SnapSAN™ CLI Command Reference Linux

User Guide

S3000/S5000

Preface

This user guide explains how to use various types of commands provided for Data Replication, Snapshot, Worm, Performance Monitor, and other functions.This guide assumes that you are familiar with computer hardware, data storage, and network administration terminology and tasks. It also assumes you have basic knowledge of Internet SCSI (iSCSI), Serial-attached SCSI (SAS), Serial ATA (SATA), Storage Area Network (SAN), and Redundant Array of Independent Disks (RAID) technology.

This guide assumes that you are familiar with computer hardware, data storage, and network administration terminology and tasks. It also assumes you have basic knowledge of Internet SCSI (iSCSI), Serial-attached SCSI (SAS), Serial ATA (SATA), Storage Area Network (SAN), and Redundant Array of Independent Disks (RAID) technology.

Product Documentation and Firmware Updates

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

Point your browser to:

http: //docs.overlandstorage.com/snapsan

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

Overland Technical Support

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

http: //support.overlandstorage.com/kb

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

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

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

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

Conventions

This user guide exercises several typographical conventions:

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

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

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Command List

Overview

The following lists commands described in this document. The description of "UNIX" that appears in this document indicates all the UNIX systems, such as Linux, which ControlCommand supports.The commands described can be used by installing ControlCommand.

Command List for Common Function

No.	Command Name	Operation	Description	Target System	
				Windows	UNIX
1	iSMvollist	Volume list creation/display	Associates the logical disk information (disk array side) and the system information (server side) and displays it.	✔	✔
2	iSMcc_hostinfo	Host information collection	Collects the host information (including OS identification and system configuration information).	✔	✔
3	iSMrc_ldlist	Logical disk information display	Lists the information on logical disks in the disk array.	✔	✔
4	iSMrc_sense	Volume list display , ATgroup setting information display	Displays the information on a specific volume or the setting information of ATgroup.	✔	✔
5	iSMrc_flush	File system buffer flush	Flushes the file system cache buffer.	✔	-
6	iSMrc_mount	Volume mount	Mounts the volume (file system).	✔	-
7	iSMrc_umount	Volume unmount	Unmounts the volume (file system).	✔	-
8	iSMrc_signature	Disk signature operation	Performs an operation on each disk signature.	✔	-
9	iSMrc_scan	Disk scanning	Scans for available disks.	✔	-

✔: Target-: Non-target

- Commands No.1 and No.2 above can be used by installing the volume list command (iSMvollist) included in SnapSAN Manager.

- Each command mentioned in the above can be shared among data replication function (ReplicationControl, ReplicationControl/DisasterRecovery), snapshot function (SnapControl), WORM function (ProtectControl), and power saving function (PowerControl).

- On the Windows system, commands in the above table can be operated only by a user who belongs to the Administrators group.

- However, in a Windows Server 2008 environment in which User Account Control (UAC) is enabled, to log on as a user other than the user belonging to the OS local system administrators group and perform the operation, elevate to the system administrator in advance.

- On the UNIX system, operation authority belongs to a super user immediately after the installation. The volume list can be created only by the super user; other operations, however, can be performed by anybody by changing the authority for the command and directory operations.

- To use control volumes or to operate together with SnapSAN Manager, joint operation is possible with regard to commands No.3 and No.4. Commands No.1, No.2, and No.5 to No.9 are not targeted in joint operation with control volumes or SnapSAN Manager because those commands operate the system's volumes and collect the system information.

Command List for Data Replication Function

No.	Command Name	Operation	Description	Target System Windows	UNIX
1	iSMrc_replicate	Pair and ATgroup replicate	Starts replicating pairs and ATgroups.	✔	✔
2	iSMrc_separate	Pair and ATgroup separate	Separates pairs and ATgroups.	✔	✔
3	iSMrc_restore	Pair and ATgroup restore	Starts restoring pairs and ATgroups.	✔	✔
4	iSMrc_change	Pair copy control change, and ATgroup state change	Changes the copy control state of pairs and the state of ATgroups.	✔	✔
5	iSMrc_wait	Waiting for state transition of pair and ATgroup	Waits until replication, restoration, or separation is completed.	✔	✔
6	iSMrc_query	Pair and ATgroup state display	Displays the state of pairs and ATgroups.	✔	✔
7	iSMrc_rvmode	Change RV access restriction	Change RV access restriction.	✔	✔
8	iSMrc_updprevent	Cancels the update prevention state of the specified volume.	Cancels the update prevention state of the specified volume.	✔	✔
9	iSMrc_pair	Pairing/unpairing	Sets and cancels the paired volume.	✔	✔

No.	Command Name	Operation	Description	Target System Windows	UNIX
10	iSMrc_swap	Swap for Remote Replication pair	Swaps a Remote Replication pair or resumes a swap.	✓	✓
11	iSMrc_atg	ATgroup build	Creates and deletes ATgroups, updating attributes, and adds pairs to and deletes them from ATgroups.	✓	✓
12	iSMrc_arrayinfo	Disk array information display	Displays information about disk array replication.	✓	✓

✓: Target-: Non-target

- Commands for Common Function and each command listed in the above table can be used for data replication function (ReplicationControl and ReplicationControl/DisasterRecovery).

- On the Windows system, commands mentioned in the above table can be operated only by users who belong to the Administrators group.

  However, in a Windows Server 2008 environment in which User Account Control (UAC) is enabled, to log on as a user other than the user belonging to the OS local system administrators group and perform the operation, elevate to the system administrator in advance.

- On the UNIX system, operation authority belongs to the super user immediately after the installation. It can be performed by anybody by changing the authority for command and directory operations.

Command List for Snapshot Function

No.	Command Name	Operation	Description	Target System Windows	UNIX
1	iSMsc_create	Snapshot creation	Creates a snapshot (SV).	✓	✓
2	iSMsc_restore	Snapshot restoration	Restores from a snapshot (SV).	✓	✓
3	iSMsc_delete	Snapshot deletion	Deletes snapshot (SV) data.	✓	✓
4	iSMsc_svguard	SV guard classification setting and cancellation	Sets or cancels SV guard classification.	✓	✓
5	iSMsc_wait	Snapshot state wait	Waits for the snapshot (SV) state.	✓	✓
6	iSMsc_query	Snapshot information display	Displays snapshot information.	✓	✓
7	iSMsc_link	Link setting	Sets a link between a link- volume (LV) and BV/SV.	✓	✓
8	iSMsc_unlink	Link release	Releases a link between a link-volume (LV) and BV/SV.	✓	✓
9	iSMsc_linkinfo	Link information display	Displays link-related information.	✓	✓

✓: Target-: Non-target

- Commands for Common Function and each command mentioned in the above table can be used for snapshot function (SnapControl).
- On the Windows system, commands mentioned in the above table can be operated only by a user who belongs to the Administrators group.

  However, in a Windows Server 2008 environment in which User Account Control (UAC) is enabled, to log on as a user other than the user belonging to the OS local system administrators group and perform the operation, elevate to the system administrator in advance.

- On the UNIX system, operation authority belongs to a super user immediately after the installation. It can be performed by any user by changing the authority for the command and directory.

Command List for WORM Function

No.	Command Name	Operation	Description	Target System	
				Windows	UNIX*
1	iSMpc_protect	Protection setting or protection setting change for volume	Performs the protection setting for volume or changes the protection setting for volume.	✓	✓
2	iSMpc_release	Protection cancellation for volume	Cancels the protection for volume.	✓	✓

✓: Target-: Non-target

- Commands for Common Function and each command mentioned in the above table can be used for WORM function (ProtectControl).
- On the Windows system, commands mentioned in the above table can be operated only by a user who belongs to the Administrators group.

  However, in a Windows Server 2008 environment in which User Account Control (UAC) is enabled, to log on as a user other than the user belonging to the OS local system administrators group and perform the operation, elevate to the system administrator in advance.

- On the UNIX system, operation authority belongs to a super user immediately after the installation. It can be performed by anybody by changing the authority for the command and directory operations.
- Each command mentioned above is not targeted in joint operation with SnapSAN Manager.

Command List for Power Saving Function

No.	Command Name	Operation	Description	Target System	
				Windows	UNIX
1	iSMec_start	Starts using volumes or starts rotation of a pool	Starts using volumes or starts rotation of a pool.	✓	✓

No.	Command Name	Operation	Description	Target System Windows	UNIX
2	iSMec_stop	Stops using volumes	Stops using volumes.	✓	✓
3	iSMec_sense	Displays the use state and rotation state	Displays the use state and rotation state.	✓	✓

✓: Target-: Non-target

1. Commands for Common Function and each command mentioned in the above table can be used for power saving function (PowerControl).

2. On the Windows system, commands mentioned in the above table can be operated only by a user who belongs to the Administrators group.

   However, in a Windows Server 2008 environment in which User Account Control (UAC) is enabled, to log on as a user other than the user belonging to the OS local system administrators group and perform the operation, elevate to the system administrator in advance.

3. On the UNIX system, operation authority belongs to a super user immediately after the installation. It can be performed by anybody by changing the authority for the command and directory operations.

4. Each command mentioned above is not targeted in joint operation with SnapSAN Manager.

The commands described below can be used by installing ReplicationControl SQL Option. These commands are used in combination with the data replication function or snapshot function of ControlCommand.

Command List for Link Function

No.	Command Name	Operation	Description	Target System Windows	UNIX
1	iSMsql_snapshotbkup	Snapshot backup	Creates backups of the Microsoft SQL Server database.	✓	-
2	iSMsql_snapshotrst	Snapshot restoration	Restores the Microsoft SQL Server database from the backup.	✓	-

✓: Target-: Non-target

1. On the Windows system, commands mentioned in the above table can be operated only by a user who belongs to the Administrators group.

2. However, in a Windows Server 2008 environment in which User Account Control (UAC) is enabled, to log on as a user other than the user belonging to the OS local system administrators group and perform the operation, elevate to the system administrator in advance.

3. Each command mentioned in the above table is not targeted in joint operation with control volumes or SnapSAN Manager because those commands directly operate the system's volumes.

Volume Types

Types of volumes that are specified as operation targets by each function are as follows:

On the Windows system

Volume Types (Windows)

No.	Type	Description	Identifier
1	Logical disk name	Specifies the logical disk name set on the disk array side.	ld
2	Mount point volume name	Specifies the mount point volume name assigned by the system to the volume.	mvol
3	NTFS folder name	Specifies the NTFS folder name (path name) set for the volume.	mdir
4	Drive letter	Specifies the drive letter set for the volume.	drv
5	Physical disk number	Specifies the physical disk number of the disk (logical disk) assigned by the system.	dskn
6	Relative generation name	Specifies a number that is assigned in descending order (as in -2, -3, -4, etc.) relative to the latest generation (-1) to identify an SV corresponding to a BV.	relgen
7	Cyclic generation	Specified when the snapshot of the oldest generation is deleted as a new snapshot is created.	cyclic
8	Deleted SV auto selection	Indicates that the SV to be deleted is automatically selected when a snapshot is deleted.	auto
9	SV batch operation	Specified at the batch deletion of snapshots in all generations when a snapshot is deleted. Alternatively, specified to cancel all SV guard classifications under a BV together.	all

- The identifier is a character string that indicates the volume type and is used in the following cases:
  - When specifying a volume type by a command argument.
  - When specifying a volume type in the operation files of individual functions (replication operation file, snapshot operation file, and WORM operation file).
- Volume types No. 3 and No. 4 that cannot be used by the WORM operation commands.
- Volume type No. 5 can be used only when using the WORM operation commands.
- Volume types No. 6 to No.9 can be used only when using the snapshot operation commands and link operation commands.
- The volume type that can be used in remote operation (operation targeting a pair or volume of the remote disk array) is logical disk name only.
- The volume type that can be used in the joint operation with SnapSAN Manager is logical disk name only.

