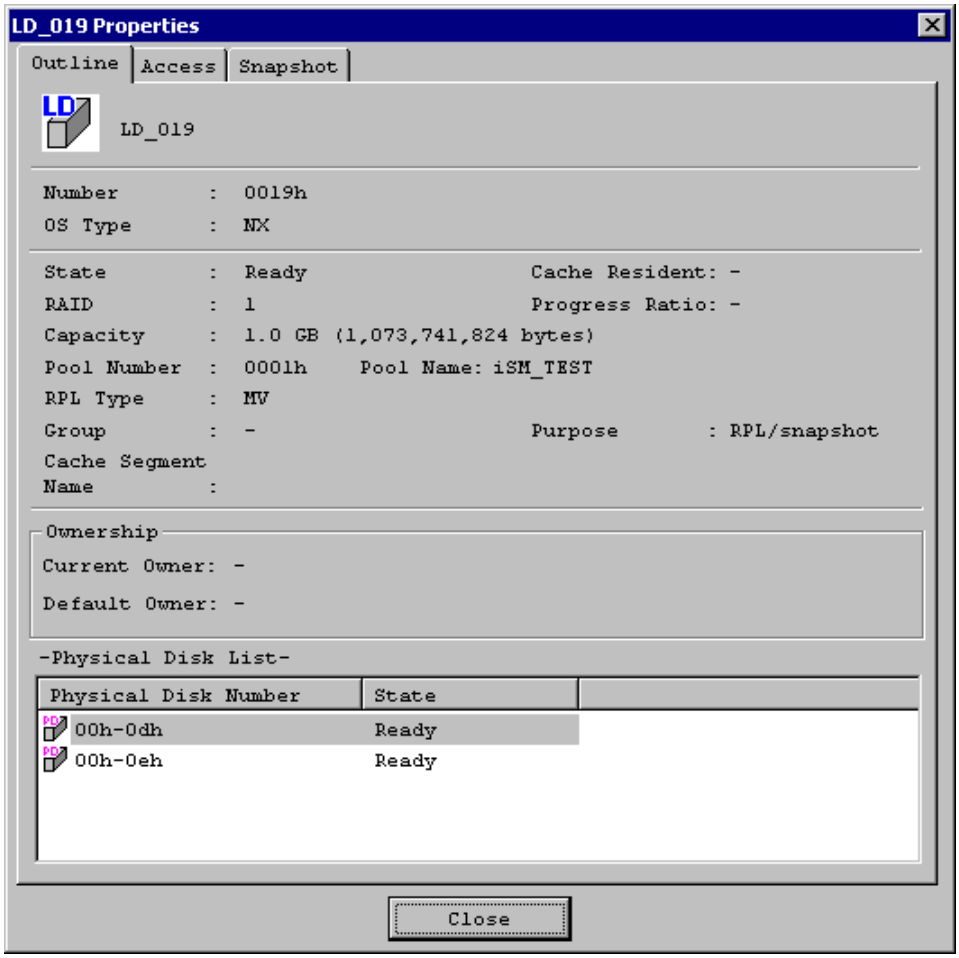


Figure 3-13 Logical Disk Details Information-1

(i) Name

Displays the logical disk name. The display contents are the same as (1) “Logical Disk list screen”.

(ii) Number

Displays the logical disk number. The display contents are the same as (1) “Logical Disk list screen”.

(iii) OS Type

Displays the form of logical disk. The display contents are the same as (1) “Logical Disk list screen”.

(iv) State

Displays the operating state of logical disk. The display contents are the same as (1) “Logical Disk list screen”.

(v) RAID

Displays the RAID type of logical disk. The display contents are the same as (1) “Logical Disk list screen”.

If the pool to which the target logical disk belongs is a dynamic pool, displays the configuration ratio of the data disk and the parity disk after the RAID type, like “6(4+PQ)”.

(vi) Capacity

Displays the capacity of logical disk.

(vii) RANK/Pool Number

Displays the RANK and pool numbers

The display contents are the same as (1) “Logical Disk list screen”.

(viii) Pool Name

Displays the name of the pool to which the logical disk belongs.

The display contents are the same as (1) “Logical Disk list screen”.

(ix) Cache Resident

Displays the cache resident status of logical disk. The display contents are the same as (1) “Logical Disk list screen”.

(x) Progress Ratio

Displays the progress ratio in logical disk where the event of “formatting”, “rebuilding”, “copy back”, “expanding” or “preventive copy” occurs. The display contents are the same as (1) “Logical Disk list screen”.

For the disk arrays with pool, the progress ratio is displayed only if a “formatting” event occurs, and not displayed if other events occur.

(xi) RPL Type

Displays the replication type of logical disk. The display contents are the same as (1) “Logical Disk list screen”.

This column does not appear when none of DynamicDataReplication and RemoteDataReplication is purchased.

(xii) Group

Displays the group to which a logical disk belongs. The display contents are the same as (1) “Logical Disk list screen”. This column does not appear when AccessControl and ReallocationControl are not purchased.

(xiii) Purpose

Displays the purpose of a logical disk. The display contents are the same as (1) “Logical Disk list screen”. This column does not appear when CachePartitioning is not purchased.

(xiv) Cache Segment Name

Displays the cache segment name to which a logical disk belongs. This column does not appear when CachePartitioning is not purchased.

(xv) Ownership

Displays the controller information (ownership: current, default) where authority to control logical disks is assigned during an invalid Cross Call mode. Then, when the Cross Call function is not supported or Cross Call mode is valid, displays “-”.

Example: Current Owner controller 0

Default Owner controller 1

(xvi) Physical Disk List

The physical disk number "PD group number (2 hexadecimal digits) - physical disk number (2 hexadecimal digits)", which configures target logical disk, and the status are displayed.

For the disk arrays with pool, displays information on the physical disks contained in the pool to which the target logical disk belongs.

Example:

Physical Disk Number	State
00h - 01h	Ready
00h - 02h	Fault

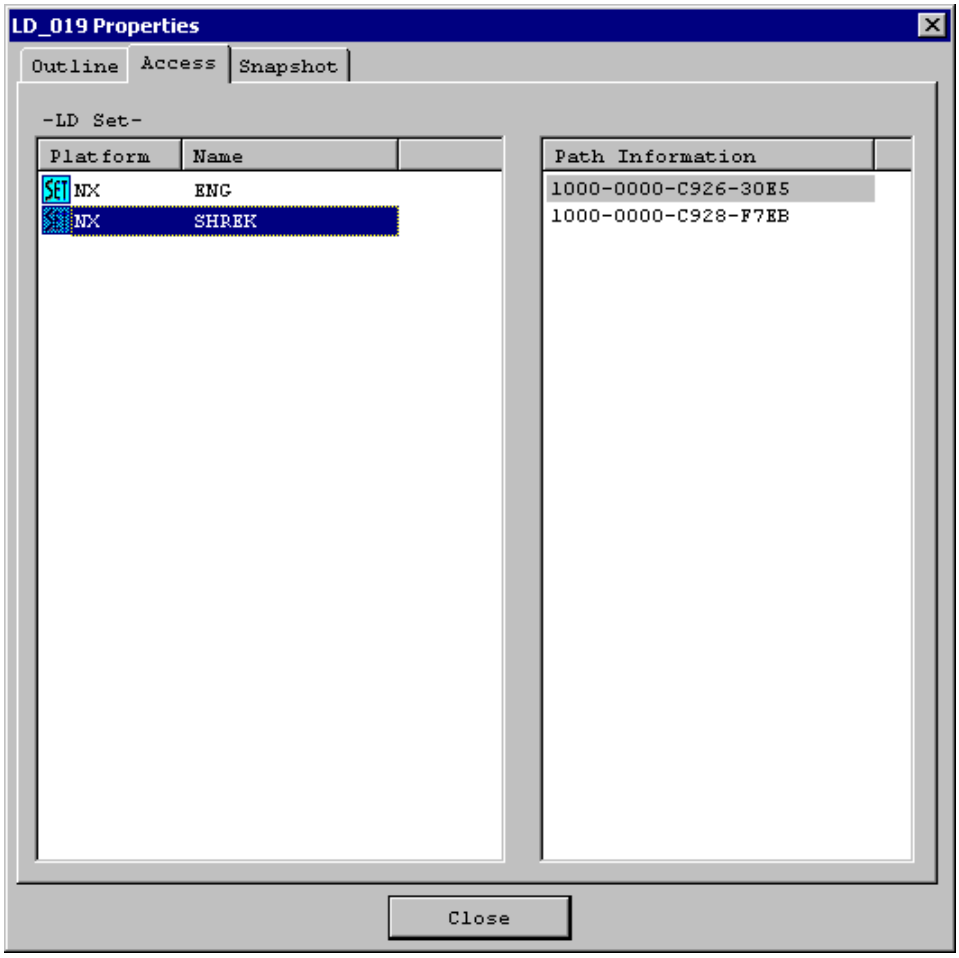


Figure 3-14 Logical Disk Details Information-2

(i) Port

Displays the port information (port number, port name, status*1) where access authority is possessed to logical disk.

This item is not displayed for disk array to which the AccessControl license has been applied.

Ports only for a host are displayed.

*1 Director state when the port is installed

Example:

Port Number	Port Name	State
00h - 01h	DB_server1	Ready
00h - 02h	DB_server2	Fault

(ii) LD Set

Displays the LD Set where the specified logical disk is bound.

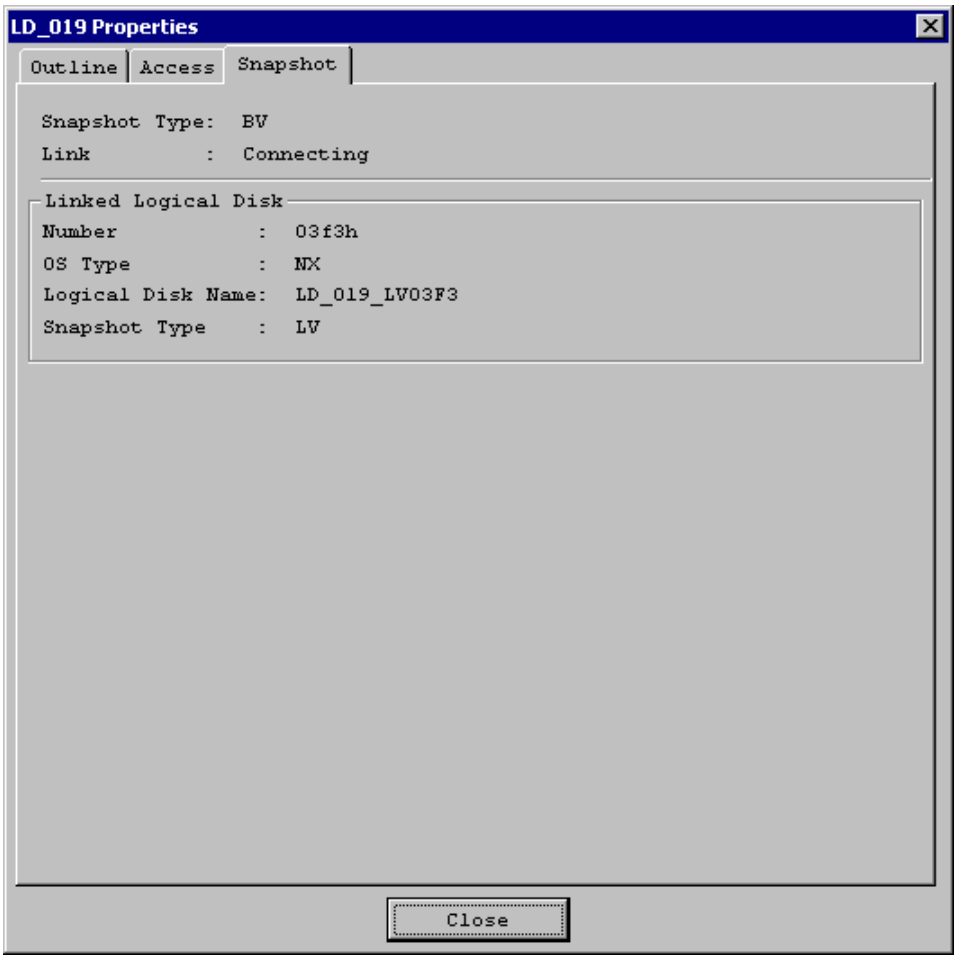


Figure 3-15 Logical Disk Details Information-3

The information related to snapshot is displayed.

* The [Snapshot] tab is not displayed, if you do not buy snapshot (DynamicSnapVolume) or the selected logical disk is not a volume related to snapshot (a snapshot related volume is a volume of which snapshot type is BV, SV, LV, SDV, or SV*).

(i) Snapshot Type

Displays the snapshot type.

The display contents are the same as (1) “Logical Disk list screen”.

(ii) Link

Displays the connection state.

The display contents are the same as (1) “Logical Disk list screen”.

(iii) Number

Displays the number of the connecting logical disk (4 digits in hexadecimal).

(iv) OS Type

Displays the (OS) type of the connecting logical disk.

The display contents are the same as (1) “Logical Disk list screen”.

(v) Logical Disk Name

Displays the logical disk name (up to 24 characters) of the connecting logical disk.

(vi) Snapshot Type

Displays the snapshot type of the connecting logical disk.

The display contents are the same as (1) “Logical Disk list screen”.

3.1.7 Physical Disk Information Display

Physical disk information is displayed in “Physical Disk list screen” displayed in the configuration display area and information list display areas, and in “Physical Disk detailed information screen” displayed as physical disk property information.

In this section, each item shown as physical disk information is described.

(1) Physical Disk list screen

The screen (dashed line in Figure 3-16) displayed when [Physical Disk] is selected (click the left button) in configuration display area and displays various attribute information such as operating state of physical disk and capacity.

When an optional physical disk is selected (click the left button) in the configuration display area, the information of logical disk (a part of related information) configured by applicable physical disk in RAID is also displayed in the list.

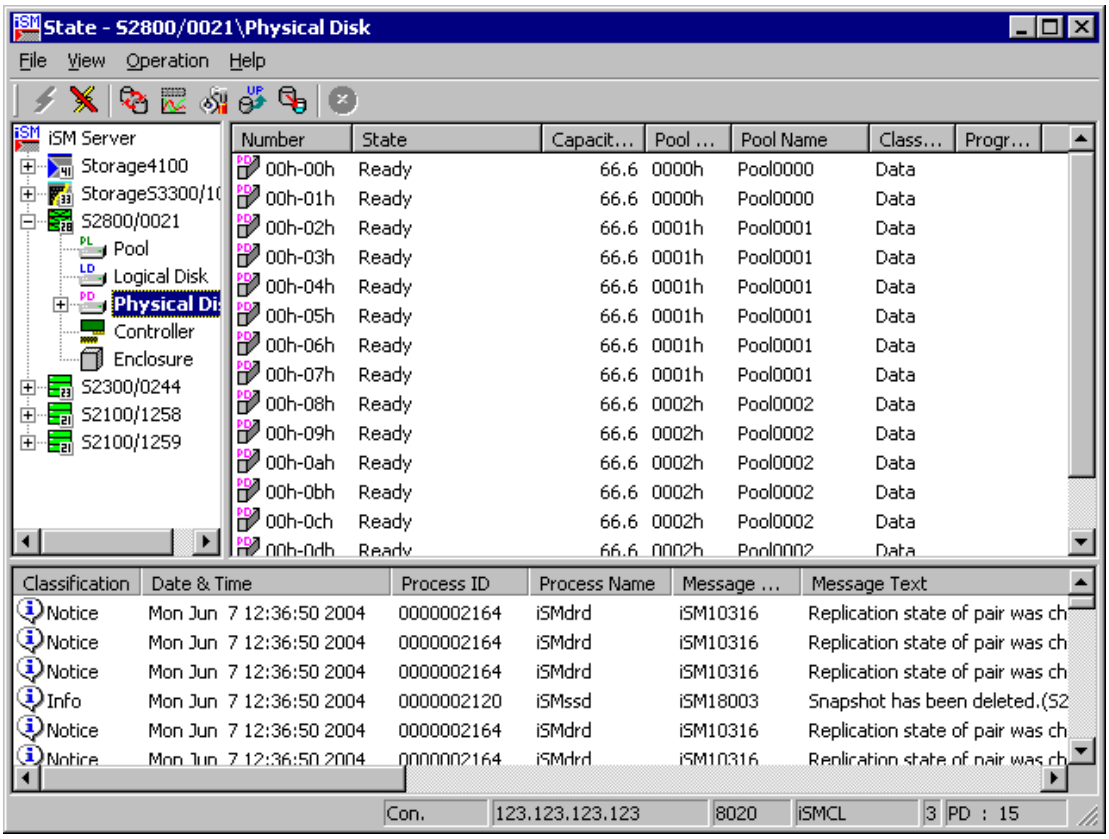


Figure 3-16 Physical Disk List Screen

(i) Icon (Operating state/Monitoring state of Physical Disk)

Displays the operating state of physical disk with the icon next to the physical disk number.

Table 3-6 Display Icons

Icon	Status
	Physical disk is in normal operation
	The event whereby “Preventive maintenance” is needed occurred in physical disk. This shows one alternative physical disk failed and the other alternative physical disk is used.
	The event whereby “Attn” is needed occurred in physical disk
	“Fault” occurred in physical disk
	These icons show that the disk array is in monitoring stop status or under configuration setting.
	This shows monitoring stop status or under configuration setting. If this icon is displayed, an event that needs “Preventive maintenance” occurred in any physical disk just before stopping monitoring.
	This shows monitoring stop status or under configuration setting. If this icon is displayed, an event that needs “Attn” occurred in any physical disk just before stopping monitoring.
	This shows monitoring stop status or under configuration setting. If displaying this icon, a fault has occurred in any physical disk just before stopping monitoring.

(ii) Number

Displays the physical disk number in “PD group number (2 hexadecimal digits) - PD number (2 hexadecimal digits)” at “Number” column.

(iii) State

Displays the operating state of physical disk and the occurrence of event at “State” column in any of the following.

Ready: Physical disk is in operation

Info (inactive): “Preventive maintenance” occurred in physical disk

Attn.(rebuilding): While re-building the data

Attn.(powering up): While starting up the physical disk

Attn.(formatting): While formatting physically

Fault: “Fault” occurred in physical disk

Offline: Physical disk is separated or does not exist.

(iv) Capacity

Displays the physical disk capacity to one decimal place at most in Gigabyte unit (1G byte=1,073,741,824 byte) at “Capacity” column. (Truncate less than 2 decimal places. But, 0 byte to 100Megabyte is displayed by 0.1).

(v) RANK/Pool Number

Displays RANK and pool numbers whereby physical disk belongs in “PD group number (2 hexadecimal digits) - RANK number (2 hexadecimal digits)” at “RANK” column.

* The pool number is displayed only for the disk arrays with pool.

(vi) Pool Name

Displays the name of the pool to which the physical disk belongs.

* The name is displayed only for the disk arrays with pool.

(vii) Classification

Displays the classification of target physical disk in any of following at “Classification” column.

Data: Physical disk that can be used as data area

Spare: Replacement of physical disk at the fault occurrence

No Setting: Physical disk that is not specified as data/spare

* For the disk arrays with pool, the classification of the physical disk subject to pool expansion is displayed as data.

(viii) Progress Ratio

If the disk array to be monitored is that with pool, displays the progress ratio in the physical disk in which a rebuilding event occurred.

(2) Physical Disk detailed information screen

This screen (Figures 3-17) is displayed if selecting (click the left button) optional physical disk and selecting by right clicking → [Properties] (or [View]→[Properties] from menu) in configuration display area or information list display area, displaying detailed information of the physical disk.

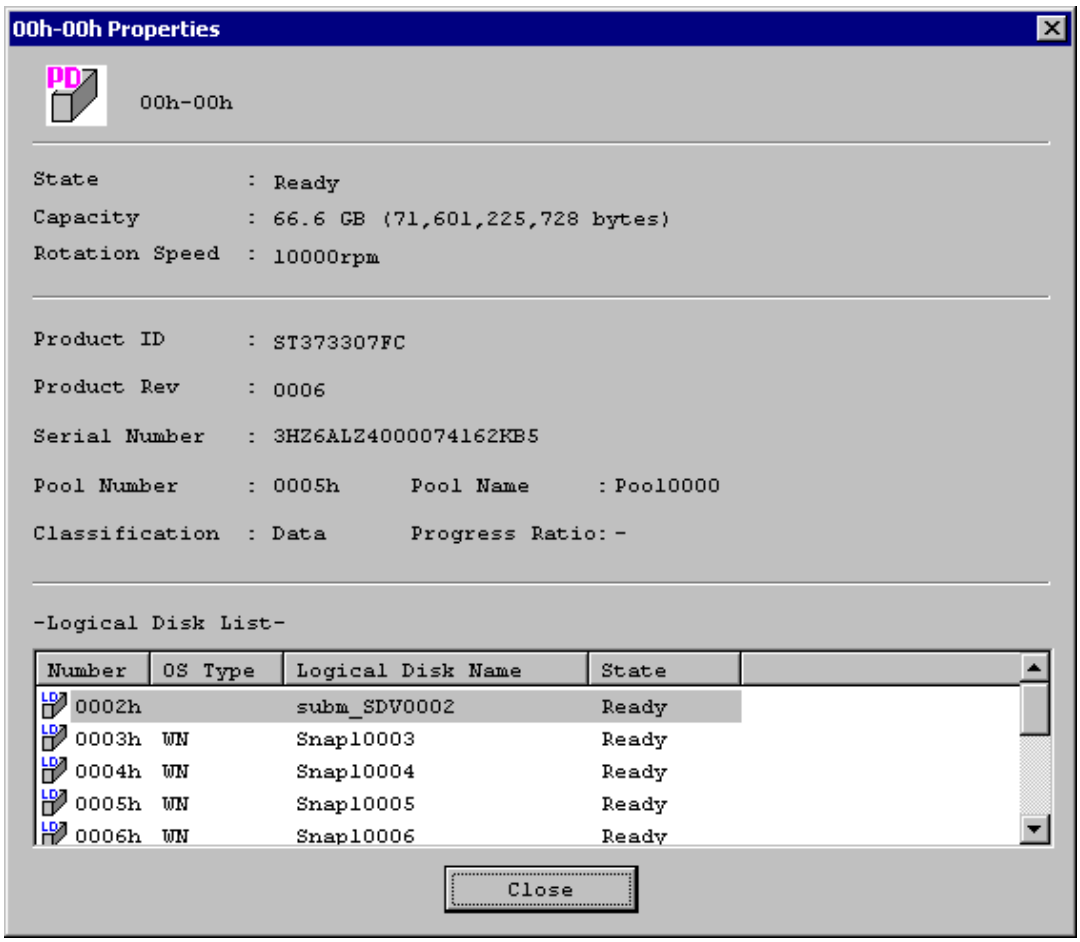


Figure 3-17 Physical Disk Detailed Information

(i) Number

Displays the physical disk number. The display contents are the same as (1) “Physical Disk list screen”.

(ii) State

Displays the operating state of physical disk and the occurrence of event. The display contents are the same as (1) “Physical Disk list screen”.

(iii) Capacity

Displays the capacity of physical disk.

(iv) Rotation Speed

Displays the number of rotation (unit: rpm) of target physical disk.

(v) Product ID

Displays the product model name (maximum of 16 characters) information of target physical disk.

(vi) Product Rev

Displays the Product Revision (4 characters) information of target physical disk.

(vii) Serial Number

Displays the product serial number (20 characters) of target physical disk.

(viii) RANK Number/Pool Number

Displays the RANK and pool numbers of physical disk. The display contents are the same as (1) “Physical Disk list screen”.

* The pool number is displayed only for the disk arrays with pool.

(ix) Pool Name

Displays the name of the pool to which the physical disk belongs.

The display contents are the same as (1) “Physical Disk list screen”.

* The name is displayed only for the disk arrays with pool.

(x) Classification

Displays the classification of physical disk. The display contents are the same as (1) “Physical Disk list screen”.

(xi) Progress Ratio

If the disk array to be monitored is a disk array with pool, displays the progress ratio in the physical disk in which a rebuilding event occurred.

The display contents are the same as (1) “Physical Disk list screen”.

(xii) Logical Disk List

Displays the logical disk number, form, logical disk name and status which are configured by target physical disk.

For the disk arrays with pool, displays the logical disk number, form, logical disk name, and status of each of the logical disks contained in the pool to which the target physical disk belongs.

When the snapshot function is used, snapshot-volume (SV) and link-volume (LV) can be set to non-display.

For details on the setting method, refer to 5.2 “Client Start/Stop”.

Example:

Logical Disk Number	OS Type	Logical Disk Name	State
0000h	WN	KAIKEI	Ready
0001h	NX	KEIRI	Fault

3.1.8 Controller Information Display

The information of a controller is displayed on the following screens:

- Controller list screen that is displayed in the information list display area
- Controller detail information screen that is displayed as the information of controller's properties

This section explains items displayed as controller information.

(1) Controller list screen

Controller list screen (Figure 3-18) displayed when [Controller] is selected (click the left button) in the configuration display area, displaying the operating state in each component of controller relation.

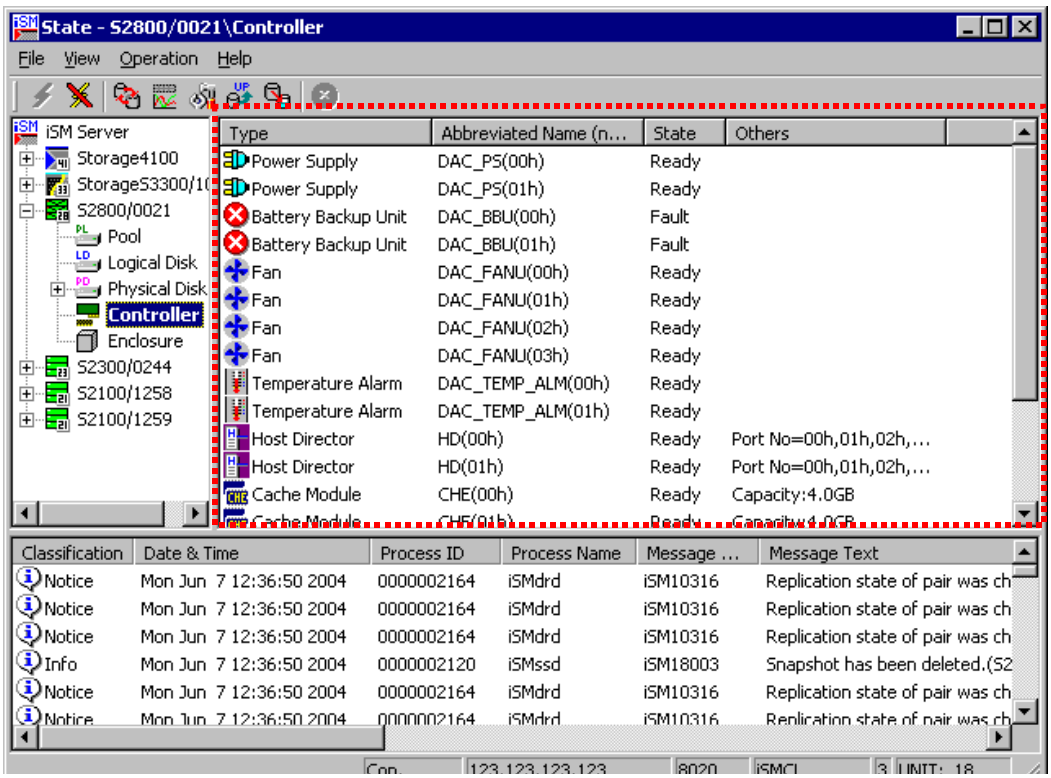


Figure 3-18 Controller List Screen

(i) Icon (operating state/monitoring state related to controller)

Displays the operating state/monitoring state of component related to controller with the icon next to "Type" column.

Table 3-7 Display Icons

Icon	Status
 etc. (Ready)	Component is in normal operation
 (Offline)	An event whereby “Attn” is needed occurred in component.
 (Fault)	“Fault” occurred in component (If component type is Temperature Alarm, it indicates abnormal temperatures.)
 etc. (Ready)	These icons show that the disk array is in monitoring stop status or under configuration setting.
 (Offline)	This shows monitoring stop status or configuration setting. If this icon is displayed, any component is disconnected or absent just before stopping monitoring.
 (Fault)	This shows monitoring stop status or configuration setting. If this icon is displayed, a “fault” has occurred in any component just before stopping monitoring. (If the component type is Temperature Alarm, temperature abnormalities are indicated.)

(ii) Type

Displays the type information as component related to controller at “Type” column in the Table 3-8.

Table 3-8 Controller Component List

Type	Abbreviation
Host Director	HD
Replication Director	RD
Disk Director	DD
Cache Module	CHE
Service Processor	SVP
Power Supply	DAC_PS
Battery Backup Unit	DAC_BBU
Fan	DAC_FANU DAC_FANL
Temperature Alarm	DAC_TEMP_ALM
Back Board	DAC_BB
BC Junction Box	BC_JB
Panel	PANEL
Maintenance PC	MAINTE_PC
Power Control Card	PCC

(iii) Abbreviated Name (number)

Displays the abbreviation and component number of component related to controller at “Abbreviation Name (number)” column (Table 3-8).

(iv) State

Displays the operating state in component related to controller in any of following at "State" column.

Ready:	Component of controller is in normal operation
Attn.(nolicense):	The program product "BaseProduct" has not been installed. (Displayed only for the Host Director)
Attn.(rebuilding):	Component of controller is in the data rebuilding state (Displayed only for Cache Module)
Attn.(charge):	Component of controller is being charged (Displayed only for Battery Backup Unit)
Offline:	Component of controller is separated or does not exist
Fault:	"Fault" occurred in component of controller (If component type is Temperature Alarm, indicates the abnormal temperature)

(v) Others

Displays supplement information in each component at "Others" column optionally. Displays the cache module capacity, port number and protocol information in controller information.

- Cache module capacity

  If component type is "Cache Module", the cache module capacity is displayed at "Others" column.

- Port number

  If component type is "Host Director", "Replication Director", or "Disk Director", port number (2 hexadecimal digits) that applicable director possesses is displayed at "Others" column.

- Protocol information

  If component type is "Host Director", the protocol information of the target director is displayed following the port number at "Others" column.

(2) Controller detail information screen

Select (left-click on) an arbitrary controller in the information list display area, right-click on it, and select [Properties] (or [View] on the menu bar → [Properties]). The Controller properties screen (Figure 3-19) appears displaying the detailed information of the selected controller.

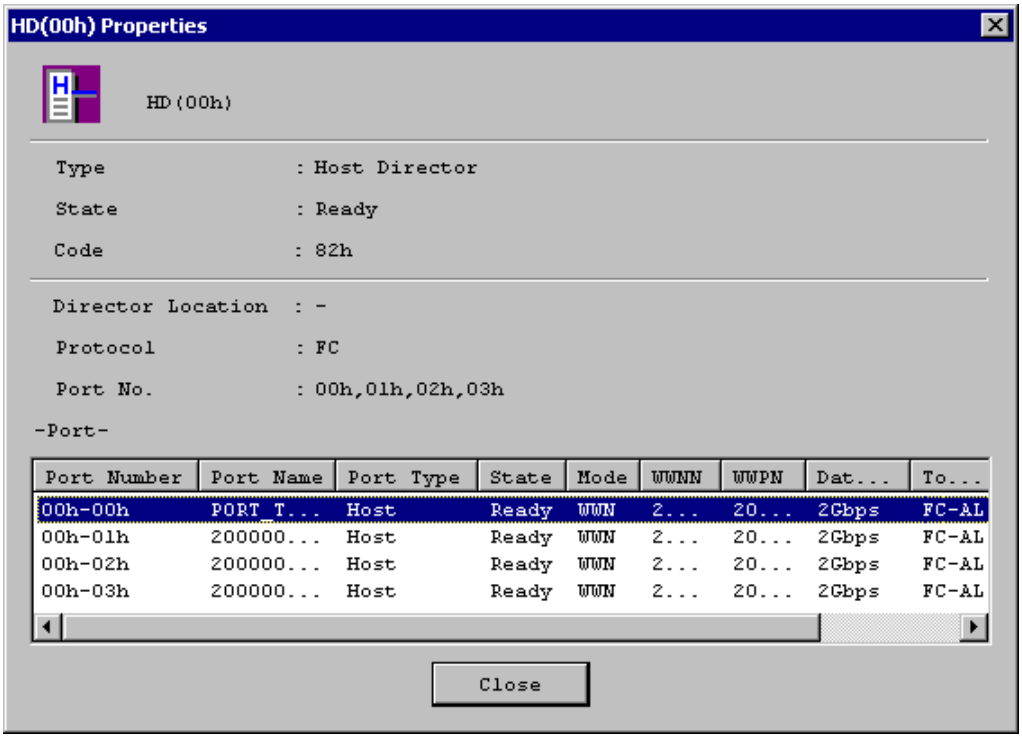


Figure 3-19 Controller Detail Information Screen

The information to be displayed varies depending on the selected component.
(In the above screen sample, the host director is selected.)

3.1.9 Disk Enclosure Information Display

The information of a disk enclosure is displayed on the following screens:

- Disk enclosure list screen that is displayed in the information list display area
- Disk Enclosure properties screen that is displayed as the information of disk enclosure's properties

This section explains items displayed as disk enclosure information.

(1) Disk Enclosure list screen

Disk Enclosure list screen is a screen (dashed line in Figure 3-20) displayed by selecting (click the left button) [Enclosure] in the configuration display area, and displays the operating state in each component relation to disk enclosure. [Enclosure] is not provided depending on your system configuration.

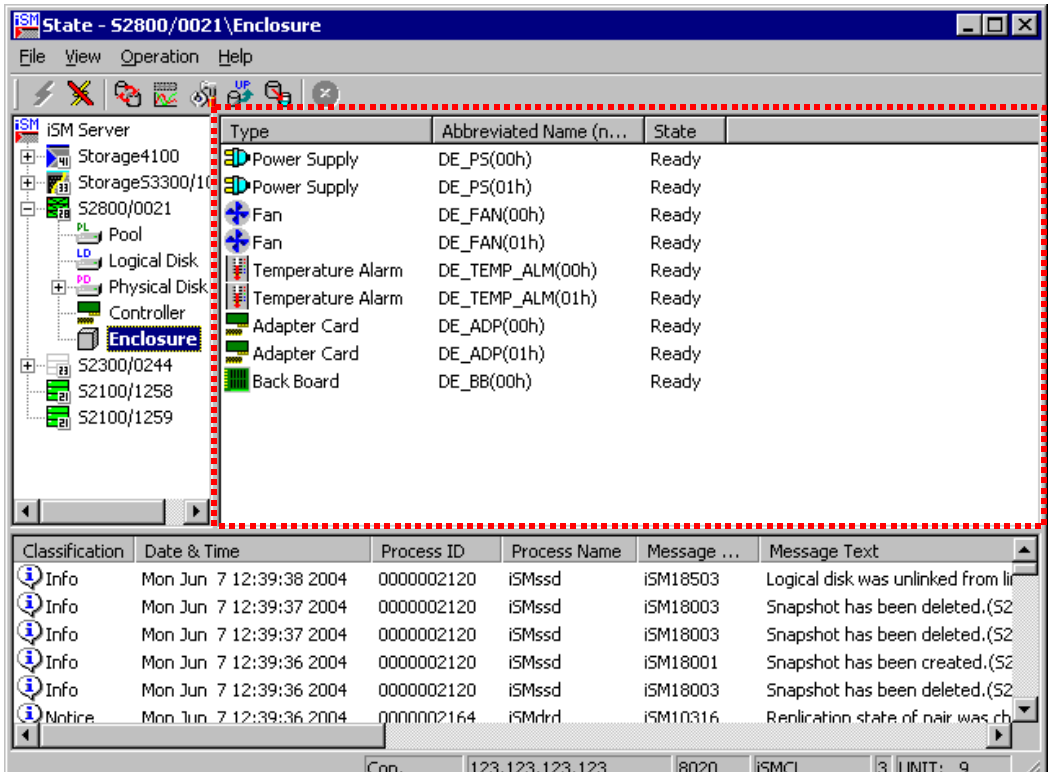


Figure 3-20 Disk Enclosure List Screen

(i) Icon (operating state/monitoring state related to disk enclosure)

Displays the operating state/monitoring state in component related to disk enclosure with the icon next to "Type" column.

Table 3-9 Display Icons

Icon	Status
 (Ready)	Component (disk enclosure) is in normal operation.
 (Offline)	Component is separated or does not exist
 (Fault)	"Fault" occurred in component (If component type is Temperature Alarm, it indicates temperature abnormalities or sensor fault.)
 (Ready)	These icons show that the disk array is in monitoring stop status or under configuration setting.
 (Offline)	This shows monitoring stop status or configuration setting. If this icon is displayed, any component is disconnected or absent just before stopping monitoring.
 (Fault)	This shows monitoring stop status or configuration setting. If this icon is displayed, a "Fault" has occurred in any component just before stopping monitoring. (If the component type is Temperature Alarm, temperature abnormalities are indicated.)

(ii) Type

Displays the following type information as the component related to disk enclosure at "Type" column.

Table 3-10 List of Components Related to Disk Enclosure

Type	Abbreviation
Adapter Card	DE_ADP
Power Supply	DE_PS
Fan	DE_FAN
Temperature Alarm	DE_TEMP_ALM
Back Board	DE_BB
EC Junction Box	EC_JB

(iii) Abbreviated Name (number)

Displays the abbreviation and component number of component related to disk enclosure at "Abbreviated Name (number)" column. (Table 3-10)

(iv) State

Displays the operating state in any of the following in component related to disk enclosure at "Status" column.

Ready: Component of disk enclosure is in normal operation.

Offline: Component of disk enclosure is separated or does not exist.

Fault: "Fault" occurred in component of disk enclosure.
(If component type is Temperature Alarm, it indicates temperature abnormalities or sensor fault.)

(2) Disk Enclosure properties screen

Select (left-click on) an arbitrary disk enclosure in the information list display area, right-click on it, and select [Properties] (or [View] on the menu bar → [Properties]). The Disk Enclosure properties screen (Figure 3-21) appears displaying the detailed information of the selected disk enclosure.

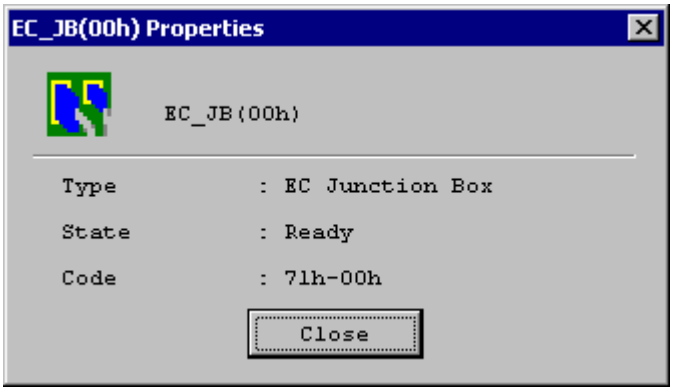


Figure 3-21 Disk Enclosure Properties Screen

The information to be displayed varies depending on the selected component.
(In the above screen sample, the EC Junction Box is selected.)

3.2 State Monitoring

The state monitoring function monitors the generation of the following events in the disk array which is an object of iSM.

<Event>

• Generation of status transition in the components

• Existence of change of a disk array name, a logical disk name and a port name

• Generation of configuration change

• Occurrence of a threshold excess of the quantity used of snapshot

iSM supports the polling mode to acquire the monitoring information in the fixed interval. When the above event is detected, iSM not only reflects the detected event on the configuration control screen of an iSM client but also outputs the message to various logs (event log, operation log). Besides, it can perform link processing such as maintenance, as started by the event detection. For log output and link function, refer to sections 3.5 “Log Output” and 3.6 “Event Link” in this manual.

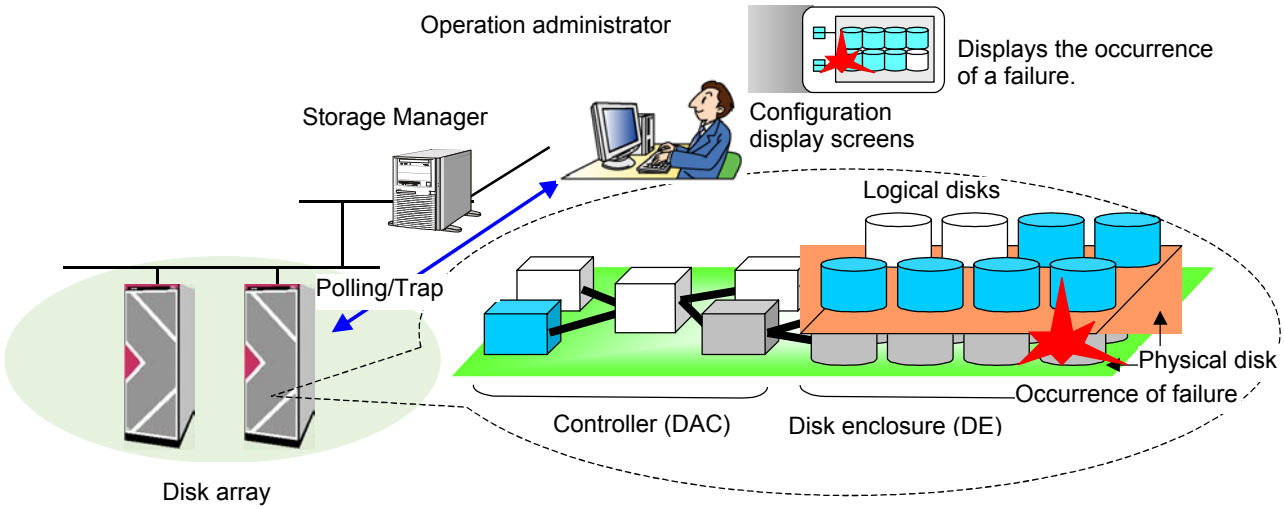


Figure 3-22 Operation Image

3.2.1 Function Outline

(1) Monitoring Events

Status monitoring function provides a function which monitors generation / transition of event indicated in Table 3-11 for the components of disk array which is an object of control.

Table 3-11 Monitoring Event List

Section	Component	Element	Event	Level
Status Transition	Physical Disk		ready	info
			Info(inactive)	info
			fault	error
			attn.(rebuilding)	notice
			attn.(powering up)	notice
			attn.(formatting)	notice
			offline	error
	Controller	HD/RD/DD CHE/SVP PS/BBU, etc	ready	info
			fault	error
			offline	error
	(Disk) Enclosure	ADP/PS FAN/BB TEMP_ALM, etc	ready	info
			fault	error
			offline	error
	Logical Disk		ready	info
			ready(formatting)	info
			fault	error
			fault(media error)	error
			attn.(reduce)	error
			attn.(rebuilding)	notice
			attn.(preventive copy)	notice
			attn.(copy back)	notice
			attn.(unformatted)	notice
			attn.(formatting)	notice
			attn.(format-fail)	notice
			attn.(expanding)	notice
			attn.(expand-fail)	notice
	Control Path		stop(control path fail)	error
	Pool		ready	info
			fault	error
			attn.(reduce)	error
			attn.(rebuilding)	notice
			attn.(preventive copy)	notice
			attn.(copy back)	notice
Name Change	Disk Array	Disk Array Name	renamed	info
	Controller	Port Name	renamed	info
	Logical Disk	Logical Disk Name	renamed	info
Configuration Change	Logical Disk	Logical Disk	config changed	notice
		Cache Disk	config changed	notice
	Physical Disk	Physical Disk	config changed	notice
	Controller	Access Control	config changed	notice

3.2.2 Description of Screen and Operation

This section describes the instructions of status monitoring information display image and monitoring control operation in the iSM client.

(1) Monitoring information display

Information monitored by the iSM server is displayed as “Message Output” and “Status Value Reflection” via iSM client.

(a) Message Output

When the status transition, name change, or configuration change is detected, messages corresponding to such events are output in the message display area.

Example of message output at fault detection

```
Sat Jan  6 02:08:44 2001 0000017917 Info    iSMrmond
    iSM07102:State of PD(28h) has become fault. (Storage4100/07 ProductID=S4100 Disk Array
    SN=3000000000000002 No=00h-01h RankNo=00h-00h) ... (i)
```

(i) indicates that a fault occurred in the physical disk (with a resource type of 28h, product ID of S4100 Disk Array, serial number of 3000000000000002, number of 00h-01h, and Rank number of 00h-00h) of the disk array (whose disk array name is “Storage4100/07”).

Example of message output at name change

```
Sat Jan  6 02:08:44 2001 0000017917 Info    iSMrmond    iSM07201:Disk Array, named
Storage4100/07, has renamed to Storage4100/dwh1  (SN=3000000000000003 )
```

The message indicates that the disk array (whose name is “Storage4100/07” and serial number is “3000000000000003”) has been renamed “Storage4100/dwh1”.

For details, refer to the “Messages Handbook”.

(b) State Value Reflection

Due to the detection of status transition, name change, or configuration change, respective status of changed elements is shown in the configuration display area on iSM client.

When events such as fault, caution, and offline occur in each component, status value of the object element for individual element layer is changed and the corresponding icons are also changed. Status of element layer or disk array layer change depends on the status change of individual element layer. For example, if attention event occurs in PD, PD of the upper element layer and disk array layer change to normal status (maintenance). (Table 3-12)

Furthermore, when two types of event at different fault level simultaneously occur in the individual element layer, an event with higher fault level is always reflected on the upper layer.

For contents of display, refer to 3.1 “Configuration Display” in this manual.

Table 3-12 Fault Status Reflection

Disk Array Layer		Component Layer		Individual Component Layer		
	Serious Fault		Fault		Pool	Fault
					LD	
or	Ready (Maintenance)	or PD	Ready (Maintenance)		PD	Fault
		or			Controller	
		or			Enclosure	
		or PL			Pool	Attention/Offline/Info
		or LD			LD	
		or PD		or PD	PD	
		or			Controller	
		or			Enclosure	
	Ready	PL	Ready	PL	Pool	Ready
		LD		LD	LD	
		PD		PD	PD	
				etc.	Controller	
				etc.	Enclosure	

* Pool-related information is displayed if the disk array to be monitored is a disk array with pool.

1. Displaying of the icon, , in the ready (maintenance) status can be selected by environment setting for the iSM client. Select [File] → [Environment Settings] from the Menu and check [Display Maintenance State] from Environment Setting Dialog.
2. If the states of the disk array layer and the component layer (pool) are Ready or Ready (Maintenance) at the occurrence of threshold excess, the threshold excess icon is displayed. If, however, [Display Maintenance State] is checked, an icon indicating the resource state is given precedence and displayed.
3. Shape or color tone of the disk array icon varies depending on the type of disk array and the monitoring state. For further detailed information on the disk array icon, refer to 3.1.3 “Disk Array Information Display” in this manual.

(2) Monitoring Start/Stop

In the iSM server, monitoring is automatically carried out for the disk array specified by the Environment Definition File (iSMsvr.conf) when the server starts-up. When you wish to temporarily stop/resume monitoring for the specific disk array due to maintenance or configuration changes, the following operation should be executed. In order to utilize this function, user level should be L3.

(i) Select [Operation]→[Start/Stop Monitoring] from the Menu to display monitoring control dialog.

(ii) From [Disk Array Subsystem Name] on Monitoring Control Dialog, select (click) a disk array that you wish to start or stop monitoring.

If you wish to monitor the disk array: Click [Start] button.

If you wish to stop monitoring: Click [Stop] button.

If you wish to stop monitoring start process during preparation of monitoring, or wish to stop recovery process during waiting for monitoring recovery: Click [Break] button.

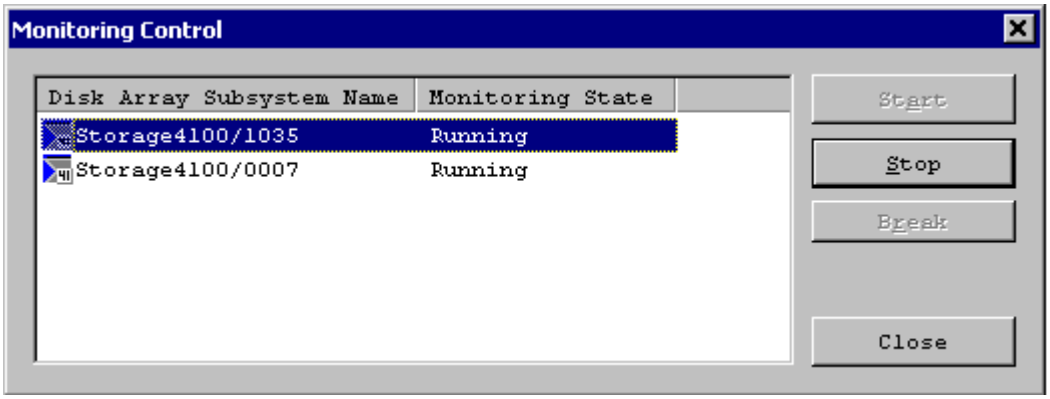


Figure 3-23 Monitoring Control Dialog

3.3 Nickname Setting

Nickname setting function is used via iSM client to set disk array name, logical disk name (and disk OS Type), and port name for the disk array which is the object of iSM monitoring. By setting these names so that they match to the identification information of the individual daily work processing systems that use the disk arrays, efficient control of the disk array can be achieved. Once information is set, it can be acquired regardless of iSM rebooting because the preset name is recorded inside the disk array.

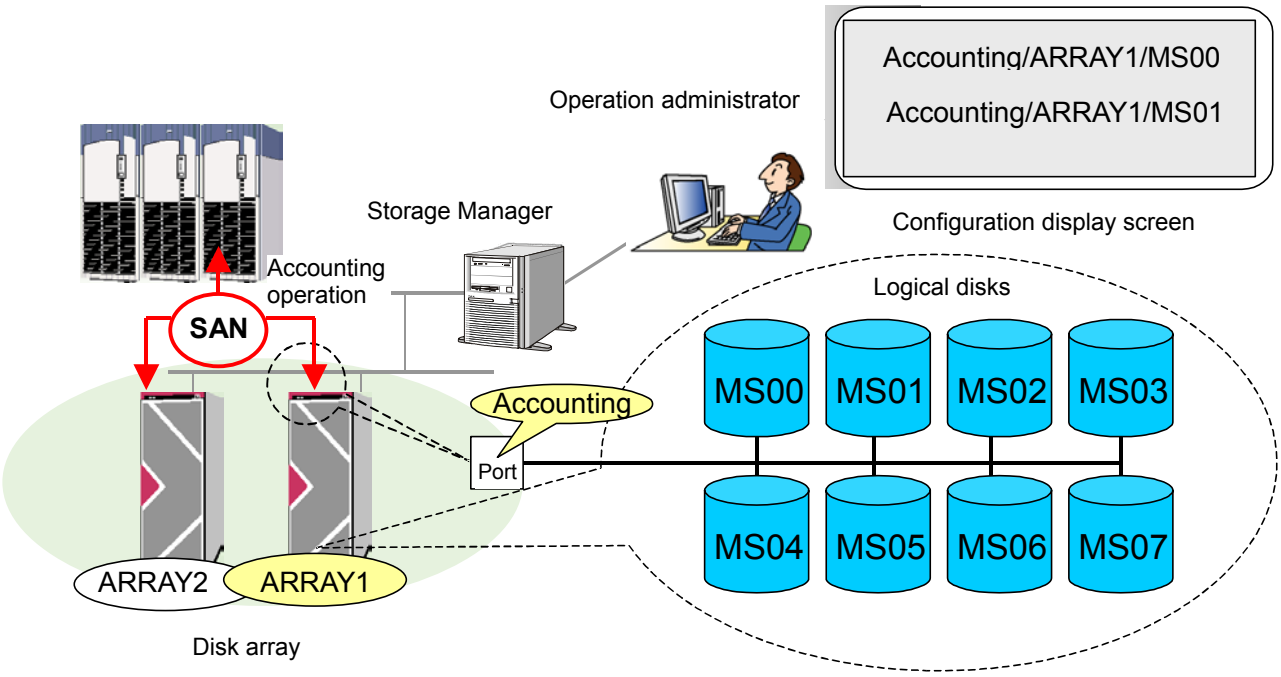


Figure 3-24 Operation Image

3.3.1 Function Outline

Nickname Setting Function is a function which sets an optional identification name (disk array name) for the object disk array of iSM monitoring, an arbitrary identification name (logical disk name + OS type) for the logical disk bound inside the disk array, and an arbitrary identification name (port name) for the port. In order to set the identification name, user level must be L3.

[Setting Items]

- Disk Array Name
- Logical Disk Name (+ OS type)
- Port Name

3.3.2 Description of Screen and Operation

This section explains the image of set information in the iSM client and the operation for setting information.

(1) Disk Array Name Setting

Disk array name can be set with the following procedure.

(i) Select (left-click on) the disk array (for which you want to set a name) in the configuration information display area (or the information list display area), right-click on it, and select [Settings] (or [Operation] on the menu bar → [Disk Array Subsystem Name Settings]). The Disk Array Subsystem Name /Port Name Setting dialog box (Figure 3-25) appears.

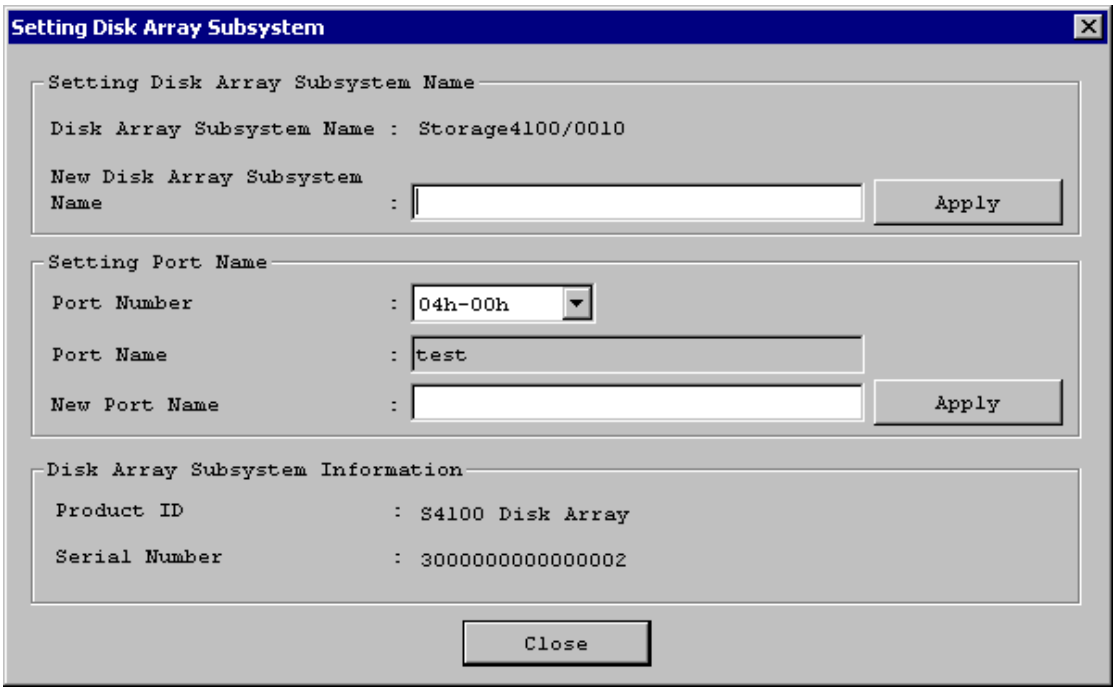


Figure 3-25 Disk Array Subsystem Name/Port Name Setting Dialog

(ii) Input the disk array name in the [New Disk Array Subsystem Name] edit box, following the rule indicated in (2) "Disk Array Setting Condition and Naming Rule", and click [Apply] button.

(iii) As an execution result of the setting, the following information is displayed in the dialog.

Table 3-13 Execution Result Dialog

Message	State
"Setting has been completed"	Execution result is normal.
"Setting information is incorrect"	Parameter Error
"Same name exits"	Same name exits.
"Access error occurred to Disk Array Subsystem"	Access error occurred.
"Cannot execute the demand during the suspension of the object Disk Array Subsystem monitoring"	Setting is unavailable due to monitoring stop.
"Cannot execute the demand during the configuration setting"	Setting is unavailable due to under configuration setting.
"Demanded process has already been executed"	Already executed
"Setting Failed (nn)"	Other errors (nn is a decimal detail code.)

* Other Errors *

When "Setting Failed (nn)" is displayed for setting process of disk array name, it is considered that the errors are detected after completion of I/O for disk array. Check by the browser whether the disk array setting has been executed, and set again if necessary.

(2) Disk Array Setting Condition and Naming Rule

(a) Setting Condition

Disk array name should be set under the following conditions. (Settings other than the followings are treated as parameter errors.)

- 1-byte alphanumeric characters including uppercase and lowercase characters. (When configuring a name with plural information, "/"or "_" can be input)
- Maximum number of characters: 32.

(b) Naming Rule

A disk array used from the ACOS-4 system must have its name identified by the ACOS host, especially when DynamicDataReplication or RemoteDataReplication are used. Therefore, to determine the disk array where the object logical disk exists, an identification name for the disk array should be set. Make a disk array name in combination of alphanumeric characters including uppercase characters and "_" (under bar), within 32 bytes.

Definition Example: CABINET01,CABINET02

In addition, when operating a disk array through other systems, it is recommended to set a disk array name that matches with identification information from the system, along with logical disk name and port name.

In addition, when disk array name is not set, "16 characters peculiar to a disk array" is set as default value at the time of shipment.

(3) OS type/logical disk name setting

OS type/logical disk name is set using the following procedure.

(a) Select (left-click on) the logical disk (for which you want to set an OS type and name) in the configuration information display area (or the information list display area), right-click on it, and select [Settings] (or [Operation] on the menu bar → [Logical Disk Name Settings]). The Setup of Logical Disk OS Type/Name dialog box (Figure 3-26) appears.

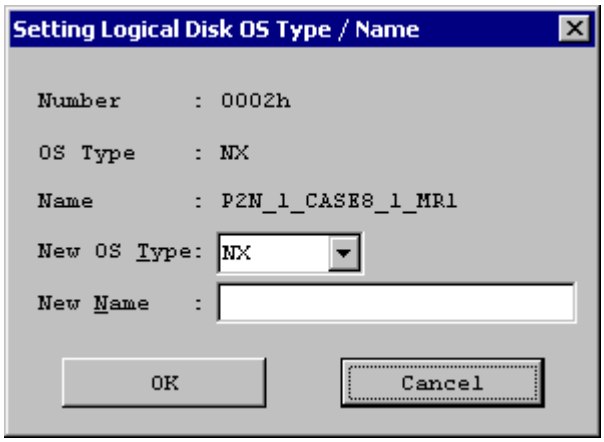


Figure 3-26 Setup of Logical Disk OS Type/Name Dialog

(b) In [New OS Type] or [New Name] Edit Box, input a logical disk name following the rules defined in (4) "OS Type/Logical Disk Name Setting Conditions and Naming Rules" and click [OK] button.

(c) As a result of the setting, the following information is displayed in the dialog.

Table 3-14 Execution Result Dialog

Message	State
"Setting has been completed"	Execution result is normal.
"Setting information (OS Type/Name) is incorrect"	Parameter Error
"Same name exits"	Same name exits.
"Error occurred in the access to the Disk Array Subsystem"	Access error occurred.
"As for Logical Disk with replication setting, OS Type cannot be changed"	OS Type of logical disk whose replication pair is set is changed.
"Cannot execute the demand during the suspension of the object Disk Array Subsystem monitoring"	Setting is unavailable due to monitoring stop.
"Cannot execute the demand during the configuration setting"	Setting is unavailable due to under configuration setting.
"Demanded process has already been executed"	Already executed
"Failed in setting (nn)"	Other errors (nn is a decimal detail code.)

* Other Errors *

When "Setting Failed (nnh)" is displayed for setting process of logical disk name, it is considered that the errors are detected after completion of I/O for disk array. Check by the browser whether the disk array setting has been executed, and set again if necessary.

(4) OS Type/Logical Disk Name Setting Conditions and Naming Rules

(a) OS Type setting conditions

Select an OS Type from the Table 3-15 below according to a system to operate a logical disk.

Especially, you must set a correct OS type when using DynamicDataReplication or RemoteDataReplication in the following systems:

- Logical volume used in ACOS-4 system
- Logical volume used in ACOS-2 system
- Logical volume used in Windows system

Table 3-15 OS Type List

OS Type	Description
A2	Logical disk operated by the ACOS-2 system
A4	Logical disk operated by the ACOS-4 system (For instructions on setting this type, contact the maintenance engineer.)
AX	Logical disk operated by the AIX system
CX	Logical disk operated by the Solaris system
LX	Logical disk operated by the Linux system
NX	Logical disk operated by the HP-UX system
WN	Logical disk operated by the Windows system

For instructions on setting the ACOS-4 type, also refer to Appendix in the "Configuration Setting Tool User's Manual (GUI)".

If the logical disk to be set is a snapshot related volume (of which snapshot type is BV, SV, LV, SV*, or SDV), the OS type cannot be changed.
The [New OS Type] edit box is grayed.

(b) Setting Conditions

A logical disk name should be set according to the conditions below. (Settings other than those listed below are processed as parameter errors.)

- 1-byte alphanumeric characters including upper- and lowercase characters. (When configuring a name with plural information, "/"or "_" can be input)
- Maximum number of characters: 24

(c) Naming Rules

A logical disk used by the ACOS-4 system must have its logical disk name that can be identified by the ACOS host, especially when DynamicDataReplication or RemoteDataReplication are used. Therefore a logical name should be set according to the rules below.

Logical disk name = [/system name/] + device identification name	
System name:	Generic system name. An identifier is composed of the combination of uppercase alphanumeric characters and "_" (under bar) within 18 bytes. It may be omitted.
Device Identifier:	Name of device defined in ACOS-4 system Example of definition: MS01,/SYSTEM01/MS01

Moreover, when operating a logical disk by other systems, it is recommended to set a logical disk name that matches with identification information of the system, along with disk array name and port name.
In addition, when OS type and logical disk name are not set, blank for the OS Type, "the 16 characters peculiar to disk array + 4 characters of logical disk number" for the logical disk name are set as default value at the time of shipment.

(5) Port name setting

Port name should be set according to the procedures below.

(i) Select (left-click on) the disk array system having the port (for which you want to set a name) in the configuration information display area (or the information list display area), right-click on it, and select [Settings] (or [Operation] on the menu bar → [Disk Array Subsystem Name Settings]). The Disk Array Subsystem Name/ Port Name Setting dialog box (Figure 3-25) appears.

(ii) Select a port number (port name) from the [Port Number] list and input port name in the [New Port Name] edit box, following the rules defined in (6) "Port Name Setting Conditions and Naming Rules" and click [Apply] button.

(iii) As a result of the setting, the following information is displayed in the dialog.

Table 3-16 Execution Result Dialog

Message	State
"Setting has been completed"	Execution result is in normal
"Setting information is incorrect"	Parameter Error
"Same name exists"	Same name exists
"Error occurred in the access to the Disk Array Subsystem"	Access error occurred.
"Cannot execute the demand during the suspension of the object Disk Array Subsystem monitoring"	Setting is unavailable due to monitoring stop
"Cannot execute the demand during configuration setting"	Setting is unavailable due to under configuration setting
"Demanded process has already been executed"	Already executed.
"Setting failed (nn)"	Other errors (nn is a decimal Detail Code.)

Other Errors

When "Setting Failed (nnh)" is displayed for setting process of logical disk name, it is considered that the errors are detected after completion of I/O for disk array. Check by the browser whether the disk array setting has been executed, and set again if necessary.

(6) Port Name Setting Conditions and Naming Rules

(a) Setting conditions

Port name should be set with the following conditions. (Settings other than those listed below are processed as parameter error.)

- 1-byte alphanumeric characters including upper- and lowercase characters. (When configure a name with plural information, "/"or "_" can be input)
- Maximum number of characters: 32

(b) Naming rules

As well as the disk array name and the logical disk name, it is recommended to set a port name that matches with the identification information for the system being operated.

In addition, when port name is not set, "16 characters peculiar to disk array + 2 characters of director number + 2 characters of port number" for the port name is set as default value at the time of shipment.

You can set a name to a port only for a host. In the [Disk Array Subsystem Name/Port Name Setting] dialog box, only the number of the port for a host is displayed.

3.4 Fault Monitoring

All messages of iSM are outputted on the message display area of client screen during the client connection. These are the fault monitoring functions for each client disk array.
This fault monitoring function is described below.

3.4.1 Description of the Function

The fault monitoring functions of iSM are the following.

(1) It outputs all messages which are connected in the message display area of the iSM client.

(2) It saves display message in the text file of PC on which the iSM client is installed. (log collection)

(3) The user notification function according to the message level.

3.4.2 Operation Outline

The same contents with operation log are displayed in the message display area by the fault monitoring function. The display shows clearly the importance of the messages by adding an icon of each message level at the start of the message. The message which has already been displayed once also extracts to individual log file on the PC side. Whatever display status iSM client may be on screen according to the message level, it has function for noticing the fault occurrence to the user.

(1) Output to the message display area

The same operation log that is extracted on the iSM server side is displayed in the message display area. However, it displays only what is outputted during iSM client connection.
The message which shows connection/disconnection between iSM client and server is also displayed as an individual message. After determining the message level, add the proper icon ( (Err) /  (Warning) /  (Notice, Info)) at the start of line.

(2) Log collection

The message which is displayed in the message display area is outputted in the individual log file on the PC side. Up to 1MB data can be stored in one log file. If it exceeds 1MB, it is renamed to an iSM old file and a new iSM log file is created. Because two files, OLDiSM.log and iSM.log are used one after the other, a maximum of 2MB file can be saved and more capacity is not needed.

(3) User notification function

Because the iSM client is not always displayed in the foreground, there is a function which notifies faults to the user at each message level.
When the message level is  (Err) /  (Warning), the task tray blinks and the notification button changes from  to  .
The notification, the notification is stopped by pushing down the notification button  or menu. Then the notification button returns from  to  .

3.5 Log Output

A message of iSM is output to operation log and event log. The details of a log output are explained below.

3.5.1 Description of Function

Log output function of iSM is as follows.

(1) Outputs messages to operation log.

(2) Outputs important messages to event log.

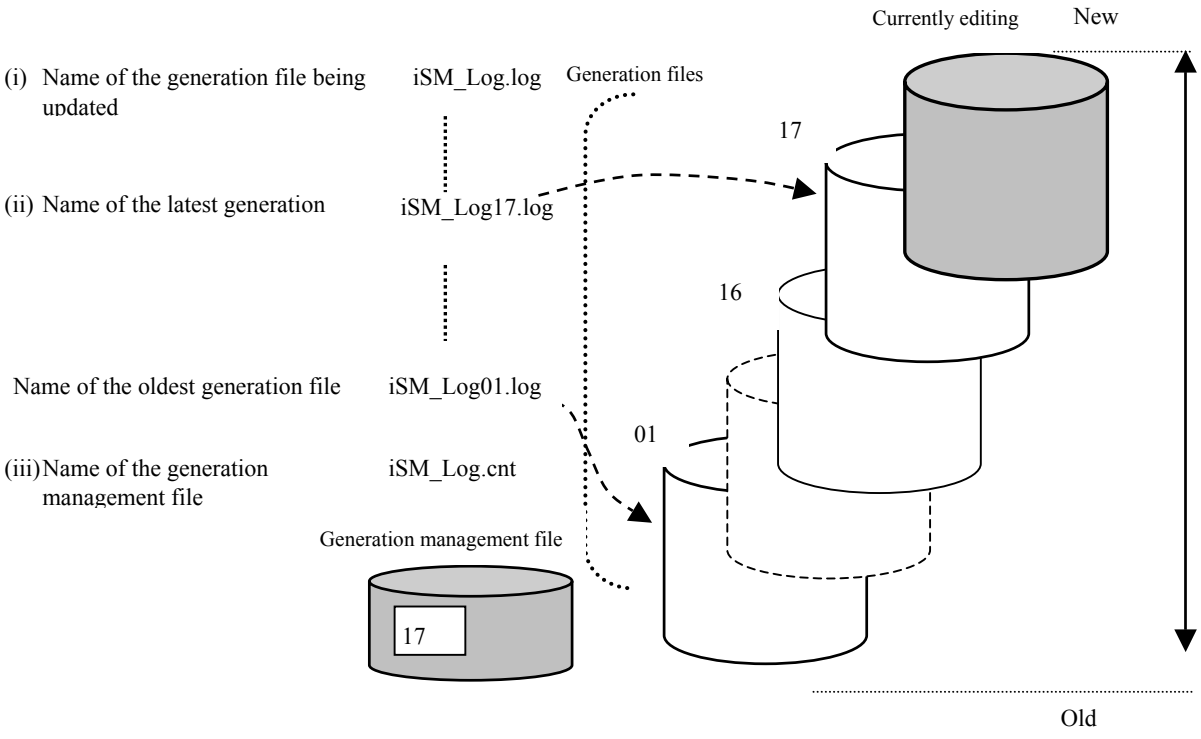
(3) Changes the output file when the size of an operation log exceeds the maximum.

3.5.2 Outline of Operation

Operation log is composed of an outputting log file, its generation file (backup file) and a generation management file saving the management information of generation file. An operation log is created on the log file saving directory (installation directory\etc\log). A generation file has a structure that holds backup of a log file one by one and it is created to a maximum of 99 files. However, if the number of generation files exceeds the maximum, the oldest file will be overwritten.

These file changes and name changes are performed automatically, and the user does not need to pay attention.

Example: When 17 generation files have been created by the operation log.



(1) Log file

One message output by iSM server is saved as one record into the outputting log file. When the log file exceeds the specified size, it is initialized after copying to a generation file.

File size: 1 to 10 (MB) Default is 1MB; can be specified by environment setting.

File name: "iSM_Log" + .log

(2) Generation file

A generation file is a backup file of the log file, and is created with maximum of 99 files. The generation file shows the backed up order by the generation number in its file name, and the larger the number is, the newer the file is. However, the file with the largest number is not necessarily the newest one because overwriting is made from the file of the generation number 1 and subsequent files when the number of created files exceeds the maximum. To identify the newest file correctly, refer to (3) "Generation management file".

File name: "iSM_Log" + nn + .log

Generation number: 01 to 99

(3) Generation management file

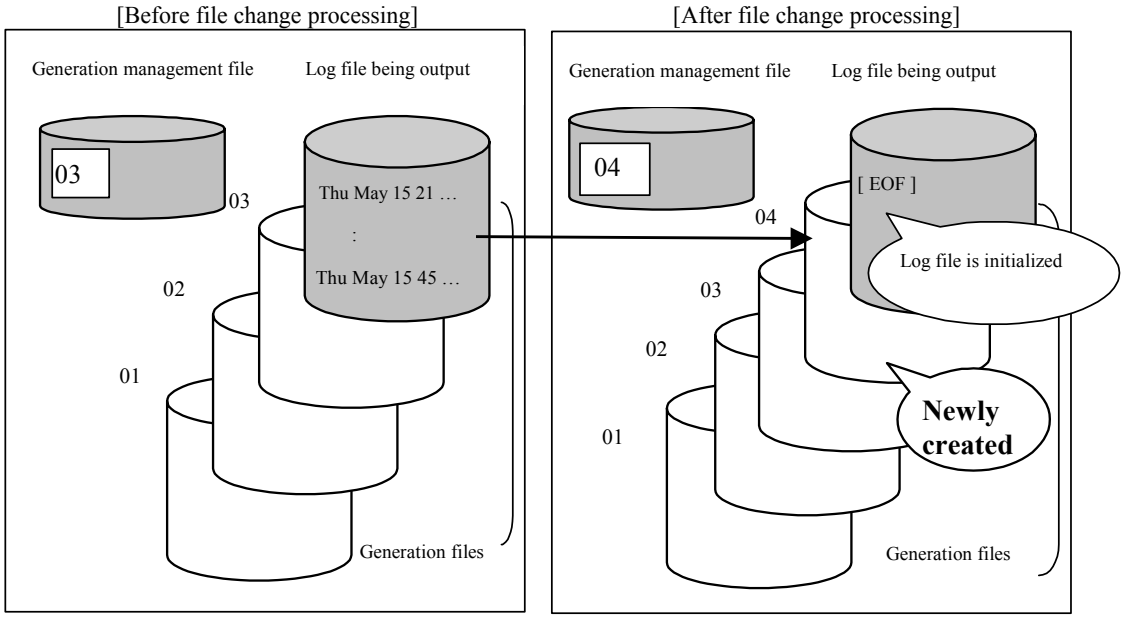
A generation management file is a file that shows the latest information on the generation file numbers, and saves the information with 2-digit generation number (2 bytes). When the generation number of generation management file is 99, the next generation number will be assigned to 01. When a generation management file does not exist right after the installation of iSM, or a number other than 01 to 99 is accidentally specified, the following processing should be done.

(i) Set the generation number to "01" for the next file to be processed.