On the UNIX system

Volume Types (UNIX)

No.	Type	Description	Identifier
1	Logical disk name	Specifies the logical disk name set on the disk array side.	ld
2	Special file name	Specifies the special file name of the disk (logical disk) assigned by the system.	sfn
3	Volume group name	Specifies the volume group name of LVM that contains the disk (logical disk).	vg
4	Disk group name	Specifies the disk group name of VxVM that contains the disk (logical disk).	dg
5	Relative generation name	Specifies a number that is assigned in descending order (as in -2, -3, -4, etc.) relative to the latest generation (-1) to identify an SV corresponding to a BV.	relgen
6	Cyclic generation	Specified when the snapshot of the oldest generation is deleted as a new snapshot is created.	cyclic
7	Deleted SV auto selection	Indicates that the SV to be deleted is automatically selected when a snapshot is deleted.	auto
8	SV batch operation	Specified at the batch deletion of snapshots in all generations when a snapshot is deleted. Alternatively, specified to cancel all SV guard classifications under a BV together.	all

- The identifier is a character string that indicates the volume type and is used in the following cases:
  - When specifying a volume type by a command argument.
  - When specifying a volume type in the operation files of individual functions (replication operation file, snapshot operation file, and WORM operation file).
- To use the volume group, the LVM environment is necessary.
- To use the disk group, the VxVM environment is necessary.
- To specify a special file name (/dev/rdsk/c#t#d#s#), remove the special file name's slice (partition) number (s#).
- To specify a special file name (/dev/sdX# X is an alphabetic lower-case character), remove the special file name's partition number (#).
- Volume types No.5 to No.8 can be used only when using the snapshot operation commands and link operation commands.
- For the WORM operation commands, it is impossible to specify an LVM volume group or a VxVM disk group as the volume type.
- The pair operation command and ATgroup build command operation are performed on a single logical disk; therefore, it is impossible to specify an LVM volume group or a VxVM disk group.
- The volume type that can be used in remote operation (operation targeting a pair or volume of the remote disk array) is logical disk name only.
- The volume type that can be used in the joint operation with SnapSAN Manager is logical disk name only.

Log Output

ControlCommand outputs command operation history information to the command trace file. The following describes an overview of command trace file output operation and the contents of output items.

Operation Overview

The command trace file consists of the file being output and its generation files (backup file).
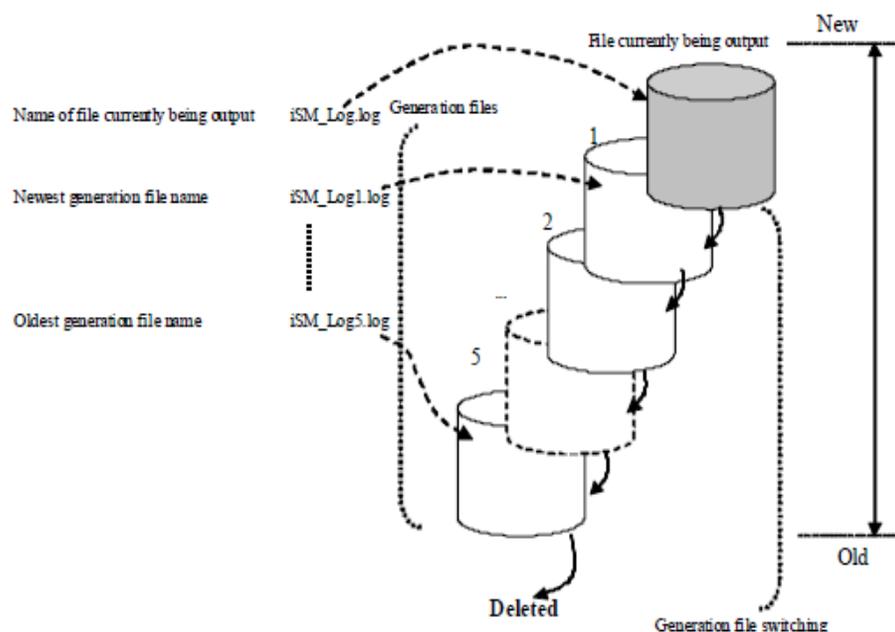
Figure 1-1: Five Generation Files Created in Command Trace File

- Location of command trace file creation

  Create a command trace file directly in the "etc" directory (folder) created under the directory (folder) where ControlCommand is installed.

- Command trace file size

  Create 200-KB (kilobytes) files of up to five generations by default.

  In Windows, the file size and the number of generations can be changed by using the operation option setting file. In UNIX, they can be changed by using environment variable settings.

- Command trace file name

  - SnapSAN Manager_Log.log: Newest command trace file

  - SnapSAN Manager_Log(n).log: Command trace file of n generations ago

- Generation file switching

  Generation file switching of the command trace file takes place when the size set in the operation option setting file (Windows) or in the environment variable (UNIX) is exceeded.

  At this time, if the maximum number of generations set in the operation option setting file (Windows) or in the environment variable (UNIX) is exceeded, the oldest file is deleted.

  Generation file switching is transparent to the user because it is automatically performed.

Contents of Output Items

The following items are output to the command trace file.

- Trace information output time and information for identifying commands and processes (common information)
- Command execution image

  The image of the executed command is output.
- Command output messages and execution result

  The contents of output messages displayed on a terminal when a command is executed are also output to the command trace file. However, if a command for information display is executed, the display result is not output.

```
2007/09/12 11:27:58.639 host1 VOL-CLI   : 0000003521(0000002580) Info    vollist      iSM13200: ~
2007/09/12 11:27:58.690 host1 VOL-CLI   : 0000003521(0000002580) Info    vollist      iSM13247: ~
2007/09/12 11:28:24.493 host1 RPL-CLI   : 0000003526(0000002864) Info    rc_query     iSM13200: ~
2007/09/12 11:28:24.574 host1 RPL-CLI   : 0000003526(0000002864) Info    rc_query     iSM13247: ~
2007/09/12 11:29:01.140 host1 SC-CLI    : 0000003528(0000002792) Info    sc_query     iSM19000: ~
2007/09/12 11:29:48.577 host1 EC-CLI    : 0000003531(0000002264) Info    ec_sense     iSM25000: ~
2007/09/12 11:30:12.112 host1 PC-CLI    : 0000003533(0000002592) Info    pc_protect   iSM21000: ~
2007/09/12 11:30:12.322 host1 PC-CLI    : 0000003533(0000002592) Info    pc_protect   iSM21011: ~
        :
```

Common Information for Command Trace File

Item	Description
Date	Date information is output in the "yyyy/mm/dd" format.
Time	Time information is output in the "hh:mm:ss.msec" format.
Host name	The host name of server that executed the command is output.
Function type	A function type is output.
Process number (thread number)	A command process number is output in a decimal format. For Windows, a thread number is output in decimal.
Error level	An error level is output.
Command type	A command type is output.

Item	Description
Message ID	A message ID is output.
Message text	A message text is output.

Common Functions

Volume List Creation/Display

The iSMvollist command creates and displays the list of logical disks and related information. The Volume List can be created and displayed only by the devices recognized by the system.

iSMvollist (Windows)

Creates and displays the table of logical disks and related information.

[Synopsis]

```
iSMvollist  -cr
iSMvollist  -d
iSMvollist  -dl  disk_array  [ld_number]
iSMvollist  -de  disk_array  [ld_name]
iSMvollist  -dd  disk_array  [drive  |  path]
iSMvollist  -dp  disk_array  [disk_number]
iSMvollist  -dh  disk_array  [HBT  [LUN]]
iSMvollist  -a
iSMvollist  -al  ld_number
iSMvollist  -ae  ld_name
iSMvollist  -ad  {drive  |  path}
iSMvollist  -ap  disk_number
iSMvollist  -av  volume_name
iSMvollist  -ah  HBT  [LUN]
iSMvollist  -ai  [-pd  pd_type]
iSMvollist  -ctl
iSMvollist  -p
iSMvollist  -ax
iSMvollist  —ver
iSMvollist  -tgt  {-all  |  -ldname  ldname  |  -arrayname  arrayname}
iSMvollist  -?
```

Options

The iSMvollist command recognizes the following options and arguments.

- -cr

  Scans the physical disks connected to the server, and creates or updates the volume information of the target devices. When disk arrays are added or deleted, and when logical disks are bound or unbound, you must perform this command to re-create the Volume List.

- -d

  Displays the list of the disk arrays in the Volume List as well as the number of logical drives in each disk array.

- -dl disk_array [ld_number]

  Displays the relations for the disk arrays specified by disk_array, sorted by the logical disk number as the key.

  If ld_number is specified, it displays the relations only for the specified logical disk.

- -de disk_array [ld_name]

  Displays the relations for the disk arrays specified by disk_array, sorted by the logical disk name as the key.

  If ld_name is specified, it displays the relations only for the specified logical disk name.

- -dd disk_array [drive | path]

  Displays the relations for the disk arrays specified by disk_array, sorted by the drive letter or path name of the NTFS folder as the key.

  If drive or path is specified, it displays the relations only for the specified drive letter or path name of the NTFS folder.

- -dp disk_array [disk_number]

  Displays the relations for the disk arrays specified by disk_array, sorted by the physical disk number as the key.

  If disk_number is specified, it displays the relations only for the specified physical disk.

- -dh *disk_array* [*HBT* [*LUN*]]

  Displays the relations for the disk arrays specified by *disk_array*, sorted by *HBT* and *LUN* as the keys.

  If *HBT* is specified, it displays the relations only for the specified *HBT*.

  Furthermore, if *LUN* is specified, it displays the relations only for the specified *HBT* and *LUN*.

- -a

  Displays all volume information in the Volume List.

- -al *ld_number*

  Displays the relations only for the logical disk number specified by *ld_number*.

- -ae *ld_name*

  Displays the relations only for the logical disk name specified by *ld_name*.

- -ad {*drive | path*}

  Displays the relations only for the drive letter or path name of the NTFS folder specified by *drive* or *path*.

- -ap *disk_number*

  Displays the relations only for the physical disk number specified by *disk_number*.

- -av *volume_name*

  Displays the relations only for the mount point volume name specified in *volume_name*.

- -ah *HBT* [*LUN*]

  Displays the relations only for the host numbers, bus numbers, and target IDs specified by *HBT*. If *LUN* is specified, it displays the relations only for the specified *HBT* and *LUN*.

- -ai [-pd *pd_type*]

  Displays information about configurations of all volumes in the volume list.
  For *pd_type* of the -pd option, PD Type of logical disks (attribute of physical disks in the disk arrays) can be specified. Displays only configuration information about a PD Type if *pd_type* is specified.
  Specify either attribute to *pd_type*:

  - FC FC attribute
  - ATA ATA attribute
  - SAS SAS attribute
  - SSD SSD attribute
  - NLSAS Nearline SAS attribute
  - SAS(SED) Encrypting SAS attribute

- -ctl

  Lists the physical disk number and logical disk number of the control volume, and the corresponding disk array name. The control volume is used in operating data replication and snapshot functions from the business server.

- -p

  Displays the version and creation time and date of the Volume List property information.

- -ax

  Lists disk array information in the Volume List, information about all volumes, and property information of the Volume List.

- -ver

  Displays the version information of this command.

- -all:

  Displays iSCSI information of all volumes in the Volume List. Message 11932 is output if the volumes are not an iSCSI volume.

- -ldname

  Displays iSCSI information of the specified volume. Message 11933 is output if the specified volume is not a iSCSI volume.

- -array name

  Displays iSCSI information of all volumes for the specified disk array. Message 11933 is output if the volumes are not an iSCSI volume.

- -?

  Lists the version information and options of this command.

Displayed Information

The iSMvollist command creates and displays the list of logical disks and related information. The table contains the message and description of the messages displayed by iSMvollist command.