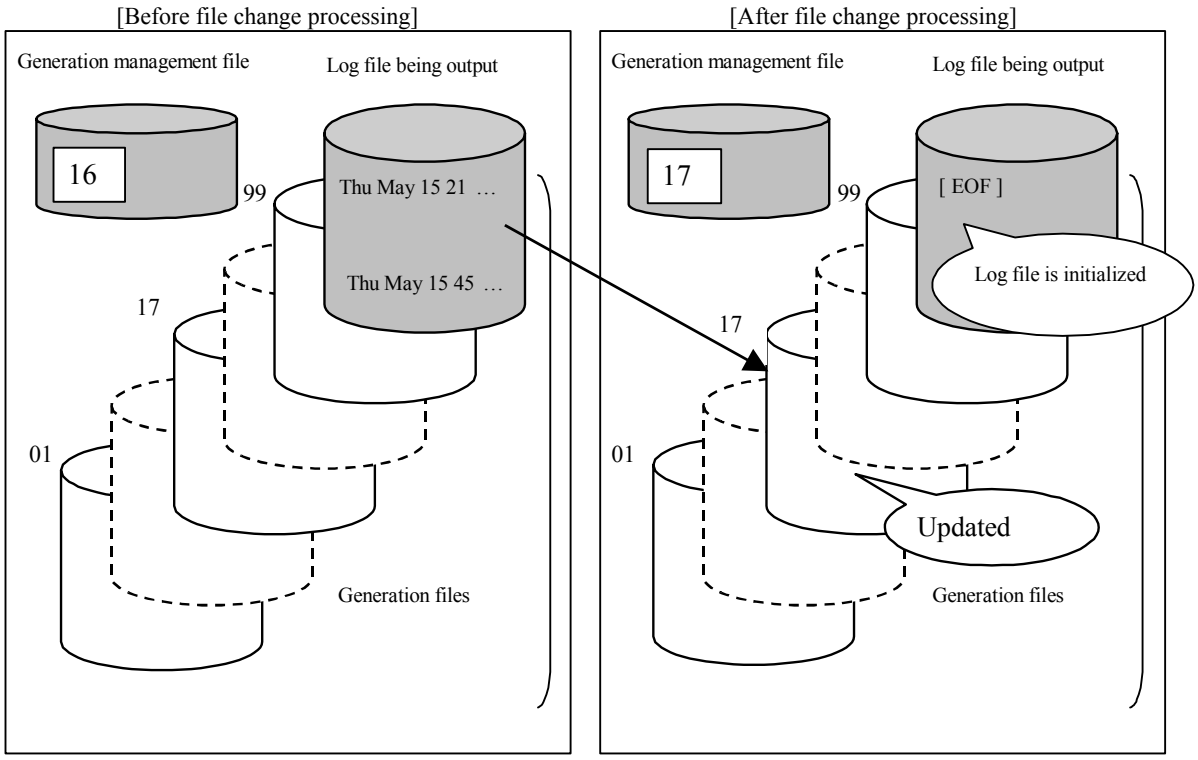
(ii) After backing up the information to a generation file, re-create the generation management file

File name: "iSM_Log" + .cnt

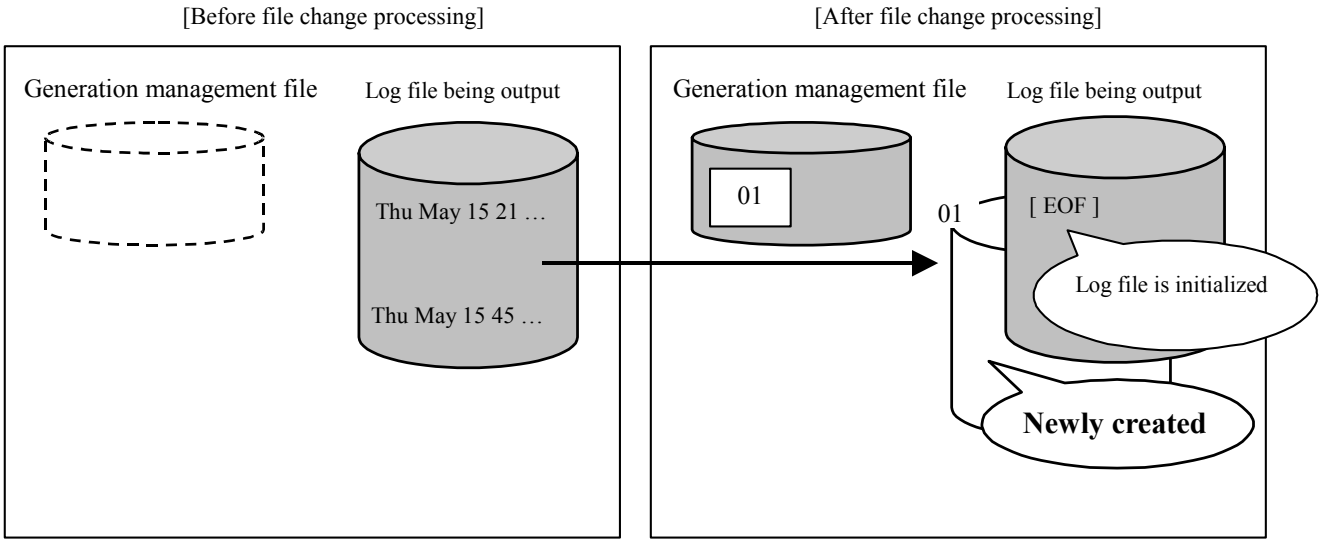
Example 1: File change processing when generation files are not created up to 99



Example 2: File change processing when generation files are created up to 99



Example 3: File change processing when a generation management file does not exist (including default setting)



3.5.3 Record Format

3.5.3.1 Operation Log

(1) Record format of operation log

0	24	25	35	36	43	44	54	55	58	63	64
Generating time	Blank	Process ID	Blank	Message Classifi-cation	Blank	Process name	Blank	"iSM"	Message number	":"	
ch(24)	ch(1)	ch(10)	ch(1)	ch(7)	ch(1)	ch(10)	ch(1)	ch(3)	ch(5)	ch(1)	

Text
ch(n)

Table 3-17 Record Format (Operation Log)

Size	Data Type	Contents	Contents Details
24	char	Generation time	Date, time and year Data format: Time format obtained from ctime( )
1	char	Blank (space)	
10	char	Process ID	Process number of message output origin
1	char	Blank (space)	
7	char	Message Classification	Message Classification LOG_ERR ..... "Err " LOG_WARNING .... "Warning" LOG_NOTICE ..... "Notice " LOG_INFO . ..... "Info "
1	char	Blank (space)	
10	char	Process name	Process name of message output origin
1	char	Blank (space)	
3	char	"iSM"	
5	char	Message number	Message serial number
1	char	":"	
n ≤ 501	char	Text	Variable length: a maximum of 501 bytes of character string (terminated by \n)

(2) Output image to operation log

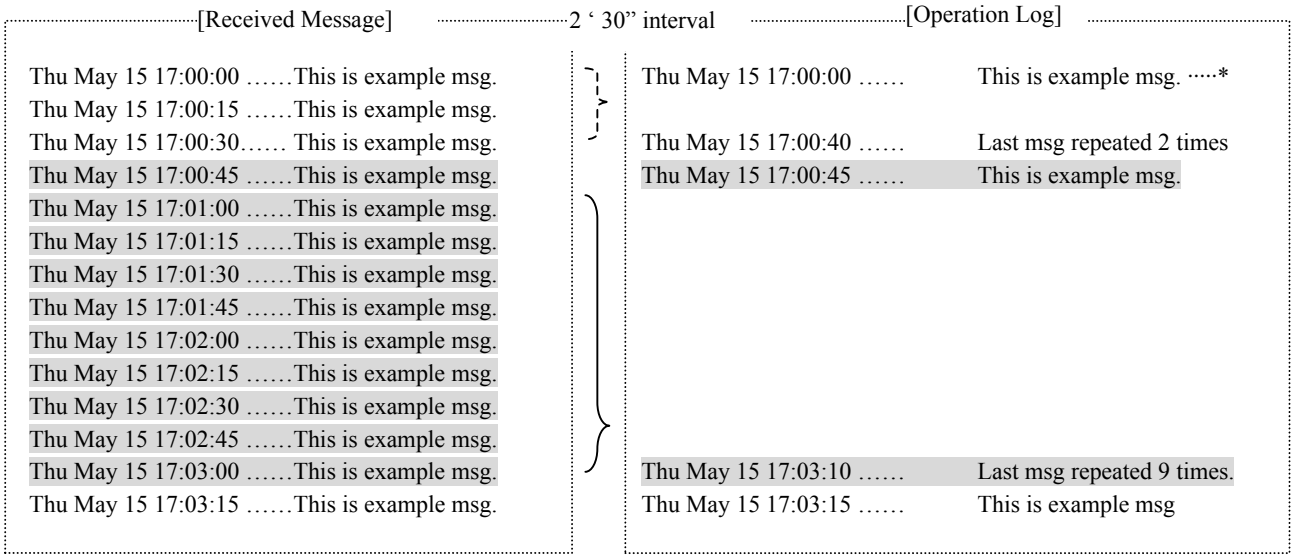
(Log File)

```
Thu May 15 17:30:29 2000 0000003258 Info   iSMlogd   iSM00000: This is example msg
Thu May 15 17:30:29 2000 0000016305 Info   iSMlogd   iSM04030 : Last message repeated 2 times
```

When the same message is continuously outputted for 3 times or more, a summarized record that shows the first message and number of times the message is outputted. When the same message is continuously outputted over the fixed time range (for 2 minutes and 30 seconds), a message outputted within the fixed time range and a message after the fixed time range are treated as different messages.

For the event link function, only the original message is sent as is not being processed by this procedure.

Example: When the same message is received every 15 seconds for 3 minutes 15 seconds (14 times in total).



* Received messages may be outputted repeatedly for 2 minutes and 30 seconds for the first time since the timer is not based on the receiving time of the message.

3.5.3.2 Event Log

(1) Record format of event log: Format 1

Event Classification	Generating time	Blank	"iSM : "	Process ID	Blank	Message Classification	Blank	Process name	
ch(m)	ch(15)	ch(1)	ch(6)	ch(10)	ch(1)	ch(7)	ch(1)	ch(10)	

	Blank	"iSM"	Message number	":"	Text
	ch(1)	ch(3)	ch(5)	ch(1)	ch(n)

Table 3-18 Record Format (Event Log)

Size	Data Model	Content	Content Details
m=11 or m=13 or m=17	char	Event Classification	Classification of Event Error ..... "error: <11>" Warning ..... "warning: <12>" Information ..... "information: <14>"
15	char	Generating time	Date and time (Example) Jun 20 11:30:17
1	char	Blank (space)	
6	char	"iSM : "	"iSMΔ:Δ" (Δ: blank)
10	char	Process ID	Process number of message output origin
1	char	Blank (space)	
7	char	Message Classification	Classification of Message Error ..... "Err " Warning ..... "Warning" Information..... "Notice " Information..... "Info "
1	char	Blank (space)	
10	char	Process name	Process name of message output origin
1	char	Blank (space)	
3	char	"iSM"	
5	char	Message number	Message serial number
1	char	":"	
n ≤ 500	char	Text	Variable length :a maximum of 500 bytes of character string

(2) Output image of event log

Important messages of iSM server are output to event log.

```
error: <11>Jan 03 11:29:52 iSM : 0000001048 Err     iSMmaind   iSM00000:This is example msg
warning: <12>Jan 03 11:29:46 iSM : 0000001048 Warning iSMmaind   iSM00000:This is example msg
information: <14>Jan 03 11:29:47 iSM : 0000001048 Notice  iSMmaind   iSM00000:This is example msg
```

3.6 Event Link

Event link function is one of the iSM functions. With this function, mails that report events, or execution files or batch files are started up on the monitoring server, according to the specified definitions, based on messages informed by iSM.

3.6.1 Description of the Function

The event link function of iSM is as follows.

(1) The mail address of a destination can be specified for each message level, so that mail notification can be made to any mail address.

(2) Execution or batch files can be specified for each message level, so that link processing is possible.

(3) Definitions can be changed dynamically on the Setting Utility screen, without the need to restart the iSM server. (For details, refer to 1.3 “Environment Setting”.)

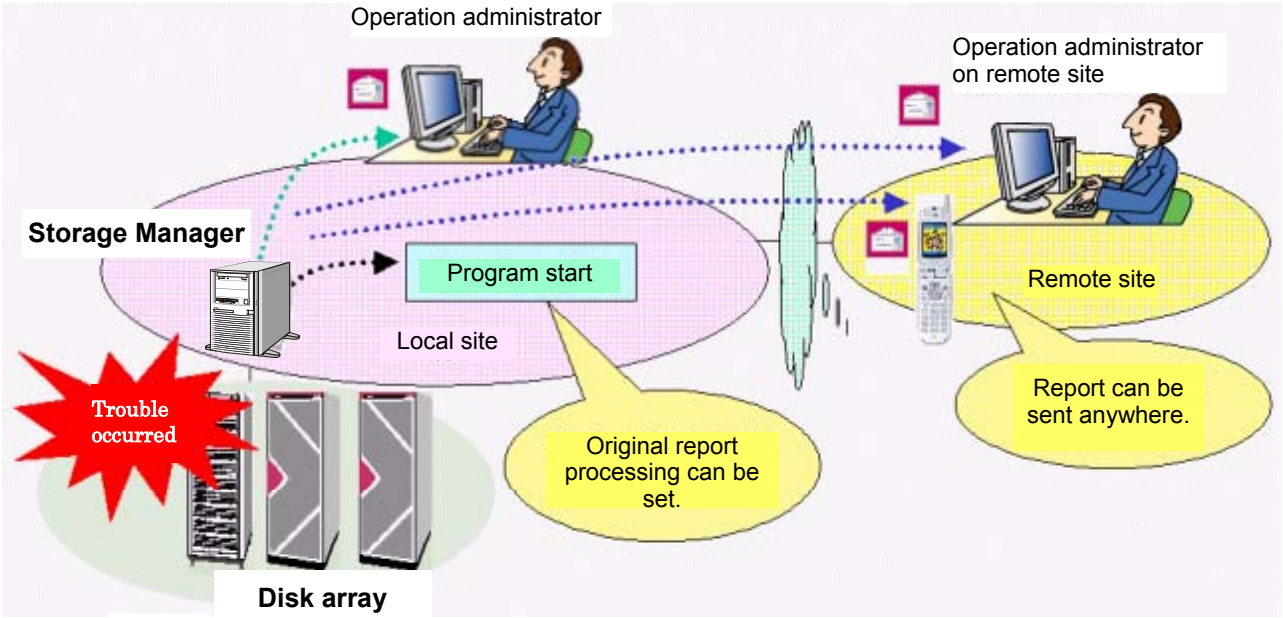


Figure 3-27 Event Link

3.6.2 Outline of link definition and processing

When a message is generated, a certain action is started as a link operation. To define this, please refer to 1.3 “Environment Setting”.

3.6.3 Outline of Operation

If the definition for the message level of a message that has arrived is registered with environment settings, the defined actions are executed. As actions for message levels, starting a batch file or program take precedence over mail transmission. If, during the execution of an action, the next message is received, the actions for the next message will be executed after the actions to be executed for the message currently being handled are completed.
In batch file or program starting, full path of the temporary file that stored the message body (installation folder \etc\msgdrv\nnnn.txt) is sent as the first parameter. For batch file, program, or programs that are started up by these files, read the temporary file if necessary and receive the message.
For mails, mail header files are sent as mails to the defined SMTP server.
If the sending of mails to the SMTP server does not end within 30 seconds, the sending is interrupted due to a time-out error. Timeout, SMTP error and starting failure of execution files or batch files are notified via message so that they can be checked on the operation log.
Because multiple link operations cannot be performed at the same time, up to 30 messages generated during a link operation will be stored in a buffer. If more messages are generated, the excess messages will be discarded.
A loop may be formed if an error event with the event link function arrives at the event link function again and, therefore, the messages output by the event link function itself will not be subject to linking.
In addition, when starting a batch file through the event link function, “Administrator” must be set to the account of “Storage Manager”.

3.6.4 Specification of Definition File

(1) Header File

The header file is the form of the actual mail to transmit, and mainly describes the header part of the mail. Input “FROM:” on the first line, and write the mail sender’s name. If mail transmission fails in SMTP server due to wrong target mail address, etc., an error message from SMTP server may send to a sender’s mail address. The contents of the mail text after the second line are sent as it is, the part above the blank line is the header, and subsequent part is the body of the mail. A message including “$MSG” in body is converted into a message that is output to an operation log triggered by “$MSG” for linkage.

FROM: iSMserver@xxx.co.jp } Describe sender’s mail address.
SUBJECT: iSMserver error report. } Header
← blank line
This is the iSMserver at XXXX(domain name etc.)
Error Reporting.
$MSG → A message output to operation log that triggered object linkage is described in this line. } Body

1. Mail address to input on the “FROM:” line must be a complete one that includes domain name.
2. Various header lines in accordance with RFC822 can be written in the header part.
3. Any contents can be described in the body part.
4. The size of the whole header file must be less than 1KB. Also, one line must be less than 256 bytes (including blank / tab / carriage return).
5. When a part of “$MSG” of a certain line is replaced into the message content, the “$MSG” which appears first can be replaced. So even if two or more “$MSG”s are described in one line, only the first “$MSG” is replaced. However, if the “$MSG”s are described in each line, they are replaced by the same contents.

3.6.5 Definition Example

Header file (Installation directory \conf\iSMsvr\mail.header)

FROM: iSMmsgdrv@xxx.co.jp	← Temporary sender address (any address can be specified)
SUBJECT: iSMserver error report.	← Title (any)
	← blank line
This is the iSMserver at iSMsystem.xxx.co.jp.	← Mail text (any)
Error Reporting.	← Mail text (Number of lines is not restricted, however, must be 1KB or less on the whole)
$MSG	← The actual contents of the message are inserted in this line, and are transmitted as mail.
If you get this mail, please be careful.	← Mail text.

3.7 ESMPRO Link

iSM has a function for linking with ESMPRO as described below. ESMPRO Agent needs to be installed in advance to a server where iSM operates.

3.7.1 Overview of the Function

The ESMPRO link functions of iSM are as follows:

(1) Alert report to ESMPRO Manager

(2) Call of the iSM client function from ESMPRO Manager

(3) Fault report to the maintenance engineer at a disk array fault (Note)

(4) Report of an iSM message on ESMPRO Manager using ESMPRO Alert Manager

If a modem is connected and fault report is made through the modem, fault report by ESMPRO link cannot be made.

3.7.2 Relationship with ESMPRO Manager

When an iSM server has been installed, reports to ESMPRO Manager are defined automatically if ESMPRO Agent is installed in advance to the server to run. Likewise, when an iSM client is installed, the iSM client is registered automatically to the operation window as an operation monitoring tool if ESMPRO Manager is installed in advance. This enables ESMPRO to perform integrated monitoring including business servers and storage.

(1) Alert report to ESMPRO Manager

When an iSM server is installed on the server machine where ESMPRO Agent has been installed, the ESMPRO report function is set to allow reporting a disk array fault or iSM fault to ESMPRO Manager.

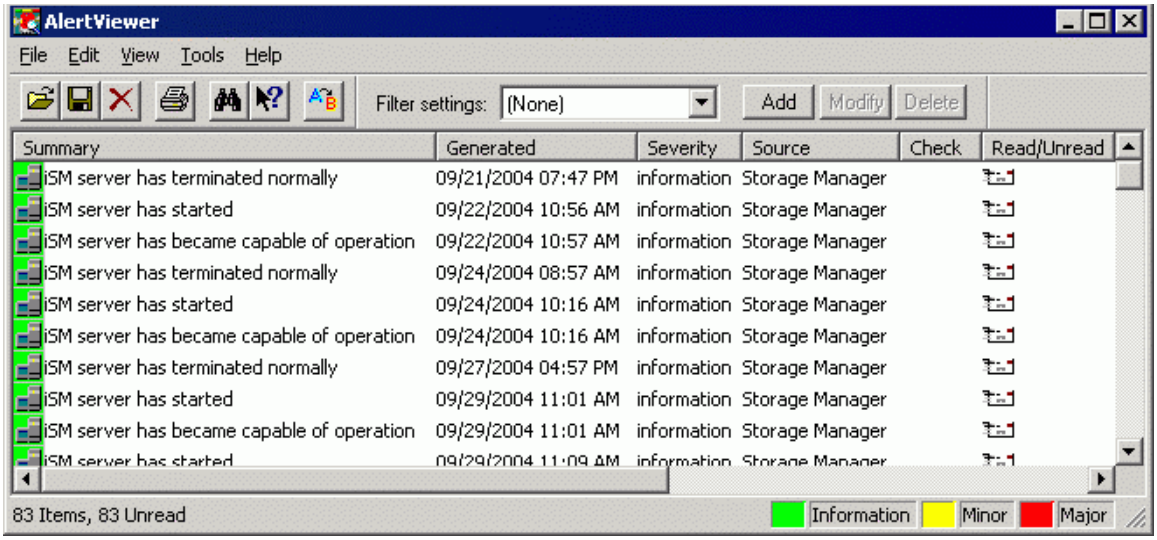


Figure 3-28 Alert Report Screen

(2) Call of the client functions of iSM from ESMPRO Manager

When an iSM client is installed on the machine where ESMPRO Manager has been installed, an iSM client is registered to the ESMPRO operation window as an operation monitoring tool. This enables ESMPRO to perform integrated monitoring including business servers and storage.

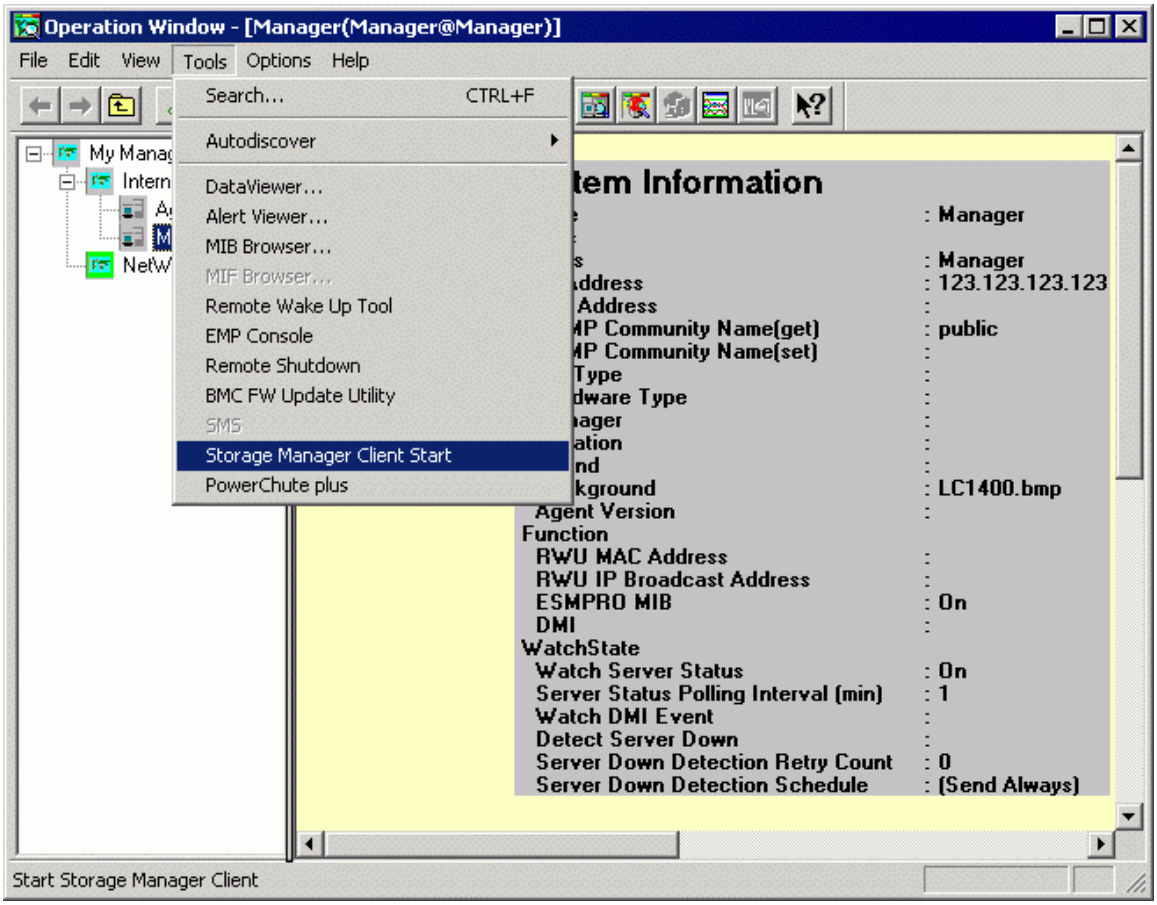


Figure 3-29 Start Menu of the Registered iSM Client

3.7.3 Disk Array Fault Report

ESMPRO Agent must be installed in advance on the server where iSM server runs when maintenance contract for a disk array is made.

If a fault occurs in the disk array monitored by iSM, the fault report function that is one of the ESMPRO Agent functions can be used through event logs on a server machine.

The fault report function enables you to report a fault to maintenance engineer directly and get maintenance service.

3.7.4 Link between ESMPRO Manager and ESMPRO Alert Manager

The Alert Type Link setting tool can operate in isolation in a personal computer in which iSM is not installed. Also, this tool can be set to link ESMPRO Manager with ESMPRO Alert Manager to make various reports.

This tool can operate in the environment where ESMPRO Manager has been installed. You can set the tool when you install an iSM server or iSM client, or you can start the tool in isolation and make settings.

(1) Setting at installation

When an iSM server or iSM client is installed to a server machine or a personal computer, the following screen telling ESMPRO Manager has been installed appears. If ESMPRO Manager is not installed to the designated environment, the following screen does not appear.

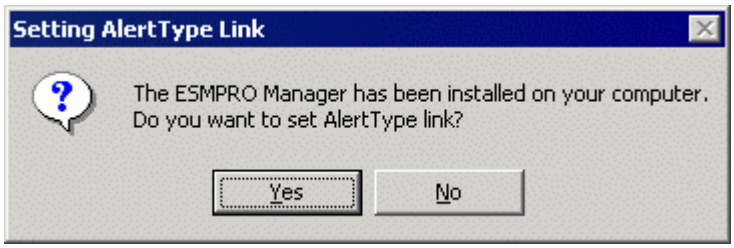


Figure 3-30 Confirmation Screen of Alert Type Link

To set the tool to report a message, reported from iSM to ESMPRO Manager, using ESMPRO Alert Manager, click [Yes] and proceed installation.

(2) Setting by the Alert Type Link setting tool

If you start and set the Alert Type Link setting tool in isolation, follow the following procedure for setting.

(i) Log on as the Administrator.

(ii) Start Explorer and select the folder in which an iSM server or iSM client is installed or select the following program in the CD-ROM.

<When started from the folder in which an iSM server is installed (default)>

[installed-folder]\sbin\iSMalset.exe

<When started from the folder in which an iSM client is installed (default)>

[installed-folder]\iSMalset.exe

<When started from the CD-ROM>

CD-ROM drive: \ALSET\WINDOWS\ISMALSET.EXE

(iii) When the following screen appears, click [Set].

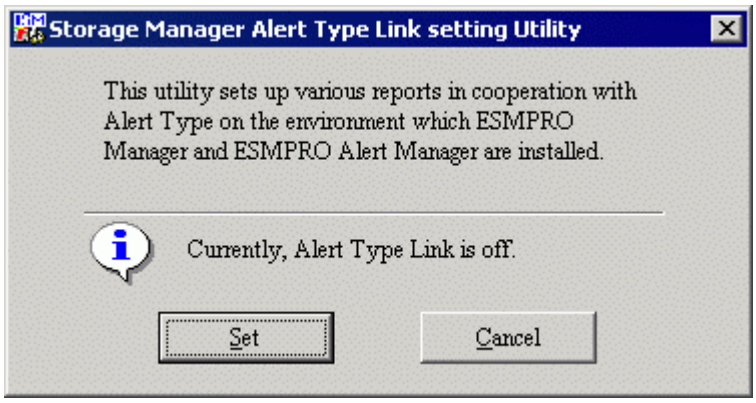


Figure 3-31 Alert Type Link Setting Tool Screen-1

If the tool has already been set to make a report by ESMPRO Alert Manager, the following screen appears. Click [Cancel] to close the screen.

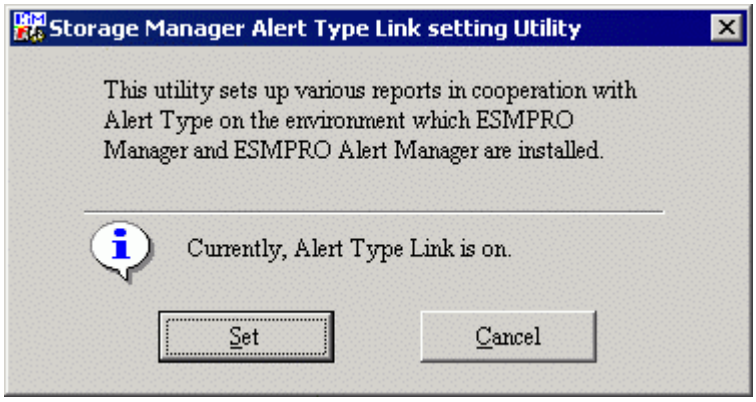


Figure 3-32 Alert Type Link Setting Tool Screen-2

If the Alert Type Link setting tool is started in the environment where ESMPRO Manager is not installed, the following screen appears. First of all install ESMPRO Manager, then start the tool, and make settings.

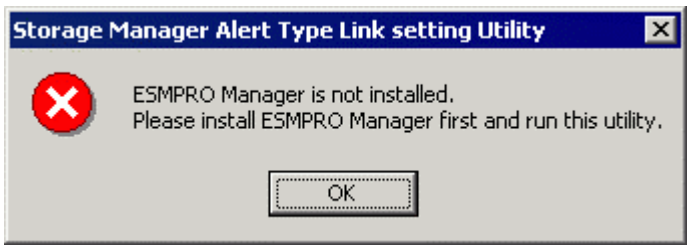


Figure 3-33 Execution Result of Alert Type Link Setting Tool

Chapter 4 Server Menu

The Server Menu is a menu for calling environment setting and operation change of the iSM server.

4.1 Operation Method

The Server Menu is activated via the authority of a user in the Administrators group, by selecting the [Server Menu] in the [Storage Manager Server] in the [Programs] ([All Programs] for Windows Server 2003) folder from the [Start] button in the task bar.

When the menu is activated, a window appears where icons are arranged.

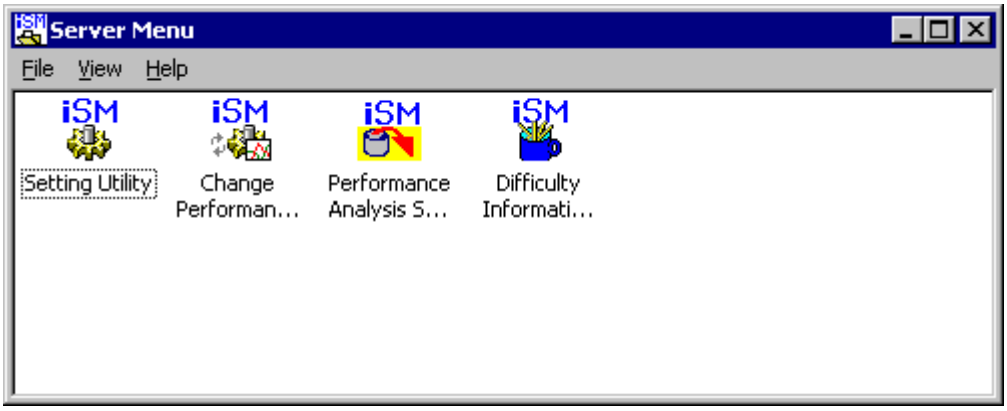


Figure 4-1 iSM Server Menu Icons Screen

To start each function, double-click on the corresponding icon.

- Setting Utility

  Specifies the operating environment of a disk array or the like that is to be monitored by the iSM server.
- Change Performance Display Refresh Rate

  Changes the frequency of updating the numeric value table or the time-series graph on the performance monitoring screen.
- Performance Analysis Supporting Tool

  Supports the analysis of statistical information accumulated by the iSM server.
- Difficulty Information Gather

  Gathers analysis information when the iSM server fails.

4.2 Functions

This section explains the functions that can be performed through the iSM server menu.

4.2.1 Environment Setting

Environment setting is made by calling the Storage Manager Setting Utility to define the operating environment of the iSM server.

The user must make the following definitions by using the Storage Manager Setting Utility before executing the iSM server:

- Disk array monitoring method
- Definition of user name, password and user level to log in from the iSM client.
- Definition of cooperative function
- Other

For details of the Storage Manager Setting Utility, refer to 1.3 “Environment Setting”.

4.2.2 Changing Performance Display Refresh Rate

The performance monitoring function as an optional function collects performance information on the disk array at a predetermined interval, from one to six times per minute and reflects the resulting data on the Numeric Table or Graph. The performance display refresh rate is defined in advance by the Storage Manager Setting Utility before the iSM server is activated and can be changed dynamically via the performance display refresh rate change function while the iSM server is operating.

For details on the changing of the performance display refresh rate, refer to 1.5.1 “Real-Time Display of Load Status” of the “PerformanceMonitor User’s Manual”.

4.2.3 Performance Analysis Supporting Tool

To effectively utilize the disk array, it is important to regularly analyze the usage state and load balance of the disk array and perform tuning including the optimum arrangement of files and expansion of devices. The iSM provides the following performance analysis supporting tools aiming at support for performance analysis of the disk array:

(1) Archiver

The Archiver summarizes the statistic information of the disk array stored by the iSM on an hourly or daily basis. Use of the Archiver reduces the statistic information volume thus saving the disk capacity necessary for accumulating statistic information.

(2) CSV Conversion Tool

The CSV Conversion Tool extracts statistic information from the statistic information history/summarized files of iSM and turns it into character string data for output in the CSV format. Spreadsheet software, etc. is used to display the contents of a CSV-format output file in a graph or to make various types of analysis later.

(3) Performance Report Editor

The Performance Report Editor edits and modifies the statistic information stored in statistic information history/summarized files of iSM into a format that allows the user to readily make performance analysis, and outputs the resulting information as a file. Editing the statistic information by using the Performance Report Editor assures easy and proper performance analysis.

For how to use performance analysis support tools, refer to the following sections of the "PerformanceMonitor User's Manual".

Archiver	- 3.3.3 "Summarizing Statistic Information"
CSV Conversion Tool	- 3.3.4 "Extracting Statistic Information"
Performance report Editor	- 3.3.5 "Editing Statistic Information"

To perform efficient operation of the disk array, it is advantageous to grasp long-term load and analyze long-term performance. The iSM cyclically reads the statistic information collected by the disk array and stores the information obtained into a statistic information history file.

Performance analysis supporting tools support analysis of such statistic information via the following functions.

- Summarizing the statistic information history file into statistic information in a section that is longer than a logging interval to create statistic information summarized file with compressed file capacity (Archiver).
- Outputting necessary statistic information from a statistic information history file or statistic information summarized file in the CSV format to make available the resulting information to spreadsheet software, etc. (CSV Conversion Tool)

For details of how to use Performance analysis support tools, refer to 3.3.3 "Summarizing Statistic Information" and 3.3.4 "Extracting Statistic Information" in the "PerformanceMonitor User's Manual".

4.2.4 Information Gathering for Server Fault

If a possible cause of a fault is not known after the iSM server has abnormally terminated, it is necessary to analyze log and trace information.

The function of information collection in the event of an iSM fault, collects log and trace information under the iSMgather directory of the directory where the iSM server is installed (typically c:\Program Files\NEC\iSMsvr\iSMgather).

For measures against a fault, refer to 6.1 "Measures for Server Fault".

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Part III Operations

Chapter 5 Normal Operation

5.1 Server Start/Stop

Once the iSM server is installed, it starts/stops automatically when the system starts/stops.
To prevent the iSM server from automatically starting during reboot of the system, click [Start] → [Programs] ([All Programs] for Windows Server 2003) → [Administrative Tools] → [Services], specify [NEC Storage Manager], and switch the startup type from [Automatic] to [Manual].

5.1.1 Server Start

To start the iSM server, click [Start] → [Programs] ([All Programs] for Windows Server 2003) → [Administrative Tools] → [Services], and specify [NEC Storage Manager].
If you make the start of the batch file etc., by event link function, pay attention to the execution account of the service [NEC Storage Manager]. The execution account of executed batch file is regarded as the same account as the service [NEC Storage Manager]. The installed setting account is set to operation system authority [Local System Account]. Because the account cannot be controlled by administrator or user of administrators group, you should modify it to administrator from the service property. About the event link, refer to 3.6 “Event Link” in Part II “Functions”.

5.1.2 Server Stop

If definition information is changed with environmental definition, you should reboot the iSM server.
To stop the iSM server in this case, click [Start] → [Programs] ([All Programs] for Windows Server 2003) → [Administrative Tools] → [Services], and specify [NEC Storage Manager].

5.2 Client Start/Stop

5.2.1 Client Start

The iSM client is connected to the iSM server with TCP/IP communication and is the program which graphically implements various functions on a PC.

(1) Starting the client

Select the [Start] menu → [Programs] ([All Programs] for Windows XP/Windows Server 2003) → [Storage Manager Client] → [Storage Manager Client], and the iSM client starts and the main window appears. If multiple connections are defined, a menu appears with nicknames added for the individual connections like [Storage Manager Client <connection-name>]. Check the connections with their nickname, and start the iSM client. Alternatively, the client can be started by double-clicking the shortcut icon on the desktop.

After starting the client, go on to (3) "Connection". If starting the client for the first time since installation or if adding a connection, go to (2) "Environment settings" and then (3) "Connection".

(2) Environment settings

After installation according to the installer or if adding a connection, select [File] and [Environment Settings], and the following setting screen is displayed.

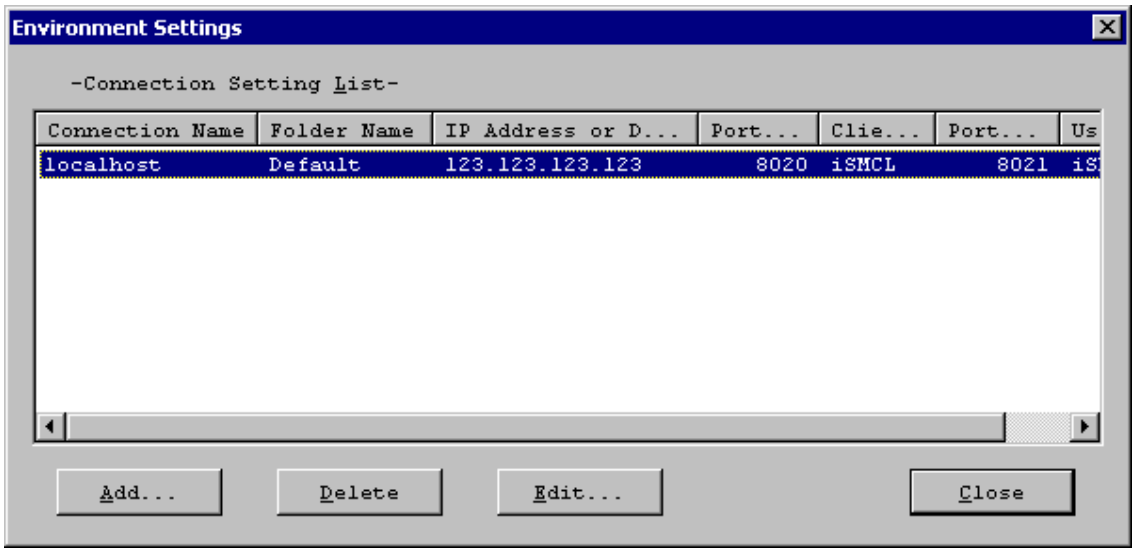


Figure 5-1 Environment Setting (List, Selection) Screen

Select the connection for which to perform environment settings and click the [Edit] button, and the Environment Setting screen, shown below, appears. To add a connection, click the [Add] button, to delete the settings of a connection, select the connections whose settings are to be deleted and click the [Delete] button.

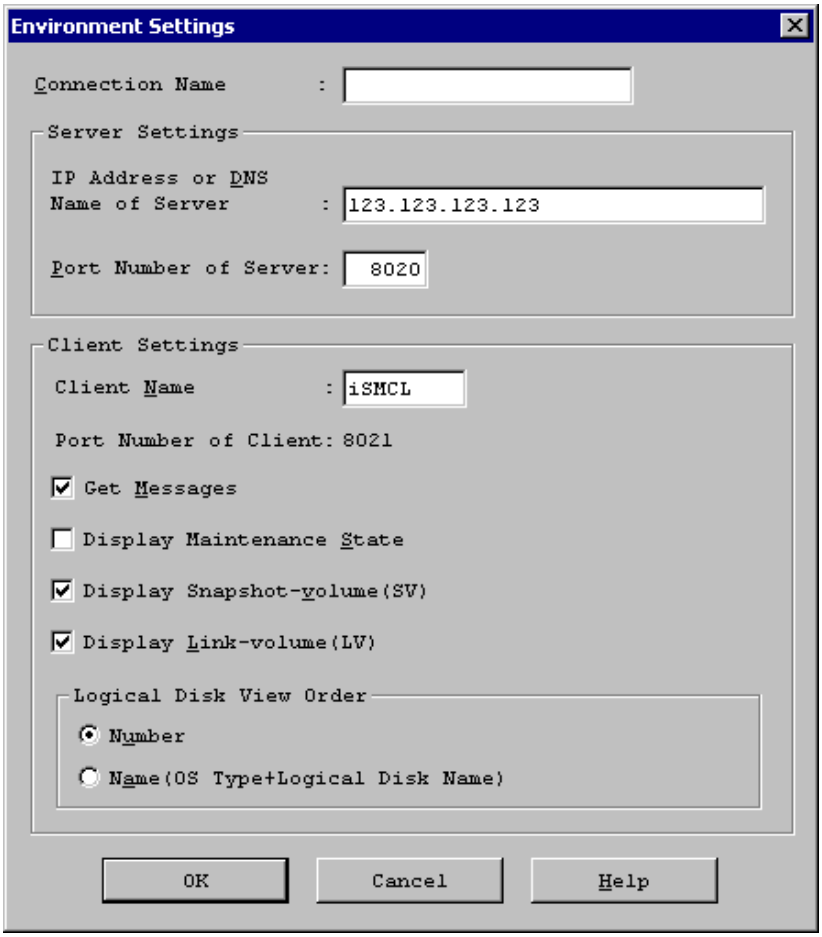


Figure 5-2 Environment Setting (Individual Setting) Screen

(i) Connection Name

Enter the nickname for identifying a connection. (This item is mandatory if you specify multiple connections.) The specified connection name is displayed in the title bar of each client screen. When you have started multiple clients, you can determine which server the information on each screen is for from the connection name displayed in its title bar.