Message	Description
ATG Name	ATgroup name

Message	Description
Attribute	Logical disk attribute • IV — Unpaired logical disk • MV MV — logical disk • RV RV — logical disk • RV/MV — Logical disk specified as both MV and RV • MV(ATG) — Logical disk set as MV belonging to an ATgroup • LV — Logical disk set as LV (link-volume) • BV — Logical disk set as BV (base-volume) for snapshot • SV — Logical disk set as SV (snapshot-volume) for snapshot • MV/BV — Logical disk set as MV and BV (base-volume) for snapshot • MV(ATG)/BV — Logical disk set as MV belonging to an ATgroup, and BV (base-volume) for snapshot • RV/BV — Logical disk set as RV and BV (base-volume) for snapshot • CV — Logical disk having been bound as a control volume • MV/CV — Logical disk having been bound as a control volume and paired as MV
Begin Date	Begin date (year/month/day)
Capacity	Displays the logical disk capacity to one decimal place. To display the capacity, the unit (Bytes/KB/MB/GB/TB/PB/EB) is added.
Created date_time	Time and date of Volume List creation
Data Protection	Displays the status of the logical disk protection by the WORM function
disk_array_name	Disk array name
Disk Array Number	Disk Array Number of disk arrays in the Volume List
Disk No	Physical disk number
Disk Signature	Signature information read directly from a physical disk. "INVALID" is displayed if there is no valid signature on the target physical disk. Also, "FAILURE" is displayed if an attempt to read a signature fails, for example, because the target physical disk is in the Not Ready state.
Entry	Number of pairs registered with the ATgroup
HBT	Host adapter number, bus number, target ID
LD_Name	Logical disk name
LDN	Logical disk number
Link disk array name	Nickname of the link disk array will be shown if ATgroup matches both conditions below. However, "(unknown)" will be shown instead if failed to get nickname for disk array. • ATgroup to which pairs are registered • ATgroup created by specifying the link disk array for disk arrays which supports the function specifying the link disk array For others for which link disk array is not fixed, a hyphen ("-") is displayed.
LUN	LUN (Logical unit number)
LV Link Status	LV link status displayed if the target disk is an LV. link Link connected unlink Link not connected "-" is displayed if the target physical disk is not an LV.

Message	Description
Management	Indicates whether or not the system directly recognizes the disk arrays. • direct The system recognizes the target disk array. • indirect The system does not recognize the target disk array.
Map Signature	Signature information read from the map file by specifying the -read option. "-" is displayed if there is no signature information in the map file.
No.	• Concentrator number (4 hexadecimal digits) • Unit-specific number assigned to concentrator
Node Number	Displays the node number to which the logical disk belongs. If it is not the logical disk in the disk array with node or the node number cannot be obtained, "-" (hyphen) is displayed.
normal	Normal mode You can release protection and reset the retention period at any time.
Not Prevent	Not Prevent state
Number of Drives	Number of items of volume information for each disk array
Number of LDN	Number of items of volume information for each disk array
OS Type	OS type
Owner $hostname$	Host Name Host name of the server that has the Volume List
Path Availability of special file	Usually nothing is displayed. In data replication or snapshot operations, "B" is displayed if an error is detected in access to the relevant special file.
Path Drive letters	or path name of the NTFS folder
PD Type	• FC — Logical disk configured of physical disks with the FC attribute • ATA — Logical disk configured of physical disks with the ATA attribute • SAS — Logical disk configured of physical disks with the SAS attribute • SSD — Logical disk configured of physical disks with the SSD attribute • NLSAS — Logical disk configured of physical disks with the nearline SAS attribute. • SAS(SED) — Logical disk configured of physical disks with the encrypting SAS attribute.
Prevent Prevent state	When the Remote Replication pair is being swapped, swapping the Remote Replication pair is suspended, or the Remote Replication quick sync function is being used, the paired MV and RV are in the Prevent state.
protection	Logical disk protected Logical disk not protected hyphen ("-") is displayed for all items
Protection Information	Displays the information on the logical disk protection. When the logical disk is not protected or when the protection information cannot be acquired, a hyphen ("-") is displayed for the all items.
Protection State	Protection state • RO – Write-protect (Valid) • NA – Read/write-protect (Valid) • RO(expired) – Write-protect (Expired) • NA(expired) – Read/write-protect (Expired)
Receiving	Data is being received.

Message	Description
Reinitialize	Reinitialization of logical disk
	When reinitialization has not been executed, a hyphen ("-") is displayed.
	formatting(nn%)
	Reinitialization is being executed
	nn displays the value indicating progress ratio of the initialization processing.
	format-fail Reinitialization failed
Retention Date	Retention date (year/month/day)
	When the retention date has not been specified, a hyphen ("-") is displayed.
	When the retention date is specified as permanent, the following value is displayed.
	permanent Retention date is specified as permanent
Retention Mode	Retention mode
Saved Signature	Signature information held on the disk array side.
	It is displayed only if the target physical disk has a volume attribute of an RV. In other cases, "-" is displayed.
	"FAILURE" is displayed if an attempt to obtain signature information from the disk array fails.
Secure mode	You cannot release protection until the retention period has elapsed. However, you can extend the retention period or change the protection state
Site ATgroup location	• concentrator : Concentrator
	• distributor : Distributor
Special File	Special file name
	Displayed as a 32-byte item
Strict mode	You cannot release protection until the retention period has elapsed. Neither can you reset the retention period and protection state.
target_name	Target name
Type	OS type
Update Prevention State	Volume update prevention state.
	When the swap function for Remote Replication pair cannot be used or the information cannot be obtained, a hyphen ("-") is displayed.
VAA	Volume Absolute Address
v.v.vvv	Version of iSMvollist used in Volume List creation
Volume Name	Mount point volume name
Volume Information nnn	Number of items of volume information in the Volume List

iSMvollist Command List

This section contains a list of the iSMvollist command and displayed information. Reference the "Displayed Information" table for a description of the messages.

C:\>iSMvollist -d

```
C:\>iSMvollist -d
--- Disk Array List ---
Disk Array Name Number of Drives
disk_array nnnn
C:\>
```

C:\>iSMvollist -a

```
C:\>iSMvollist -a
LDN LD Name VAA OS Type
  HBT   LUN Disk No. Disk Array
  Volume Name
  Path
ldn ld_name vaa type
  hbt   lun disk_no disk_array
  volume_name
  path
C:\>
```

C:\>iSMvollist -ctl

```
C:\>iSMvollist -ctl
--- Control Volume List ---
Disk No. LDN Disk Array Name
disk_no ldn disk_array
```

```
C:\>
```

C:\>iSMvollist -p

```
C:\>iSMvollist -p
--- Property of Volume List File ---
Version   v.v.vvv
Created   date_time
Owner Host Name hostname
Disk Array ddd
Volume Information nnn
C:\>
```

C:\>iSMvollist -ax

The version and execution date and time of iSMvollist are displayed on the first line.

The information displayed as "Disk Array List" is the same as when the -d option is specified.

The information displayed as "Volume List" is the same as when the -ai option is specified.

The information specified as "Property of Volume List File" is the same as when the -p option is specified.

```
C:\>iSMvollist -ax
Volume List   iSMvollist    Version V.V.VVV Date: yyyy/mm/dd HH:MM:SS
--- Disk Array List ---
Disk Array Name Number of Drives
disk_array nnnn
--- Volume List ---
LDN LD Name    VAA OS Type
 HBT LUN Disk No. Disk Array PD Type
 Volume Name
 Path
ldn ld_name     vaa type
 hbt lun disk_no disk_array pd_type
 volume_name
 path
--- Property of Volume List File ---
Version v.v.vvv
Created date_time
Owner Host Name hostname
Disk Array ddd
Volume Information nnn
C:\>
```

C:\> iSMvollist -tgt -all

```
C:\> iSMvollist -tgt -all
LDN        LD Name      Disk Array           Target Name
ldn         ld_name       disk_array_name     target_name
C:\>
```

C:\>iSMvollist -cr

The command creates the Volume List.

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

C:\>iSMvollist -ae dev001

The command displays the Volume List with the logical disk name specified.

```
C:\>iSMvollist -ae dev001
LDN LD Name VAA OS Type
  HBT   LUN   Disk No. Disk Array
  Volume Name
  Path
030ch dev001 3000000000000002030c WN
  h4b0t35 000h disk2 Storage4100/1007
  \\?\Volume{674de734-ee66-11d5-95d8-00004c792133}\
  H:
C:\>
```

- While updating or creating a Volume List, you cannot create, update, or display the Volume List or execute ReplicationControl or SnapControl.

- Create or update the volume list when the OS on the server recognizes the logical disks and volumes.
- For a replication volume (RV) of the data replication function, the pair must be in the Separated state.
- For a link-volume (LV) of the snapshot function, a link to a snapshot-volume (SV) must be established.
- Create or update the volume list when a mount point (drive letter or NTFS folder) to be used has been set for volumes.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

iSMvollist (UNIX)

The iSMvollist command creates and displays the list of logical disks and related information. The Volume List can be created and displayed only by the devices recognized by the system.The Volume List is necessary when using commands of ReplicationControl, SnapControl, and ProtectControl (except for joint operation with SnapSAN Manager). Reference the "Displayed Information" table for a description of the messages.

Creates and displays the list of logical disks and related information.

[Synopsis]
```
iSMvollist-r
iSMvollist -nr
iSMvollist-or
iSMvollist -d
iSMvollist -l [Special File | LD Name]
iSMvollist -vs Disk Array Name [Special File]
iSMvollist -vl Disk Array Name [LDN]
iSMvollist -ve Disk Array Name [LD Name]
iSMvollist -ai [-pd PD Type]
iSMvollist -ctl
iSMvollist -p
iSMvollist -ax
iSMvollist —ver
iSMvollist -tgt {-all | -ldname ldname | -arrayname arrayname}
iSMvollist -help
```

Options

The iSMvollist command recognizes the following options.

- -r

  Creates the list of the logical disks, VAAs, and special files.

  When a disk array has been added or deleted, or a logical disk has been bound or unbound, be sure to execute this command to re-create the volume list.

- -d

  Lists the disk arrays stored in the volume list and displays the number of logical disks located in each disk array.

- -l [Special File | LD Name]

  Displays the relations for the logical disk names, VAA, and special file names.

  If Special File or LD Name is specified, the relation only for the specified special file name or logical disk name is displayed.

- -vs Disk Array Name [Special File]

  Displays the relations for the disk arrays specified by Disk Array Name, sorted by the special file name as the key.

  If Special File is specified, the relation only for the specified special file name is displayed.

- -vl Disk Array Name [LDN]

  Displays the relations for the disk arrays specified by Disk Array Name, sorted by the logical disk number as the key.

  If LDN is specified, the relation only for the specified logical disk number is displayed.

- -ve Disk Array Name [LD Name]

  Displays the relations for the disk arrays specified by Disk Array Name, sorted by the logical disk name as the key.

  If LD Name is specified, the relation only for the specified logical disk name is displayed.

- -ai [-pd PD Type] Displays the relations and configuration information for the logical disk names, VAA, and special file names.

  For PD Type of the -pd option, PD Type of logical disks (attribute of physical disks in the disk arrays) can be specified. Displays only configuration information about a PD Type if PD Type is specified.

  Specify either attribute to PD Type:

  - FC FC attribute
  - ATA ATA attribute
  - SAS SAS attribute
  - SSD SSD attribute
  - NLSAS Nearline SAS attribute
  - SAS(SED) Encrypting SAS attribute

- -ctl

  Lists the special file name, logical disk number, and corresponding disk array name of the control volume.

  The control volume is used in operating data replication and snapshot functions from the business server.

- -p

  Displays the version and creation time and date of the Volume List property information.

- -ax

  Lists disk array information in the Volume List, volume information about all logical disk names/VAAs/special file names, and Volume List property information.

- -ver

  Displays the version information of this command.

- -tgt

  Displays *targetname* of a volume in the Volume List.

- -all

  Displays iSCSI information of all volumes in the Volume List. Message 11932 is output if the volumes are not an iSCSI volume.

- -ldname

  Displays iSCSI information of the specified volume. Message 11933 is output if the specified volume is not a iSCSI volume.

- -array name

  Displays iSCSI information of all volumes for the specified disk array. Message 11933 is output if the volumes are not an iSCSI volume.

- * This option is supported only for Linux.

- -help

  Lists the version information and options of this command.

This section contains a list of commands, displayed information and messages. The "Displayed Information" table contains a description of the messages.

Disk Array List

iSMvollist -d

```
# iSMvollist -d
```

Disk Array Name Number of LDN

```
disk_array    nnn
#
```

Special File Disk Array Path

iSMvollist -l

```
# iSMvollist -l
```

LDN LD NAME VAA TYPE

Special File Disk Array Path

```
ldn ld name VAA   type
special_file_name disk_array path
#
```

Volume List Version

iSMvollist -ai

```
# iSMvollist -ai
```

Volume List iSMvollist Version *V.V.VVV*

LDN LD NAME VAA TYPE

Special File Disk Array Path

PD Type

ldn ld name VAA type

special_file_name disk_array path

pd_type

#

Control Volume List

iSMvollist -ctl

```
# iSMvollist -ctl
```

- The version and execution date and time of iSMvollist are displayed on the first line.
- The information displayed as "Disk Array List" is the same as when the -d option is specified.
- The information displayed as "Volume List" is the same as when the -ai option is specified.
- The information specified as "Property of Volume List File" is the same as when the -p option is specified.

Property of Volume List File

iSMvollist -p

```
# iSMvollist -p
```

Volume List Version

iSMvollist -ax

- Volume List iSMvollist Version *V.V.VVV* Date: *yyyy/mm/dd HH:MM:SS*

Disk Array Target Name

iSMvollist -tgt -all

```
# iSMvollist -tgt -all
LDN LD Name Disk Array Target Name
ldn ld_name disk_array_name target_name
#
```

iSMvollist -r

The command creates the volume list.

```
# iSMvollist -r
iSMvollist: Info: iSM11700: Please wait a minute.
iSMvollist: Info: iSM11100: Command has completed successfully.
#
```

iSMvollist –l

The command lists the volume list information.

```
# iSMvollist —l
LDN LD NAME VAA TYPE
Special File Disk Array Path
0002h disk002 200000304c5176340002 CX
  /dev/rdsk/c1t230000004C517634d1 Storage0001
0004h disk004 200000304c5176340004 CX
/dev/rdsk/c1t230000004C517634d2 Storage0001
#
```

Special File Name

iSMvollist -l /dev/rdsk/c1t2d0

The command displays the volume list information by specifying the special file name.

```
# iSMvollist -l /dev/rdsk/c1t2d0
LDN LD NAME   VAA   TYPE
Special File Disk Array Path
0001h disk001  30000000000000020000 NX
/dev/rdsk/c1t2d0 Storage4100/07
#
```

Persistent Special File Name

iSMvollist -l /dev/rdisk/disk137

The command displays the volume list information by specifying the persistent special file name.

```
# iSMvollist —l /dev/rdisk/disk137
LDN LD  NAME VAA TYPE
Special File Disk  Array Path
0042h disk001 200000004c7f089c0042 NX
/dev/rdisk/disk137 S2800/0108
#
```

- While the volume list is being created or updated, it is not possible to create, update, or display the volume list or to perform the command operations of the ReplicationControl operation or SnapControl operation.
- Create or update the volume list when the OS on the server recognizes the logical disks and volumes.
  - For a replication volume (RV) of the data replication function, the pair must be in the Separated state.
  - For a link-volume (LV) of the snapshot function, a link to a snapshot-volume (SV) must be established.
- Create or update the volume list when a mount point (drive letter or NTFS folder) to be used has been set for volumes.
- For Linux, while the SnapSAN Manager Server is running on the same server, the volume list can be displayed, but cannot be created or updated.

- The vollist command (volume list creation and display) does not support the persistent special file (Persistent DFS). Therefore, the `-nr` and `-or` options of the volume list command cannot be specified. The version of the volume list command can be checked by the `-ver` option.

[Return Valutes]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

Host Information Collection

iSMcc_hostinfo

The `iSMcc_hostinfo` command collects the information including the host name, OS identification information, and HBA (host bus adapter) information of the server on which this command is executed. Additionally, the collected host information can be registered in the disk arrays and exported to a file.

The file exported by this command is transferred to the server on which the SnapSAN Manager server operates by using the file transfer or USB memory, and then registered to the disk arrays by using the host information store command. Collecting the host information and registering it to the disk array enables the SnapSAN Manager client to display the configuration as the host connected to the disk arrays to check and manage the host information.

[Synopsis]

```
iSMcc_hostinfo —export file_name [-arrayname diskarray]
iSMcc_hostinfo —store [-arrayname diskarray]
iSMcc_hostinfo -ver
iSMcc_hostinfo -?
```

iSMcc_hostinfo Options

The iSMcc_hostinfo command recognizes the following options.

- -export

  file_name Acquires the information including the host name, OS identification information, and HBA (host bus adapter) information of the server on which this command is executed, and writes the host information to the host information file. For file_name, specify the path name of the host information file to which the host information is stored.

- -store

  Acquires the information including the host name, OS identification information, and HBA (host bus adapter) information of the server on which this command is executed, and stores the host information to the disk arrays which is connected to the server. (The disk array logical disks must be recognized on the server on which this command is executed.)

- -arrayname diskarray

    While targeting the disk arrays specified in diskarray, collects the host information, exports it to the host information file, or stores it to the disk arrays.
    When no disk array is specified in collecting host information by specifying the -export option, the SnapSAN S3000/S5000 disk arrays with FC or SAS are the target of operation among the disk arrays connected to the server. In registering host information by specifying the -store option, the SnapSAN S3000/S5000 disk arrays with FC or SAS are the target among disk arrays connected to the server.

- -ver Displays the version information of this command.

- -? Displays the usage of this command.

C:\> iSMcc_hostinfo -export file_name

The command collects the host information and exports it to the host information file.

```
C:\> iSMcc_hostinfo -export file_name
iSMcc_hostinfo: Info: iSM11700: Please wait a minute.
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array= diskarray1) (code=aaaa-bbbb-bbbb-bbbb)
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array= diskarray2) (code=aaaa-bbbb-bbbb-bbbb)
iSMcc_hostinfo: Info: iSM11100: Command has completed successfully.
C:\>
```

C:\> iSMcc_hostinfo -store

The command collects the host information and stores it to the disk array.

```
C:\> iSMcc_hostinfo -store
iSMcc_hostinfo: Info: iSM11700: Please wait a minute.
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array= diskarray1) (code=aaaa-bbbb-bbbb-bbbb)
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array= diskarray2) (code=aaaa-bbbb-bbbb-bbbb)
iSMcc_hostinfo: Info: iSM11100: Command has completed successfully.
C:\>
```

Description of messages:
`iSM11700:`

Please wait a minute.Indicates that the collection of the host information is started.

`iSM11770`

Host Information was exported successfully. (Disk Array=diskarray) (code=aaaa-bbbb-bbbb-bbbb).Indicates that the host information has been exported to the host information file or stored to the disk arrays.

- In diskarray, the nickname of target disk array is displayed. Additionally, the process number is displayed in aaaa and the internal code for maintenance is displayed in bbbb.

`iSM11100`

- Command has completed successfully.

- Indicates that the command execution is completed.

C:\> iSMcc_hostinfo -export \OUTPUT\Server001

The command collects the host information and exports it to the host information file.

```
C:\> iSMcc_hostinfo -export \OUTPUT\Server001
iSMcc_hostinfo: Info: iSM11700: Please wait a minute.
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array= Storage001) (code=759d-5800-00a3-0000)
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array= Storage002) (code=759d-5800-00a3-0000)
iSMcc_hostinfo: Info: iSM11100: Command has completed successfully.
C:\>
```

C:\> iSMcc_hostinfo -store -arrayname Storage002

The command collects the host information and stores it to the disk array.

```
C:\> iSMcc_hostinfo -store -arrayname Storage002
iSMcc_hostinfo: Info: iSM11700: Please wait a minute.
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array=Storage002) (code=6351-5800-00a3-0000)
iSMcc_hostinfo: Info: iSM11100: Command has completed successfully.
C:\>
```

- Collecting host information (-export option) can be operated with FC or SAS.
- Collecting host information (-export option) cannot be performed for the disk arrays to which the secure mode is set.
- Registering the host information to the disk arrays (-store option) can be operated only for disk array with FC or SAS which supports the host information display.
- Registering the host information to the disk arrays (-store option) cannot be performed for the disk arrays to which the secure mode is set.
- Since the length of the host name that is registered after registering the host information to the disk array (-store option) is up to 32 bytes, bytes from the 33rd byte are ignored. Therefore, the host name may be redundant with the host name already registered.
- This command cannot be executed in parallel on the same server.

[Return Values]

0: Collecting and exporting the host information has been normally terminated.

1: Collecting and exporting the host information has been abnormally terminated.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- The information collection from the system fails.
- An error occurs in the system function.
- The instruction fails due to a disk array error.

2: Collecting and exporting a part of the host information has been abnormally terminated.

iSMcc_hostinfo (UNIX)

Collects the host information. The iSMcc_hostinfo command collects the information including the host name, OS identification information, and HBA (host bus adapter) information of the server on which this command is executed. In addition, collected host

information can be stored in the disk array and output to a file. The file exported by this command is transferred to the server on which the SnapSAN Manager server operates by using the file transfer or USB memory, and then registered to the disk arrays by using the host information store command. Collecting the host information and registering it to the disk array enables the SnapSAN Manager client to display the configuration as the host connected to the disk arrays to check and manage the host information.

[Synopsis]

iSMcc_hostinfo -export *file_name* [-arrayname *diskarray*]

iSMcc_hostinfo -store [-arrayname *diskarray*]

iSMcc_hostinfo -ver

iSMcc_hostinfo -help

Options

The iSMcc_hostinfo command recognizes the following options.

- -export *file_name*

  Acquires the information including the host name, OS identification information, and HBA (host bus adapter) information of the server on which this command is executed and writes the host information to the host information file. For *file_name*, specify the path name of the host information file to which the host information is stored.

- -store

  Obtains the host name, OS identification information, and host bus adapter (HBA) information of the server on which this command is executed and stores the information in a disk array connected to the server. (The disk array logical disks must be recognized on the server on which this command is executed.)

- -arrayname *diskarray*

  While targeting the disk array specified in *diskarray*, collects the host information and exports it to the host information file.
  When no disk array is specified, the SnapSAN S3000/S5000 disk arrays with FC or SAS are the target of operation among disk arrays connected to the server.

- -ver Displays the version information of this command.

- -help Displays the usage of this command.

iSMcc_hostinfo -export file_name

The command collects the host information and exports it to the host information file.

```
# iSMcc_hostinfo -export file_name
iSMcc_hostinfo: Info: iSM11700: Please wait a minute.
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array=diskarray1) (code=aaaa-bbbb-bbbb-bbbb)
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array=diskarray2) (code=aaaa-bbbb-bbbb-bbbb)
iSMcc_hostinfo: Info: iSM11100: Command has completed successfully.
#
```

iSMcc_hostinfo -store

The command collects the host information and stores it in the disk array.

```
# iSMcc_hostinfo -store
iSMcc_hostinfo: Info: iSM11700: Please wait a minute.
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array=diskarray1) (code=aaaa-bbbb-bbbb-bbbb)
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array=diskarray2) (code=aaaa-bbbb-bbbb-bbbb)
iSMcc_hostinfo: Info: iSM11100: Command has completed successfully.
```

The "Displayed Information" table contains a description of the common messages. However the messages specific to this command are listed below:

iSM11700

> Please wait a minute. Indicates that the collection of the host information is started.

iSM11770

> Host Information was exported successfully.