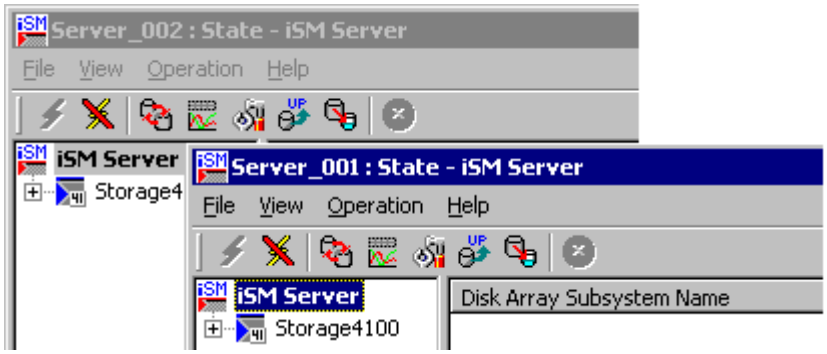


Figure 5-3 Example of Display of Connection Name in Title Bar

For a connection name, you cannot use a blank and those characters that cannot be used for a file name (\/:,;*?"<>|). If you enter a name containing an unusable character and click the [OK] button, an error dialog box is displayed; enter a connection name again.

(ii) IP Address or DNS Name of Server

Specify the IP address or DNS name of the iSM server (This item is mandatory).

(iii) Port Number of Server

In general, the port number does not need to be changed. Specify a port number only when the port is assigned particularly in the iSM server setting.

(iv) Client Name

Specify the name for individually identifying the client (This item is mandatory).

An arbitrary name can be specified with alphanumeric characters as long as it is unique.

(v) Port Number of Client

Display the port number that is used to transfer data between client screens.

Usually a default port number is used. If the number is used by another program already, it must be changed. If multiple connections are defined, the client allocates default values from 8021 sequentially.

To change the port number, edit the iSMmain.ini file referenced by each client, as described below. iSMmain.ini is stored in the folder displayed in [Folder Name] of [Connection Setting List]. If [Folder Name] displays the "default" connection, the file is stored in the installation folder.

[CLIENT]

PORT=8021 ← Change this value into a port number that is not used currently.

1. Numbers allowed for a port number are 1 to 65535. Specifying a disallowed number results in displaying an error dialog and termination. You can click the [Browse] button only if [SHELL] is selected in Action Type.
2. If the system has been activated, the specified value is used upon restarting.
3. "iSMmain.ini" file contains various setting data. Do not edit other data than a client port number. Editing other data may disable operations of the system.

(vi) Get Messages

Check to save the message, which is displayed on the client fault monitoring screen, as a text file on the PC.

(vii) Display Maintenance State

Check to switch the state of the upper structure to (Notice) when an event other than normal events occurs in the individual element layer. Normally, events ((Warning) or (Err)) in the individual element layer are ignored in the upper structure because they do not affect operation. This option is selected when you want to check them in detail. When an event (e.g. LD failure) which affects operation occurs in the individual element layer, the upper structure fails (Err) regardless of this setting.

The setting information is saved when you click [OK] after the setting ends.

(viii) Display Snapshot-volume (SV)

[Display Snapshot-volume] sets whether to display snapshot-volume (SV) when Logical Disk List is displayed on the main window, the Pool Property screen or the Physical Disk Property screen. The default value is Display. This setting is enabled after the client is restarted. This setting is not available for the unit without the snapshot (DynamicSnapVolume) function.

(ix) Display Link-volume (LV)

[Display Link-volume] sets whether to display link-volume (LV) when Logical Disk List is displayed on the main window, the Pool Property screen or the Physical Disk Property screen. The default value is Display. This setting is enabled after the client is restarted. This setting is not available for the unit without the snapshot (DynamicSnapVolume) function.

(x) Logical Disk View Order

[Logical Disk View Order] sets the order in which logical disks are initially displayed on each screen. Select [Number] or [Name (OS Type+Logical Disk Name)]. This setting changes the order in which columns are displayed in the logical disk list. This setting is enabled after the client is restarted.

If you click [OK] after the setting is completed, the setting information is saved.

If a connection is added, a shortcut icon for the iSM client is created on the desktop and in the [Start] menu.

(3) Connection

If [File] and [Connection] is selected after environment setting, connection is actually performed for the iSM server.

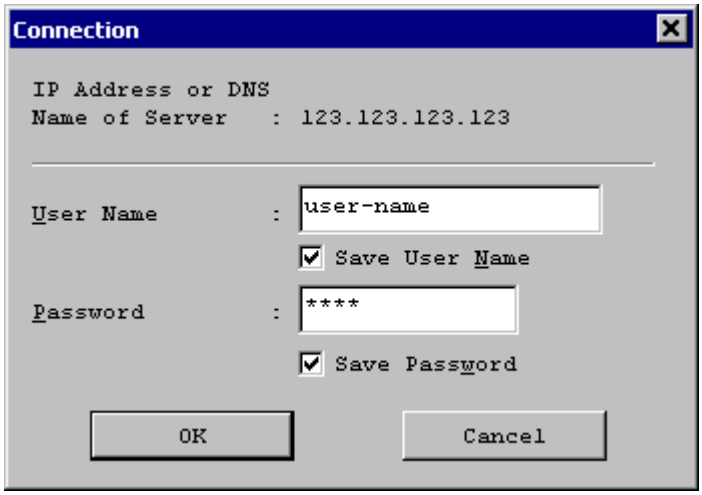


Figure 5-4 Connection Screen

(i) User name

Input the user name and password which are registered at the setting of the iSM server side.

(ii) Password

User name/password can be saved individually. However, once a user name and a password are saved, any person other than the registered users can log in the system by using a registered user name and password. Therefore users must strictly manage the user names and passwords in terms of security.

If you click [OK] here, the current disk array configuration is displayed on the setting information display screen and the message is displayed in order on the lower fault monitoring screen. If there are disk arrays for which the BaseProduct license is not unlocked yet, the screen appears listing the disk arrays. (Figure 5-5)

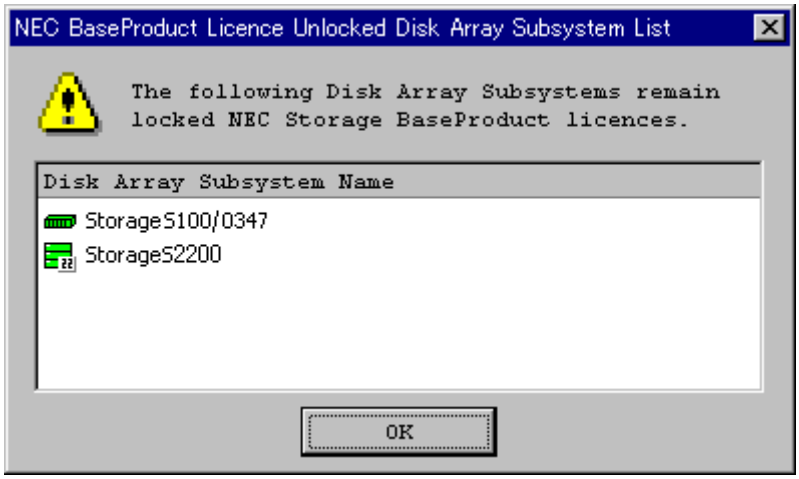


Figure 5-5 List of Disk Array Subsystems with BaseProduct License Not Unlocked

(4) User Level

The iSM client user is given the definition at the iSM server side. The user has the user level and the following operations are possible.

Table 5-1 User Level List

Level 1	Only reference of the status display/monitoring	For ordinary user
Level 2	Level 1 plus the functions needed for daily operations are permitted.	For operator
Level 3	All functions including various setting to the disk array are permitted.	For system administrator

After connection, the user level is displayed on the iSM client status line and only those functions that can be manipulated in that level become executable. Please refer to each function description for the differences of permitted function at every level for each function.

(5) Icons on the Desktop and the [Start] Menu

If you delete a client-starting icon located on the desktop or in the [Start] menu or if you uninstall an iSM client and then re-install it, you can re-create the icon with the procedure described below.

<<Re-creating an icon on the desktop>>

(i) Click [Start] → [Programs] ([All Programs] for Windows XP/Windows Server 2003) → [Storage Manager Client], and right-click the menu item for creating an icon on the desktop.

(ii) From the menu that appears, select [Copy].

(iii) On Explorer, display the "\Documents and Settings\All Users\Desktop" folder on the system drive.

(iv) Right-click on the displayed folder, and select [Paste].

<<Re-creating an icon on the desktop and in the [Start] menu>>

(i) On Explorer, display iSMCL.EXE located in the client's installation folder.

(ii) Right-click the iSMCL.EXE icon, and from the menu that appears, select [Create Shortcut].

(iii) Right-click the icon created in the installation folder, and from the menu that appears, select [Properties],

and the property screen is displayed.

(iv) Select the [Shortcut] tab from the properties screen.

(v) After the double quotation of the iSMCL.EXE file name displayed as an item of [Target], add a blank and the name of the desired folder containing connection information.

Example: `"C:\Program Files\NEC\iSMClient\iSMCL.exe" SG1`

Folder containing connection information is located below the installation folder. View the iSMmain.ini (connection IP) or iSMstat.ini (connection name) found in each folder, and determine the name of the folder you want to specify.

(vi) Select the [General] tab.

(vii) In the input field located to the right of the icon, enter the name of the shortcut.

Example: `Storage Manager Client <connection name>`

(viii) Click the [OK] button to close the properties screen.

(ix) To create an icon on the desktop, copy or move the icon created with the above steps to the "\Documents and Settings\All Users\Desktop" folder on the system drive.

(x) To create a menu item, copy or move the icon created with steps up to (viii) to "\Documents and Settings\All Users\Start Menu\Programs\Storage Manager Client" (default value).

Note the following when re-creating an icon:

1. Uninstalling an iSM client deletes the icon on the desktop and the menu item.
   If you are to re-install a client after uninstalling it, copy the icon to an appropriate folder on the desktop before uninstalling it. After re-installing it, you can restore the icon before uninstallation by copying the saved icon to the "\Documents and Settings\All Users\Desktop" folder on the system drive (for the [Start] menu, the "\Documents and Settings\All Users\Start Menu\Programs\Storage Manager Client" (default value) folder on the system drive).
   * Re-install the iSM client in the same folder as that before uninstallation, so that the icon reference will not be nullified.
2. If you delete both an icon on the desktop and a menu item, the procedure for re-creating the icon will be cumbersome. For this reason, leave the menu item undeleted.
3. The name of the icon to be created on the desktop must be in the format of "Storage Manager Client <connection name>". If you create the icon name in another format, the icon on the desktop will not be deleted during uninstallation.
4. If, in an environment in which the name of the desktop icon "iSM client" created by the installer (for example, "Storage Manager Client <connection name>") has changed, you install in overwrite mode with Windows 2000, two icons are displayed on the desktop for a single connection. If this occurs, delete the desktop icon created later.
5. The term "icon", as used throughout the above explanation refers to "shortcut icon".

5.2.2 Each Function Start

The iSM client has such functions as configuration monitoring, fault monitoring, performance monitoring, replication operation, configuration setting, and snapshot management. In the screen that is activated first, the configuration display area (upper left corner (i)) and the information list display area (upper right corner (ii)) correspond to configuration monitoring. The message display area (lower area (iii)) corresponds to fault monitoring. The replication and performance monitoring are displayed on a separate screen by clicking buttons (iv), (v), (vi), (vii), and (viii) on this screen or selecting [File], then [Replication], [Performance], [Configuration], [Optimizer], or [Snapshot] from the menu.

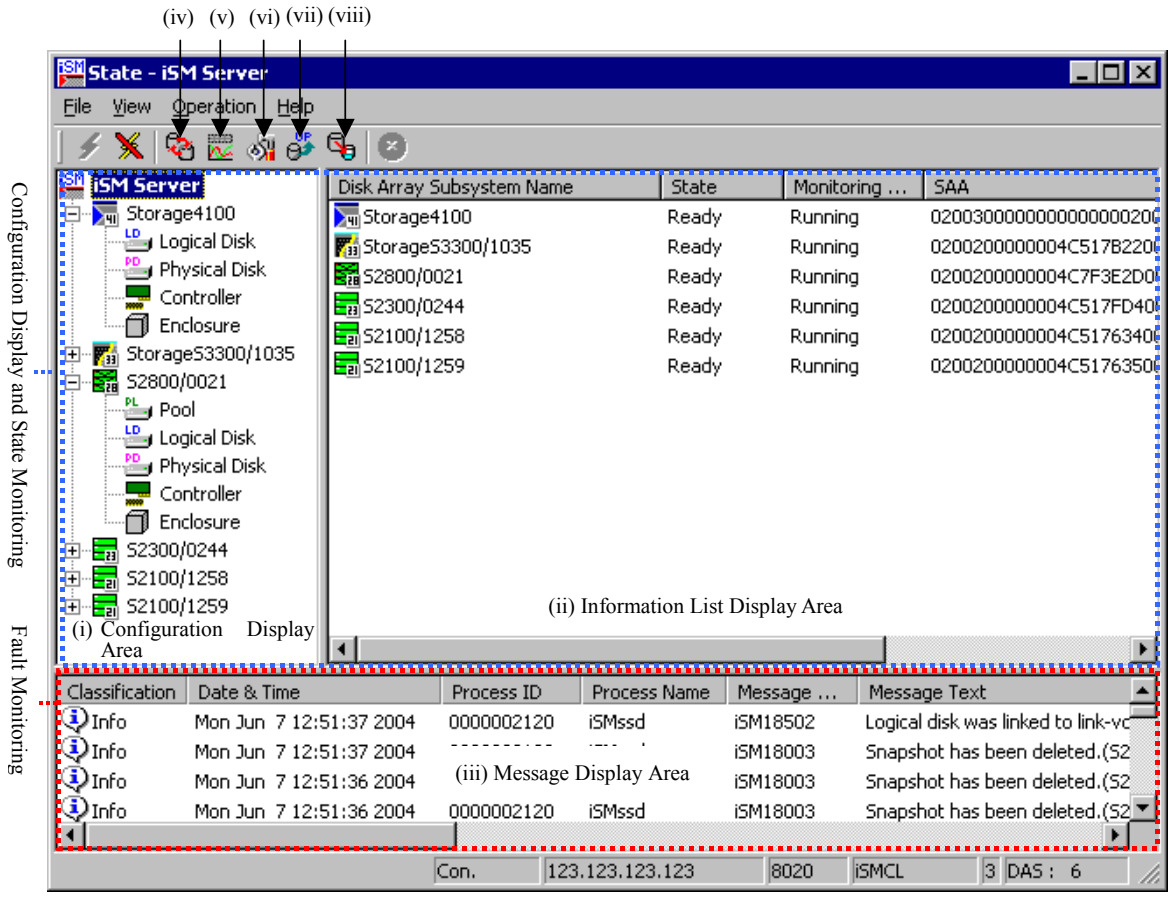


Figure 5-6 iSM Client Main Window

If you define a connection for each iSM server to be connected based on environment settings, you can start multiple iSM clients. In addition, multiple configuration setting screens can be displayed; however, only a single configuration setting screen can be displayed in “set” mode, while other configuration setting screens can be displayed in “browse” mode only. Other function screens do not differ in functions even if multiple clients are started.

5.3 Volume List Command (iSMvollist)

The Volume List command can be executed independently on the server machines where iSM is not installed and reports disk array names and logical disk names of subsystem connected via the fibre channel (FC). This command can be used to obtain the relationship (hereafter referred to as the volume information) between Windows system information such as drive letters, HBT (host adapter number/bus number/target ID), LUNs, and physical disk numbers and disk array information such as logical disk name and disk array name. This command can also be used to create or update the volume information.

HBT is described below.

<Host Adapter Number: HBA>

This is the number of an interface card to connect the SCSI bus and the host. There are two or more buses in the host adapter.

<Bus Number: Bus>

This is the number of a path (bus) from the host adapter to a target (SCSI device). One path can handle two or more targets.

<Target ID>

This is an ID to identify a device connected to the SCSI bus. One ID is assigned to one disk array.

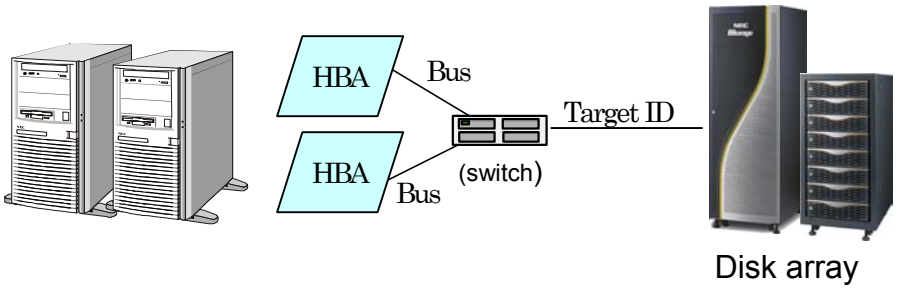


Figure 5-7 Relationship Between System Configuration and HBT

5.3.1 Startup and Termination of Volume List

(1) Startup of Volume List

Input "iSMvollist" in the command line, and the Volume List will start.

If no option is specified or the -? option is specified, the version information and option list are displayed as shown below.

```
> iSMvollist -?
iSMvollist Version n.n.nnn
Usage: iSMvollist -cr
Usage: iSMvollist –d
Usage: iSMvollist -dl disk_array [ld_number]
Usage: iSMvollist -de disk_array [ld_name]
Usage: iSMvollist -dd disk_array [drive | path]
Usage: iSMvollist -dp disk_array [disk_number]
Usage: iSMvollist -dh disk_array [HBT [LUN]]
Usage: iSMvollist -a
Usage: iSMvollist -al ld_number
Usage: iSMvollist -ae ld_name
Usage: iSMvollist -ad {drive | path}
Usage: iSMvollist -ap disk_number
Usage: iSMvollist -av volume_name
Usage: iSMvollist -ah HBT [LUN]
Usage: iSMvollist –ctl
Usage: iSMvollist –p
Usage: iSMvollist –ax
Usage: iSMvollist –ver
Usage: iSMvollist -?
```

* The above display is just for an example. Version is always according to the actual Volume List.

(2) Options Used for Volume List

The functions of the Volume List and the options that can be used for each function are as follows:

- -cr option: Used to create or update the Volume List by scanning physical disks connected to a server.
- -d option: Used to display information in the list form about the disk arrays existing in the volume information.
- -dl option: Used to display relationships of the disk array specified by disk_array. They are displayed after sorting based on logical disk numbers. When an ld_number is specified, only relationships concerning the specified logical disk are displayed.
- -de option: Used to display relationships of the disk array specified by disk_array. They are displayed after sorting based on logical disk names. When an ld_name is specified, only relationships of the specified logical disk name are displayed.
- -dd option: Used to sort relationships of the disk array specified by disk_array using a drive letter or the path name of an NTFS folder as a key to display. When a drive or path is specified, only relationships concerning the specified drive letter or path name of an NTFS folder are displayed.

- -dp option: Used to display relationships of the disk array specified by disk_array. They are displayed after sorting based on physical disk numbers. When a disk_number is specified, only relationships of the specified physical disk are displayed.
- -dh option: Used to display relationships of the disk array specified by disk_array. They are displayed after sorting based on HBTs and LUNs. When an HBT is specified, only relationships of the specified HBT are displayed. When a LUN is specified, relationships of the specified HBT and LUN are displayed as well.
- -a option: Used to display all the volume information in the Volume List.
- -al option: Used to display only relationships concerning the logical disk specified to ld_number.
- -ae option: Used to display only relationships concerning the logical disk name specified to ld_name.
- -ad option: Used to display only relationships concerning a drive letter or path name of an NTFS folder specified to drive or path.
- -ap option: Used to display only relationships concerning the physical disk number specified to disk_number.
- -av option: Used to display only relationships concerning the mount point volume name specified to volume_name.
- -ah option: Used to display only relationships concerning the Host number, Bus number and target ID specified to HBT. When LUN is specified, only relationships concerning the specified HBT and LUN are displayed.
- -ctl option: Used to list the physical disk number and logical disk number of the control volume and the corresponding disk array name.
  The control volume is used to operate the data replication or snapshot function from a business server. For details on the control volume, refer to manuals for data replication and snapshot.
- -p option: Used to display the version of the Volume List and the created date as the property of the Volume List.
- -ax option: Used to list the disk array information and all volume information in the Volume List, and the property information of the Volume List.
- -ver option: Used to display the version information of the volume list command.
- -? option: Used to display the version information and option list of the volume list command.

Each parameter is described below.

disk_array: Disk array name (nickname). Up to 32 ASCII characters can be specified. A part displayed as “Disk Array” or “Disk Array Name” on the example screen indicates the disk array name.

ld_number: Logical disk number built on the disk array. This can be specified in hexadecimal 0 to fff. If a character other than “0” to “9”, “a” to “f” and “A” to “F” is input, the parameter format error will occur. A part displayed as “LDN” on the example screen indicates the logical disk number.

ld_name: Logical disk name (nickname). Up to 24 ASCII characters can be specified. When a disk array is shipped, the SAA (unique number to identify the disk array) plus a logical disk number are registered. A part displayed as “LD Name” on the example screen indicates the logical disk name.

drive, path: Drive letter the user gives to a volume, or path name of an NTFS folder. You can give a drive letter and path names of multiple NTFS folders for a volume. This falls on [Path] on the screen display.

disk_number: Physical disk number that the Windows system allocates uniquely for managing disk devices. This can be specified in decimal 0 to 255. If a character other than "0" to "9" is input, the parameter format error will occur. A part displayed as "Disk No." on the example screen indicates the disk number.

volume_name: Identifier that the Windows system allocates uniquely for managing volumes. This is referred to as a MountPoint volume name. This falls on [Volume Name] on the screen display.

HBT: Abbreviation of a host adapter number, bus number and target ID. This can be specified in the format of h*xx*b*xx*t*xx* and a decimal number from 0 to 255 can be specified for *xx*. (Figure 5-7 Relationship Between System Configuration and HBT) You can identify a disk array by HBT.

<Host Adapter Number : HBA>

This is the number of an interface card to connect the SCSI bus and the host. There are two or more buses in the host adapter.

<Bus Number : Bus>

This is the number of a path (bus) from the host adapter to a target (SCSI device). One path can handle two or more targets.

<Target ID>

This is an ID to identify a device connected to the SCSI bus. One ID is assigned to one disk array.

LUN: Logical unit number to identify each of the two or more logical structures that can be accessed with one target ID. This can be specified in decimal 0 to 255. A logical disk on a disk array is recognized as a unique logical unit. You can identify a disk array and logical disk by HBT and LUN.

(3) Termination of Volume List

When a Volume List is terminated normally, items corresponding to specified options are displayed.
The execution results are displayed only when the -cr option is specified.

1. The volume list command should be carried out by the authority of the Administrator group.
2. When the Volume List is installed for the first time, no volume information exists. Create it using the -cr option.
3. When the configuration of a device is changed, the volume information must be updated to reflect the latest status. Update the volume information using the -cr option.

5.3.2 Examples of Display for Each Option

(1) Volume List Creation/Update

When -cr option id specified, the volume information is updated.

```
> iSMvollist –cr
iSMvollist:  Info:        iSM11700: Please wait a minute.
iSMvollist:  Info:        iSM11701: Volume list is created successfully.
```

If another process is updating or referring to the volume list, the following error message will appear.

```
iSM11751: Process_name has already started.
```

* *process_name* is expressed by the identifier of the process that is updating or referring to the volume list.

(2) List of Disk Array Information

When the -d option is specified, the disk array list in the volume information is displayed.

```
> iSMvollist -d

--- Disk Array List ---
Disk Array Name          Number of Drives
Storage2100/13           12
Storage4100/07           64
Storage4100/10           128
```

Each item is described below.

- Disk Array Name: Nickname of a disk array
- Number of Drives: Total number of volume information for each disk array

* If the Volume List is not created, the following error message will appear.

```
iSM11711: Volume list data does not exist.
```

(3) Display of Volume Information Based on Logical Disk Number

When -dl option is specified, the volume information is displayed after sorting based on the logical disk number.

```
> iSMvollist -dl Storage4100/07

--- Volume Data Information ---
LDN(h)     HBT          LUN(h)     Disk No.   LD Name              OS Type
  Path
0000       h1b2t34      00         disk0      driveWN1             WN
  D:
0001       h1b2t34      01         disk1      driveWN2             WN
  E:
0002       h1b2t34      02         disk2      driveWN3             WN
  F:
0003       h1b2t34      03         disk3      driveWN4             WN
  G:
0004       h1b2t34      04         disk4      driveWN5             WN
  -
0005       h1b2t34      05         disk5      driveWN6             WN
  -
```

When a logical disk number is specified, only information on the specified logical disk number is displayed.

```
> iSMvollist -dl Storage4100/07 0

--- Volume Data Information ---
LDN(h)     HBT          LUN(h)     Disk No.   LD Name              OS Type
  Path
0000       h1b2t34      00         disk0      driveWN1             WN
  D:
```

Each item is described below.

- LDN: Logical disk number
- Path: Logical drive name or NTFS folder name
- HBT: Host adapter number, bus number and target ID
- LUN: LUN
- Disk No: Disk number
- LD Name: Logical disk name
- OS Type: The OS type of a logical disk is displayed in one of the following.
  - A2: Logical disk operated by the ACOS-2 system
  - A4: Logical disk operated by the ACOS-4 system
  - AX: Logical disk operated by the AIX system
  - CX: Logical disk operated by the Solaris system
  - LX: Logical disk operated by the Linux system
  - NX: Logical disk operated by the HP-UX system
  - WN: Logical disk operated by the Windows system

* If the specified logical disk number does not exist, the following error message will appear.

```
iSM11723: Specified ld_number does not exist in volume list data.
```

(4) Display of Volume Information Based on Logical Disk Name

When the -de option is specified, the volume information is displayed after sorting based on the logical disk name.

```
> iSMvollist -de Storage4100/07

--- Volume Data Information ---
LD Name                 LDN(h)    HBT         LUN(h)    Disk No.    OS Type
  Path
driveWN1                0000      h1b2t34     00        disk0       WN
  D:
driveWN2                0001      h1b2t34     01        disk1       WN
  E:
driveWN3                0002      h1b2t34     02        disk2       WN
  F:
driveWN4                0003      h1b2t34     03        disk3       WN
  G:
driveWN5                0004      h1b2t34     04        disk4       WN
  -
driveWN6                0005      h1b2t34     05        disk5       WN
  -
```

When a logical disk name is specified, only information on the specified logical disk name is displayed.

```
> iSMvollist -de Storage4100/07 driveWN6

--- Volume Data Information ---
LD Name                 LDN(h)    HBT         LUN(h)    Disk No.    OS Type
  Path
driveWN6                0005      h1b2t34     05        disk5       WN
  -
```

For the description of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number”.

* If the specified logical disk name does not exist, the following error message will appear.

```
iSM11724: Specified ld_name does not exist in volume list data.
```

(5) Display of Volume Information Based on Drive Letter or Path Name of NTFS Folder

When the -dd option is specified, the volume information is displayed after sorting data based on drive letters and path names of NTFS folders.

```
> iSMvollist -dd Storage4100/07

--- Volume Data Information ---
Path
  LDN(h)     HBT          LUN(h)     Disk No.   LD Name              OS Type
D:
  0000       h1b2t34      00         disk0      driveWN1             WN
E:
  0001       h1b2t34      01         disk1      driveWN2             WN
F:
  0002       h1b2t34      02         disk2      driveWN3             WN
G:
  0003       h1b2t34      03         disk3      driveWN4             WN
-
  0004       h1b2t34      04         disk4      driveWN5             WN
-
  0005       h1b2t34      05         disk5      driveWN6             WN
```

When a drive letter or the path name of an NTFS folder is specified, only information on the specified drive letter or path name of the NTFS folder is displayed.

```
> iSMvollist -dd Storage4100/07 D

--- Volume Data Information ---
Path
  LDN(h)     HBT          LUN(h)     Disk No.   LD Name              OS Type
D:
  0000       h1b2t34      00         disk0      driveWN1             WN
```

For the description of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number”.

* When the specified drive letter or path name of the NTFS folder does not exist, the following error message will appear.

```
iSM11725: Specified drive does not exist in volume list data.
```

(6) Display of Volume Information based on Physical Disk Number

When the -dp option is specified, the volume information is displayed based on the physical disk number.

```
> iSMvollist -dp Storage4100/07

--- Volume Data Information ---
Disk No.    LDN(h)      HBT         LUN(h)      LD Name             OS Type
  Path
disk0       0000        h1b2t34     00          driveWN1            WN
  D:
disk1       0001        h1b2t34     01          driveWN2            WN
  E:
disk2       0002        h1b2t34     02          driveWN3            WN
  F:
disk3       0003        h1b2t34     03          driveWN4            WN
  G:
disk4       0004        h1b2t34     04          driveWN5            WN
  -
disk5       0005        h1b2t34     05          driveWN6            WN
  -
```

When a physical disk number is specified, only information about the specified physical disk number is displayed.

```
> iSMvollist -dp Storage4100/07 0

--- Volume Data Information ---
Disk No.    LDN(h)      HBT         LUN(h)      LD Name             OS Type
  Path
disk0       0000        h1b2t34     00          driveWN1            WN
  D:
```

For the description of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number”.

* If the specified physical disk number does not exist, the following error message will appear.

```
iSM11726: Specified disk_number does not exist in volume list data.
```

(7) Display of Volume Information based on HBT and LUN

When the -dh option is specified, the volume information is displayed based on the HBT and LUN.

```
> iSMvollist -dh Storage4100/07

--- Volume Data Information ---
HBT         LUN(h)      LDN(h)      Disk No.    LD Name                 OS Type
  Path
h1b2t34     00          0000        disk0       driveWN1                WN
  D:
h1b2t34     01          0001        disk1       driveWN2                WN
  E:
h1b2t34     02          0002        disk2       driveWN3                 WN
  F:
h1b2t34     03          0003        disk3       driveWN4                WN
  G:
h1b2t34     04          0004        disk4       driveWN5                WN
  -
h1b2t34     05          0005        disk5       driveWN6                WN
  -
```

When an HBT is specified, only information on the specified HBT is displayed.

```
> iSMvollist -dh Storage4100/07 h1b2t34

--- Volume Data Information ---
HBT         LUN(h)      LDN(h)      Disk No.    LD Name                 OS Type
  Path
h1b2t34     00          0000        disk0       driveWN1                WN
  D:
h1b2t34     01          0001        disk1       driveWN2                WN
  E:
h1b2t34     02          0002        disk2       driveWN3                WN
  F:
h1b2t34     03          0003        disk3       driveWN4                WN
  G:
h1b2t34     04          0004        disk4       driveWN5                WN
  -
h1b2t34     05          0005        disk5       driveWN6                WN
  -
```

When an HBT and LUN are specified, only information on the specified HBT and LUN is displayed.

```
> iSMvollist -dh Storage4100/07 h1b2t34 0

--- Volume Data Information ---
HBT         LUN(h)      LDN(h)      Disk No.    LD Name                 OS Type
  Path
h1b2t34     00          0000        disk0       driveWN1                WN
  D:
```

For the description of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number”.

* When LUN is omitted and only HBT is specified but the specified HBT does not exist, the following error message will appear.

```
iSM11727: Specified HBT does not exist in volume list data.
```

* When an HBT and LUN are specified but the specified HBT or LUN does not exist, the following error message will appear.

```
iSM11728: Specified HBT or LUN does not exist in volume list data.
```

(8) Volume List Display

When -a option is specified, all the volume information in the volume list is displayed.

```
> iSMvollist -a
LDN        LD Name                          VAA                          OS Type
 HBT                  LUN       Disk No.   Disk Array
 Volume Name
 Path
0000h      dev000                           30000000000000020000         WN
 h4b0t35              000h      disk1      Storage4100/07
\\?\Volume{4b94d348-58a7-11d5-abc1-806d6172696f}\
 G:
0001h      dev001                           30000000000000020001         WN
 h4b0t35              001h      disk2      Storage4100/07
 -
 -
0002h      dev002                           30000000000000020002         WN
 h4b0t35              002h      disk3      Storage4100/07
\\?\Volume{4b94d349-58a7-11d5-abc1-806d6172696f}\
 H:
0003h      dev003                           30000000000000020003         WN
 h4b0t35              003h      disk4      Storage4100/07
 -
 -
0004h      dev004                           30000000000000020004         WN
 h4b0t35              004h      disk5      Storage4100/07
\\?\Volume{9ba5c1c4-147f-11d5-958d-00004c7929e8}\
 Y:
-
-
-
```

Each item is described below.

- VAA: Volume Absolute Address
- Path: Drive letter or path name of an NTFS folder
- Volume Name: Mount point volume name

For explanation of the items other than the above, refer to (3) “Display of Volume Information Based on Logical Disk Number”.

* If no volume list has been created, the following error message will appear.

```
iSM11711: Volume list data does not exist.
```

(9) Display of Volume Information on the Specified Logical Disk Number

When -al option is specified, the volume information on the specified logical disk number is displayed.

```
> iSMvollist –al 0
LDN        LD Name                          VAA                              OS Type
 HBT                  LUN        Disk No.   Disk Array
 Volume Name
 Path
0000h      dev000                           30000000000000020000             WN
 h5b1t0               000h       disk1      Storage4100/07
\\?\Volume{d1a8d660-5748-11d5-a606-009027520bce}\
 F:
```

For explanation of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number” and (8) “Volume List Display”.

* If the specified logical disk number does not exist, the following error message will appear.

```
iSM11723: Specified ld_number does not exist in volume list data.
```

(10) Display of Volume Information on the Specified Logical Disk Name

When -ae option is specified, the volume information on the specified logical disk name is displayed.

```
> iSMvollist –ae dev000
LDN        LD Name                          VAA                              OS Type
 HBT                  LUN        Disk No.   Disk Array
 Volume Name
 Path
0000h      dev000                           30000000000000020000             WN
 h5b1t0               000h       disk1      Storage4100/07
\\?\Volume{d1a8d660-5748-11d5-a606-009027520bce}\
 F:
```

For explanation of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number” and (8) “Volume List Display”.

* If the specified logical disk name does not exist, the following error message will appear.

```
iSM11724: Specified ld_name does not exist in volume list data.
```

(11) Display of Volume Information on the Specified Drive Letter or NTFS Folder Path Name

When the -ad option is specified, the volume information on the specified drive letter or path name of an NTFS folder is displayed.

```
> iSMvollist –ad F:
LDN        LD Name                          VAA                              OS Type
 HBT                  LUN        Disk No.   Disk Array
 Volume Name
 Path
0000h      dev000                           30000000000000020000             WN
 h5b1t0               000h       disk1      Storage4100/07
 \\?\Volume{d1a8d660-5748-11d5-a606-009027520bce}\
 F:
```

For explanation of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number” and (8) “Volume List Display”.

* When the specified drive letter or path name of an NTFS folder does not exist, the following error message will appear.

```
iSM11725: Specified drive does not exist in volume list data.
```

(12) Display of Volume Information on the Specified Physical Disk Number

When -ap option is specified, the volume information on the specified physical disk number is displayed.

```
> iSMvollist –ap 1
LDN        LD Name                          VAA                              OS Type
 HBT                  LUN        Disk No.   Disk Array
 Volume Name
 Path
0000h      dev000                           30000000000000020000             WN
 h5b1t0               000h       disk1      Storage4100/07
 \\?\Volume{d1a8d660-5748-11d5-a606-009027520bce}\
 F:
```

For explanation of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number” and (8) “Display of Volume Information”.

* If the specified physical disk number does not exist, the following error message will appear.

```
iSM11726: Specified disk_number does not exist in volume list data.
```

(13) Display of Volume Information on the Specified Mount Point Volume Name

When -av option is specified, the volume information on the specified mount point volume name is displayed.

```
> iSMvollist –av \\?\Volume{0e237a8f-5fb8-11d5-b1d7-009027520bce}\
LDN        LD Name                          VAA                              OS Type
 HBT                    LUN        Disk No.  Disk Array
 Volume Name
 Path
0000h      dev000                           30000000000000020000             WN
 h5b1t0                 000h       disk1     Storage4100/07
\\?\Volume{0e237a8f-5fb8-11d5-b1d7-009027520bce}\
 F:
```

For explanation of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number” and (8) “Display of Volume Information”.

* If the specified mount point volume does not exist, the following error message will appear.

```
iSM11732: Specified Volume Name does not exist in volume list data.
```

(14) Display of Volume Information on the Specified HBT and LUN

When -ah option is specified, the volume information, the volume information on the specified HBT and LUN is displayed.

When HBT is specified, only the information on the specified HBT is displayed.

```
> iSMvollist -ah h5b1t0

LDN        LD Name                          VAA                              OS Type
 HBT                    LUN        Disk No.  Disk Array
 Volume Name
 Path
0000h      dev000                           30000000000000020000             WN
 h5b1t0                 000h       disk1     Storage4100/07
\\?\Volume{4b94d348-58a7-11d5-abc1-806d6172696f}\
 G:
0001h      dev001                           30000000000000020001             WN
 h5b1t0                 001h       disk2     Storage4100/07
 -
 -
0002h      dev002                           30000000000000020002             WN
 h5b1t0                 002h       disk3     Storage4100/07
\\?\Volume{4b94d349-58a7-11d5-abc1-806d6172696f}\
 H:
0003h      dev003                           30000000000000020003             WN
 h5b1t0                 003h       disk4     Storage4100/07
 -
 -
```

When HBT and LUN are specified, only the information on the specified HBT and LUN is displayed.

```
> iSMvollist -ah h5b1t0 1

LDN         LD Name                          VAA                              OS Type
 HBT                    LUN        Disk No.  Disk Array
 Volume Name
 Path
0000h       dev000                           30000000000000020000             WN
 h5b1t0                 000h       disk1     Storage4100/07
\\?\Volume{4b94d348-58a7-11d5-abc1-806d6172696f}\
 G:
```

For explanation of each item, refer to (3) “Display of Volume Information Based on Logical Disk Number” and (8) “Display of Volume Information”.