(Disk Array=*diskarray*) (code=*aaaa-bbbb-bbbb-bbbb*)

> Indicates that the host information has been exported to the host information file or stored to the disk arrays. In `diskarray`, the nickname of target disk array is displayed. Additionally, the process number is displayed in `aaaa` and the internal code for maintenance is displayed in `bbbb`.

iSM11100

> Command has completed successfully.Indicates that the command execution is completed.

iSMcc_hostinfo -export /tmp/Server001 –arrayname Storage002

The command collects the host information and exports it to the host information file.

```
# iSMcc_hostinfo -export /tmp/Server001 —arrayname Storage002
iSMcc_hostinfo: Info: iSM11700: Please wait a minute.
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array=Storage002) (code==5749-5800-00a3-0000)
iSMcc_hostinfo: Info: iSM11100: Command has completed successfully.
#
```

iSMcc_hostinfo –store –arrayname Storage002

The command collects the host information and stores it in the disk array.

```
# iSMcc_hostinfo —store —arrayname Storage002
iSMcc_hostinfo: Info: iSM11700: Please wait a minute.
iSMcc_hostinfo: Info: iSM11770: Host Information was exported
successfully. (Disk Array=Storage002) (code=4360-5800-00a3-0000)
iSMcc_hostinfo: Info: iSM11100: Command has completed successfully.
#
```

- Collecting host information (`-export` option) can be operated for the disk arrays with FC or SAS.
- Collecting host information (`-export` option) cannot be performed for the disk arrays to which the secure mode is set.
- Host information can only be stored in a disk array with FC or SAS (by using the `-store` option) that support host information display.

- Host information cannot be stored in a disk array (by using the -store option) for which the secure mode is specified.
- When storing host information in a disk array (by using the -store option), the maximum host name length is 32 bytes, and any additional bytes are ignored. This might result in a host name being the same as a previously stored name.
- This command cannot be executed in parallel on the same server.

[Return Values]

0: Collecting and exporting the host information has been normally terminated.

1: Collecting and exporting the host information has been abnormally terminated.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- The information collection from the system fails.
- An error occurs in the system function.
- The instruction fails due to a disk array error.

2: Collecting and exporting a part of the host information has been abnormally terminated.

Host Information File

iSMcc_hostinfo

The host information file that is exported by the `iSMcc_hostinfo` command is described. The host information including the host name, OS identification information, and HBA (host bus adapter) information of the server is stored in one host information file per one server.

[File Location And Name]

Can be freely specified.

[Synopsis]

This file is described in the following synopsis:

```
<websamexport>
<class name="table-name-1">
    <property name="item-name-1-1" value="value-1-1"></property>
    <property name="item-name-1-2" value="value-1-2"></property>
                :
    <property name="item-name-1-n" value="value-1-n"></property>
</class>
<class name="table-name-2">
    <property name="item-name-2-1" value="value-2-1"></property>
                :
    <property name="item-name-2-n" value="value-2-n"></property>
</class>
<class name="table-name-3">
    :
</class>
    :
    :
<class name="table-name-n">
    :
</class>
</websamexport>
```

Rules

- The number of characters to be described in one line is up to 2048 bytes (including space character, tab character, and linefeed code).

- Be sure to describe "<websamexport>" on the first line.

- Only one block surrounded by "<" and ">" can be described in one line.
  However, only if an item name (property name) and the value are described, the blocks of <property name="item-name" value="value"> and </property> can be described in one line.

- No space or tab character can be described immediately after "<" and "</".
  However, any number of space or tab characters can be described in the following location:

  - Before and after a block surrounded by "<" and ">"

  - Before and after "name"

  - Before and after "value"

  - Before and after "="

  - Before and after a character string of table name, item name, and value surrounded by double quotation marks (") or single quotation marks (')

- No line break is allowed in the middle of a block surrounded by "<" and ">".

- An upper-case character and the corresponding lower-case character are handled as different characters.

- No comment can be described.

- Although a line with only space or tab characters can be described, the line is ignored.

- When a character string to be described includes double quotation marks ("), surround the entire character string by single quotation marks (').

- When describing multi-byte characters such as Japanese characters, use UTF-8 (Unicode) as the character code.

- The same item name cannot be described twice or more in each table.

Table (Class) and Item (Property) Description

The table names (class names) to be described in the host information file are listed below.

The underlined table (class) names must be described in the host information file.

(Class) List

Table Name (Class Name)	Description
iSM_NodeInfo	Describe the information related to the nodes of the server. Describe one table for each server (host information file). This table is mandatory and the description cannot be omitted.
iSM_ArrayInfo	Describe the information related to a disk array connected to the server. Describe one table for each disk array. Multiple tables can be described in one server (host information file).
iSM_HBAInfo	Describe the information related to an FC HBA (host bus adapter) mounted on the server. Describe one table for each HBA. Multiple tables can be described in one server (host information file).
iSM_FCPortInfo	Describe the information related to an FC HBA mounted on the server. Describe one table for each FC port of the HBA. Multiple tables can be described in one server (host information file). When you describe this table, you need to describe the corresponding iSM_HBAInfo table as well.
iSM_FCConnectionInfo	Describe the information related to a connection between an FC HBA mounted on the server and the disk array. Describe one table for one connection configuration between each FC port of the HBA and the disk array. Multiple tables can be described in one server (host information file). When you describe this table, you need to describe the corresponding iSM_ArrayInfo table, iSM_HBAInfo table, and iSM_FCPortInfo table as well.
iSM_SASHBAInfo	Describe the information related to a SAS HBA (host bus adapter) mounted on the server. Describe one table for each HBA. Multiple tables can be described in one server (host information file).
iSM_SASPortInfo	Describe the information related to a SAS HBA mounted on the server. Describe one table for each SAS port of the HBA. Multiple tables can be described in one server (host information file). When you describe this table, you need to describe the corresponding iSM_SASHBAInfo table as well.
iSM_SASConnectionInfo	Describe the information related to a connection between a SAS HBA mounted on the server and the disk array. Describe one table for one connection configuration between each SAS port of the HBA and the disk array. Multiple tables can be described in one server (host information file). When you describe this table, you need to describe the corresponding iSM_ArrayInfo table, iSM_SASHBAInfo table, and iSM_SASPortInfo table as well.This table is output when the iSMcc_hostinfo command is executed in a Linux environment. It is not output in a Windows environment.

The item (property) names to be defined in each table are listed below.

The underlined items (properties) are required and cannot be omitted when the relevant tables (classes) are described in the host information file.

Item (Property) List in the iSM_NodeInfo

Item Name (Property Name)	Description
OwnerHostName	Describe the host name (node name) of the server within 256 single-byte characters. However, the host name that can be registered to the disk array is up to 32 single-byte characters. Characters from the 33rd character are ignored. The domain name and the sub domain name need not be described.
HostInfoDate	Describe the date and time on which the host information file was created in the following format. "yyyy-mm-ddΔHH:MM:SS" yyyy Year (in Western calendar, 4 digits) mm Month (2 digits*) dd Day (2 digits*) Δ Space of 1 byte HH Hour (2 digits*) MM Minute (2 digits*) SS Second (2 digits*) * Add "0" to the head if necessary so as to become 2 digits.
OSType	Describe any value of the following as the OS type of the server. "65530" In the case of Windows environment "36" In the case of Linux environment "9" In the case of AIX environment "1" Others (In the case of OS environment other than above) In this case, an arbitrary character string that shows the type of OS can be described in the item of OSInfo.
OSInfo	When the OSType item is "1" (Others), describe a character string with up to 16 single-byte characters that indicates the OS type of the server. The other description is ignored. However, a character string of 17 single-byte characters or more cannot be described. The single-byte upper-case and lower-case alphabetical characters, numbers, space, slash (/), underbar (_), hyphen (-), and period (.) can be used for the description.
IPAddress	Describe the IP addresses of the servers by delimiting with a period (".") as the information to recognize the host. For a server with multiple IP addresses, describe only one IP address which can identify the server. If "1" is specified for the AddressType, it is required to describe this item.
AddressType	Select whether or not to describe the IP Address by describing either of the following values: "1" To describe IPAddress "0" To not describe IPAddress

Item Name (Property Name)	Description
SystemName	Describe the node identification ID. In the host information file created by the host information collection command, this value is automatically created for each server. In this case, you cannot change this value. When describing an arbitrary value, describe an alphanumeric character string of 33 bytes or less that is unique in the entire system (server's host name etc). Once a value was registered to the disk array as the node identification ID of the server, you cannot change the value.
PCDBVersion	Be sure to describe the following value: "1.0"

Item (Property) List in the iSM_ArrayInfo Table

Item Name (Property Name)	Description
DiskArrayName	Describe the nickname of the disk array.
SAA	Describe the SAA (Subsystem Absolute Address). This value can be checked by displaying the property information of the relevant disk array from the SnapSAN Manager client.
WWNN	Describe WWNN (World Wide Node Name or World Wide Name) of the disk array. This value can be checked by displaying the property information of the relevant disk array from the SnapSAN Manager client. Only alphanumeric characters can be described.
SystemName	Describe the same value as the SystemName item of the iSM_NodeInfo table.
CSName	Even if a value is described, it is ignored (for future use).
PCDBVersion	Be sure to describe the following value: "1.0"

Item (Property) List in the iSM_HBAInfo

Item Name (Property Name)	Description
WWNN	Describe the WWNN (World Wide Node Name) of the FC HBA. Only alphanumeric characters can be described.
SystemName	Describe the same value as the SystemName item of the iSM_NodeInfo table.
PCDBVersion	Be sure to describe the following value: "1.0"

Item (Property) List in the iSM_FCPortInfo

Item Name (Property Name)	Description
WWNN	Describe the WWNN (World Wide Node Name) of the FC HBA to which the FC port belongs. Describe the same value as the WWNN item of the associated iSM_HBAInfo table.
WWPN	Describe the WWPN (World Wide Port Name) of the FC port. Only alphanumeric characters can be described.
SystemName	Describe the same value as the SystemName item of the iSM_NodeInfo table.
PCDBVersion	Be sure to describe the following value: "1.0"

Item (Property) List in the iSM_FCConnectionInfo

Item Name (Property Name)	Description
WWPN	Describe the WWPN (World Wide Port Name) of the FC port. Describe the same value as the WWPN item of the associated iSM_FCPortInfo table.
TargetWWNN	Describe the WWNN (World Wide Node Name) of the disk array being connected to the FC port. Describe the same value as the WWNN item of the iSM_ArrayInfo table described for the relevant disk array.
TargetWWPN	Describe the WWPN (World Wide Port Name) of the port of the disk array being connected to the FC port. Only alphanumeric characters can be described.
StoragePortNumber	Describe the host director number and the port number of the storage being connected to the FC port by the value (in decimal) calculated by the following formula: ((host-director-number x 256) + port-number)
SystemName	Describe the same value as the SystemName item of the iSM_NodeInfo table.
PCDBVersion	Be sure to describe the following value: "1.0"

Item (Property) List in the iSM_SASHBAInfo

Item Name (Property Name)	Description
SystemName	Describe the same value as the SystemName item of the iSM_NodeInfo table.
PCDBVersion	Be sure to describe the following value: "1.0"

Item (Property) List in the iSM_SASPortInfo

Item Name (Property Name)	Description
WWPN	Describe the WWPN (World Wide Port Name) of the SAS port. Only alphanumeric characters can be described.
SystemName	Describe the same value as the SystemName item of the iSM_NodeInfo table.
PCDBVersion	Be sure to describe the following value: "1.0"

Item (Property) List in the iSM_SASConnectionInfo

Item Name (Property Name)	Description
WWPN	Describe the WWPN (World Wide Port Name) of the SAS port. Describe the same value as the WWPN item of the associated iSM_SASPortInfo table.
TargetWWPN	Describe the WWPN (World Wide Port Name) of the port of the disk array being connected to the SAS port. Only alphanumeric characters can be described.
StoragePortNumber	Describe the host director number and the port number of the storage being connected to the SAS port by the value (in decimal) calculated by the following formula: ((host-director-number x 256) + port-number)
SystemName	Describe the same value as the SystemName item of the iSM_NodeInfo table.
PCDBVersion	Be sure to describe the following value: "1.0"

The host information file examples are shown below.

Example for a server with FC HBA

```
<websamexport>
<class name="iSM_NodeInfo">
      <property name="OwnerHostName" value="TestServer"></property>
      <property name="HostInfoDate" value="2007-09-12
13:35:59"></property>
      <property name="OSType" value="65530"></property>
      <property name="IPAddress" value="10.1.2.3"></property>
      <property name="AddressType" value="1"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2">
      </property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_ArrayInfo">
      <property name="DiskArrayName" value="TestStorage"></property>
      <property name="SAA"
value="0200200000004C517BFD0000000000000000000000000000000000000000">
      </property>
      <property name="WWNN" value="200000004C517BFD"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2">
      </property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_HBAInfo">
      <property name="WWNN" value="20000000C92BB354"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2">
      </property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_FCPortInfo">
      <property name="WWNN" value="20000000C92BB354"></property>
      <property name="WWPN" value="10000000C92BB354"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2">
      </property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_FCConnectionInfo">
      <property name="WWPN" value="10000000C92BB354"></property>
      <property name="TargetWWNN" value="200000004C517BFD"></property>
      <property name="TargetWWPN" value="280000004C517BFD"></property>
      <property name="StoragePortNumber" value="1"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2">
      </property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_HBAInfo">
      <property name="WWNN" value="20000000C92BB3A6"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2">
      </property>
```

```xml
        <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_FCPortInfo">
        <property name="WWNN" value="20000000C92BB3A6"></property>
        <property name="WWPN" value="10000000C92BB3A6"></property>
        <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2">
        </property>
        <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_FCConnectionInfo">
        <property name="WWPN" value="10000000C92BB3A6"></property>
        <property name="TargetWWNN" value="200000004C517BFD"></property>
        <property name="TargetWWPN" value="250000004C517BFD"></property>
        <property name="StoragePortNumber" value="257"></property>
        <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2">
        </property>
        <property name="PCDBVersion" value="1.0"></property>
</class>
</websamexport>
```

Example for a server with SAS HBA

```
<websamexport>
<class name="iSM_NodeInfo">
      <property name="OwnerHostName" value="TestServer"></property>
      <property name="HostInfoDate" value="2007-09-12
13:35:59"></property>
      <property name="OSType" value="65530"></property>
      <property name="IPAddress" value="10.1.2.3"></property>
      <property name="AddressType" value="1"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2"></property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_ArrayInfo">
      <property name="DiskArrayName" value="TestStorage"></property>
      <property name="SAA"
value="0200200000004C517BFD0000000000000000000000000000000000000">
      </property>
      <property name="WWNN" value="200000004C517BFD"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2"></property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_SASHBAInfo">
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2"></property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_SASPortInfo">
      <property name="WWPN" value="500605B0027C2A30"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2"></property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_SASConnectionInfo">
      <property name="WWPN" value="500605B0027C2A30"></property>
      <property name="TargetWWPN" value="5000991000010040"></property>
      <property name="StoragePortNumber" value="1"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2"></property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_SASHBAInfo">
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2"></property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_SASPortInfo">
      <property name="WWPN" value="500605B0027C2B70"></property>
      <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2"></property>
      <property name="PCDBVersion" value="1.0"></property>
</class>
<class name="iSM_SASConnectionInfo">
      <property name="WWPN" value="500605B0027C2B70"></property>
```

```
        <property name="TargetWWPN" value="5000991000010080"></property>
        <property name="StoragePortNumber" value="257"></property>
        <property name="SystemName"
value="W12FBC11403304730A264CE1B63BC29A2"></property>
        <property name="PCDBVersion" value="1.0"></property>
</class>
</websamexport>
```

- Since the host name that can be registered to the disk array is up to 32 single-byte characters, characters from the 33rd character are ignored. Therefore, the host name may be redundant with the host name already registered.

  If you need to change the host name, change the host name in the host information file output by the iSMcc_hostinfo command. Then, register the host information again using that host information file. Be careful not to overwrite the newly registered host information by registering the original host name in the operations afterwards.

- If the FC host bus adapter including multiple FC ports is mounted on the Linux server, different HBAs (iSM_HBAInfo table) may be associated to each of the FC port information (iSM_FCPortInfo table) in the host information file output by the iSMcc_hostinfo command.

- If the SAS host bus adapter including multiple SAS ports is mounted on the Linux server, different HBAs (iSM_SASHBAInfo table) may be associated to each of the SAS port information (iSM_SASPortInfo table) in the host information file output by the iSMcc_hostinfo command.

  To delete the registered host information, right-click the host information on "Connected Host List Screen" of the SnapSAN Manager client and select (left-click) [Host Information Deleting].

[Sample host information file (when described to the minimum)]

The following is an example performing only a minimum description in host information file to use host information in "LD Set Setting" of Access Control and "LD Bind Quick Configuration" of Configuration Setting.

Collection of information on server described in host information file

It is necessary to collect information on the following items beforehand, and to decide it.

Information on Server that Needs to Be Collected

Item Name	Example
Host name of the server	Server1
Date and time on which the host information file was created	2007-09-12 13:35:59
OS type of the server	65530
IP address of the server	10.1.1.10
Node identification ID of the server	Server1
WWNN of the FC HBA of the server	200000004C517BFD
WWPN of the FC port of the FC HBA of the server	250000004C517BFD
WWPN of the SAS port of the SAS HBA of the server	500605B0027C2A30

Creating the Host Information File

Create the host information file according to the collected information by using a text editor etc. Referring to the following example of host information file, replace the under line part with an actual value.

In this example, the server has a configuration in which there are two FC HBAs and each of them has one FC port. Depending on the number of FC or SAS HBAs and the number of FC or SAS ports, change the number of iSM_HBAInfo tables and the number of iSM_FCPortInfo tables, or the number of iSM_SASHBAInfo tables and the number of iSM_SASPortInfo tables.

```
<websamexport>
   <class name="iSM_NodeInfo">
        <property name="OwnerHostName" value="Host name of the
server"></property>
        <property name="HostInfoDate" value="Date and time when the host
information file was created">
        </property>
        <property name="OSType" value="OS type of the server"></property>
        <property name="IPAddress" value="IP address of the
server"></property>
        <property name="AddressType" value="1"></property>
        <property name="SystemName" value="Node ID of the
server"></property>
        <property name="PCDBVersion" value="1.0"></property>
   </class>
   <class name="iSM_HBAInfo">
        <property name="WWNN" value="WWNN of the first FC HBA of the
server"></property>
        <property name="SystemName" value="Node ID of the
server"></property>
        <property name="PCDBVersion" value="1.0"></property>
   </class>
   <class name="iSM_FCPortInfo">
        <property name="WWNN" value="WWNN of the first FC HBA of the
server"></property>
        <property name="WWPN" value="WWPN of the FC port of the first
FC HBA of the server"></property>
        <property name="SystemName" value="Node ID of the
server"></property>
        <property name="PCDBVersion" value="1.0"></property>
   </class>
   <class name="iSM_HBAInfo">
        <property name="WWNN" value="WWNN of the second FC HBA of the
server"></property>
        <property name="SystemName" value="Node ID of the
server"></property>
        <property name="PCDBVersion" value="1.0"></property>
   </class>
   <class name="iSM_FCPortInfo">
        <property name="WWNN" value="WWNN of the second FC HBA of the
server"></property>
        <property name="WWPN" value="WWPN of the FC port of the second
FC HBA of the server"></property>
        <property name="SystemName" value="Node ID of the
server"></property>
        <property name="PCDBVersion" value="1.0"></property>
   </class>
</websamexport>
```

Logical Disk Information Display

iSMrc_ldlist

The iSMrc_ldlist command displays logical disks and related information.The "Displayed Information" table contains a description of the messages.

Displays logical disks and related information.

[Synopsis]

```
iSMrc_ldlist -a [-protect disks][-node][-iopath iopath]
iSMrc_ldlist -d [-iopath iopath]
iSMrc_ldlist -de diskarray [ld_name]
[-node]
[-protect disks]
iSMrc_ldlist -cr [-iopath iopath]
iSMrc_ldlist -ver
iSMrc_ldlist -?
iSMrc_ldlist -help
```

Options

The iSMrc_ldlist command recognizes the following options and arguments.

- -a Displays information of the logical disks stored in all disk arrays.
- -d Displays the list of disk arrays and indicates whether or not the system recognizes the disk arrays as target systems.
- -de disk_array [ld_name] Displays information of the logical disks stored in the disk array specified by disk_array. If ld_name is specified, only information of the specified logical disk name is displayed.
- -cr Updates the latest information by re-obtaining information of disk arrays and logical disks that are connected to the system. This option can be used only when joint operation with iSM (controlling the issuance of I/O to disk arrays via the iSM) is conducted.
- -protect disks Specify this option when additionally displaying whether the logical disk protection by the WORM function has been set.

One of the following can be specified for *disks*.

- all All logical disks are targeted for the display.
- only Only the logical disks having been protected are targeted for the display.
- -node Specify this option when additionally displaying the node number to which the logical disk belongs.
- -iopath *iopath* Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows.

One of the following can be specified for *iopath*.

- direct Replication I/O commands are issued directly to disk arrays.
- manager iSM being operated in the same server is connected and replication I/O commands are issued to disk arrays from iSM.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

- -ver Displays the version information of this command.

- -? Displays the usage of this command (Windows).
- -help Displays the usage of this command (UNIX).

A list of logical disks on all disk arrays is displayed.

When -de option was specified, only the information on a specific disk array and the logical disks is displayed. In this case, the displayed items are the same as those with -a option specified.

On the Windows system

```
C:\> iSMrc_ldlist -a
Receiving…
-------------------------------------------------------------------------
-------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name Attribute Capacity PD Type
-------------------------------------------------------------------------
-------------------------------------------------
[disk_array_name](management)
ldn type ld_name attribute capacity  pd_type
C:\>
```

On the UNIX system

```
# iSMrc_ldlist -a
Receiving...
------------------------------------------------------------
```

[Disk Array Name](Management)

```
LDNOS TypeLD NameAttributeCapacityPD Type
------------------------------------------------------------
```

[disk_array_name](*management*)
ldntypeld_nameattributecapacitypd_type
#

Description of messages:

Receiving... Data is being received.

This message remains displayed until data reception is completed only if joint operation with SnapSAN Manager is taking place. The display of this message can be suppressed by setting an option.

Disk Array Name Disk array name Management Indicates whether or not the system directly recognizes the disk arrays.

- direct The system recognizes the target disk array.
- indirect The system does not recognize the target disk array.

On the Windows system

 The list of disk arrays is displayed.

```
C:\> iSMrc_ldlist -d
Receiving…
------------------------------------------------------------------------
--------------------------------
Disk Array Name Management
------------------------------------------------------------------------
--------------------------------
disk_array_name management
C:\>
```

On the UNIX system

```
# iSMrc_ldlist -d
Receiving...
-------------------------------------------------------------
Disk Array Name Management
-------------------------------------------------------------
disk_array_name management
#
```

Description of messages:

Receiving... Data is being received.

This message remains displayed until data reception is completed only if joint operation with SnapSAN Manager is taking place. The display of this message can be suppressed by setting an option.

Disk Array Name Disk array name

Management Indicates whether or not the system directly recognizes the disk arrays.

- direct The system recognizes the target disk array.
- indirect The system does not recognize the target disk array.

For the logical disks on all disk arrays, the information on the logical disk protection by the WORM function is displayed.

When the -de option was specified, only the information on a specific disk array and the logical disks is displayed. In this case, the displayed items are the same as those with the -a option specified.

On the Windows system

```
C:\> iSMrc_ldlist -a -protect disks
Receiving…
------------------------------------------------------------------------
-------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name Attribute Capacity PD Type Data Protection
------------------------------------------------------------------------
-------------------------------------------------
[disk_array_name](management)
ldn type ld_name attribute capacity pd_type protect_state
C:\>
```

On the UNIX system

```
# iSMrc_ldlist -a -protect disks
Receiving ...
----------------------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name AttributeCapacity PD Type Data Protection
----------------------------------------------------------------
[disk_array_name](management)
ldn typeld_name attributecapacity pd_type protect_state
#
```

On the Windows system

```
C:\> iSMrc_ldlist -a -node
Receiving…
-----------------------------------------------------------------------
--------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name Attribute Capacity PD Type Node Number
-----------------------------------------------------------------------
--------------------------------------------------
[disk_array_name](management)
ldn type ld_name attribute capacity pd_type node_number
C:\>
```

On the UNIX system

```
# iSMrc_ldlist -a -node
Receiving ...
-------------------------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name Attribute Capacity PD Type  Node Number
-------------------------------------------------------------------
[disk_array_name](management)
ldn typeld_name attribute capacity pd_typenode_number
#
```

This command displays the list of logical disks.