* When LUN is omitted and only HBT is specified but the specified HBT does not exist, the following error message will appear.

```
iSM11727: Specified HBT does not exist in volume list data.
```

* When HBT and LUN are specified but the specified HBT or LUN does not exist, the following error message will appear.

```
iSM11728: Specified HBT or LUN does not exist in volume list data.
```

(15) List of Control Volume

When the -ctl option is specified, the physical disk number and logical disk number of the control volume and the corresponding disk array name are listed.

The control volume is used to operate the data replication or snapshot function from a business server. For details on the control volume, refer to manuals for data replication and snapshot.

```
> iSMvollist -ctl
--- Control Volume List ---
Disk No.    LDN    Disk Array Name
Disk5       0004h  Storage2800
```

Each item is described below.

Disk No. : Physical disk number

LDN : Logical disk number

Disk Array Name : Nickname of a disk array

* When the control volume is not defined, the following warning message will appear.

```
iSM11714: Volume list data has no control volume.
```

(16) Display of Property of Volume List

When the -p option is specified, the property information of the volume list is displayed.

```
> iSMvollist -p
--- Property of Volume List File ---
Version                 3.2.001
Created                 2004/03/12 09:38:46
Owner Host Name         W2K3SERVER
Disk Array              1
Volume Information      12
```

Each item is described below. Items may be added when a function is enhanced.

- Version : Version information of the volume list command used when the Volume List was created
- Created : Date when the Volume List was created
- Owner Host Name : Host name of the server owning the Volume List
- Disk Array : Total number of disk arrays in the Volume List
- Volume Information : Total number of the volume information items in the Volume List

(17) Display of Disk Array Information, Volume Information, and Property Information

When the -ax option is specified, disk array information, volume information, and property of the Volume List are displayed.

```
> iSMvollist -ax
Volume List  iSMvollist   Version 3.2.003        Date: 2004/03/19 22:03:21

--- Disk Array List ---
Disk Array Name                 Number of LDN
S2800/0001                      2

--- Volume List ---
LDN   LD Name                                VAA                                OS Type
 HBT         LUN   Disk No.          Disk Array
 Volume Name
 Path
0004h MV_WN_DB1                              00000004c517b7d0004                WN
 h4b0t35     000h  disk5              S2800/0001
  \\?\Volume{4b94d348-58a7-11d5-abc1-806d6172696f}\
 D:
0005h MV_WN_DB2                              200000004c517b7d0005               WN
 h4b0t35     001h  disk6               S2800/0001
  \\?\Volume{4b94d348-58a7-11d5-abc1-806d6172696f}\
 H:

--- Property of Volume List File ---
Version                         3.2.001
Created                         2004/03/12 09:38:46
Owner Host Name                 W2K3SERVER
Disk Array                      1
Volume Information              2
```

* The version of the executed volume list command and the execution date are displayed on the first line.

Each item is described below. Items may be added when a function is enhanced.

Information displayed as [Disk Array List]

: The same information as the -d option is displayed.

Information displayed as [Volume List]

: The same information as the -a option is displayed.

Information displayed as [Property of Volume List File]

: The same information as the -p option is displayed.

5.4 Volume List Display

This function consists of functions, such as list of volume information, selection display on a disk array basis, creation or update of the Volume List.

This function also provides a function for defining the control volume to be used to operate the data replication or snapshot function from a business server. For details on the control volume and its definition method, refer to manuals for data replication and snapshot.

 Note the following when using the function of Volume List Display:

1. A Volume List is also used in data replication control by the replication control command (ReplicationControl) and snapshot control by the snapshot operation command (SnapControl). Creating/Updating a Volume List by mistake may cause an error in data replication or snapshot control. Be careful in creating/updating a Volume List.
2. When a Volume List is created/updated, volumes in Not Ready state are not registered in the Volume List. Therefore, separate all the paired RVs from each other that are connected before creating/updating a Volume List.
3. When a Volume List is created or updated, specify all the drive letters and the path names of the NTFS folders that are to be used in data replication control.
4. Do not execute Create/Update of Volume List during execution of the iSMvollist command.
5. Do not execute Create/Update of Volume List during execution of the replication control command (ReplicationControl) or snapshot operation command (SnapControl).

5.4.1 Starting/Terminating Volume List Display

This section explains the procedures for starting and terminating the function of Volume List Display.

(1) Starting the function of Volume List Display

(i) Click the [Start] button of Windows and select [Programs] ([All Programs] for Windows Server 2003) → [Storage Manager Volume List] → [Volume List Display].

(ii) The screen of Volume List Display appears.

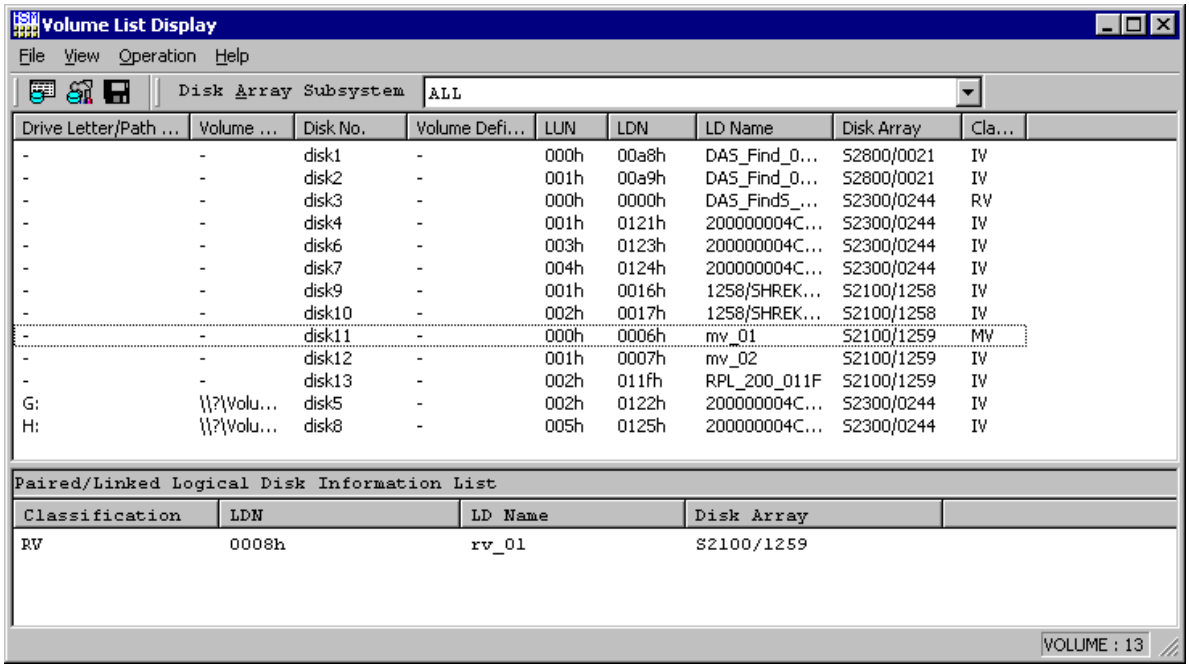


Figure 5-8 Screen of Volume List Display

For details on the screen of Volume List Display, refer to 5.4.2 “Screen of Volume List Display” and 5.4.3 “Menu Item List”.

(2) Terminating the function of Volume List Display

On the screen of Volume List Display, select [File] on the menu bar → [Exit]. Alternatively, click the close button of the system menu.

When the function of Volume List Display is terminated, the window size, the row width of the list view, and the window position of the Volume List Display screen currently displayed are stored automatically. The stored screen information will take effect when the Volume List Display function is started next.

5.4.2 Screen of Volume List Display

Figure 5-9 shows the layout of the screen of Volume List Display.

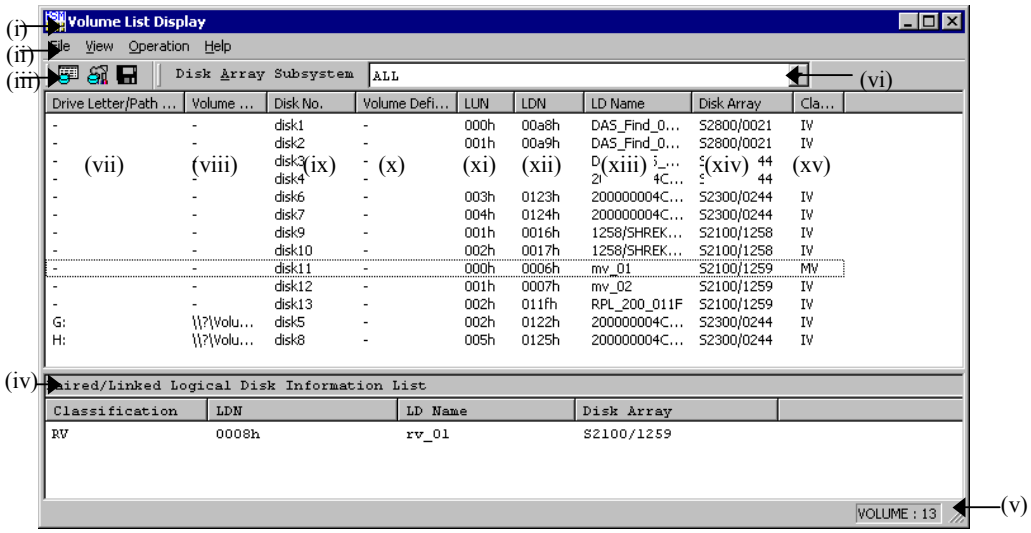


Figure 5-9 Layout of Volume List Display Screen

(i) Title bar

Displays the title of the Volume List Display function.

(ii) Menu bar

For details on each item of the menu bar, refer to 5.4.3 “Menu Item List”.

(iii) Toolbar and toolbar buttons

[Create/Update Volume List] Toolbar Button

Clicking this button has the same effect as selecting [Create/Update Volume List] from the menu.

[Define Control Volume] Toolbar Button

Clicking this button has the same effect as selecting [Define Control Volume] from the menu.

[CSV Output of Information List] Toolbar Button

Clicking this button has the same effect as selecting [CSV Output of Information List] from the menu.

(iv) Paired/Linked Logical Disk Information List

Displays the logical disk information of a subject paired with the volume selected on the Volume List Display screen using the data replication or snapshot function after acquiring the information from the disk array. When connected to a link volume, the logical disk information of a subject linked with is acquired from the disk array and displayed.

(v) Status bar

The following information is displayed on the status bar.

VOLUME

Displays the number of volume information items to be displayed on the Volume List Display screen. When volume information for all disk arrays is displayed, the number of all volume information items in the Volume List is displayed. For the selection display by a disk array, the number of volume information items on the corresponding disk array is displayed.

(vi) Disk Array Subsystem selection combo box

Clicking the pull-down button displays the list of disk arrays currently registered in the Volume List file.

(vii) Drive Letter/Path Name

Displays path information in the Volume List file.

(viii) Volume Name

Displays volume names in the Volume List file.

(ix) Disk No.

Displays physical disk numbers in the Volume List file.

(x) Volume Definition

Displays the identification information of the control volume definition.

(xi) LUN

Displays logical unit numbers in the Volume List file.

(xii) LDN

Displays logical disk numbers in the Volume List file.

(xiii) LD Name

Displays logical disk names in the Volume List file.

(xiv) Disk Array

Displays disk array names in the Volume List file.

(xv) Classification

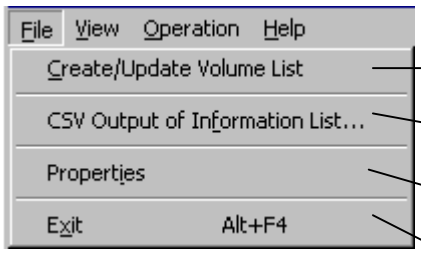
Displays the classification (volume attribute) of volumes related to data replication and snapshot after acquisition.

The information on (vi) to (xiv) above is acquired from the Volume List and then displayed, however, the information on (iv) and (xv) is acquired from the disk array and then displayed.

5.4.3 Menu Item List

This section explains the items on the menu bar of the screen of Volume List Display.

File



Create/Update Volume List
5.4.6 “Volume List Creation/Update”

CSV Output of Information List
5.4.7 “CSV Output of Information List”

Properties
5.4.8 “Display of Volume List Properties”

Exit
5.4.1 “Starting/Terminating Volume List Display”

View

Toolbar
5.4.9 “View/Hide of Toolbar”

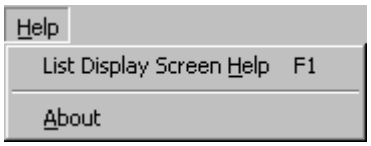
Status bar
5.4.10 “View/Hide of Status Bar

Update Display Information
5.4.11 “Update Display Information”

Operation

Define Control Volume
5.4.12 “Definition of Control Volume”

Help



List Display Screen Help
Displays information about the screen of Volume List Display.

About
Displays information about versions.

5.4.4 Display List of Volume Information

Starting the function of Volume List Display lists all the volume information of the Volume List.

Execution procedure

(i) Click the [Start] button of Windows and select [Programs] ([All Programs] for Windows Server 2003) → [Storage Manager Volume List] → [Volume List Display].

(ii) The Volume List Display screen is started and volume information appears.

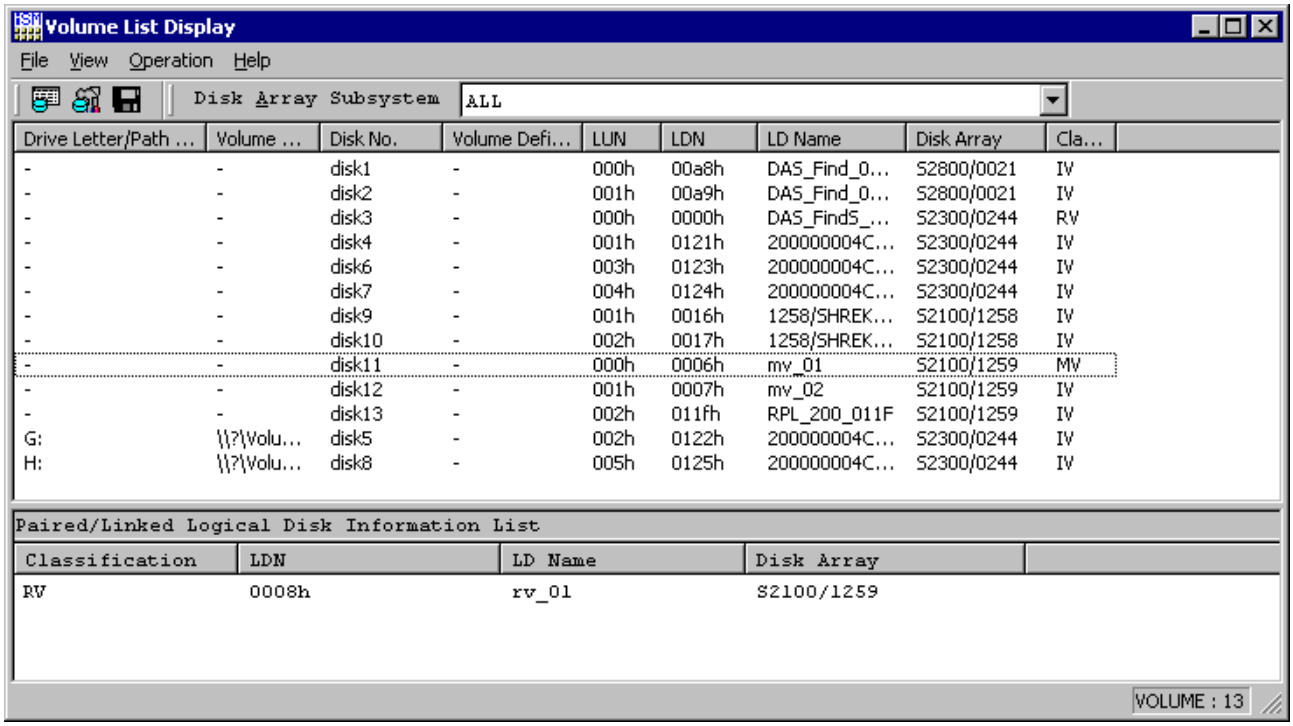


Figure 5-10 Display List of Volume Information

5.4.5 Selection Display by Disk Array

Click the pull-down button of Disk Array Subsystem selection combo box on the screen of Volume List Display, and select the target disk array. The information of only the selected disk array is displayed.

Execution procedure

(i) Select the target disk array from the Disk Array Subsystem selection combo box on the screen of Volume List Display.

(ii) The volume information of the selected disk array is displayed.

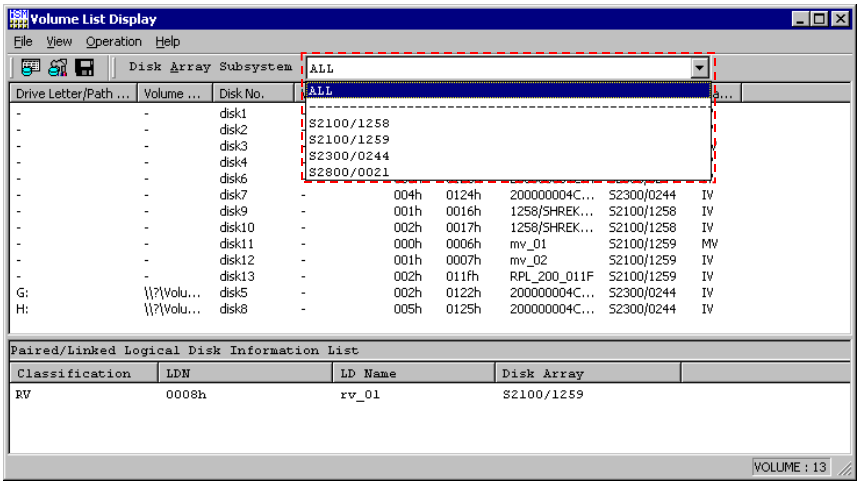


Figure 5-11 Selection Display by Disk Array

5.4.6 Volume List Creation/Update

To create/update a Volume List, select [File] → [Create/Update Volume List] on the screen of Volume List Display.

Execution procedure

(i) Select [File] → [Create/Update Volume List] on the screen of Volume List Display. The following inquiry message is displayed:

Figure 5-12 Execution Confirmation Screen for Create/Update Volume List

(ii) Clicking the [OK] button executes Create/Update Volume List.
Clicking the [Cancel] button cancels Create/Update Volume List and returns to the screen of Volume List Display.

(iii) The following message is displayed when the Volume List has been created/updated normally.

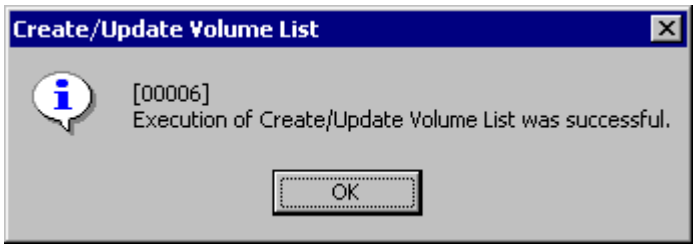


Figure 5-13 Confirmation Screen for Create/Update Volume List

(iv) Clicking the [OK] button returns to the screen of Volume List Display screen.

(v) The screen of Volume List Display is automatically updated when the Volume List file has been created/updated.

5.4.7 CSV Output of Information List

To output an information list as a CSV file, select [File] → [CSV Output of Information List] on the screen of Volume List Display screen.

Execution procedure

(i) Select [File] → [CSV Output of Information List] on the Volume List Display screen. The screen of CSV Output of Information List appears.

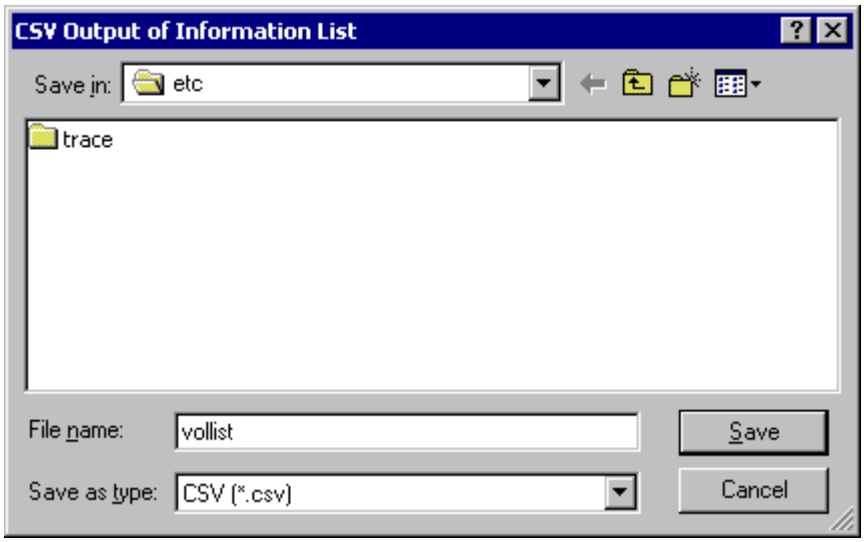


Figure 5-14 CSV Output of Information List

(ii) Specify the save destination.
The default save destination is the “etc” folder in the installation directory.

(iii) Specify the file name.
The default file name is “vollist.csv”.

(iv) Click the [Save] button to save the input information.
Clicking the [Cancel] button returns to the Volume List Display screen without saving data.

(v) When the file is saved successfully, the following message is displayed:

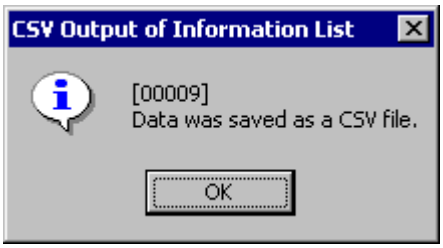


Figure 5-15 Confirmation Screen for CSV Output of Information List

(vi) Clicking the [OK] button returns to the screen of Volume List Display.

File sample

The following is a sample of a CSV file output by executing CSV Output of Information List

```
Drive Letter/Path Name, Volume Name, Disk No.,Volume Definition,LUN, LDN, LD Name, Disk Array, Classification, Paired/Linked Logical Disk Information
E:,\\?\Volume{6bd09e61-4d87-11d8-a1d8-0007e903d285}\,disk1,-,000h,0000h,DB_DATA_MV,Tokyo_Customer_DataBase,MV,
“RV(0005h,DB_DATA_RV,Tokyo_Customer_DataBase)/RV(0010h,DB_DATA_RV2,Tokyo_Customer_DataBase)/RV(0011h,DB_DATA_RV3,Tokyo_Customer_DataBase)”
F:,\\?\Volume{6bd09e62-4d87-11d8-a1d8-0007e903d285}\,disk2,-,001h,0001h,DB_REDO1_MV,Tokyo_Customer_DataBase,
MV,”RV(0006h,DB_REDO1_RV,Tokyo_Customer_DataBase)”
G:,\\?\Volume{6bd09e63-4d87-11d8-a1d8-0007e903d285}\,disk3,-,002h,0002h,DB_REDO2_MV,Tokyo_Customer_DataBase,
MV,”RV(0007h,DB_REDO2_RV,Tokyo_Customer_DataBase)”
H:,\\?\Volume{6bd09e64-4d87-11d8-a1d8-0007e903d285}\,disk4,-,003h,0003h,DB_CTL_MV,Tokyo_Customer_DataBase,MV,
“RV(0008h,DB_CTL_RV,Tokyo_Customer_DataBase)”
I:,\\?\Volume{6bd09e65-4d87-11d8-a1d8-0007e903d285}\,disk5,-,004h,0004h,DB_ARCHIVE_MV,Tokyo_Customer_DataBase,
MV,”RV(0009h,DB_ARCHIVE_RV,Tokyo_Customer_DataBase)”
-:,\\?\Volume{6bd09e66-4d87-11d8-a1d8-0007e903d285}\,disk6,-,000h,00a0h,TEMP,Storage4300/001,IV,-
-:,\\?\Volume{6bd09e67-4d87-11d8-a1d8-0007e903d285}\,disk7,Control,00h,0266h,WORK,Storage4300/002,IV,-
```

Figure 5-16 Output Example of CSV File

This file is output in format in which each item of the display information is separated by a comma.
One volume information item is output as information for a line.
The logical disk information displayed in the Paired/Linked Logical Disk Information List is output in the following format. Multiple logical disk information items are delimited with slashes, concatenated, and output.

“***Classification***(***LDN***, ***LDName***, ***DiskArray***) [/***Classification***(***LDN***, ***LDName***, ***DiskArray***) […]]”

Classification : Classification
LDN : Logical disk number
LDName : Logical disk name
DiskArray : Disk array name

5.4.8 Display of Volume List Properties

To confirm properties of Volume List, select [File] → [Properties] on the screen of Volume List Display.

Execution procedure

(i) To display the following properties, select [File] → [Properties] on the screen of Volume List Display.

(ii) To return to the screen of Volume List Display, click the [Close] button.

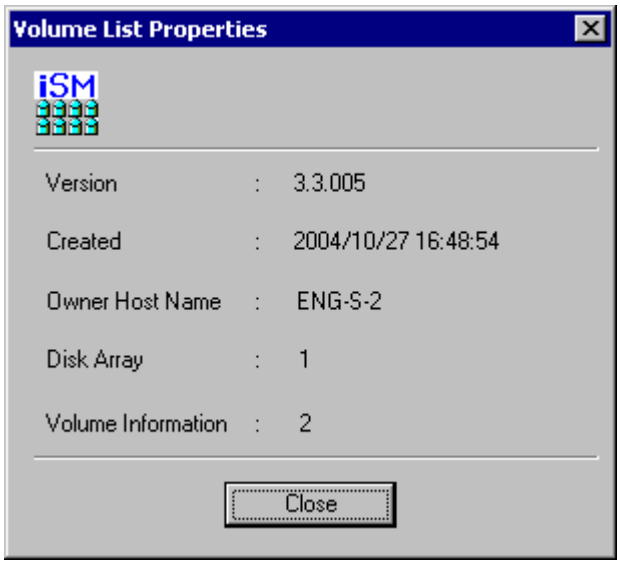


Figure 5-17 Volume List Properties

- Version

  Displays the version of the volume list command used to create the Volume List.
- Created

  Displays the date when the Volume List was created.
- Owner Host Name

  Displays the host name of the server owning the Volume List.
- Disk Array

  Displays the total number of disk arrays in the Volume List.
- Volume

  Displays the total number of volume information items in the Volume List.

5.4.9 View/Hide of Toolbar

To select view or hide of the toolbar, select [View] → [Toolbar] on the screen of Volume List Display.

View

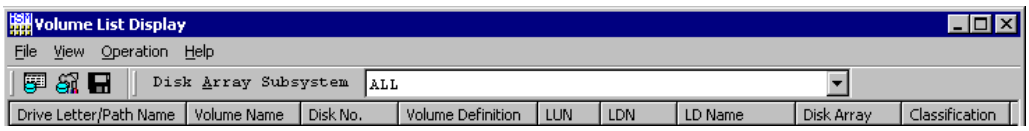


Figure 5-18 View of Toolbar

Hide

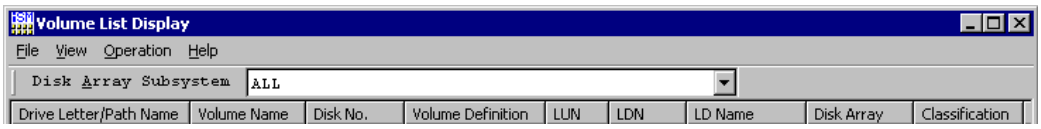


Figure 5-19 Hide of Toolbar

5.4.10 View/Hide of Status Bar

To select display or hide of the status bar, select [View] → [Status bar] on the screen of Volume List Display.

View

Figure 5-20 View of Status Bar

Hide

Figure 5-21 Hide of StatusBar

5.4.11 Update Display Information

To update the information of a Volume List file, select [View] → [Update Display Information] on the screen of Volume List Display.

The Volume List file contents are updated and the screen of Volume List Display is automatically updated.

5.4.12 Definition of Control Volume

To start the screen for defining the control volume, select [Operation] → [Define Control Volume] on the screen of Volume List Display.

The control volume is a volume used to operate the data replication or snapshot function from a business server. If you do not use the data replication operation command or the snapshot operation command, you do not need to define the control volume.

For details on how to define or use the control volume, refer to manuals for data replication and snapshot.

5.5 Configuration Display Command (iSMview)

The configuration view command displays the settings of a specified disk array, the subsystem resource status, the LD configuration, and the LD status. Table 5-2 shows the items that can be displayed.

Table 5-2 Items Displayed by the iSMview Command

Display Item	Description
Disk array Information	Displays information about disk array. <Disk Array Information> Disk Array Name, Resource State, Monitoring, Vendor ID, Product ID, Product FW Revision, Storage Control Software Revision, World Wide Name, Serial Number, SAA, Total Capacity, User System Code <Disk Array Control Mode> Cross Call Mode, Auto Assignment Mode, Auto Repair Mode, Auto Time Setup Mode <Access Control Information> Access Control Mode <Control Path> Path No., Control Path, Path State <Expand LUN> Port No., Exist, Expand LUN <Cache Partitioning Information> Cache Partitioning Mode <Product Information> Product, State
LD Information	Displays information about LD. <LD Information> LDN, OS Type, LD Name, LD State <LD Detail Information> LDN, OS Type, LD Name, LD Capacity, Progress Ratio, RANK, Pool No., Pool Name, RaidType, LD State, Expansion State, Group, Purpose, RPL Attribute, Snapshot Attribute, Current Owner, Default Owner, Cache Resident, PD List, Segment Number, Segment Name <LD/Port List> Port No.,Port Name, Port State, Port Mode <LD/WWN List> Platform, LD Set Type, LD Set Name, Path Count <LD Set List> Platform, LD Set Name, Path Count, LD Count

Display Item	Description
LD-snapshot Information	Displays information about LD snapshot. <Snapshot LD Information> LDN, OS Type, LD Name, Snapshot Attribute <Snapshot LD Detail Information> LDN, OS Type, LD Name, LD Capacity, Snapshot Attribute <Snapshot LD List> LDN, OS Type, LD Name, Snapshot Attribute < Link Control LD List> LDN, OS Type, LD Name, Snapshot Attribute
RANK Information	Displays information about RANK. <RANK Information> RANK No., Raid Type, RANK State <RANK Detail Information> RANK No., RaidType, RANK State, RebuildTime, RANK Capacity, Progress Ratio, PD List <Partition List> Start Address, End Address, Capacity, LDN
Pool Information	Displays information about pool. <Pool Information> Pool No., Pool Name, Pool Type, Pool State <Pool Detail Information> Pool No., Pool Name, Pool Type, RAID Type, Pool State, Expansion State, Rebuild Time(hour), Expansion Time(hour), Pool Capacity, Used Pool Capacity, Free Pool Capacity, Progress Ratio, PD List, Expanding PD List <Partition List> Start Address, End Address, Capacity (GB), LDN
Pool-snapshot Information	Displays information about pool snapshot. <Snapshot Pool Information> Pool No., Pool Name, Threshold <Snapshot Pool Detail Information> Pool No., Pool Name, Pool Type, Threshold, Total Snapshot Capacity, Used Snapshot Capacity, Snapshot Threshold, Snapshot Control Capacity <SDV List> LDN, OS Type, LD Name, LD Capacity
PD Information	Displays information about PD. <PD List> PDN, PD State, Classification <PD Detail Information> PDN, Classification, State, PD Capacity, Vendor ID, Product ID, Product Revision, Serial Number, LD List

Display Item	Description
Controller Information	Displays information about Controller. <Controller Information> Type, Abbr. Name, No., State, Info Common display information <BC Junction Box Information> <Power Supply Information> <Battery Information> <Fan Information> <Temperature Information> <Host Director Information> <Host Director/Port Information> < Disk Director Information> <Replication Director Information> <Cache Module Information> <Back Board Information> <Service Processor Information> <Disk Array TCP/IP Information> <SCSI Socket Information> <SNMP Information> <Trap Information> <Panel Information> <Maintenance PC Information> <Management Processor Information> <Ethernet HUB Information> <Power Control Card Information> Type, Abbreviated Name, Number, State, Code Additional display information of <Host Director Information> Director Location, Revision, Protocol, Port No. Additional display information of <Host Director/Port Information> Port No., Port Name, Port Type, State, Mode, WWNN, WWPN, Data Rate, Saved Data Rate, Topology, Saved Topology, N_Port_ID/Switch, Saved N_Port_ID/Switch Additional display information of <Disk Director Information> Director Location, Revision, Port No. Additional display information of <Replication Director Information> Director Location, Revision, Port No. Additional display information of <Cache Module Information> Capacity Additional display information of <Service Processor Information> Revision <Disk Array TCP/IP Information> IP Address, Subnet Mask, Gateway Address <SCSI Socket Information> SCSI Socket Guard Invalid, SCSI Socket Valid IP Address <SNMP Information> Community Name, SNMP Trap Transmission IP Address, SNMP Valid, SNMP Valid IP Address <Trap Information> Trap Sense Interval, Unit Contact, Unit Name, Unit Location, Unit Info
Disk Enclosure Information	Displays information about Disk Enclosure. <Disk Enclosure Information>

Display Item	Description
	Type, Abbr. Name, No., State Common display information <EC Junction Box Information> <Power Supply Information> <FAN Information> <Temperature Information> <Adapter Card Information> <Back Board Information> Type, Abbreviated Name, Number, State, Code
Port Information	Displays information about Port Information. Port No., Port Name, Platform, Port Mode, Port State
Maintenance Information	Displays information about Maintenance Information <Maintenance Information> Storage Control Software Revision, Temp. Sense Interval, Write Cache Mode (Single BBU), Write Cache Mode (Single HD), Hot Spare Mode, Controller Host Type, Disk Array Series, Product Code, Subsystem Category, Convert Flag
Access Control Information	Displays information about Access Control Information. <Access Control Information> Access Control Mode <Port Information> Port No., Port Name, Port State, Port Mode <Port List>, <LD/Port List> Port No., Port Name, Port State, Port Mode <Port/LD List> LDN, OS Type, LD Name <WWN Information> Platform, LD Set Name, WWPN List <WWN List>, <LD/WWN List> Platform, LD Set Name, Path Count <WWN/LD List> LUN, LDN, OS Type, LD Name <LD Set List> Platform, LD Set Name, Path Count, LD Count <LD Set Information> Platform, LD Set Name, Path List <LUN/LD List> LUN, LDN, OS Type, LD Name
LD Administrator Information	Displays information about LD Administrator. <Reallocation Control Information> Inaccessible LD Total Capacity <LD Set Capacity Information> Platform, LD Set Name, Capacity <Preserve Group Information> Group Total Capacity, Purpose, Purpose Total Capacity, LDN, OS Type, LD Name, RANK, Pool No., RAID, Capacity <Reserve Group Information> Group Total Capacity, Purpose, Purpose Total Capacity, LDN, OS Type, LD Name, RANK, Pool No., RAID, Capacity
Cache Partitioning Information	Displays information about cache partitioning. <Cache Partitioning Detail Information> Cache Partitioning Mode, Allocatable Cache Capacity, Total Allocated Capacity, Total Unallocated Capacity, Total Minimum Capacity,

Display Item	Description
	Current Segment Count, Allocatable Segment Count <Cache Segment List> Number, Segment Name, Max. Capacity, Min. Capacity, Allocated Capacity <Cache Segment Detail Information> Segment Number, Segment Name, Maximum Capacity, Minimum Capacity, Allocated Cache Capacity, LD Count, Total LD Capacity <Cache Segment/LD List> LDN, OS Type, LD Name

5.5.1 Start/Termination of the iSMview Command

(1) Start of the iSMview command

To start the command, enter iSMview in the command line.

If an option is omitted, the program version and the usage are displayed as shown below.

```
iSMview Version n.n.nnn

Usage : iSMview -d      [<Disk Array Name>]
        iSMview -l      <Disk Array Name>
        iSMview -ln     <Disk Array Name> {<LDN> | <OS Type:LD Name>}
        iSMview –sl     <Disk Array Name>
        iSMview –sln    <Disk Array Name> {<LDN> | <OS Type:LD Name>}
        iSMview -r      <Disk Array Name>
        iSMview -rn     <Disk Array Name> <PDG>-<RANK>
        iSMview -pl     <Disk Array Name>
        iSMview -pln    <Disk Array Name> <Pool Number>
        iSMview -plm    <Disk Array Name> <Pool Name>
        iSMview -spl    <Disk Array Name>
        iSMview -spln   <Disk Array Name> <Pool Number>
        iSMview -splm   <Disk Array Name> <Pool Name>
        iSMview -h      <Disk Array Name>
        iSMview -hn     <Disk Array Name> <PDG>-<PDN>
        iSMview -c      <Disk Array Name>
        iSMview -cn     <Disk Array Name> <Abbreviated Name> <Resource Number>
        iSMview -e      <Disk Array Name>
        iSMview -en     <Disk Array Name> <Abbreviated Name> <Resource Number>
        iSMview -p      <Disk Array Name>
        iSMview -a      <Disk Array Name>
        iSMview -an     <Disk Array Name> {<LDN> | <OS Type>:<LD Name>}
        iSMview -ap     <Disk Array Name> {<Port Name> | <Port Number>}
        iSMview -aw     <Disk Array Name> <LD Set Type>:<LD Set Name>
        iSMview -ac     <Disk Array Name> <LD Set Type>:<LD Set Name>
        iSMview -ra     <Disk Array Name>
        iSMview -cp     <Disk Array Name>
        iSMview -cpn    <Disk Array Name> <Segment Number>
        iSMview -cpm    <Disk Array Name> <Segment Name>
        iSMview -all    <Disk Array Name>
```

* The above is a display sample. The actual program version is displayed.

(2) Termination of the iSMview command

When the iSMview command terminates normally, items for the specified options are displayed.

5.5.2 iSMview Command Options

This section explains the functions of the iSMview command and the corresponding options.