On the Windows system

```
C:\> iSMrc_ldlist -a
-----------------------------------------------------------------------
----------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name Attribute Capacity PD Type
-----------------------------------------------------------------------
----------------------------------------------------
[Storage2800](direct)
0000h WN 200000004C0010550000 IV 2.0 GB FC
0001h WN WN_RDR01 MV/RV 2.0 GB FC
0002h WN WN_RDR02 MV 2.0 GB FC
[Storage1800](direct)
0000h NX GSF0000 IV 2.0 GB ATA
0001h LX DBGSF01 RV 2.0 GB ATA
0002h LX DBGSF02 RV 2.0 GB ATA
C:\>
On the UNIX system
# iSMrc_ldlist -a
---------------------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name Attribute Capacity PD Type
---------------------------------------------------------------
[Storage1800](direct)
0000h NX GSF0000 IV 2.0 GB ATA
0001h LX DBGSF01 RV 2.0 GB ATA
0002h LX DBGSF02 RV 2.0 GB ATA
[Storage2800](indirect)
0000h WN DBLD0000 IV 3.9 GB FC
0001h LX DBLD0001 MV 2.0 GB FC
#
```

This command displays the list of protection states of the logical disks.

On the Windows system

```
C:\> iSMrc_ldlist -de Storage1800 -protect all
-----------------------------------------------------------------------
-------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name Attribute Capacity PD Type Data Protection
-----------------------------------------------------------------------
-------------------------------
[Storage1800](direct)
0000h NX GSF0000 IV 2.0 GB ATA protection
0001h LX DBGSF01 RV 2.0 GB ATA -
0002h LX DBGSF02 RV 2.0 GB ATA -
C:\>
```

On the UNIX system

```
# iSMrc_ldlist -de Storage1800 -protect only
-----------------------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name Attribute Capacity PD Type Data Protection
-----------------------------------------------------------------
[Storage1800](direct)
0000h NX GSF0000 IV 2.0 GB ATA protection
#
```

This command displays the list of node numbers to which the logical disk belongs.

On the Windows system

```
C:\> iSMrc_ldlist -de StorageD8 -node
--------------------------------------------------------------------------
--------------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name Attribute Capacity PD Type Node Number
--------------------------------------------------------------------------
--------------------------------------------------------
[StorageD8](direct)
0000h NX DSF0000 IV 2.0 GB FC   1
0001h LX FBGSF01 RV 2.0 GB FC   3
0002h LX FBGSF02 MV 2.0 GB FC   0

C:\>
```

On the UNIX system

```
# iSMrc_ldlist -de StorageD8 -node
---------------------------------------------------------------------
[Disk Array Name](Management)
LDN OS Type LD Name  Attribute  Capacity  PD Type  Node Number
---------------------------------------------------------------------
[StorageD8](direct)
0000h NX DSF0000 IV 2.0 GB FC   1
0001h LX FBGSF01 RV 2.0 GB FC   3
0002h LX FBGSF02 MV 2.0 GB FC   0
#
```

This command displays the list of disk arrays.

On the Windows system

```
C:\> iSMrc_ldlist -d
--------------------------------------------------------------------------
--------------------------------
Disk Array Name Management
--------------------------------------------------------------------------
--------------------------------
Storage2800 direct
Storage1800 direct
C:\>
```

On the UNIX system

```
# iSMrc_ldlist -d
-----------------------------------------------------------
Disk Array Name Management
-----------------------------------------------------------
Storage2800 direct
Storage1800 indirect
#
```

```
-----------------------------------------------------------------
[StorageD8] (direct)
0000h   NX        DSF0000  IV        2.0 GB      FC              1
0001h   LX        FBGSF01  RV        2.0 GB      FC              3
0002h   LX        FBGSF02  MV        2.0 GB      FC              0

#
```

(4) This command displays the list of disk arrays

On the Windows system

```
C:\> iSMrc_ldlist -d
---------------------------------------------------------------------------
Disk Array NameManagement
---------------------------------------------------------------------------
Storage2800   direct
Storage1800   direct

C:\>
```

On the UNIX system
```
# iSMrc_ldlist -d
-----------------------------------------------------------
Disk Array Name   Management
-----------------------------------------------------------
Storage2800 direct
Storage1800 indirect
#
```

- The following logical disk attributes are not displayed:
    - Reserved attributes (registered with the reserve group)
    - SDV for snapshot (snapshot data volume)
- System Volume
    - The attribute of the control volume is displayed when the control volume is bound on a disk array which can identify the control volume attribute.
    - The control volume attribute is not displayed when it cannot be obtained from the disk array not recognized by the system (indirect for management). For a logical disk defined as a control volume on the server, the attribute is not displayed.

The following notes do not apply to joint operation with SnapSAN Manager.

- At least one logical disk on the target disk array must have been registered in the volume list.
- The command cannot be executed when the volume list is being created.
- The command cannot be executed when a special file dedicated for SnapSAN Manager is being created for Linux,.

- For the disk arrays to which the secure mode is set as the operation mode from the relevant system and the link disk arrays, the logical disks to be displayed must satisfy any of the following conditions:
  - The logical disks must have been registered in the volume list.
  - The volume to be paired with the target logical disk must have been registered in the volume list.
  - A paired upper or lower volume for the target logical disk must have been registered in the volume list.
  - When the target logical disk is BV (base-volume), SV (snapshot-volume), or LV (link-volume) for snapshot, the BV or the LV linked to the BV or SV must have been registered in the volume list.
  - The target logical disk must not be locked by the operation guard setting.

[Return Values]

0: The display of logical disks and related information has been normally terminated.

1: The display of logical disks and related information has been abnormally terminated.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- The instruction fails due to a disk array error.

iSMrc_sense

The iSMrc_sense command displays the volume name and attribute of a specified volume or information about the settings of a specified ATgroup.

[Synopsis]

```
iSMrc_sense-vol volume -volflg vol_flg
[-attr] [-protect] [-updprevent]
[-iopath iopath]
iSMrc_sense-file file_name
[-attr] [-protect] [-updprevent]
[-iopath iopath]
iSMrc_sense-atg [atgroup]
[-site atg_site]
```

[-αρραψναμε δισκαρραψ]

```
[-linkarrayname]
[-iopath iopath]
iSMrc_sense -ver
iSMrc_sense-?
iSMrc_sense-help
```

Options

The iSMrc_sense command recognizes the following options.

- -vol volume
  - Specify the volume name.
- -volflg vol_flg
  - Specify the volume type specified in -vol.

This argument must be specified with -vol.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

- -attr
  - Specify to display the logical disk attribute and the LV link state (link-volume).
- -protect
  - Specify to additionally display the information on the logical disk protection by the WORM function.
- -updprevent
  - Specify to display the volume update prevention state additionally.
- -atg [atgroup]
  - Specify the ATgroup name of an operation target.
    If no ATgroup name is specified, all ATgroups are assumed.
- -site atg_site
  - Specify the location of an ATgroup.
  - atg_site can be either of the following:
    - concInformation about an ATgroup is displayed with the concentrator as a target.
    - distInformation about an ATgroup is displayed with the distributor specified as a target.
  - If this parameter is omitted, information about an ATgroup is displayed with both the concentrator and distributor specified as targets.
- -arrayname diskarray
  - Specify the disk array name (nickname) of an operation target.
- -linkarrayname
  - Specify to display the link disk array configuring the ATgroup.
- -iopath iopath
  - Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- directReplication I/O commands are issued directly to disk arrays.
- manageriSM being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

- -file file_name
  - To specify multiple volumes, describe the volumes in file_name.

When multiple volumes are specified, if an error occurs in some volumes, an error message indicating that is displayed, and the process is continued until it is terminated in all the specified volumes.

- -ver Displays the version information of this command.
- -? Displays the usage of this command (Windows).

- -help Displays the usage of this command (UNIX).

[DISPLAYED INFORMATION]

On the Windows system

(1) The command displays the following information if a volume name display is selected.

```
C:\>iSMrc_sense -vol ld-name -volflg ld
  Disk No. disk_number
  LD Name    ld_name
  VAA  VAA
  Type  type
  Volume Name  volume_name
  Path  path

C:\>
```

```
C:\>iSMrc_sense -vol ld-name -volflg ld -attr
  Disk No. disk_number
  LD Name    ld_name
  VAA  VAA
  Type  type
  Volume Name  volume_name
  Path  path
  Attribute    ld_attribute
  LV Link Status    link_status

C:\>
```

(2) The command displays the following information if a protection information display is selected.

```
C:\>iSMrc_sense -vol ld-name -volflg ld   -protect
  Disk No. disk_number
```

```
LD Name    ld_name
VAA  VAA
Type  type
Volume Name  volume_name
Path  path
Protection Information
    Protection State   protection_state
    Begin Date  begin_date
    Retention Dateretention_date
    Retention Mode   retention_mode
    Reinitialize  reinitialize_status

C:\>
```

```
C:\>iSMrc_sense -vol ld-name -volflg ld   -attr -protect
    Disk No. disk_number
    LD Name    ld_name
    VAA  VAA
    Type  type
    Volume Name  volume_name
    Path  path
    Attribute    ld_attribute
    LV Link Status   link_status
    Protection Information
        Protection State      protection_state
        Begin Date     begin_date
        Retention Date    retention_date
        Retention Mode       retention_mode
        Reinitialize     reinitialize_status

C:\>
```

(3) The command displays the following information if an update prevention
state display is selected.

```
C:\>iSMrc_sense -vol ld-name -volflg ld -updprevent
    Disk No. disk_number
    LD Name    ld_name
    VAA  VAA
    Type  type
    Volume Name  volume_name
    Path  path
    Update Prevention State   prevention_state

C:\>
```

(4)   The command displays the following information if an ATgroup setting
display is selected.

```
C:\>iSMrc_sense  -atg atgroup

No.  ATG Name    Site   Entry
  Disk Array Name
xxxxh   atgroup     site   entry
  diskarray

C:\>
```

```
C:\>iSMrc_sense  -atg atgroup   -linkarrayname
No.  ATG Name    Site   Entry
        Disk Array Name
    Link Disk Array Name
xxxxh   atgroup     site   entry
        diskarray
        linkdiskarray

C:\>
```

This display appears only if the -attr option is specified. "-" is displayed unless the target volume is LV.

link: Link connected

unlink: Link not connected

- Protection Information

  Displays the information on the logical disk protection. When the logical disk is not protected or when the protection information cannot be acquired, a hyphen ("-") is displayed for all items.

- Protection state

  - ROWrite-protect (Valid)

  - NARead/write-protect (Valid)

  - RO(expired)Write-protect (Expired)

  - NA(expired)Read/write-protect (Expired)

- Begin Date Begin date (year/month/day)

- Retention Date Retention date (year/month/day)

  - When the retention date has not been specified, a hyphen ("-") is displayed.

  - When the retention date is specified as permanent, the following value is displayed.

  - permanentRetention date is specified as permanent

- Retention Mode Retention mode

  - normalNormal mode

  Releases protection and reset the retention period at any time.

  - secureSecure mode

  You cannot release protection until the retention period has elapsed. However, you can extend the retention period or change the protection state.

- strictStrict mode

    You cannot release protection until the retention period has elapsed. Neither can you reset the retention period and protection state.

- Reinitialize Reinitialization of logical disk

    When reinitialization has not bee executed, a hyphen ("-") is displayed.

    formatting(nn%)

    Reinitialization is being executed

    nn displays the value indicating progress ratio of the initialization processing.

    format-failReinitialization failed

- Update Prevention State

    Volume update prevention state.When the swap function for Remote Replication pair cannot be used or the information cannot be obtained, a hyphen ("-") is displayed.