- -d option: Lists the information of the target disk array. To display the detailed information of the disk array, specify Disk Array Name.
  For details, refer to (1) “Display of a disk array list” and (2) “Display of detailed information about a specified disk array”.
- -l option: Displays information about the LDs of a specified disk array.
  For details, refer to (3) “List of logical disk information”.
- -ln option: Displays detailed information about a specified LD.
  For details, refer to (4) “Display of detailed logical disk information”.
- -sl option: Displays list information of snapshots about the specified LD.
  For details, refer to (5) “Display of snapshot list information about a logical disk”.
- -sln option: Displays snapshot detailed information about the specified LD.
  For details, refer to (6) “Display of snapshot detailed information about a logical disk”.
- -r option: Displays information about the RANKs of a specified logical disk.
  For details, refer to (7) “List of RANK information”.
- -rn option: Displays detailed information about a specified RANK.
  For details, refer to (8) “Display of detailed RANK information”.
- -pl option: Displays detailed pool information about a specified disk array.
  For details, refer to (9) “List of pool information”.
- -pln option: Displays detailed information about a specified pool.
  For details, refer to (10) “Display of detailed pool information”.
- -plm option: Displays detailed information about a specified pool.
  For details, refer to (10) “Display of detailed pool information”.
- -spl option: Displays information about snapshot pool of the specified disk array.
  For details, refer to (11) “List of snapshot pool”.
- -spln option: Displays snapshot detailed information about the specified pool.
  For details, refer to (12) “Display of snapshot detailed information about pool”.
- -splm option: Displays snapshot detailed information about the specified pool.
  For details, refer to (12) “Display of snapshot detailed information about pool”.
- -h option: Displays information about the PDs of a specified disk array.
  For details, refer to (13) “List of physical disk information”.
- -hn option: Displays detailed information about a specified PD.
  For details, refer to (14) “Display of detailed physical disk information”.
- -c option: Displays information about the controllers of a specified physical disk.
  For details, refer to (15) “Display of controller information about a specified disk array”.
- -cn option: Displays detailed information about a specified controller in a specified disk array.
  For details, refer to (16) “Display of detailed information about a specified controller in a specified disk array”.
- -e option: Displays information about the disk enclosures of a specified disk array.
  For details, refer to (17) “Display of disk enclosure information”.

- -en option: Displays detailed information about a specified disk enclosure in a specified disk array.
  For details, refer to (18) “Display of detailed information about a specified disk enclosure”.
- -p option: Displays information about the ports of a specified disk array.
  For details, refer to (19) “Display of port information”.
- -a option: Displays information about the access control of a specified disk array.
  For details, refer to (20) “Display of access control information about a specified disk array”.
- -an option: Displays information about the access control of a specified LD.
  For details, refer to (21) “Display of LD access control information”.
- -ap option: Displays information about access control (PORT mode) of a specified port.
  For details, refer to (22) “Display of information about port access control (PORT mode)”.
- -aw option: Displays information about the access control (WWN mode) of a specified LD Set.
  For details, refer to (23) “Display of information about LD Set Access Control (WWN mode)”.
- -ac option: Displays information about the access control of a specified LD Set.
  For details, refer to (24) “Display of information about LD Set Access Control”.
- -ra option: Displays information about LD Administrator of a specified disk array.
  For details, refer to (25) “Display of information about LD Administrator of a disk array”.
- -cp option: Displays information about cache partitioning of a specified disk array.
  For details, refer to (26) “Display of information about cache partitioning of a disk array”.
- -cpn option: Displays information about cache partitioning of a specified segment number.
  For details, refer to (27) “Display of information about cache partitioning of a segment”.
- -cpm option: Displays information about cache partitioning of a specified segment name.
  For details, refer to (27) “Display of information about cache partitioning of a segment”.
- -all option: Displays all information about a target disk array.
  For details, refer to (28) “Display of all configuration information”.

(1) Display of a disk array list

If only the -d option is specified, the system displays a list of connected target disk array systems.

```
#iSMview -d
--- Disk Array List ---
Product ID          Disk Array Name   Resource State   Monitoring
S2110 Disk Array    Storage001        ready            running
S4100 Disk Array    Storage002        attn.            stop
S4100 Disk Array    Storage003        fault            stop
                                                       (fault)
```

The display items are as follows:

(1) Disk Array List

Lists information about target disk arrays.

Product ID: Displays the model names of the target disk arrays.

Disk Array Name: Displays the individual names of the target disk arrays.

Resource State: Displays one of the following indicating the highest-level one of events that have occurred in the disk array and the resources:

- ready: Normal (The disk array and all the resources are in normal state.)
- attn.: Attention (An event which may affect operation has occurred.)
- fault: Abnormal (An event that affects operation has occurred.)

Monitoring: Displays one of the following as the monitoring state of the disk array:

- running: The disk array is to be monitored.
- starting: The disk array is in the monitoring start processing.
- stopping: The disk array is in the monitoring stop processing.
- stop: The disk array is not to be monitored.
- stop(fault): Information about the disk array cannot be obtained for some reason, and the monitoring of the disk array has stopped.
- stop(maint): The monitoring of the disk array has stopped, and the disk array is to be maintained by the maintenance tool. ("(Maintenance)" is shown in the detailed information of the target disk array.)
- stop(config.): The monitoring of the disk array has stopped, and the configuration setting is in progress. ("(Configuration)" is shown in the detailed information of the target disk array.)
- wait recovery: The disk array is waiting for the recovery of the monitoring function.

* "attn." or "fault" displayed in the column "Resource State" indicates that the disk array has encountered an event.
  "stop(fault)" displayed in the column "Monitoring" indicates that the information of the disk array could not be obtained normally.
* If the iSM server recognizes a disk array which is not in any of the above monitoring states, "???" is displayed in the column "Monitoring".
* Refer to 3.3 "Nickname Setting" for details on the setting of Disk Array Name.
  Refer to 3.2 "State Monitoring" for details on the setting for the monitoring function to start/stop monitoring the disk array status.

(2) Display of detailed information about a specified disk array

If Disk Array Name is specified in the -d option, the system displays detailed information about the specified disk array.

```
#iSMview -d Storage003

--- Disk Array Detail Information ---
Disk Array Name                    : Storage003
Resource State                     : fault
Monitoring                         : stop(fault)
Vendor ID                          : XXX
Product ID                         : S4300 Disk Array
Product FW Revision                : 0730
Serial Number                      : 00001234
SAA                                : 02003000000000000002000000000000
                                     00000000000000000000000000
 World Wide Name                   : 200000004C517D00
 Total Capacity                    : 1.333TB
 User System Code                  : 0123456789
 Storage Control Software Revision : 0211

--- Disk Array Control Mode ---
Cross Call Mode                    : on
Auto Assignment Mode               : off
Auto Repair Mode                   : on
Auto Time Setup Mode               : on

--- Access Control Information ---
Access Control Mode                : on

--- Control Path ---
Path No.(h)                        : 00
Control Path                       : 127.0.0.1
Path State                         : ready

Path No.(h)                        : 01
Control Path                       : ---
Path State                         : ---

--- Expand LUN ---
Port No.(h)  Exist  Expand LUN
00-00        yes    on
00-01        no     ---
01-00        yes    on
01-01        no     ---

--- Cache Partitioning Information ---
Cache Partitioning Mode      : on

--- Product Information ---
Product                                                    State
NEC Storage BaseProduct Ver3.1(Dir1,2)                     : available
NEC Storage BaseProduct Ver2.1(Dir3,4)                     : available
NEC Storage BaseProduct Ver2.1(Dir5,6)                     : available
NEC Storage BaseProduct Ver2.1(Dir7,8)                     : available
NEC Storage AccessControl(144Connection)                   : available
NEC Storage CachePartitioning(10TB)                        : available
NEC Storage DynamicDataReplication Ver2(10TB)              : available
NEC Storage PerformanceOptimizer(10TB)                     : available
NEC Storage RemoteDataReplication Ver2(10TB)               : available
NEC Storage RemoteDataReplication/DisasterRecovery(10TB)   : available
NEC Storage PerformanceMonitor                             : available
NEC Storage ReallocationControl                            : available
```

The display items are as follows:

(1) Disk Array Detail Information

Displays the detailed information of the specified disk array.

Disk Array Name:	Individual name of the disk array
Resource State:	Status of the disk array and resources For details, refer to (1) “Display of a disk array list”.
Monitoring:	Monitoring state of the disk array For details, refer to (1) “Display of a disk array list”.
Vendor ID:	ID of the disk array’s supplier
Product ID:	Model name of the disk array
Product FW Revision:	Information about the version of the disk array
Serial Number:	Product number of the disk array
SAA:	SAA of the disk array
World Wide Name:	Worldwide name of the disk array
Total Capacity:	Total capacity of the physical disks
User System Code:	User system code * If the target disk array is not supported, “0000000000” is displayed.
Storage Control Software Revision:	Revision of storage control software

* Refer to 3.3 “Nickname Setting” for details on the setting of Disk Array Name.
  Refer to 3.2 “State Monitoring” for details on the setting for the monitoring function to start/stop monitoring the disk array status.

(2) Disk Array Control Mode

Displays the values set for the specified disk array.

Cross Call Mode:	Indicates that the Cross Call mode is on/off.
Auto Assignment Mode:	Indicates that the Auto Assignment mode is on/off.
Auto Repair Mode:	Indicates that the Auto Repair mode is on/off.
Auto Time Setup Mode:	Indicates that the Auto Time Setup mode is on/off.

(3) Access Control Information

Displays access control information.

Access Control Mode:	Indicates that the Access Control mode is on/off.

(4) Control Path

Displays information about the paths to which the disk array is connected.

Path No.(h):	Indicates the path number.
Control Path:	Indicates the control path. The IP address (with LAN connection) or the FC path name is displayed. “-” is displayed if there is no path to which the current path is switched when a failure occurs.
Path State:	Indicates either of the following as the path state: ready: Normal state fault: Abnormal state (blockade)

(5) Expand LUN

Displays the installation status of each port and the status (on/off) of the Expand LUN function.

Port No.(h): Indicates the HD number and port number.

Exist: Indicates yes/no as the port installation status.

Expand LUN: Indicates that the Expand LUN function is on/off.

* The status of the Expand LUN function is displayed for only the disk arrays of the 100/1100/1200/1300/2100/2200/2300 series.
* "---" is displayed in the column "Expand LUN" if the port is not installed.

(6) Cache Partitioning Information

Cache Partitioning Mode: Indicates the status (on/off) of cache partitioning mode.

(7) Product Information

Displays the status of each function.

Product: Indicates the licenses granted for the disk array.

NEC Storage BaseProduct:	Indicates that the license to use BaseProduct has been granted.
NEC Storage AccessControl:	Indicates that the license to use AccessControl has been granted.
NEC Storage AccessControl(WWN):	Indicates that the license to use AccessControl(WWN) has been granted.
NEC Storage CachePartitioning:	Indicates that the license to use CachePartitioning has been granted.
NEC Storage DynamicDataReplication:	Indicates that the license to use DynamicDataReplication has been granted.
NEC Storage DynamicSnapVolume:	Indicates that the license to use DynamicSnapVolume has been granted.
NEC Storage PerformanceOptimizer:	Indicates that the license to use PerformanceOptimizer has been granted.
NEC Storage RemoteDataReplication:	Indicates that the license to use RemoteDataReplication has been granted.
NEC Storage RemoteDataReplication/DisasterRecovery:	Indicates that the license to use RemoteDataReplication/DisasterRecovery has been granted.
NEC Storage PerformanceMonitor:	Indicates that the license to use PerformanceMonitor has been granted.
NEC Storage ReallocationControl:	Indicates that the license to use ReallocationControl has been granted.

State: Indicates the availability of the individual products.

available:	The product can be used.
not available:	The product cannot be used.

* If a specified disk array is not supported, detailed information is not displayed.

* If no disk arrays exist, the error message as shown below is displayed.

```
iSM11162:Disk Array Subsystem which can be operated by this program is not found.
```

* If a specified disk array does not exist, the error message as shown below is displayed.

```
iSM11163:Specified Disk Array Subsystem is not found.
```

(3) List of logical disk information

If the -l option is specified, the system lists information about the LDs of a specified disk array.

```
#iSMview -l Storage001
--- LD Information ---
LDN(h)  OS Type        LD Name          LD State
0000    NX             nxsvr/c10t0d0    ready
0001    NX             nxsvr/c10t0d1    ready
0002    NX             nxsvr/c10t0d2    ready
```

The display items are as follows:

(1) LD Information

Lists the information of all logical disks bound in the specified disk array.

LDN(h): LD number

OS Type: Displays one of the following indicating the type of OS used with each LD, which is obtained from the disk array.

- A4: Logical disk operated by the ACOS4 system
- A2: Logical disk operated by the ACOS2 system
- NX: Logical disk operated by the HP-UX system
- WN: Logical disk operated by the Windows system
- CX: Logical disk operated by the Solaris system
- LX: Logical disk operated by the Linux system
- AX: Logical disk operated by the AIX system

LD Name: Arbitrary ID information (logical disk name) of each LD, which is obtained from the disk array

LD State: Displays one of the following as the operating state of each LD.

ready:	All the PDs making up the LD are in normal state.
ready(formatting):	The logical disk is being formatted. (The LD is available.)
attn.(reduce):	A failing PD has been disconnected (reduced).
attn.(rebuilding):	The rebuilding of data is in progress.
attn.(copy back):	A spare disk is being copied in redundant state.
attn.(preventive copy):	Preventive exchange assignment processing is in progress.
attn.(unformatted):	The logical disk has not been formatted.
attn.(formatting):	The logical disk is being formatted. (The LD is unavailable.)
attn.(format-fail):	A format error has occurred.
attn.(expanding):	Logical expansion processing is in progress.
attn.(expand-fail):	A logical expansion error has occurred.
fault:	A functional error has occurred.
fault(media error):	A medium error has occurred.

* If no LDs have been bound in a specified disk array, the error message as shown below is displayed.

```
iSM11173:LD doesn't exist.
```

* Refer to 3.3 "Nickname Setting" for details on the settings of OS Type and LD Name (logical disk name).

(4) Display of detailed logical disk information

If the -ln option is specified, the system displays detailed information about a specified logical disk.

```
#iSMview -ln Storage002 00
--- LD Detail Information ---
LDN(h)                  : 0000
OS Type                 : NX
LD Name                 : nxsvr/c10t0d0
LD Capacity             : 2.1GB(2,254,857,830Bytes)
Pool No.(h)             : 0000
Pool Name               : Pool0000
RaidType                : RAID1
LD State                : ready
Expansion State         : ---
Group                   : Reserve
Purpose                 : ---
RPL Attribute           : MV
Snapshot Attribute      : BV
Current Owner           : 00/01
Default Owner           : 00
Cache Resident          : no
PD List(h)              : 00-00,01,02,03
Segment Number(h)       : 00
Segment Name            : Default

--- LD/Port List ---
Port No.(h)     Port Name                       Port State    Port Mode
00-00           10000000000000130100            ready         Port

--- LD/WWN List ---
Platform    LD Set Name       Path Count
WN          WIN_SET                    2
NX          NX_SET                     3

--- LD Set List ---
Platform    LD Set Name       Path Count    LD Count
WN          WIN_SET                    2           2
LX          LIN_SET                    4          16
```

The display items are as follows:

(1) LD Detail Information

Displays the detailed information of a specified LD.

LDN(h): Logical disk number

OS Type: Type of OS used with each LD. For details, refer to (3) "List of LD information".

LD Name: Arbitrary ID information (logical disk name) of each LD, which is obtained from the disk array

LD Capacity: Capacity of the LD

Progress Ratio: Percentage of progress
The system displays this item only when “LD State” indicates attn. (rebuilding, copy back, preventive copy, formatting, or expanding), and does not display the item in any other cases.

RANK(h): Rank number. RANK(h), and Pool No.(h) and Pool Name are mutually exclusive.

Pool No.(h): Pool number

Pool Name: Pool name

RaidType: RAID type of the LD

LD State: Operating state of the LD
For details, refer to (3) “List of LD information”.

Expansion State: Pool expansion state. (LD expansion is displayed by LD State.)

---:	Pool expansion has not been performed or has terminated normally.
expanding:	Pool expansion is in progress.
expand-fail:	Pool expansion has failed.

Group: Usage of LD. Displays one of the following.

Preserve:	LD for preserve groups
Reserve:	LD for reserve groups
---:	LD not set for a group

Purpose: Attribute of LD. Displays one of the following.

RPL:	Logical disk for which only pair setting for replication is made
Snapshot:	Logical disk for which only snapshot setting is made (BV)
Link Volume:	Logical disk that is a link-volume (LV)
RPL/Snapshot:	Logical disk for which a pair setting for replication and snapshot setting have already been made
Optimization :	Work disk for optimizing performance
---:	General logical disk for which no specific usage is set

RPL Attribute: RPL type. Displays one of the following.

MV:	MV
RV:	RV
RV/MV:	Volume that can be both RV and MV
IV:	Volume for which a pair is not set
---:	Volume that is not targeted for replication

Snapshot Attribute: Snapshot type. Displays one of the following.

BV:	BV (Volume from which snapshot is copied)
SV:	SV (Volume storing information used to manage difference of BV at some point in time)
LV:	LV (Virtual volume linking a BV or SV and accessing it indirectly)
SDV:	SDV (Special logical disk configuring snapshot reserve area (SRA))
SV*:	Volume that is a type of snapshot volumes and does not have information used to manage difference of BV
---:	Volume that is not a snapshot target

Current Owner: Indicates the number of the host director that has the current ownership for the target LD. If the Cross Call mode of the disk array is on, two host director numbers are displayed.

Default Owner: Indicates the number of the host director that has the initial ownership for the target LD.

Cache Resident: If the LD is a cache resident disk, “yes” is displayed. If it is a general disk, “no” is displayed.
PD List(h): Lists the PDs making up the target LD.
Segment Number(h): Indicates the number of the cache segment to which a target LD belongs.
Segment Name: Indicates the name of the cache segment to which a target LD belongs.

* A 1-digit number (0) can be specified as a logical disk number.
* Current Owner and Default Owner are displayed for the disk arrays of the 100/1100/1200/1300/2100/2200/2300 series.
* Cache Resident is displayed for only the disk arrays of the 3000/4000 series and the disk arrays with pool.
* Refer to 3.3 “Nickname Setting” for details on the setting of OS Type and LD Name.

(2) LD/Port List

Lists information about the access control (PORT mode) of the specified LD.
Port No.(h): Director number and port number
Port Name: Port name
Port State: Port state
Port Mode: Port mode

* If LD/Port List does not exist, the above information is not displayed.
* LD/Port List is displayed for only the disk arrays of the 1100/1200/2100/2200/3100/4100 series.

(3) LD/WWN List

Lists information about the access control (WWN mode) of the specified LD.
Platform: Platform
LD Set Name: LD Set name
Path Count: Number of paths

* LD/WWN List is displayed for only the disk arrays of the 1100/1200/2100/2200/3100/4100 series.
* If LD/WWN List does not exist, the above information is not displayed.

(4) LD Set List

Lists information about the LD Set of the specified LD.
Platform: Platform
LD Set Name: LD Set name
Path Count: Number of paths
LD Count : Number of LDs

* LD Set List is displayed for only the disk arrays of the 100/1300/2300/2800/3300/4300 series.
* If LD Set List does not exist, the above information is not displayed.
* If a specified LD does not exist, the error message as shown below is displayed.

```
iSM11173:LD doesn’t exist.
```

* Refer to 3.3 “Nickname Setting” for details on the setting of Port Name.

(5) Display of snapshot list information about a logical disk

If the -sl option is specified, the system displays snapshot list information of logical disks about the specified disk array.

```
# iSMview -sl Storage001

--- Snapshot LD Information ---
LDN(h)  OS Type   LD Name          Snapshot Attribute
0000    NX        LD0000           BV
0001    NX        LD0001           SV
0002    NX        LD0002           LV

#
```

The displayed items are as follows:

(1) Snapshot LD Information

Lists information of all the LDs bound in the disk array.

LDN(h): LD number

OS Type: Displays the OS type for each LD.

LD Name: Arbitrary identification information (logical disk name) for each LD acquired from the disk array

Snapshot Attribute: Snapshot volume type

* If no snapshot LD is bound in the disk array, the error message as shown below is displayed.

```
11184 Snapshot LD doesn't exist.
```

(6) Display of snapshot detailed information about a logical disk

If the -sln option is specified, the system displays snapshot detailed information about the specified LD.

```
# iSMview -sln Storage001 0001h

--- Snapshot LD Detail Information ---
LDN(h)                : 0001
OS Type               : NX
LD Name               : Snap_BV0001
LD Capacity           : 11.5GB
Snapshot  Attribute   : BV

--- Snapshot LD List ---
LDN(h)   OS Type   LD Name          Snapshot Attribute
0002     NX        LD00002          SV
0003     NX        LD00003          LV

#
```

The displayed items are as follows:

(1) Snapshot LD Detail Information

Displays detailed information about the specified LD.

LDN(h): LD number

OS Type: Displays the OS type for each LD.

LD Name: Arbitrary identification information (logical disk name) for each LD acquired from the disk array

LD Capacity: LD capacity

Snapshot Attribute: Snapshot volume type

BV: Base-volume (Volume from which snapshot is replicated)

SV: Snapshot-volume (Volume storing information used to manage difference of BV at some point in time)

LV: Link-volume (Virtual volume linking a BV or SV and having indirect access)

SV*: A type of snapshot-volume with no information to manage difference of BV

(2) Snapshot LD List/Link Control LD List

Displays LD information linked with the specified LD.

LDN(h): LD number

OS Type: Displays the OS type for each LD.

LD Name: Arbitrary identification information (logical disk name) for each LD acquired from the disk array

Snapshot Attribute: Snapshot volume type

BV: Base-volume (Volume from which snapshot is replicated)

SV: Snapshot-volume (Volume storing information used to manage difference of BV at some point in time)

LV: Link-volume (Virtual volume linking a BV or SV and having indirect access)

SV*: A type of snapshot-volume with no information to manage difference of BV

(7) List of RANK information

If the -r option is specified, the system lists information about the RANKs of a specified disk array.

```
#iSMview -r Storage001
--- RANK Information ---
RANK No.(h)        RaidType        RANK State
00-00              RAID5(4+P)      ready
00-01              RAID5(4+P)      attn.(reduce)
```

The display items are as follows:

(1) RANK Information

Lists information of all the RANKs bound in the disk array.

RANK No.(h): RANK number

Raid Type: RAID type of each RANK

RANK State: RANK state

ready: The RANK is in normal state.

attn.(reduce): A failing PD has been disconnected (reduced).

attn.(rebuilding):	The rebuilding of data is in progress.
attn.(copy back):	A spare disk is being copied in redundant state.
attn.(preventive copy):	Preventive exchange assignment processing is in progress.
attn.(expanding):	Logical expansion processing is in progress.
attn.(expand-fail):	A logical expansion error has occurred.
fault:	A functional error has occurred.
fault(media error):	A medium error has occurred.

* RANK Information is displayed only for other than the disk arrays with pool.

* If no RANKs exist in a specified disk array, the error message as shown below is displayed.

```
iSM11172:RANK doesn't exist.
```

(8) Display of detailed RANK information

If the -rn option is specified, the system displays detailed information about a specified RANK.

```
#iSMview -rn Storage001 00-00
--- RANK Detail Information ---
RANK No.(h)       : 00-00
RaidType          : RAID5(4+P)
RebuildTime       : 10hour (s)
RANK State        : attn.(rebuilding)
RANK Capacity     : 66.5GB
Progress Ratio    : 12%
PD List(h)        : 00-00,01,02,03,04

--- Partition List ---
Start Address(h)    End Address(h)    Capacity    LDN(h)
00000000            00ffffff          8192MB      0000
01000000            0100ffff          32MB        free
01010000            01ffffff          8160MB      0002
```

The display items are as follows:

(1) RANK Detail information

Displays the detailed information of the specified RANK.

RANK No.(h):	RANK number
RaidType:	RAID type of the RANK For details, refer to (6) "List of RANK information".
RebuildTime:	Time for rebuilding the RANK
RANK State:	RANK state
RANK Capacity:	Capacity of the RANK
Progress Ratio:	Percentage of progress The system displays this item only when "RANK State" indicates attn. (rebuilding, copy back, preventive copy, or expanding), and does not display the item in any other cases.
PD List(h):	List of the PDs making up the target RANK

(2) Partition List

Lists information about the partitions of the specified RANK.

Start Address(h): Start address of the LD or free area

End Address(h): End address of the LD or free area

Capacity: LD capacity in units of MBs

LDN(h): The logical disk number is displayed in format of LD No.
"free" is displayed if the LD has not been bound.

* Partition List is displayed only for other than the disk arrays with pool.

* If a specified RANK does not exist, the error message as shown below is displayed.

```
iSM11172:RANK doesn't exist.
```

(9) List of pool information

If the -pl option is specified, the system lists information about the pools of a specified disk array.

```
#iSMview –pl Storage001
--- Pool Information ---
Pool No.(h)  Pool Name        Pool Type  Pool State
0000         Pool01           basic      ready
0001         Pool02           dynamic    attn.(preventive copy)
```

The display items are as follows:

(1) Pool Information

Lists the information of all pools bound in the specified disk array.

Pool No.(h): Pool number

Pool Name: Pool name

Pool Type: Pool type

basic: Basic pool

dynamic: Dynamic pool

Pool State: Pool state

ready: The pool is in normal state.

attn.(reduce): The failing PD has been disconnected (reduced).

attn.(rebuilding): The rebuilding of data is in progress.

attn.(copy back): A spare copy is being copied in redundant state.

attn.(preventive copy): Preventive exchange assignment processing is in progress.

fault: A functional error has occurred.

* Pool State is displayed only for the disk arrays with pool.

* If no pools exist, the error message as shown below is displayed.

```
iSM11182:Pool doesn't exist.
```

(10) Display of detailed pool information

If the -pln or -plm option is specified, the system displays detailed information about a specified pool.

```
#iSMview -pln Storage001 00
--- Pool Detail Information ---
Pool No.(h)             : 0000
Pool Name               : Pool01
Pool Type               : dynamic
RAID Type               : RAID6(4+PQ)
Pool State              : ready
Expansion State         : expanding
Progress Ratio          : 75%
Rebuild Time(hour)      : 1
Expansion Time(hour)    : 2
Pool Capacity           : 66.5GB(71,403,831,296Bytes)
Used Pool Capacity      : 4.1GB(4,466,933,760Bytes)
Free Pool Capacity      : 62.3GB(66,936,897,536Bytes)
PD List(h)              : 00-00,01,02,03,04,05
Expanding PD List(h)    : 00-07

--- Partition List ---
Start Address(h)    End Address(h)    Capacity(GB)    LDN(h)
---                 ---                        2.0    0000
---                 ---                        2.0    0001
---                 ---                       62.3    free
```

The display items are as follows:

(1) Pool Detail Information

Displays the detailed information of the specified pool.

Pool No.(h): Pool number

Pool Name: Pool name

Pool Type: Pool type

basic: Basic pool

dynamic: Dynamic pool

RAID Type: RAID type of the pool

Pool State: Pool state

For details, refer to (8) “List of pool information”.

Expansion State: Pool expansion state

---: Pool expansion has not been performed or has terminated normally.

expanding: Pool expansion is in progress.

expand-fail: Pool expansion has failed.

Progress Ratio: Percentage of progress of pool expansion

Rebuild Time(hour): Target time for rebuilding the pool

Expansion Time(hour): Target time for expanding the pool

Pool Capacity: Capacity of the pool

Used Pool Capacity: Space used by the pool

Free Pool Capacity: Free space not used by the pool

PD List(h): List of PDs making up the target pool

Expanding PD List(h): List of expanding PDs

(2) Partition List

Lists information about the partitions of the specified pool.

Start Address(h): Start address of the LD or free area

End Address(h): End address of the LD or free area

Capacity(GB): LD capacity in units of GBs.

LDN(h): The logical disk number is displayed in format of LD No. "free" is displayed if the LD has not been bound.

* Partition List is displayed only for the disk arrays with pool.

* If a specified pool does not exist, the error message as shown below is displayed.

```
iSM11182:Pool doesn't exist.
```

(11) List of snapshot pool

If the -spl option is specified, the system lists information about the snapshot pool of the specified disk array.

```
#iSMview –spl Storage001

--- Snapshot Pool Information ---
Pool No.(h) Pool Name          Threshold
0000        Pool000            ---
0001        Pool001            ---
0002        Pool002            exceeded
```

(1) Snapshot Pool Information

Lists the snapshot pool bound in the disk array.

Pool No.(h): Pool number

Pool Name: Pool name

Threshold: Threshold state

exceeded: The snapshot used capacity exceeds the threshold.

---: The snapshot used capacity does not exceed the threshold.

* If no snapshot pool exists, the error message as shown below is displayed.

```
11183 Snapshot Pool doesn't exist.
```

(12) Display of snapshot detailed information about pool

If the -spln or -splm option is specified, the system displays snapshot detailed information about the specified pool.

```
# iSMview -spln Storage001 0

--- Snapshot Pool Detail Information ---
Pool No.(h)                : 0001
Pool Name                  : Pool0001
Pool Type                  : dynamic
Threshold                  : ---
Total Snapshot Capacity    : 66.0GB
                             70,866,960,384Bytes
Used Snapshot Capacity     : 0.0GB(0%)
                             0Bytes
Snapshot Threshold         : 52.7GB(80%)
                             56,693,568,000Bytes
Snapshot Control Capacity : 2.0GB
                             2,148,532,224Bytes

--- SDV List ---
LDN(h)  OS Type    LD Name                    LD Capacity
0380               Pool0000_SDV0380           22.0GB
```

(1) Snapshot Pool Detail Information

Displays detailed information about snapshot of the pool.

Pool No.(h):	Pool number
Pool Name:	Pool name
Pool Type:	Pool type
Threshold:	Threshold state
Total Snapshot Capacity:	Capacity of the snapshot reserve area
Used Snapshot Capacity:	Space used for snapshot
Snapshot Threshold:	Snapshot threshold
Snapshot Control Capacity:	Space used for controlling snapshot

(2) SDV List

Lists snapshot areas belonging to the specified pool.

LDN(h):	LD number
OS Type:	Displays the OS type for each LD.
LD Name :	Arbitrary identification information (logical disk name) for each LD acquired from the disk array
LD Capacity:	Capacity of LD

* If the specified snapshot pool does not exist, the error message as shown below is displayed.

```
11183 Snapshot Pool doesn't exist.
```

(13) List of physical disk information

If the -h option is specified, the system lists information about the PDs of a specified disk array.

```
#iSMview -h Storage001
--- PD List ---
PDN(h)      PD State          Classification
00-00       ready             data
00-01       info. (inactive)  data
00-02       ready             data
00-03       ready             data
00-04       ready             not set
00-05       ready             not set
00-06       ready             not set
00-07       ready             not set
```

The display items are as follows:

(1) PD List

Lists the information of all PDs bound in the specified disk array.

PDN(h): Physical disk number

PD State: Operating state of each PD

- ready: The PD is in normal state.
- attn.(powering up): The PD is being activated.
- attn.(rebuilding): The PD is being rebuilt.
- attn.(formatting): The PD is being formatted.
- info.(inactive): The PD is under preventive maintenance.
- fault: The PD is in abnormal state.

Classification: Classification of the PD

- data: The target PD is available as a data area.
- spare: The target PD is a hot spare disk.
- not set: The target PD is not set as “data” or “spare”.

* If no PDs exist in a specified disk array, the error message as shown below is displayed.

```
iSM11174:PD doesn’t exist.
```

0

(14) Display of detailed physical disk information

If the -hn option is specified, the system displays detailed information about a specified PD.

```
#iSMview -hn Storage001 00-00
--- PD Detail Information ---
PDN(h)              : 00-01
Classification      : data
State               : info. (inactive)
PD Capacity         : 17.8GB
Progress Ratio      : 75%
Vendor ID           : SEAGATE
Product ID          : ST373405FC
Product Revision    : 0002
Serial Number       : 3EK0KC5E000072119ZFK
LD List(h)          : 0002(LND0)
                    : 0003(LND2)
```

The display items are as follows:

(1) PD Detail Information

Displays the detailed information of the specified PD.

PDN(h): Physical disk number

Classification: Classification of the PD

- data: The target PD is available as a data area.
- spare: The target PD is a hot spare disk.
- not set: The target PD is not set as “data” or “spare”.

State: Operating state of the PD

For details, refer to (12) “List of physical disk information”.

PD Capacity: Capacity of the PD

Progress Ratio: Percentage of progress of pool rebuilding

Vendor ID: ID of the product supplier

Product ID: Model name of the product

Product Revision: Information about the product version

Serial Number: Product number

LD List(h): List of the LDs consisting of the target PD, which is displayed in format of LD No. (LD Name).

* If a specified PD does not exist, the error message as shown below is displayed.

```
iSM11174:PD doesn’t exist.
```

(15) Display of controller information about a specified disk array

If the -c option is specified, the system displays information about the controllers of a specified disk array.

```
#iSMview -c Storage002
--- Controller Information ---
Type                Abbr. Name      No.(h)  State   Info.
BC Junction Box     BC_JB           00      ready
BC Junction Box     BC_JB           01      ready
Power Supply        DAC_PS          00      ready
Power Supply        DAC_PS          01      ready
Battery             DAC_BBU         00      ready
Battery             DAC_BBU         01      ready
FAN                 DAC_FANU        00      ready
FAN                 DAC_FANU        01      ready
FAN                 DAC_FANL        00      ready
FAN                 DAC_FANL        01      ready
Temperature         DAC_TEMP_ALM    00      ready
Temperature         DAC_TEMP_ALM    01      ready
Host Director       HD              00      ready   Port No.:00 FC
Host Director       HD              01      ready   Port No.:00 FC
Disk Director       DD              00      ready   Port No.:00,01
Disk Director       DD              00      ready   Port No.:00,01
Replication Director RD             00      ready   Port No.:00,01,02,03
Replication Director RD             01      ready   Port No.:00,01,02,03
Cache Module        CHE             00      ready   512.0MB
Cache Module        CHE             01      ready   512.0MB
Service Processor   SVP             00      ready
Back Board          DAC_BB          00      ready
Panel               PANEL           00      ready
Power Control Card  PCC             00      ready
Maintenance PC      MAINTE_PC       00      ready
```

The display items are as follows:

(1) Controller Information

Type: Displays one of the following as the resource type:

- Back Board: Backboard
- Battery: Battery
- BC Junction Box: Junction box of the basic cabinet
- Cache Module: Cache module
- Disk Director: Disk director
- FAN: Fan (upper/lower)
- Host Director: Host director
- Panel: Panel
- Power Control Card: Power control card
- Power Supply: Power supply
- Replication Director: Replication director
- Service Processor: Service processor
- Maintenance PC: Maintenance PC
- Temperature: Temperature sensor
- Management Processor: Management Processor
- Ethernet HUB: Ethernet HUB

Abbr. Name: Indicates the abbreviations of resources.

BC_JB:	BC Junction Box
CHE:	Cache module
DAC_BB:	Backboard
DAC_BBU:	Battery
DAC_FANL:	Fan (lower)
DAC_FANU:	Fan (upper)
DAC_PS:	Power supply
DAC_TEMP_ALM:	Temperature sensor
DD:	Disk director
HD:	Host director
MAINTE_PC:	Maintenance PC
PANEL:	Panel
PCC:	Power control card
RD:	Replication director
SVP:	Service processor
MP:	Management Processor
EHUB:	Ethernet HUB

No.(h): Indicates the resource number.

State: Displays one of the following as the resource state:

ready:	Normal state
fault:	Abnormal state
offline:	Not installed
attention(nolicense):	License not granted
rebuilding:	Rebuilding
charge:	Charging

* "attention(nolicense)" is displayed for host directors only.
* rebuilding is displayed for cache modules only.
* charge is displayed for batteries only.

Info.: Additional information about the resource

With a host director:	The port number is displayed.
	The physical protocol is displayed.
With a cache module:	The cache capacity is displayed.

* If a cache module is faulty, information about the cache capacity may not be obtained correctly. In this case, "---" is displayed as the cache capacity.

* If no controllers exist in a specified disk array, the error message as shown below is displayed.

```
iSM11541:Controller resource doesn't exist.
```

(16) Display of detailed information about a specified controller in a specified disk array

If the -cn option is specified, the system displays detailed information about a specified controller in a specified disk array.

Specify a disk array and controller as shown below.

-cn <Disk Array Name> <Abbreviated Name> <Resource Number>

(a) Basic Cabinet Junction Box (BC_JB)

```
# iSMview -cn Storage002 BC_JB 00h
--- BC Junction Box Information ---
Type                : BC Junction Box
Abbreviated Name    : BC_JB
Number(h)           : 00
State               : ready
Code(h)             : 41-00
```

The display items are as follows:

(1) BC Junction Box Information

Displays the detailed information of the basic cabinet junction box.

Type:	Resource type ("BC Junction Box" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("BC_JB" is displayed.)
Number(h):	Resource number
State:	Resource state ready: Normal state fault: Abnormal state
Code(h):	Code for identifying the resource type

(b) Cache Module (CHE)

```
# iSMview -cn Storage002 CHE 00h
--- Cache Module Information ---
Type                : Cache Module
Abbreviated Name    : CHE
Number(h)           : 00
State               : ready
Code(h)             : a0-00
Capacity            : 1.2GB
```

The display items are as follows:

(1) Cache Module Information

Displays the detailed information of the cache module.

Type:	Resource type ("Cache Module" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("CHE" is displayed.)

Number(h): Resource number

State: Resource state

- ready: Normal state
- rebuilding: Rebuilding
- fault: Abnormal state

Code(h): Code for identifying the resource type

Capacity: Cache capacity

(c) Back Board (DAC_BB)

```
# iSMview -cn Storage002 DAC_BB 00h

--- Back Board Information ---
Type                : Back Board
Abbreviated Name    : DAC_BB
Number(h)           : 00
State               : ready
Code(h)             : b1-00
```

The display items are as follows:

(1) Back Board Information

Displays the detailed information of the back board.

Type: Resource type

("Back Board" is displayed.)

Abbreviated Name: Abbreviation of the resource ("DAC_BB" is displayed.)

Number(h): Resource number

State: Resource state

- ready: Normal state
- fault: Abnormal state

Code(h): Code for identifying the resource type

(d) Battery (DAC_BBU)

```
# iSMview -cn Storage002 DAC_BBU 00h
--- Battery Information ---
Type                : Battery
Abbreviated Name    : DAC_BBU
Number(h)           : 00
State               : ready
Code(h)             : 65-00
```

The display items are as follows:

(1) Battery Information

Displays the detailed information of the battery.

Type:	Resource type
	("Battery" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("DAC_BBU" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	charge: Charging
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(e) Fan (lower) (DAC_FANL)

```
# iSMview -cn Storage002 DAC_FANL 00h
--- FAN Information ---
Type              : FAN
Abbreviated Name  : DAC_FANL
Number(h)         : 00
State             : ready
Code(h)           : 69-00
```

The display items are as follows:

(1) FAN Information

Displays the detailed information of the fan (lower).

Type:	Resource type
	("FAN" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("DAC_FANL" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(f) Fan (upper) (DAC_FANU)

```
# iSMview -cn Storage002 DAC_FANU 00h
--- FAN Information ---
Type              : FAN
Abbreviated Name  : DAC_FANU
Number(h)         : 00
State             : ready
Code(h)           : 69-00
```

The display items are as follows:

(1) FAN Information

Displays the detailed information of the fan (upper).

Type:	Resource type
	("FAN" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("DAC_FANU" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(g) Power Supply (DAC_PS)

```
# iSMview -cn Storage002 DAC_PS 00h
--- Power Supply Information ---
Type              : Power Supply
Abbreviated Name  : DAC_PS
Number(h)         : 00
State             : ready
Code(h)           : 43-00
```

The display items are as follows:

(1) Power Supply Information

Displays the detailed information of the power supply.

Type:	Resource type
	("Power Supply" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("DAC_PS" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(h) Temperature Sensor (DAC_TEMP_ALM)

```
# iSMview -cn Storage002 DAC_TEMP_ALM 00h
--- Temperature Information ---
Type              : Temperature
Abbreviated Name  : DAC_TEMP_ALM
Number(h)         : 00
State             : ready
Code(h)           : 6c-00
```

The display items are as follows:

(1) Temperature Information

Displays the detailed information of the temperature sensor.

Type:	Resource type
	("Temperature" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("DAC_TEMP_ALM" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(i) Disk Director (DD)

```
# iSMview -cn Storage002 DD 00h
--- Disk Director Information ---
Type                : Disk Director
Abbreviated Name    : DD
Number(h)           : 00
State               : ready
Code(h)             : 90
Director Location   : DA00
Port No.(h)         : 00,01
```

The display items are as follows:

(1) Disk Director Information

Displays the detailed information of the disk director.

Type:	Resource type
	("Disk Director" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("DD" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
	offline: Not installed
Code(h):	Code for identifying the resource type
Director Location:	Location of the director.
Port No.(h):	Director's port numbers

* "---" is displayed for "Director Location" if a specified disk array is of the 100/1000/2000 series.

(j) Host Director (HD)

```
# iSMview -cn Storage002 HD 00h

--- Host Director Information ---
Type                : Host Director
Abbreviated Name    : HD
Number(h)           : 00
State               : ready
Code(h)             : 80
Director Location   : HA00
Protocol            : FC
Port No.(h)         : 00,01,02,03

--- Host Director/Port Information ---
Port No.(h)         : 00-00
Port Name           : Storage4100/0000
Port Type           : host
State               : ready
Mode                : WWN
WWNN                : 200000004C517D00
WWPN                : 210000004C517D00
Data Rate           : 2Gbps
Topology            : Fabric
N_Port_ID/Switch    : 0000EFh/01h

(Omitted)
```

The display items are as follows:

(1) Host Director Information

Displays the detailed information of the host director.

Type:	Resource type	
	(“Host Director” is displayed.)	
Abbreviated Name:	Abbreviation of the resource (“HD” is displayed.)	
Number(h):	Resource number	
State:	Resource state	
	ready:	Normal state
	fault:	Abnormal state
	offline:	Not installed
	attention(nolicense):	License not granted
Code(h):	Code for identifying the resource type	
Director Location:	Location of the director	
Protocol:	Protocol	
Port No.(h):	Director’s port numbers	

(2) Host Director/Port Information

Displays the detailed information of the port.

Port No.(h):	Port number
Port Name:	Port name
Port Type:	Port type
	RPL: Port for replication
	host: Port for a host
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Mode:	Access control mode (“WWN” or “PORT”)
WWNN:	Word Wide Node Name
WWPN:	World Wide Port Name
Data Rate:	Data transfer rate (“1 Gbps” or “2 Gbps”)
Topology:	Topology (“FC-AL” or “Fabric”)
N_Port_ID/Switch:	N_Port_ID and Switch

* “---” is displayed for “Director Location” if the specified disk array is other than that with pool of the 100/1000/2000 series.

(k) Maintenance PC (MAINTE_PC)

```
# iSMview -cn Storage002 MAINTE_PC 00h
--- Maintenance PC Information ---
Type              : Maintenance PC
Abbreviated Name  : MAINTE_PC
Number(h)         : 00
State             : ready
Code(h)           : b8-00
```

The display items are as follows:

(1) Maintenance PC Information

Displays the detailed information of the maintenance PC.

Type:	Resource type
	(“Maintenance PC” is displayed.)
Abbreviated Name:	Abbreviation of the resource (“MAINTE_PC” is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(l) Panel (PANEL)

```
# iSMview -cn Storage002 PANEL 00h
--- Panel Information ---
Type              : Panel
Abbreviated Name  : PANEL
Number(h)         : 00
State             : ready
Code(h)           : b5-00
```

The display items are as follows:

(1) Panel Information

Displays the detailed information of the panel.

Type:	Resource type
	(“Panel” is displayed.)
Abbreviated Name:	Abbreviation of the resource (“PANEL” is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(m) Power Control Card (PCC)

```
# iSMview -cn Storage002 PCC 00h
--- Power Control Card Information ---
Type              : Power Control Card
Abbreviated Name  : PCC
Number(h)         : 00
State             : ready
Code(h)           : b9
```

The display items are as follows:

(1) Power Control Card Information

Displays the detailed information of the power control card.

Type:	Resource type (“Power Control Card” is displayed.)
Abbreviated Name:	Abbreviation of the resource (“PCC” id displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(n) Replication Director (RD)

```
# iSMview -cn Storage002 RD 02h
--- Replication Director Information ---
Type                : Replication Director
Abbreviated Name    : RD
Number(h)           : 02
State               : ready
Code(h)             : 80
Director Location   : HA01
Port No.(h)         : 00,01,02,03
```

The display items are as follows:

(1) Replication Director Information

Displays the detailed information of the replication director.

Type: Resource type
("Replication Director" is displayed.)

Abbreviated Name: Abbreviation of the resource ("RD" is displayed.)

Number(h): Resource number

State: Resource state

ready: Normal state

fault: Abnormal state

offline: Not installed

Code(h): Code for identifying the resource type

Code(h): Code for identifying the resource type

Director Location: Location of the director

Port No.(h): Director's port numbers

* "---" is displayed for "Director Location" if a specified disk array is of the 100/1000/2000 series.

(o) Service Processor (SVP)

```
# iSMview -cn Storage001 SVP 00h

--- Service Processor Information ---
Type                : Service Processor
Abbreviated Name    : SVP
Number(h)           : 00
State               : ready
Code(h)             : b3

--- 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 Socket Guard Invalid          : on
SCSI Socket Valid IP Address       : 192.168.0.1

--- SNMP Information ---
Community Name                     : public
SNMP Trap Transmission IP Address: : 192.168.0.1
                                   : 192.168.0.2
SNMP Valid                         : on
SNMP Valid IP Address              : 192.168.0.1
                                   : 192.168.0.2

--- Trap Information ---
Trap Sense Interval : 20
Unit Contact        : XXX, Manager Name, 8-23-xxxx
Unit Name           : Storage2300
Unit Location       : Fuchu-shi Sumiyoshi-cho x-xx-xx
Unit Info           : Setting Date : 2002/01/01
```

The display items are as follows:

(1) Service Processor Information

Displays the detailed information of the service processor.

Type: Resource type
("Service Processor" is displayed.)

Abbreviated Name: Abbreviation of the resource ("SVP" is displayed.)

Number(h): Resource number

State: Resource state
ready: Normal state
fault: Abnormal state

Code(h): Code for identifying the resource type

(2) Disk Array TCP/IP Information

Displays information about the TCP/IP of the specified disk array.

IP Address: IP address

Subnet Mask: Subnet mask

Gateway Address: Gateway address

(3) SCSI Socket Information

Displays information about the monitoring server.

SCSI Socket Guard Invalid: Indicates that monitoring by the monitoring server is permitted (on/off).

SCSI Socket Valid IP Address: IP address of the monitoring server that is permitted to perform monitoring

(4) SNMP Information

Displays information about SNMP.

Community Name: Community name

SNMP Trap Transmission IP Address: IP address of the host that transmits SNMP traps

SNMP Valid: Indicates that making SNMP requests is permitted (on/off).

SNMP Valid IP Address: IP address of the host that is permitted to make SNMP requests

(5) Trap Information

Displays information about traps.

Trap Sense Interval: Interval at which traps are monitored

Unit Contact: Management information

Unit Name: System name

Unit Location: Installation location

Unit Info: Other information

* The items (2) Disk Array TCP/IP Information, (3) SCSI Socket Information, (4) SNMP Information, (5) Trap Information are displayed for only disk arrays that support Network Setting.

* If a specified resource type is wrong or the resource of a specified resource number does not exist, the error message as shown below is displayed.

```
iSM11544: Specified Resource does not exist.
```

(p) Management Processor (MP)

```
# iSMview -cn Storage002 MP 00h

--- Management Processor Information ---
Type              : Management Processor
Abbreviated Name  : MP
Number(h)         : 00
State             : ready
Code              : b6-00
```

The display items are as follows:

(1) Management Processor Information

Displays the detailed information of the management processor.

Type: Resource type (“Management Processor” is displayed.)

Abbreviated Name: Abbreviation of the resource (“MP” is displayed.)

Number(h): Resource number

State: Resource state

ready: Normal state

fault: Abnormal state

Code: Code for identifying the resource type

(q) Ethernet HUB (EHUB)

```
# iSMview -cn Storage002 EHUB 00h

--- Ethernet HUB Information ---
Type              : Ethernet HUB
Abbreviated Name  : EHUB
Number(h)         : 00
State             : ready
Code              : b7-00
```

The display items are as follows:

(1) Ethernet HUB Information

Displays the detailed information of the Ethernet HUB.

Type: Resource type (“Ethernet HUB” is displayed.)

Abbreviated Name: Abbreviation of the resource (“EHUB” is displayed.)

Number(h): Resource number

State: Resource state

ready: Normal state

fault: Abnormal state

Code: Code for identifying the resource type

(17) Display of disk enclosure information

If the -e option is specified, the system displays disk enclosure information about a specified disk array.

```
#iSMview -e Storage002
--- Disk Enclosure Information ---
Resource Type      Abbr. Name      No.(h)    State
EC Junction Box    EC_JB           00        ready
Power Supply       DE_PS           00        ready
Power Supply       DE_PS           01        ready
FAN                DE_FAN          00        ready
FAN                DE_FAN          01        ready
Temperature        DE_TEMP_ALM     00        ready
Temperature        DE_TEMP_ALM     01        ready
Adapter Card       DE_ADP          00        ready
Adapter Card       DE_ADP          01        ready
Back Board         DE_BB           00        ready
```

The display items are as follows:

(1) Disk Enclosure Information

Displays information about resources.

Resource Type: Displays one of the following as the resource type:

Adapter Card:	Adapter
Back Board:	Backboard
EC Junction Box:	Junction box of the extended cabinet
FAN:	Fan
Power Supply:	Power supply
Temperature:	Temperature sensor

Abbr. Name: Indicates the abbreviations of resources.

DE_ADP:	Adapter
DE_BB:	Backboard
DE_FAN:	Fan
DE_PS:	Power supply
DE_TEMP_ALM:	Temperature sensor
EC_JB:	Junction box of the basic cabinet

No.(h): Resource number

State: Resource state

ready:	Normal state
fault:	Abnormal state

* If no disk enclosure exists in a specified disk array, the error message as shown below is displayed.

```
iSM11542:Enclosure resource doesn't exist.
```

(18) Display of detailed information about a specified disk enclosure

If the -en option is specified, the system displays detailed information about a specified disk enclosure in a specified disk array.

Specify a disk array and disk enclosure as shown below.

-en <Disk Array Name> <Abbreviated Name> <Resource Number>

(a) Adapter (DE_ADP)

```
# iSMview -en Storage002 DE_ADP 00h
--- Adapter Card Information ---
Type              : Adapter Card
Abbreviated Name  : DE_ADP
Number(h)         : 00
State             : ready
Code(h)           : c0-00
```

The display items are as follows:

(1) Adapter Card Information

Displays the detailed information of the adapter card.

Type:	Resource type
	(“Adapter Card” is displayed.)
Abbreviated Name:	Abbreviation of the resource (“DE_ADP” is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(b) Back Board (DE_BB)

```
# iSMview -en Storage002 DE_BB 00h
--- Back Board Information ---
Type                    : Back Board
Abbreviated Name        : DE_BB
Number(h)               : 00
State                   : ready
Code(h)                 : c9-00
Maximum Number of PDs   : 15
```

The display items are as follows:

(1) Back Board Information

Displays the detailed information of the back board.

Type:	Resource type
	(“Back Board” is displayed.)
Abbreviated Name:	Abbreviation of the resource (“DE_BB” is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type
Maximum Number of PDs:	Maximum number of physical disks that can be installed (“10” or “15”)

(c) Fan (DE_FAN)

```
# iSMview -en Storage002 DE_FAN 00h
--- FAN Information ---
Type            : FAN
Abbreviated Name: DE_FAN
Number(h)       : 00
State           : ready
Code(h)         : 78-00
```

The display items are as follows:

(1) FAN Information

Displays the detailed information of fan.

Type:	Resource type
	("FAN" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("DE_FAN" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(d) Power Supply (DE_PS)

```
# iSMview -en Storage002 DE_PS 00h
--- Power Supply Information ---
Type              : Power Supply
Abbreviated Name  : DE_PS
Number(h)         : 00
State             : ready
Code(h)           : 73-00
```

The display items are as follows:

(1) Power Supply Information

Displays the detailed information of the power supply.

Type:	Resource type
	("Power Supply" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("DE_PS" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(e) Temperature (DE_TEMP_ALM)

```
# iSMview -en Storage002 DE_TEMP_ALM 00h
--- Temperature Information ---
Type              : Temperature
Abbreviated Name  : DE_TEMP_ALM
Number(h)         : 00
State             : ready
Code(h)           : 7c-00
```

The display items are as follows:

(1) Temperature Information

Displays the detailed information of the temperature sensor.

Type:	Resource type
	("Temperature" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("DE_TEMP_ALM" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

(f) Extended Cabinet Junction Box (EC_JB)

```
# iSMview -en Storage002 EC_JB 00h
--- EC Junction Box Information ---
Type              : EC Junction Box
Abbreviated Name  : EC_JB
Number(h)         : 00
State             : ready
Code(h)           : 71-00
```

The display items are as follows:

(1) EC Junction Box Information

Displays the detailed information of the extended cabinet junction box

Type:	Resource type
	("EC Junction Box" is displayed.)
Abbreviated Name:	Abbreviation of the resource ("EC_JB" is displayed.)
Number(h):	Resource number
State:	Resource state
	ready: Normal state
	fault: Abnormal state
Code(h):	Code for identifying the resource type

* If a specified resource type is wrong or the resource of a specified resource number does not exist, the error message as shown below is displayed.

```
iSM11544: Specified Resource does not exist.
```

(19) Display of port information

If the -p option is specified, the system displays information about the ports of a specified disk array.

```
#iSMview -p Storage002
--- Port Information ---
Port No.(h)     Port Name                 Platform   Port Mode   Port State
00-00           10000000000000130100      WN         port        ready
00-01           10000000000000130200      NX         port        ready
```

The display items are as follows:

(1) Port Information

Displays information about the ports.

Port No.(h): Port number

Port Name: Port name

Platform: Platform

Port Mode: Port mode

Port State: Port state

* "---" is displayed for "Platform" if the platform information is not supported.

(20) Display of access control information about a specified disk array

If the -a option is specified, the system displays information about the access control of a specified disk array.

```
#iSMview -a Storage001
--- Access Control Information ---
Access Control Mode : ON

--- Port List ---
Port No.(h)     Port Name                 Port State   Port Mode
00-00           10000000000000130100      ready        Port

--- WWN List ---
Platform        LD Set Name     Path Count
WN              WIN_SET         2

--- LD Set List ---
Platform        LD Set Name     Path Count   LD Count
WN              WIN_SET         2            2
LX              LIN_SET         4            16
```

The display items are as follows:

(1) Access Control Information

Access Control Mode: Indicates that the Access Control mode is on/off.

(2) Port List

Lists information about the Access Control (PORT mode) of the specified disk array.

Port No.(h): Port number

Port Name: Port name

Port State: Port state

Port Mode: Port mode

* Port List is displayed for only the disk arrays of the 1100/1200/2100/2200/3100/4100 series.

(3) WWN List

Lists information about the Access Control (WWN mode) of the specified disk array.

Platform: OS type of the platform

LD Set Name: LD Set name

Path Count: Number of paths

* WWN List is displayed for only the disk arrays of the 1100/1200/2100/2200/3100/4100 series.

* If WWN List does not exist, the above information is not displayed.

(4) LD Set List

Lists information about the LD Sets of the specified disk array.

Platform: Platform

LD Set Name: LD Set name

Path Count: Number of paths

LD Count : Number of logical disks

* LD Set List is displayed for only the disk arrays of the 100/1300/2300/2800/3300/4300 series.

* If LD Set List does not exist, the above information is not displayed.

(21) Display of LD Access Control information

If the -an option is specified, the system displays information about the Access Control of a specified logical disk.

```
#iSMview -an Storage001 0

--- LD/Port List ---
Port No.(h)     Port Name                       Port State      Port Mode
00-00           10000000000000130100            ready           Port

--- LD/WWN List ---
Platform        LD Set Name     Path Count
WN              WIN_SET         2
NX              NX_SET          3

--- LD Set List ---
Platform        LD Set Name     Path Count      LD Count
WN              WIN_SET         2               2
LX              LIN_SET         4               16
```

The display items are as follows:

(1) LD/Port List

Lists information about the Access Control (PORT mode) of the specified LD.

Port No.(h): Port number

Port Name: Port name

Port State: Port state

Port Mode: Port mode

* LD/Port List is displayed for only the disk arrays of the 1100/1200/2100/2200/3100/4100 series.

(2) LD/WWN List

Lists information about the Access Control (WWN mode) of the specified LD.

Platform: Platform

LD Set Name: LD Set name

Path Count: Number of paths

* LD/WWN List is displayed for only the disk arrays of the 1100/1200/2100/2200/3100/4100 series.
* If LD/WWN List does not exist, the above information is not displayed.

(3) LD Set List

Lists information about the LD Sets of the specified LD.

Platform: Platform

LD Set Name: LD Set name

Path Count: Number of paths

LD Count : Number of logical disks

* LD Set List is displayed for only the disk arrays of the 100/400/1300/1400/2300/2400/2800/3300/4300 series.
* If LD Set List does not exist, the above information is not displayed.

* A 1-digit number (0) can be specified as a logical disk number.
* If a specified LD does not exist, the error message as shown below is displayed.

```
iSM11173:LD doesn't exist.
```

* Refer to 3.3 “Nickname Setting” for details on the setting of Port Name.

(22) Display of information about port Access Control (PORT mode)

If the -ap option is specified, the system displays information about the Access Control (PORT mode) of a specified port.

```
#iSMview -ap Storage001 00-00

--- Port Information ---
Port No.(h)       : 00-00
Port Name         : 10000000000000130100
Port State        : ready
Port Mode         : port

--- Port/LD List ---
LDN(h)      OS Type      LD Name
0000        WN           Win0000
0001        WN           Win0001
```

The display items are as follows:

(1) Port Information

Displays information about the Access Control (PORT mode) of the specified port.

Port No.(h): Port number

Port Name: Port name

Port State: Port state

Port Mode: Port mode

* Refer to 3.3 “Nickname Setting” for details on the setting of Port Name.

(2) Port/LD List

Lists LD information about the Access Control (PORT mode) of the specified port.

LDN(h): Logical disk number

OS Type: OS type of each LD

For details, refer to (3) “List of logical disk information”.

LD Name: Arbitrary ID information (logical disk name) of each LD, which is obtained from the disk array

* This option is displayed for only the disk arrays of the 1100/1200/2100/2200/3100/4100 series.

* A port number or port name can be specified for a port.

* A 1-digit (0-0) can be specified as a port number.

* If a specified port does not exist, the error message as shown below is displayed.

```
iSM11175:Port doesn’t exist.
```

(23) Display of information about LD Set Access Control (WWN mode)

If the -aw option is specified, the system displays information about the Access Control (WWN mode) of a specified LD Set.

```
#iSMview -aw Storage001 WN:WIN_SET

--- WWN Information ---
Platform        : WN
LD Set Name     : WIN_SET
WWPN List       : 1111-1111-1111-1111
                  2222-2222-2222-2222
                  3333-3333-3333-3333

--- WWN/LD List ---
LUN(h)      LDN(h)      OS Type     LD Name
0000        0000        WN          WIN_SET
0001        0001        NX          NX_SET
```

The display items are as follows:

(1) WWN Information

Displays information about the Access Control (WWN mode) of the specified LD Set.

Platform: Platform

LD Set Name: LD Set name

WWPN List: List of the WWPNs

(2) WWN/LD List

Lists LD information about the Access Control (WWN mode) of the specified LD Set.

LUN(h): LUN number

LDN(h): Logical disk number

OS Type: OS type of each LD

LD Name: Arbitrary ID information of each LD

* This option is displayed for only the disk arrays of the 1100/1200/2100/2200/3100/4100 series.

* If a specified LD Set does not exist, the error message as shown below is displayed.

```
iSM11178:LD Set doesn't exist.
```

* If the WWPN information of a specified LD Set does not match, the error message as shown below is displayed.

```
iSM11179:LD Set doesn't match.
```

* If a specified WWPN does not exist, the error message as shown below is displayed.

```
iSM11181:WWPN doesn't exist.
```

(24) Display of information about LD Set Access Control

If the -ac option is specified, the system displays information about the Access Control of a specified LD Set.

```
#iSMview -ac Storage001 WN:WIN_SET

--- LD Set Information ---
Platform        : WN
LD Set Name     : WIN_SET
Path List       : 00h-00h(PORT0000)
                  1111-1111-1111-1111
                  2222-2222-2222-2222

--- LUN/LD List ---
LUN(h)    LDN(h)    OS Type  LD Name
0000      0000      WN       Win0000
0001      0001      WN       Win0001
```

The display items are as follows:

(1) LD Set Information

Displays information about the Access Control of the specified LD Set.

Platform: Platform

LD Set Name: LD Set name

Path List: List of the paths

(2) LUN/LD List

Lists LD information about the Access Control of the specified LD Set.

LUN(h): LUN number

LDN(h): Logical disk number

OS Type: OS type of each LD

LD Name: Arbitrary ID information of each LD

* This option is displayed for only the disk arrays of the 100/1300/2300/2800/3300/4300 series.

* If a specified LD Set does not exist, the error message as shown below is displayed.

```
iSM11178:LD Set doesn't exist.
```

(25) Display of Information about LD Administrator of a disk array

If the -ra option is specified, the system displays information about LD Administrator of a specified disk array.

```
#iSMview –ra Storage001

--- Reallocation Control Information ---
Inaccessible LD Total Capacity : 24.0GB(28.0GB)


--- LD Set Capacity Information ---
Platform  LD Set Name          Capacity
DF        S2800               8.0GB
AX        test001             ---


--- Preserve Group Information ---
Group Total Capacity   : 16.0GB(20.0GB)


Purpose                : RPL/Snapshot
Purpose Total Capacity : 4.0GB

LDN   OS Type  LD NAME          Pool No.(h)   RAID  Capacity
0007  NX       LD0007          0002          6     4.0GB

Purpose                : RPL
Purpose Total Capacity : 4.0GB

LDN   OS Type  LD NAME          Pool No.(h)   RAID  Capacity
0008  NX       LD0008          0002          6     4.0GB

Purpose                : Snapshot
Purpose Total Capacity : 4.0GB

LDN   OS Type  LD NAME          Pool No.(h)   RAID  Capacity
0009  NX       LD0009          0002          6     4.0GB

Purpose                : Link Volume
Purpose Total Capacity : ---(4.0GB)

LDN   OS Type  LD NAME          Pool No.(h)   RAID  Capacity
0010  NX       LD0010          0002          6     4.0GB

Purpose                : ---
Purpose Total Capacity : 4.0GB

LDN   OS Type  LD NAME          Pool No.(h)   RAID  Capacity
0005           LD0005          0001          6     2.0GB
0006           LD0006          0001          6     2.0GB


--- Reserve Group Information ---
Group Total Capacity   : 8.0GB


Purpose                : Optimization
Purpose Total Capacity : 4.0GB

LDN   OS Type  LD NAME          Pool No.(h)   RAID  Capacity
0011  NX       LD0011          0002          6     4.0GB

Purpose                : ---
Purpose Total Capacity : 4.0GB

LDN   OS Type  LD NAME          Pool No.(h)   RAID  Capacity
0011  NX       LD0011          0002          6     4.0GB
```

The display items are as follows.

(1) Reallocation Control Information

Displays the total capacity of LDs that do not belong to the disk array LD Set.

Inaccessible LD Total Capacity: Total capacity of LDs

(2) LD Set Capacity Information

Displays information on LD Set of a disk array.

Platform: LD Set format

LD Set Name: LD Set name

Capacity: Total capacity of LDs belonging to the LD Set

(3) Preserve Group Information

Displays detailed information on LDs of a disk array.

Group Total Capacity: Total capacity of LDs belonging to the preserve group

Purpose: Usage of the LD. Displays one of the following.

RPL/Snapshot: LD for which pair setting for replication and snapshot setting have already been made

RPL: LD for which pair setting for replication has already been made

Snapshot: LD for snapshot

Link Volume: LD for link volumes

---: LD for which specific purpose has not been made

Purpose Total Capacity: Total capacity of the above LDs

LDN(h): LD number

OS Type: OS type for each LD

LD NAME: Optional identification information for each LD

Pool No.(h): Pool number to which the LD belongs

RAID: RAID type of the LD

Capacity: Capacity of the LD

(4) Reserve Group Information

Displays detailed information on LDs of a disk array.

Group Total Capacity: Total capacity of LDs belonging to the reserve group

Purpose: Usage of the LD. Displays one of the following.

Optimization: Work disk for performance optimization

---: LD for which specific usage is not set

Purpose Total Capacity: Total capacity of the above LDs

LDN(h): LD number

OS Type: OS type for each LD

LD NAME: Optional identification information for each LD

Pool No.(h): Pool number to which the LD belongs

RAID: RAID type of the LD

Capacity: Capacity of the LD

(26) Display of information about cache partitioning of a disk array

If the -cp option is specified, the system displays information about cache partitioning of a specified disk array.

```
#iSMview -cp Storage002

--- Cache Partitioning Detail Information ---
Cache Partitioning Mode              :on
Allocatable Cache Capacity           :2.00GB
Total Allocated Capacity             :2.00GB
Total Unallocated Capacity           :0.00GB
Total Minimum Capacity               :2.00GB
Current Segment Count                :2
Allocatable Segment Count            :0

--- Cache Segment List ---
Number(h)   Segment Name    Max. Capacity   Min. Capacity   Allocated Capacity
00          DefaultSegment  1.00GB(50%)     1.00GB(50%)     1.00GB(50%)
01          Segment1        1.00GB(50%)     1.00GB(50%)     1.00GB(50%)
```

The display items are as follows.

(1) Cache Partitioning Detail Information

Displays detailed information on cache.

Cache Partitioning Mode:	Indicates the status (on/off) of cache partitioning mode.
Allocatable Cache Capacity:	Capacity of cache to be allocated
Total Allocated Capacity:	Total capacity of cache to be allocated
Total Unallocated Capacity:	Capacity of unallocated cache
Total Minimum Capacity:	Total minimum capacity
Current Segment Count:	Current number of cache segments
Allocatable Segment Count:	Number of allocatable cache segments

(2) Cache Segment List

Lists cache segments.

Number(h):	Cache segment number
Segment Name:	Cache segment name
Max. Capacity:	Maximum capacity of allocated cache
Min. Capacity:	Minimum capacity of allocated cache
Allocated Capacity:	Capacity of currently allocated cache

(27) Display of information about cache partitioning of a segment

If the -cpn or -cpm option is specified, the system displays information about cache partitioning of a specified segment.

```
#iSMview -cpn Storage002 01h

--- Cache Segment Detail Information ---
Segment Number(h)          :01
Segment Name               :Segment1
Maximum Capacity           :16.00GB(50%)
Minimum Capacity           :8.00GB(25%)
Allocated Cache Capacity   :12.00GB(38%)
LD Count                   :3
Total LD Capacity          :31.8GB

--- Cache Segment/LD List ---
LDN(h)    OS Type          LD Name
0000      LX               200000004C517B7D000C
0001      WN               200000004C517B7D006B
0001      CX               200000004C517B7D0189
```

The display items are as follows:

(1) Cache Segment Detail Information

Displays detailed information on cache segments

Segment Number(h):	Cache segment number
Segment Name:	Cache segment name
Maximum Capacity:	Maximum capacity of allocated cache
Minimum Capacity:	Minimum capacity of allocated cache
Allocated Cache Capacity:	Capacity of currently allocated cache
LD Count:	Number of LDs allocated to the segment
Total LD Capacity:	Total capacity of LDs allocated to the segment

(2) Cache Segment/LD List

Lists LD information about a specified cache segment.

LDN(h):	LD number
OS Type:	OS type for each LD
LD Name:	Optional identification information for each LD

(28) Display of all configuration information

If the -all option is specified, the system displays all information about a target disk array.

```
#iSMview –all Storage001
 #iSM     2004/01/01 00:00:00                ...Title and date
Configuration List iSMview Version n.n.nnn   ...Header
[DiskArray]                                  ...Section
•                                            ...Data
•
[LD]                                         ...Section
•                                            ...Data
•
[PD]                                         ...Section
•                                            ...Data
•
[RANK]                                       ...Section
•                                            ...Data
•
[Pool]                                       ...Section
•                                            ...Data
•
[Snapshot-Pool]                              ...Section
•                                            ...Data
•
[Controller]                                 ...Section
•                                            ...Data
•
```

The display items are as follows:

Title/Rev/date:	The title and the file creation time are displayed.
Header:	Information for recognizing the configuration setting file and the program revision are displayed.
Section and data:	Each section is a portion allocated from the data area. The contents of each section are displayed as data.
[DiskArray]:	Displays information about the target disk array. The display contents are equivalent to those displayed by the -d option.
[LD]:	Displays information about the LDs. The display contents are equivalent to those displayed by the -l/-ln option.
[Snapshot-LD]:	Displays information about LD snapshot. The display contents are equivalent to those displayed by the -sl/-sln option.
[PD]:	Displays information about the PDs. The display contents are equivalent to those displayed by the -h/-hn option.
[RANK]:	Displays information about the RANKs. The display contents are equivalent to those displayed by the -r/-rn option. This item is exclusive; either this or [Pool] information is displayed at a time.
[Pool]:	Displays information about the pools. The display contents are equivalent to those displayed by the -pl/-pln option.

[Snapshot-Pool]: Displays information about pool snapshot.
The display contents are equivalent to those displayed by the -spl/-spln option.

[Controller]: Displays information about the controllers.
The display contents are equivalent to those displayed by the -c/-cn option.

[Enclosure]: Displays information about the disk enclosures.
The display contents are equivalent to those displayed by the -e/-en option.

[Port]: Displays information about the ports.
The display contents are equivalent to those displayed by the -p option.

[Maintenance]: Displays maintenance information for maintenance persons.

[Access Control]: Displays information about the Access Control.
The display contents are equivalent to those displayed by the -a/-an/-ap/-aw/-ac option.

[ReallocationControl]:
Displays information about LD Administrator.
The display contents are equivalent to those displayed by the -ra option.

[Cache Partitioning]:
Displays information about cache partitioning.
The display contents are equivalent to those displayed by the -cp/-cpn option.

Result: Displays the result of specifying the -all option.

Command Completed Successfully!!:	Successful
Command Completed Abnormally!!:	Unsuccessful

1. Users who have an administrative right and the administrators for iSM are permitted to execute the iSMview command.
2. Specify a RANK number in format of the RANK's PDG number and the RANK number that are separated by a "- (hyphen)". Specifying only a RANK number results in a parameter error.
3. Specify a PD number in format of the PD's PDG number and the PD number that are separated by a "- (hyphen)". Specifying only a PD number results in a parameter error.
4. Specify a port number in format of the port's host director number and the port number that are separated by a "- (hyphen)".
   Specifying only a port number results in a parameter error.
5. Specify an LD Set name in format of the LD Set type and the LD Set name that are separated by a ": (colon)". Specifying only an LD Set name results in a parameter error.
6. Specify optional identification information for each LD (logical disk name) in format of the OS type for each LD and optional identification information for each LD (logical disk name) that are separated by ": (colon)". Specifying only optional identification information for each LD (logical disk name) results in a parameter error.
7. LD number, PD group number, PD number, Pool number, Resource number, Port number, and Cache segment number are recognized as decimal numbers. When "h" is attached at the end, they are recognized as hexadecimal numbers.

5.6 Configuration Information File Output Command (iSMcsv)

The configuration information file output command (iSMcsv) outputs the configuration information of a disk array in the CSV format. Table 5-4 shows a list of files. This command creates a new directory and outputs the files shown in Table 5-4 in this directory. For details on the files, refer to 5.6.4 “Descriptions of Output Files”.

Table 5-4 File List

File Name	Description
DiskArray.csv	Information about a disk array
LDList.csv	Information about LDs
PDList.csv	Information about PDs
RANKList.csv	Information about RANKs * This item is exclusive; either this or pool information can be output at a time.
PoolList.csv	Information about pool
PortList.csv	Information about ports
LDSetList.csv	Information about the LD Set
LDSet-Path.csv	Information about correspondence between LD Sets and paths
PD-LD.csv	Information about correspondence between PDs and LDs
RANK-LD.csv	Information about correspondence between RANKs and LDs * This item is exclusive; either this or pool information can be output at a time.
Pool-LD.csv	Information about correspondence between pools and LDs
Port-LD.csv	Information about correspondence between ports and LDs * This file is not output when a LD Set is used.
LDSet-LD.csv	Information about correspondence between LD Sets and LDs * This file is not output when a port is used.
RANK-PD.csv	Information about correspondence between RANKs and PDs * This item is exclusive; either this or pool information can be output at a time.
Pool-PD.csv	Information about correspondence between pools and PDs
CachePartitioning.csv	Information about cache partitioning * This file is not output when the CachePartitioning license is not applied.
CacheSegmentList.csv	Information about cache segments * This file is not output when the CachePartitioning license is not applied.
CacheSegment-LD.csv	Information about correspondence between cache segments and LDs * This file is not output when the CachePartitioning license is not applied.
PairInfo.csv	Information about pairs * This file is not output when the DynamicDataReplication and RemoteDataReplication licenses are not applied.
SnapshotLDList.csv	Information about snapshot LDs * This file is not output when the DynamicSnapVolume license is not applied.

File Name	Description
SnapshotPoolList.csv	Information about snapshot pool * This file is not output when the DynamicSnapVolume license is not applied.
SnapshotPool-SDV.csv	Information about correspondence between snapshot pool and SDV * This file is not output when the DynamicSnapVolume license is not applied.
ATGInfo.csv	Information about Atomic Group * This file is not output when the RemoteDataReplication/DisasterRecovery license is not applied.
Pool-ExpandingPD.csv	Information about correspondence between pool and pool-expanding PD

5.6.1 Start and Stop

(1) Start of the iSMcsv command

To start the configuration information file output command (iSMcsv) (referred to as this command below), enter "iSMcsv" on the command line.

If an option is omitted, the program version and the usage are displayed as shown below.

```
iSMcsv Version n.n.nnn

Usage : iSMcsv -arrayname <Disk Array Name> -out <directory>
```

* The above is a display sample. The version of your program is displayed instead.

(2) Termination of the iSMcsv command

When the configuration information file output command terminates normally, configuration information files are output in the specified directory.

5.6.2 Descriptions of Options

The functions and corresponding options of the configuration information file output command are described below.

- -arrayname <disk array name> option

  : Specifies a disk array whose CSV files are output.

  To check the disk array name, use the configuration display command (iSMview).

  For details on the configuration display command (iSMview), refer to 5.5 "Configuration Display Command (iSMview)".

- -out <directory> option

  : Specifies a directory to which files are output. Directories named by the date and time are created in the directory specified by <directory>.

5.6.3 Execution of the Command

An example of executing the configuration information file output command is shown below.

```
>iSMview -d
  --- Disk Array List ---
  Product ID          Disk Array Name          Resource State   Monitoring
  S2300 Disk Array    Storage001               ready            running
  S4300 Disk Array    Storage002               ready            running
>
>iSMcsv -arrayname Storage001 –out /home/user/tmp
   iSM11605:Please wait a minute.
   iSM11100:Command completed successfully.
```

This is an example when disk array name Storage001 is used.

- The disk array name is checked by the configuration display command (iSMview –d option).
- This command is executed with the disk array name and directory specified.
- A data and time directory is created in the specified directory (D:\tmp).

  D:\tmp\YYYYMMDDhhmm

  YYYY: Year

  MM: Month

  DD: Day

  hh: Time

  mm: Minute

  * When the same directory name already exists, a new directory is created with any number added to the directory name.

    D:\tmp\YYYYMMDDhhmm_n (n: Additional number)

- In a data and time directory, multiple files related to configuration information of the disk array (Storage001) are output in CSV format.

5.6.4 Descriptions of Output Files

This section explains CSV output files.

(1) Information about a disk array (DiskArray.csv)

Outputs information about a disk array.

Disk Array Name	Resource State	Vendor ID	Product ID	Product FW Revision
Storage002	ready	XXX	S4300 Disk Array	020B

Serial Number	SAA
0000000921701126	0200200000004C517B7D00000000000000000000000000000000000000

World Wide Name	Total Capacity	User System Code
200000004C517B7D	4.420TB	

The display items are as follows:

Disk Array Name:	Name of the disk array
Resource State:	Status of the disk array and configuration resources
Vendor ID:	ID information indicating the disk array supplier
Product ID:	Model name of the disk array
Product FW Revision:	Version information of the disk array
Serial Number:	Product number of the disk array
SAA:	Unique identifier of the disk array
World Wide Name:	World Wide Name of the disk array
Total Capacity:	Total capacity of the disk array
User System Code:	User system code

(2) Information about LDs (LDList.csv)

LDN(h)	OS Type	LD Name	LD Capacity	LD Capacity(bytes)	RAID Type	LD State
0000	CX	XXX000	3.9GB	4187593113	RAID1	attn.(rebuilding)
0001	NX	XXX000	3.9GB	4187593113	RAID1	ready
0002	WN	XXX0003	3.9GB	4187593113	RAID5	ready
0003	WN	XXX0004	3.9GB	4187593113	RAID1	ready
0004	WN	XXX0005	3.9GB	4187593113	RAID0	ready

Progress Ratio	Expansion State	Group	Purpose	RPL Attribute	Cache Resident	Current Owner	Default Owner
12%	---	Preserve	---	IV	no		
	---	Preserve	---	IV	no		
	---		Reserve	Optimization	---	no	
	expanding	---	---	IV	no		
	---	Reserve	---	---	no		

The display items are as follows:

LDN(h):	LD number
OS Type:	OS type for each LD
LD Name:	Optional identification information for each LD (logical disk name)
LD Capacity:	LD capacity
LD Capacity(bytes):	LD capacity (bytes)
RAID Type:	RAID type of the LD
LD State:	Operational status of the LD
Progress Ratio:	Progress ratio
Expansion State:	Expansion status of the LD
Group:	Usage of the LD
Purpose:	Attribute of the LD
RPL Attribute:	RPL type
Cache Resident:	Cache resident disk
Current Owner:	Number of the host director having the current owner right of the target LD
Default Owner:	Number of the host director having the initial owner right of the target LD

* The RPL Attribute item is output for the disk array to which the DynamicDataReplication or RemoteDataReplication license is applied.

(3) Information about PDs (PDList.csv)

Outputs a list of PDs.

PDN(h)	Classification	State	Progress Ratio	PD Capacity	Vendor ID	Product ID	Product Revision	Serial Number
00-00	data	ready		33.2GB	XXX	XXX	DK3000-0001	1234000A
00-01	data	ready		33.2GB	XXX	XXX	DK3000-0002	1234000B
00-02	spare	ready		33.2GB	XXX	XXX	DK3000-0003	1234000C
00-03	not set	ready		33.2GB	XXX	XXX	DK3000-39FC	12345920
00-04	data	ready		33.2GB	XXX	XXX	DK3000-40FC	12345921

The display items are as follows:

PDN(h):	PD number
Classification:	PD classification
State:	Operational status of the PD
Progress Ratio:	Progress ratio
PD Capacity:	Capacity of the PD
Vendor ID:	ID information indicating the supplier of the product
Product ID:	Model name if the product
Product Revision:	Version information of the product
Serial Number:	Product number

(4) Information about RANKs (RANKList.csv)

Outputs a list of RANKs.

RANK No.(h)	RAID Type	RebuildTime(hours)	RANK State	Progress Ratio	RANK Capacity
00-00	RAID1(1+1)	0	attn.(rebuilding)	20%	16.6GB
00-01	RAID1(1+1)	0	attn.(rebuilding)	30%	16.6GB
00-02	RAID1(1+1)	0	attn.(rebuilding)	12%	16.6GB
00-03	RAID1(1+1)	0	attn.(rebuilding)	34%	16.6GB
00-04	RAID1(1+1)	0	fault		16.6GB
00-05	RAID5(4+P)	0	ready		16.6GB
00-06	RAID5(4+P)	0	ready		16.6GB
00-07	RAID5(4+P)	0	ready		16.1GB
00-08	RAID5(4+P)	0	ready		16.1GB

The display items are as follows:

RANK No.(h):	RANK number
RAID Type:	RAID type of the RANK
RebuildTime(hours):	Time required for rebuilding the RANK
RANK State:	Status of the RANK
Progress Ratio:	Progress ratio
RANK Capacity:	Capacity of the RANK

(5) Information about pools (PoolList.csv)

Outputs a list of pools.

Pool No(h)	Pool Name	Pool Type	RAID Type	Pool State	Expansion State	Progress Ratio	Pool Capacity
0000	Pool00	virtual	RAID1	attn.(rebuilding)	---		14.5GB
0001	Pool01	virtual	RAID1	attn.(rebuilding)\	---		14.5GB
0002	Pool02	virtual	RAID1	attn.(rebuilding)	---		14.5GB
0003	Pool03	virtual	RAID1	attn.(rebuilding)	---		14.5GB
0004	Pool04	virtual	RAID1	fault	---		14.5GB
0005	Pool05	virtual	RAID5	ready	---		52.0GB
0006	Pool06	virtual	RAID5	ready	---		52.0GB
0007	Pool07	virtual	RAID6(4+PQ)	ready	---		66.5GB
0008	Pool08	virtual	RAID6(4+PQ)	ready	expanding	20%	66.5GB

Pool Capacity(bytes)	Used Pool Capacity	Used Pool Capacity(bytes)	Free Pool Capacity	Free Pool Capacity(bytes)
13000000000	4.5GB	3000000000	10.0GB	10000000000
13000000000	4.5GB	3000000000	10.0GB	10000000000
13000000000	4.5GB	3000000000	10.0GB	10000000000
13000000000	4.5GB	3000000000	10.0GB	10000000000
13000000000	4.5GB	3000000000	10.0GB	10000000000
55000000000	17.5GB	18000000000	34.5GB	33000000000
55000000000	43.0GB	42000000000	9.0GB	9000000000
66000000000	21.0GB	21000000000	27.0GB	27000000000
66000000000	21.0GB	21000000000	45.5GB	43000000000

The display items are as follows:

Pool No(h):	Pool number
Pool Name:	Pool name
Pool Type:	Pool type
RAID Type:	RAID type of the pool
Pool State:	Pool state
Expansion State:	Pool expansion state
Progress Ratio:	Percentage of progress of pool expansion
Pool Capacity:	Capacity of the pool
Pool Capacity (bytes):	Capacity of the pool (bytes)
Used Pool Capacity:	Space used by the pool
Used Pool Capacity (bytes):	Space used by the pool (bytes)
Free Pool Capacity:	Free space not used by the pool
Free Pool Capacity (bytes):	Free space not used by the pool (bytes)

(6) Information about ports (PortList.csv)

Outputs a list of ports.

Port No.(h)	Port Name	Platform	Port Mode	Port State
00-00	Port1	WN	WWN	ready
00-01	Port2	NX	WWN	ready
01-00	Port3	NX	port	ready
01-01	Port4	NX	port	ready

The display items are as follows:

Port No.(h): Port number

Port Name: Port name

Platform: Platform

Port Mode: Mode of the port

Port State: Status of the port

(7) Information about the LD Set (LDSetList.csv)

Outputs a list of the LD Set.

Platform	LD Set Name
WN	exp54wd
NX	Lserver1

The display items are as follows:

Platform: Platform

LD Set Name: LD Set name

(8) Information about correspondence between LD Sets and paths (LDSet-Path.csv)

Outputs information about correspondence between LD Sets and paths.

Platform	LD Set Name	WWPN	Port No.(h)	Port Name
WN	exp54wd	1000-0000-C928-3A3F		
WN	exp54wd	1000-0000-C928-3A3C		
WN	exp54wd	1000-0000-C928-3A2C		
WN	exp54wd	0000-0001-C928-3A51		
A2	Lserver1			
NX	FileServer		00-00	StoragePort001

The display items are as follows:

Platform: Platform

LD Set Name: LD Set name

WWPN: WWPN

Port No.(h): Port number

Port Name: Port name

(9) Information about correspondence between PDs and LDs (PD-LD.csv)

Outputs information about correspondence between PDs and LDs.

PDN(h)	LDN(h)	OS Type	LD Name
00-00	0016	WN	pm_nx_drsys1
00-00	001c	WN	pm_nx_drsys2
00-00	001e	NX	pm_nx_drsys3
00-01	001f	NX	oracle_data01

The display items are as follows:

PDN(h): PD number

LDN(h): LD number

OS Type: OS type for each LD

LD Name: Optional identification information for each LD (logical disk name)

(10) Information about correspondence between RANKs and LDs (RANK-LD.csv)

Outputs information about correspondence between RANKs and LDs.

RANK No.(h)	LDN(h)	Start Address(h)	End Address(h)	Capacity
00-00	0000	00000000	00427fff	2128MB
00-00	0001	00428000	0084ffff	2128MB
00-00	0002	00850000	00c77fff	2128MB
00-00	free	00c78000	0109ffff	2128MB
00-01	0004	00000000	00109fff	532MB
00-01	0008	0010a000	00213fff	532MB
00-01	free	00214000	0031dfff	532MB

The display items are as follows:

RANK No.(h): RANK number

LDN(h): LD number (“free” when not constructed)

Start Address(h): Start address of LD or free space

End Address(h): End address of LD or free space

Capacity: LD capacity (MB)

(11) Information about correspondence between pools and LDs (Pool-LD.csv)

Outputs information about correspondence between LDs and pools.

Pool No(h)	LDN(h)	Start Address(h)	End Address(h)	Capacity
0000	0000	00000000	00427fff	2128MB
0000	0001	00428000	0084ffff	2128MB
0000	0002	00850000	00c77fff	2128MB
0000	free	00c78000	0109ffff	2128MB
0001	0004	00000000	00109fff	532MB
0001	0008	0010a000	00213fff	532MB
0001	free	00214000	0031dfff	532MB
0001	0010	0031a000	00427fff	532MB
0002	0020			8192MB
0002	0021			8192MB
0002	free			32MB

The display items are as follows:

Pool No(h): Pool number

LDN(h): LD number ("free" is displayed if the LD has not been bound.)

Start Address(h): Start address of the LD or free area

End Address(h): End address of the LD or free area

Capacity: LD capacity (units of MBs)

(12) Information about correspondence between ports and LDs (Port-LD.csv)

Outputs information about correspondence between ports and LDs.

Port No(h)	Port Name	LDN(h)	OS Type	LD Name
00-00	Port3	0000	NX	100000000000100000
00-00	Port3	0001	NX	100000000000100000
00-00	Port3	0002	NX	100000000000100000
00-00	Port3	0003	NX	100000000000100000

The display items are as follows:

Port No(h): Port number

Port Name: Port name

LDN(h): LD number

OS Type: OS type for each LD

LD Name: Optional identification information for each LD (logical disk name)

(13) Information about correspondence between LD Sets and LDs (LDSet-LD.csv)

Outputs information about correspondence between LD Sets and LDs.

Platform	LDSet Name	LDN(h)	LUN(h)	OS Type	LD Name
WN	Exp120rc	0000	0000	WN	200000004C0123450000
WN	Exp120rc	0001	0001	WN	200000004C0123450001
WN	Exp120rc	0002	0002	WN	200000004C0123450002
WN	Exp120rc	0003	0003	WN	200000004C0123450003
WN	Exp120rc	0004	0004	WN	200000004C0123450004
WN	Exp120rc	0005	0005	WN	200000004C0123450005
WN	Exp120rc	0006	0006	WN	200000004C0123450006
NX	Lserver1	0010	0011	NX	200000004C0123450020
NX	Lserver1	0011	0012	NX	200000004C0123450021

The display items are as follows:

Platform: Platform

LD Set Name: LD Set name

LDN(h): LD number

LUN(h): LUN number

OS Type: OS type for each LD

LD Name: Optional identification information for each LD

(14) Information about correspondence between RANKs and PDs (RANK-PD.csv)

Outputs information about correspondence between RANKs and PDs.

RANK No(h)	PDN(h)
00-01	00-01
00-01	00-02
00-02	00-03
00-02	00-04

The display items are as follows:

RANK No(h): RANK number

PDN(h): PDN number

(15) Information about correspondence between pools and PDs (Pool-PD.csv)

Outputs information about correspondence between pools and PDs.

Pool No(h)	PDN(h)
0001	00-01
0001	00-02
0002	00-03
0002	00-04

The display items are as follows:

Pool No(h): Pool number

PDN(h): PDN number

(16) Information about cache partitioning (CachePartitioning.csv)

Outputs information about cache partitioning.

Cache Partitioning Mode	Allocatable Cache Capacity	Total Allocated Capacity
off	32.00GB	25.00GB

Total Unallocated Capacity	Total Minimum Capacity	Current Segment Count
7.00GB	25.00GB	0

The display items are as follows:

Cache Partitioning Mode:	Cache partitioning mode
Allocatable Cache Capacity:	Capacity of cache to be allocated
Total Allocated Capacity:	Total capacity of cache to be allocated
Total Unallocated Capacity:	Capacity of unallocated cache
Total Minimum Capacity:	Total minimum capacity
Current Segment Count:	Number of current cache segments

(17) Information about cache segments (CacheSegmentList.csv)

Outputs a list of cache segments.

Segment Number(h)	Segment Name	Maximum Capacity	Maximum Ratio	Minimum Capacity
00	DefaultSegment	1.00GB	50%	1.00GB
01	Server1	1.00GB	50%	1.00GB

Minimum Ratio	Allocated Cache Capacity	Allocated Cache Ratio
50%	1.00GB	50%
50%	1.00GB	50%

The display items are as follows:

Segment Number(h):	Cache segment number
Segment Name:	Cache segment name
Maximum Capacity:	Maximum capacity of cache to be allocated (capacity)
Maximum Ratio:	Maximum capacity of cache to be allocated (ratio)
Minimum Capacity:	Minimum capacity of cache to be allocated (capacity)
Minimum Ratio:	Minimum capacity of cache to be allocated (ratio)
Allocated Cache Capacity:	Capacity of cache currently allocated (capacity)
Allocated Cache Ratio:	Capacity of cache currently allocated (ratio)

(18) Information about correspondence between cache segments and LDs (CacheSegment-LD.csv)

Outputs information about correspondence between cache segments and LDs.

Segment Number(h)	SegmentName	LDN(h)	OS Type	LD Name
00	DefaultSegment	0000	WN	LD-RPL001
00	DefaultSegment	0000	WN	LD-RPL002
00	DefaultSegment	0000	WN	LD-RPL003
00	DefaultSegment	0000	WN	LD-RPL004
00	DefaultSegment	0000	WN	LD-RPL005
01	Segment1	0001	NX	LD-CONF0001
02	Segment2	0002	NX	LD-CONF0002

The display items are as follows:

Segment Number(h):	Cache segment number
Segment Name:	Cache segment name
LDN(h):	LD number
OS Type:	OS type for each LD
LD Name:	Optional identification information for each LD

(19) Information about pairs (PairInfo.csv)

Outputs information about pairs of the replication function.

MV DiskArrayName	MV OS Type	MV LD Name	RV DiskArrayName	RV OS Type	RV LD Name
Storage003	NX	pm_nx_ora9c	Storage003	NX	pm_nx_rv01
Storage003	NX	pm_nx_ora9d	Storage003	NX	pm_nx_rv02
Storage003	NX	pm_nx_ora9l	Storage003	NX	pm_nx_rv03
Storage003	NX	pm_nx_ora9a	Storage003	NX	pm_nx_rv04

The display items are as follows:

MV DiskArrayName:	Name of the disk array to which MV belongs
MV OS Type:	OS type of MV
MV LD Name:	Logical disk name of MV
RV DiskArrayName:	Name of the disk array to which RV belongs
RV OS Type:	OS type of RV
RV LD Name:	Logical disk name of RV

(20) Information about snapshot LDs (SnapshotLDList.csv)

Outputs information about LDs of the snapshot function.

LDN(h)	OS Type	LD Name	Snapshot Attribute	LDN(h)	OS Type	LD Name	Snapshot Attribute
0001	NX	LD0001	BV	0003	NX	LD0003	SV
0002	NX	LD0002	BV	0004	NX	LD0004	LV
0003	NX	LD0003	SV	0001	NX	LD0001	BV
0004	NX	LD0004	SV	0004	NX	LD0002	LV

The display items are as follows:

LDN(h):	LD number
OS Type:	OS type for each LD
LD Name:	Arbitrary identification information (logical disk name) for each LD acquired from the disk array
LD Capacity:	Capacity of an LD
Snapshot Attribute:	Snapshot volume type

(21) Information about snapshot pool (SnapshotPoolList.csv)

Outputs information about pools of the snapshot function.

Pool No(h)	Pool Name	Threshold	Total Snapshot Capacity	Total Snapshot Capacity (bytes)
0001	Pool0001	---	55.0GB	59055800320

Used Snapshot Capacity	Used Snapshot Capacity (bytes)	Used Snapshot Capacity (%)	Snapshot Threshold
16.5GB	17716740096	30	44.0GB

Snapshot Threshold (bytes)	Snapshot Threshold (%)	Snapshot Control Capacity
47244640256	80	2.0GB

Snapshot Control Capacity (bytes)
2148532224

The display items are as follows:

Pool No(h):	Pool number
Pool Name:	Pool name
Threshold:	Threshold state
Total Snapshot Capacity:	Capacity of the snapshot reserve area
Total Snapshot Capacity(bytes):	Capacity of a snapshot reserve area (bytes)
Used Snapshot Capacity:	Space used for snapshot
Used Snapshot Capacity(bytes):	Space used for snapshot (bytes)
Used Snapshot Capacity(%):	Space used for snapshot (%)
Snapshot Threshold:	Snapshot threshold
Snapshot Threshold(bytes):	Snapshot threshold (bytes)
Snapshot Threshold(%):	Snapshot threshold (%)

Snapshot Control Capacity: Space used for controlling snapshot

Snapshot Control Capacity(%): Space used for controlling snapshot (%)

(22) Information about correspondence between snapshot pool and SDV (SnapshotPool-SDV.csv)

Outputs information about pool of the snapshot function.

Pool No(h)	Pool Name	LDN (h)	OS Type	LD Name	LD Capacity
0001	Pool0001	0004		Pool0001_SDV0004	57.0GB

Pool No(h): Pool number

Pool Name: Pool name

LDN(h): LD number

OS Type: OS type for each LD

LD Name: Arbitrary identification information (logical disk name) for each LD acquired from the disk array

LD Capacity: Capacity of each LD

(23) Information about Atomic Group (ATGInfo.csv)

Outputs information about Atomic Group.

AtgroupName	DiskArrayName	LDN	OS Type	LD Name
ATG0001	Storage002	0001h	WN	LD0001

ATgroupName: Name of Atomic Group

DiskArrayName: Name of each disk array

LDN: LD number

OS Type: OS type for each LD

LD Name: Arbitrary identification information (logical disk name) for each LD acquired from the disk array

(24) Information about correspondence between pool and pool-expanding PD

Outputs information about correspondence between pool and pool-expanding PD.

Pool No(h)	PDN(h)
0001	00-11
0001	00-12
0002	00-13
0002	00-14

Pool No(h): Pool number

PDN(h): Pool-expanding PDN number

1. This command can be executed by the user who has an administrative right or the administrator for iSM.
2. When output CSV files are displayed by using Excel, correct data may be included depending on the standard data format of Excel. Select [Data]-[Get External Data]-[Import Text File]-[Files of type]-[All Files] and then include the desired CSV files.
3. This command may take much time to obtain configuration information depending on the configuration.

Chapter 6 Measures in Abnormalities

6.1 Measures for Server Fault

Detections and measures of software fault in the server program (iSM server) that may occur during the operation of iSM are mainly described herein.

6.1.1 Fault Detection from Client Screen

First, the server fault can be detected from the iSM client screen.
The iSM server software fault is notified in the message display area on the iSM client main screen as a warning or an error message.
For details of the message, refer to the “Messages Handbook”.
When the hardware fault of disk array is notified on the main screen or replication screen, contact our maintenance personnel or consult with the manual for each disk array.

6.1.2 Server State Check

When iSM server does not work properly and you cannot check from the client, log in the host which iSM server operates and checks the status.

(1) About the dialog box which comes out when iSM server is manually started from service

When it fails in starting of iSM server, the following dialog boxes may be displayed.

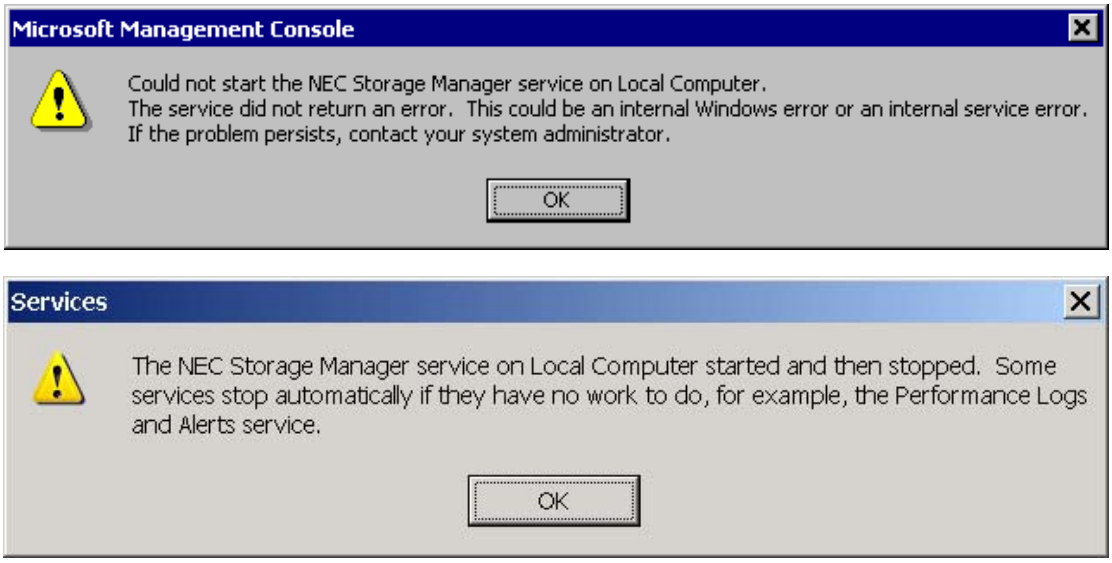


Figure 6-1 Dialog Box Displayed at iSM Server Start Failure

About the reason of this dialog, consider the following several

• The environment setting mistake (information of the physical disk which not exists is set up. etc)

About all above reason, refer to the event log and operation log.

(2) Operating state check by Windows Task Manager

Open the Windows Task Manager and check whether the iSM server is operating. Check if iSMmaind.exe for managing the processes of the iSM server is active.

Figure 6-2 shows a sample of a report on the iSM server's processes. The number of processes may change or processes not shown here may be used.

Image Name	PID	CPU	CPU Time	Mem Usage
iSMcmdd.exe	2880	00	0:00:00	2,908 K
iSMconfig.exe	824	00	0:00:00	3,152 K
iSMdrd.exe	1608	00	0:00:00	2,928 K
iSMft.exe	2244	00	0:00:00	2,884 K
iSMftd.exe	2052	00	0:00:00	3,256 K
iSMlogd.exe	984	00	0:00:00	3,992 K
iSMmaind.exe	1952	00	0:00:00	3,572 K
iSMmainNT.exe	2128	00	0:00:00	2,276 K
iSMmsgdd.exe	1008	00	0:00:00	3,576 K
iSMoptd.exe	2860	00	0:00:00	4,016 K
iSMoptfad.exe	2872	00	0:00:00	2,176 K
iSMprfd.exe	1292	00	0:00:11	10,900 K
iSMprfrtd.exe	1912	00	0:00:04	2,988 K
iSMrmond.exe	2040	00	0:00:03	2,848 K
iSMrmrtndata.ex	1480	00	0:00:00	2,328 K
iSMrmsmd.exe	2444	00	0:00:00	2,664 K
iSMrpl_report.e	2256	00	0:00:00	5,200 K
iSMss.exe	2928	00	0:00:00	3,872 K
iSMssd.exe	1880	00	0:00:00	3,008 K

Figure 6-2 Operating State Sample of the Windows Task Manager

(3) Message check

The message that can be referred on the client screen is stored in the log file (installed directory\etc\log subordinate) on the iSM server operating system.

Please refer to 3.5 "Log Output" in Part II "Functions" for log output.

Important messages are also written in the event log simultaneously.

The messages that cannot be written in the log file, or before completion of the iSM server starts need to refer to this event log.

The user can change file size property and the overwriting mode based on the event viewer.

(4) Monitoring of iSM server

If the operation monitoring software monitors iSM server processes, iSMmaind.exe that manages all iSM server processes are to be monitored.

6.1.3 Fault Caused by Failure in Connection with Disk Array

A disk array to be monitored is registered, during configuration, via specification of an IP address or host name (for TCP/IP connection) or specification of a disk and automatic detection (for FC-AL connection).
If this description for connection is incorrect or it cannot be connected by fault, the iSM server cannot monitor the disk array.
The following causes can be considered.

(1) Fault in IP address specification by TCP/IP connection

- Error in specification of an IP address or host name
- By network definition error and circuit fault, network did not connect between host that the iSM server operates and SVP of the disk array.
- Same disk array were doubly defined or also defined in FC definition.
- In two or more IP address descriptions, different disk array's IP address was defined as the same disk array.
- In the SVP definition disk array, monitoring from the host that the iSM server operates was not permitted.

(2) Fault in FC-AL connection

- Error in specification of a disk or specification missing of disk and automatic detection
- Disk array cannot be access based on hardware fault. (fault of FC-AL card, disconnection of FC-AL, disk array's down etc.)

6.1.4 Fault in Client Management

If an attempt to start the iSM server fails due to a fault in client management, a possible cause is duplicated port numbers.
The connection port number of the client information specified at environment definition should be changed to a port number that is not being used. In addition, on the client side, the port number of the iSM server should be changed and should be corrected to the above-mentioned setting value.

6.1.5 Monitoring on Disk Array has Stopped Due to Failure

Control path failure or disk array failure in a monitored disk array may result in discontinuation of disk array monitoring.
In this case, iSM switches the monitoring state on the concerned disk array into "Wait Recovery", and waits for recovery from the failure.
The fault-recovery waiting process checks the status of the faulty disk array at intervals specified in the environment definition file (monitoring restarting allowance check interval), and restarts monitoring automatically upon recognizing fault recovery.

The status waiting for faulty recovery continues until the fault recovers. To interrupt waiting for fault recovery, perform interruption process on monitoring control screen on iSM client (after executing interruption, monitoring state becomes “Stop (Fault)”).
For restarting the monitor function after recovery from failure, perform interruption process on monitor control screen on iSM client and then start monitoring again.

If monitoring on a disk array discontinues due to problems with a management server (insufficient resources, etc.), fault recovery is not waited for. In such a case, monitoring state becomes “Stop (Fault)”.

6.1.6 Failures in Performance Relation, Replication and Snapshot Operation

When Performance Monitoring, Performance Optimization, Replication or Snapshot operation fails, check the following first.

- Was the product to use Performance Monitoring, Performance Optimization, DynamicDataReplication, RemoteDataReplication or Snapshot purchased for the target disk array?
- You can check what has been purchased in Disk Array Properties in the Performance Monitoring screen on the client.
- Is the process of Performance Monitoring, Performance Optimization, Replication or Snapshot running on the machine where the iSM server is operating?
- Are there any forbidden operations done in Replication or Snapshot?

6.1.7 Restart after Server Abnormalities

If any process of an iSM server has halted after the iSM server went operable, the iSM server autonomously restarts to continue monitoring of the disk array. If an iSM client is used, connection is terminated so that re-connection is required after the iSM server is operable. The iSM server attempts to restart up to five times in an hour. If the iSM server is unable to restart at the sixth attempt, it stops or shuts down the current function.
If asking for a check on the fault, gather the fault information according to 6.1.9 “Information Gathering Method when Server Fault with Unknown Cause”.
* The iSM server becomes operable after the message “iSM01002 Storage Manager is ready” is output.
* If the iSM server shuts down a function, the message “iSM01101 The function is not available.function=function-name” is output.

The shutdown of an iSM server function means that the iSM server continues operation even if the target process (one of the processes shown in the table below) is not operating. In this case, the function of the target process cannot be used. If the process’s function is mandatory, stop the iSM server, check and eliminate the cause of the fault according to the message, and then restart the iSM server.

Table 6-1 Processes Continued by the iSM server even if They are not Operating

Process Name	Function
iSMdrd.exe, iSMrpl_report.exe	Replication (DDR/RDR) management function ReplicationControl If this function is unavailable, the clients are not permitted to use the pair function, unpair function, or volume operation function through the GUI. For the replication function, refer to the "Data Replication User's Manual (Function Guide)" and "Data Replication User's Manual (Installation and Operation Guide for Windows)".
iSMmsgdd.exe	Event link function msgdrv If this function is unavailable, the mail link function and shell link function cannot be used. For the event link function, refer to 3.6 "Event Link".
iSMprfd.exe, iSMprfrtd.exe	Performance monitoring function PerformanceMonitor If this function is unavailable, a performance monitoring command (e.g., iSMprflog) cannot be executed and the clients are not permitted to use the function for monitoring disk array performance through the GUI. For the performance monitoring function, refer to the "PerformanceMonitor User's Manual.
iSMconfig.exe	Configuration setting (GUI) function config GUI If this function is unavailable, the clients are not permitted to use the functions for setting a disk array configuration and referring to the configuration information through the GUI. For the configuration setting (GUI) function, refer to the "Configuration Setting Tool User's Manual (GUI)".
iSMoptd.exe, iSMoptfad.exe	Performance optimization function PerformanceOptimizer If this function is unavailable, the clients are not permitted to use the function for tuning disk array performance through the GUI. For the performance optimization function, refer to the "PerformanceOptimizer User's Manual".
iSMcmdd.exe	Configuration setting (GUI) function ISMcmd If this function is unavailable, the clients are not permitted to use the function for saving disk array's configuration setting information through the GUI. For the configuration setting (GUI) function, refer to the "Configuration Setting Tool User's Manual (GUI)".
iSMalived.exe	ALIVEmail function ALIVEmail If this function is unavailable, a fault cannot be reported to the NEC Fielding by e-mail. (A maintenance contract is needed for a fault report.)
iSMftd.exe	File transfer function FileTransfer If this function is unavailable, the function to transfer files to/from the iSM clients cannot be used.
iSMssd.exe	Snapshot function Snapshot If this function is unavailable, the clients are not permitted to use the functions for snapshot operation through the GUI. For the snapshot function, refer to the "Snapshot User's Manual (Function Guide)".

6.1.8 Others

The following error can also occur.

- The area overflow under the directory of installation destination directory\etc.

  Not only log files, but trace and internal socket paths at the time of the fault occurrence are stored here. So when the capacity is filled up, the iSM server will not work.

6.1.9 Information Gathering Method when Server Fault with Unknown Cause

Because the cause of server fault is unknown, necessary information for fault analysis should be gathered when you ask us for investigation.

You may gather the necessary information by executing the following command.

(1) Log on as the Administrator.

(2) Execute [Difficulty Information Gather] from the [Server Menu].

(3) Check that the directory iSMgather is created under the directory where the iSM server is installed when a directory is not specified, and under the specified directory when one is specified.

Server fault information gathering can be performed from a client. For details, refer to 6.2.4 “Information Gathering Method when Client Fault with Unknown Cause”.

To gather information at occurrence of an iSM fault, collect a subsystem log (default) as part of fault analysis information. If the subsystem log is collected, it takes time to collect fault analysis information.

6.2 Measures for Client Fault

Description herein is the detection and measures of client program (iSM client) that operate on a personal computer especially for software fault that may occur during the iSM operation.

6.2.1 Message Dialog

Basically a fault event is described to the user as a message dialog interactively. Individual dialog details are checked with the iSM client HELP. If you follow these instructions, processing is executed normally.

<Example: A client fails to start when a port number is specified in duplicate.>

If the port number to be used in a client is already used, the iSM client fails to start displaying the [00007-00] message dialog box. In this case, the iSMmain.ini file in the folder containing the iSM client needs to be edited as shown below.

[CLIENT]
PORT=8021 ← Specify a port number other than 8021.

1. A value 1 to 65535 can be specified as a port number. If a value outside the range is specified, the system terminates displaying the error message dialog box.
2. If the iSM client is active, the set value becomes valid after the client starts next time.
3. The iSMmain.ini file contains various settings. If you edit any parameters other than the iSM client's port number in the iSMmain.ini file, the operation of the iSM client is not guaranteed. To prevent this problem, do not change any other parameter settings.

6.2.2 Communication fault

If the connection with the iSM server fails, the server, not the client, may have the problem. Check the messages, etc. on the server, and identify the problem. The problem may be also communication abnormalities that are not related to iSM. The communication status between the iSM server and client should be checked.

6.2.3 Reconnection

Because the iSM client specifies the information display as its main function, the iSM may rebuild when reconnection is tried in software fault.

6.2.4 Information Gathering Method when Client Fault with Unknown Cause

Because the cause of client fault is unknown, necessary information for fault analysis should be gathered when you ask us to investigate. Select [Operation] → [Difficulty Information Gather] from the menu, and use the Difficulty Information Gather screen that starts to gather fault information. If you execute this operation during connection to the server, you can gather server fault information at the same time. Gathered information is stored with the following file names in the saving folder [\iSMgather[\iSMsvr]] and [\iSMgather[\iSMclient]].

- *hostname*_iSMgather(*n*).cab
- *hostname*_iSMvolgather(*n*).cab
- iSMCL_gather(*n*).cab

where

hostname: Host name of the connected server
(If the host name exceeds 16 bytes, the first 16 bytes are used.)

n: Identification number used if multiple files exist

The default saving folder is “client installation folder[\SGn]\DATA”.
SGn: Folder displayed in [Folder Name] of Connection Settings
(If [Folder Name] displays the “default” connection, the default value is “client installation folder\DATA”.)

When gathering fault information, history information (GatherResult.log) of gathering fault information is also stored in the saving folder. Send us the history information file together with server information and client information.

To gather server fault information at the same time, set [Detail2] → [File Transfer Information] correctly on Setting Utility screen.

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Appendix A Specifications

A.1 Number of Monitored Disk Arrays

An iSM server can monitor a maximum of 32 disk arrays.

A.2 Number of Connected Clients

One iSM server can connect with a maximum of 32 iSM clients.

A.3 Maximum Number of iSM Clients That Can Be Started Simultaneously

Up to ten iSM clients can be started on a single PC at the same time. Depending on the execution-time environment (including the free memory space), however, the maximum number of clients may not be started simultaneously.

Appendix B Environment Definition Language

B.1 Mail Header File

This section describes about the mail header file specified with the Link information used in the environment setting. For details of the environment setting, refer to Part I 1.3 “Environment Setting”.

(1) Header File

The header file is the form of the actual mail to transmit, and mainly describes the header part of the mail. Input “FROM:” on the first line, and write the mail sender’s name. If mail transmission fails in SMTP server due to wrong target mail address, etc., an error message from SMTP server may send to a sender’s mail address. The contents of the mail text after the second line are sent as it is, the part above the blank line is the header, and subsequent part is the body of the mail. A message including “$MSG” in body is converted into a message that is output to an operation log triggered by “$MSG” for linkage.

FROM: iSMserver@xxx.co.jp } Describe sender’s mail address.
SUBJECT: iSMserver error report. } Header
← blank line
This is the iSMserver at XXXX(domain name etc.)
Error Reporting.
$MSG → A message output to operation log that triggered object linkage is described in this line. } Body

1. Mail address to input on the “FROM:” line must be a complete one that includes domain name.
2. Various header lines in accordance with RFC822 can be written in the header part.
3. Any contents can be described in the body part.
4. The size of the whole header file must be less than 1KB. Also, one line must be less than 256 bytes (including blank / tab / carriage return).
5. When a part of “$MSG” of a certain line is replaced into the message content, a “$MSG” which appeared first can be replaced. So even if two or more “$MSG”s are described in one line, only the first “$MSG” is replaced. However, if the “$MSG”s are described in each line, they spread to each message.

Appendix C Notes

C.1 Items about Server

Note on the iSM server are described below.

1. One iSM server can be installed/operated in one server.
2. One disk array should be controlled by one iSM server.
3. If installing multiple disk arrays or installing an additional one, you need not run or add multiple iSM servers.

   A single iSM server can monitor multiple disk arrays.

   Note the following about iSM versions:

   - If you have multiple iSM media, use an iSM server of the latest version.

     The reason for this is that iSM servers of older versions do not support new disk arrays.
   - If you install a disk array of a new type, you need to upgrade the currently running iSM server to the latest version.
   - iSM clients must use programs of the same versions as those on the servers.
4. To conduct monitoring from multiple iSM servers at the same time, install a single iSM server for monitoring a disk array and connect multiple iSM clients to it for monitoring.

   The reason for this is that a disk array cannot be monitored by multiple iSM servers at the same time.

   If configuring iSM servers into a cluster, configure them into a unidirectional standby cluster so that they are monitored by a single server at the same time.
5. When there are many resources of a disk array, the amount of information to be collected is increased. Therefore, it may take a few minutes until the iSM server starts and the monitoring of the disk arrays resumes.
6. The contents of mail header file are sent in sequence to SMTP server in the mail function at the event link. However, in case that a part of Windows base SMTP server does not accept starting a new paragraph without using <CR+LF>, should be modified to <LF> to <CR+LF> by altering it to start a new paragraph in the mail header file.
7. iSM server stops the mail transmission service after any problem occurs when communicating with the SMTP server.

   In resuming, please re-start iSM server.

   The mail transmission service may be blocked by activation order, especially when the SMTP server is operated simultaneously in the same machine.
8. If iSM server cooperates with SNMP trap service, and SNMP trap service is re-started while running, SNMP trap cannot be received after restarting. In this case, re-starting of iSM server is needed.

9. When a system is high load, the following phenomena may occur.
   - iSM server may terminate abnormally. In this case, Please re-start iSM server.
   - The display and operation by iSM client may be kept waiting. In this case, please re-perform after carrying out for a while.

C.2 Items about Client

Note on iSM client are described below.

1. One iSM client can be installed/operated in one PC.
2. With respect to the CSV output function for the information view list, when a CSV format file is opened by spreadsheet software, the name part, which is only configured by numbers, may become exponent notation (like 30000000000000000000 → 3E+19).
3. The configuration of the disk array cannot be displayed while changing configuration through maintenance.
4. The configuration of the target disk array cannot be displayed while the network path connecting the disk array and the iSM server is failing.
5. Do not set the same name (disk array, logical disk, port) in the same iSM server.
6. The format cannot be changed for a logical disk for which the pair setting of replication is specified.
7. When the logical disk with the same number is built, note that the name and the form which were set before are inherited.
8. The disk array name is used as part of a name of a statistical information history/summarized file in the performance monitoring function. For some platforms (OS), file names are not case-sensitive. Keep this in mind when specifying a disk array name.

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