- Prevent Prevent state

    - Not PreventNot Prevent state

- No.Concentrator number (4 hexadecimal digits)

    Unit-specific number assigned to concentrator

- ATG NameATgroup name

- SiteATgroup location

    concentrator: Concentrator
    distributor: Distributor

- EntryNumber of pairs registered with the ATgroup

- Disk Array Name
    Disk array name

- Link Disk Array Name
    Link disk array name

    Nickname of the link disk array will be shown if ATgroup matches both conditions below. However, "(unknown)" will be shown instead if failed to get nickname for disk array.

    - ATgroup to which pairs are registered

    - ATgroup created by specifying the link disk array for disk arrays which supports the function specifying the link disk array

    For others for which link disk array is not fixed, a hyphen ("-") is displayed.

On the UNIX system

iSMrc_sense -vol special_file_name -volflg sfn

The command displays volume information if a volume name display is selected.

```
# iSMrc_sense -vol special_file_name -volflg sfn
Special fileLD NAMEVAAType
special_file_nameld nameVAAtype
#
# iSMrc_sense -vol special_file_name -volflg sfn -attr
Special fileLD NAMEVAAType
AttributeLV Link Status
special_file_nameld nameVAAtype
ld_attributelink_status
#
```

When environment variable `RPL_SENSE_VERTICAL_INDICATE` has been set to `ON`, the following is displayed.

```
# iSMrc_sense -vol special_file_name -volflg sfn
Special filespecial_file_name
LD NAMEld_name
VAAVAA
Typetype
#


# iSMrc_sense -vol special_file_name -volflg sfn -attr
Special filespecial_file_name
LD NAMEld_name
VAAVAA
Typetype
Attributeld_attribute
LV Link Statuslink_status
#
```

The command displays the following information if a protection information display is selected.

```
# iSMrc_sense -vol special_file_name -volflg sfn -protect
Special filespecial_file_name
LD NAMEld_name
VAAVAA
Typetype
Protection Information
Protection Stateprotection_state
Begin Datebegin_date
Retention Dateretention_date
Retention Moderetention_mode
Reinitializereinitialize_status
#
```

The command displays the following information if an update prevention state display is selected.

```
# iSMrc_sense —vol special_file_name -volflg sfn -updprevent
Special filespecial_file_name
LD NAMEld_name
VAAVAA
Typetype
Update Prevention Stateprevention_state
#
```

The command displays the following information if an ATgroup setting display is selected.

```
# iSMrc_sense -atg atgroup
No.ATG NameSiteEntry
Disk Array Name
xxxxhatgroupsiteentry
diskarray
#
# iSMrc_sense -atg atgroup -linkarrayname
No.ATG NameSiteEntry
Disk Array Name
Link Disk Array Name
  xxxxhatgroupsiteentry
diskarray
linkdiskarray
#
```

This display appears only if the -attr option is specified.

This display appears only if the -attr option is specified. "-" is displayed unless the target volume is LV.

- Protection State
    - RO Write-protect (Valid)
    - NA Read/write-protect (Valid)
    - RO(expired) Write-protect (Expired)
    - NA(expired) Read/write-protect (Expired)

Begin Date Begin date (year/month/day)

Retention Date

Retention date (year/month/day)

When the retention date has not been specified, a hyphen ("-") is displayed.

When the retention date is specified as permanent, the following value is displayed.

permanent Retention date is specified as permanent

Retention Mode Retention mode

normal Normal mode

You can release protection and reset the retention period at any time.

secureSecure mode

You cannot release protection until the retention period has elapsed. However, you can extend the retention period or change the protection state.

strictStrict mode

You cannot release protection until the retention period has elapsed. Neither can you reset the retention period and protection state.

ReinitializeReinitialization of logical disk

When reinitialization has not been executed, a hyphen ("-") is displayed.

formatting(*nn*%)Reinitialization is being executed

nn displays the value indicating progress ratio of the initialization processing.

format-failReinitialization failed

Update Prevention State

Volume Update Prevention State

When the swap function for Remote Replication pair cannot be used or the information cannot be obtained, a hyphen ("-") is displayed.

- Prevent Prevent state When the Remote Replication pair is being swapped, swapping the Remote Replication pair is suspended, or the Remote Replication quick sync function is being used, the paired MV and RV are in the Prevent state.
- Not Prevent Not Prevent state: Normal state
- No.Concentrator number (4 hexadecimal digits)
  Unit-specific number assigned to concentrator
- ATG NameATgroup name
- SiteATgroup location
  - concentrator: Concentrator
  - distributor: Distributor
- EntryNumber of pairs registered with the ATgroup
- Disk Array NameDisk array name
  - Link Disk Array Name Link disk array name
  Nickname of the link disk array will be shown if ATgroup matches both conditions below. However, "(unknown)" will be shown instead if failed to get nickname for disk array.
  - ATgroup to which pairs are registered
  - ATgroup created by specifying the link disk array for disk arrays which supports the function specifying the link disk array

For others for which link disk array is not fixed, a hyphen ("-") is displayed.

[USAGE]

On the Windows system

(1) The command displays volume name information.

```
C:\>iSMrc_sense -vol rpl302_7 -volflg ld
Disk No.    21
LD Name      rpl302_7
VAA        30000000000000020302
Type       NX
Volume Name \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
Path       R:

C:\>
```

(2) The command displays the protection state of the volume.

```
C:\>iSMrc_sense -vol rpl302_7 -volflg ld -attr
Disk No.    21
LD Name   rpl302_7
VAA 30000000000000020302
Type NX
Volume Name \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
Path R:
Protection Information
  Protection State   RO
  Begin Date  2005/02/25
  Retention Date2008/03/31
  Retention Mode    secure
  Reinitialize  -

C:\>
```

(3) The command lists information about ATgroup settings.

```
C:\> iSMrc_sense -atg
No.  ATG Name Site   Entry
    Disk Array Name
0001h ATmdb01 concentrator   2
   StorageS4300/1126
0002h ATmdb02 concentrator   6
```

```
  StorageS4300/1126
0007h ATG0381 distributor  4
  StorageS3300/1035

C:\>
```

On the UNIX system

The command displays the protection state of the volume.

```
# iSMrc_sense -vol LD0005_2 -volflg ld -attr protect
Special file/dev/sdi
LD NAMELD0005_2
VAA020020004C7F3E2C0005
TypeLX
AttributeIV
LV Link Status-
Protection Information
Protection StateNA
Begin Date2005/09/12
Retention Datepermanent
Retention Modenormal
Reinitialize-
#
```

The command lists information about ATgroup settings.

```
# iSMrc_sense -atg
No.ATG NameSiteEntry
Disk Array Name
0001hATmdb01concentrator2
StorageS4300/1126
0002hATmdb02concentrator6
StorageS4300/1126
0007hATG0381distributor4
StorageS3300/1035
#
```

<Volume name display>

- When the `-attr` option is specified, the control volume to be displayed as a logical disk attribute is displayed only for the control volume bound in the disk array that can identify the control volume attribute. For a logical disk defined as a control volume on the server, the attribute is not displayed.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target volume or a volume to be paired with the target volume must have been registered in the volume list.
  When a remote-side volume is to be operated in remote operation, the target volume must satisfy the following conditions:

  - The target volume has been paired and a paired upper or lower volume for the target pair must have been registered in the volume list.

  - When the target volume has been paired and that MV or RV is used also as BV (base-volume) for snapshot, the BV or LV linked to the BV must have been registered in the volume list.

  - When the target volume is BV (base-volume), SV (snapshot-volume), or LV (link-volume) for snapshot, the BV or LV linked to the BV or SV must have been registered in the volume list.

- The command cannot be executed when the volume list is being created.

- To specify a volume group, the target volume group must be active.

- To specify a disk group, the target disk group must be active.

- The command cannot be executed when the SnapSAN Manager-only special file is being created for Linux,.

<Displaying information about ATgroup settings>

- An ATgroup for which no pair is registered can be a display target.

The following notes do not apply to joint operation with SnapSAN Manager.

- When the secure mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, MVs or RVs of all the pairs that belong to the target ATgroup must have been registered in the volume list.
- When the standard mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, at least one logical disk that belongs to the target ATgroup must have been registered in the volume list.
- The command cannot be executed when the volume list is being created.
- The command cannot be executed when the SnapSAN Manager-only special file is being created for Linux,.

[Return Values]

<Volume name display>

0: Operation for all the paired volumes terminated normally.

1: Operation for all the paired volumes terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

2: Operation for some paired volumes terminated abnormally.

<Displaying information about ATgroup settings>

0: ATgroup operation terminated normally.

1: ATgroup operation terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

Windows Volume Operation

iSMrc_flush (Windows)

Flushes the file system buffer.. The iSMrc_flush command requests flushing the unwritten buffer data of specified drive/mount point volume/NTFS folder onto disk.For writing data completely, execution and normal termination of iSMrc_flush and iSMrc_umount commands is required. If iSMrc_umount command results in an error on server with MV and BV connected, waiting for delayed updating of file system for approx. 60 seconds after execution

of iSMrc_flush command, and then executing iSMrc_separate allows reflection of almost all updating onto disk. In this case, use the commands after mounting RV or LV and restoring the file system with the /F option of CHKDSK command.

[Synopsis]
```
iSMrc_flush -drv drive:
iSMrc_flush -mvol volume_name
iSMrc_flush -mdir path
iSMrc_flush -ver
iSMrc_flush -?
```

Options

The iSMrc_flush command recognizes the following options and arguments.

- -drv drive: Specify the name of the drive to be flushed.
- -mvol volume_name Specify the name of the mount point volume to be flushed.
- -mdir path Specify the name of the NTFS folder to be flushed.
- -ver Displays the version information of this command.
- -? Displays the usage of this command.

```
C:\>iSMrc_flush -drv volume-name
Flush Start  YYYY/MM/DD hh:mm:ss
    disk_number    ld_name  type
    volume name
    path

Flush Normal End YYYY/MM/DD hh:mm:ss
    disk_number    ld_name  type
    volume name
    path
C:\>
```

- The operation target volume must have been registered in the Volume List.
- The operation target volume must be available for Read/Write.
- A dynamic disk cannot be specified.
- The drive of the specified name must be mounted.
- This command flushes only the Windows file system. Therefore, it cannot flush the data of an application which processes its own cache. To flush the data from the application to the disk, flush the data of the application first, and then use this command to flush the file system.
- The command cannot be executed if the update prevention state of the target volume is Prevent by the volume update prevention function.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- A parameter is invalid.
- The system function (Win32API) fails.

iSMrc_mount (Windows)

The iSMrc_mount command mounts the specified mount point volume name, drive letter, or NTFS folder to the Windows file system. When mounting a volume to which a mount point (drive letter or NTF folder name) is not set, specify the name of the mount point volume to be mounted and the mount point to be set to the volume. In this case, set the specified mount point to the volume to be mounted and mount the volume. If the access restriction state of the disk of interest has been set to the Not Ready state by unmounting the disk with the `iSMrc_umount` command, the volume is automatically released from the Not Ready state before it is mounted.

[Synopsis]
```
iSMrc_mount  -mol volume_name
[{ -drv drive: | -mdir path }]
iSMrc_mount -drv drive:
iSMrc_mount -mdir path
iSMrc_mount -ver
iSMrc_mount  -?
```

Options

The iSMrc_mount command recognizes the following options and arguments.

-mvol volume_name

Specify the name of the mount point volume to be mounted.

-drv drive: Specify the name of the drive to be mounted.
When using this option together with the -mvol option, specify the drive letter of a mount point to be set up for the mount point volume of interest.

-mdir path Specify the name of the NTFS folder to be mounted.
When using this option together with the -mvol option, specify the NTFS folder name of a mount point to be set up for the mount point volume of interest.

-ver Displays the version information of this command.

-? Displays the usage of this command.

```
C:\>iSMrc_flush -drv volume-name
Flush Start  YYYY/MM/DD hh:mm:ss
    disk_number    ld_name  type
    volume name
    path

Flush Normal End YYYY/MM/DD hh:mm:ss
    disk_number    ld_name  type
    volume name
    path
C:\>
```

Description of message:
- Flush Start   *YYYY/MM/DD hh:mm:ss*
- File system flush unmount starting message and Start Time
- disk_number ld_name   type
  volume name
  path

- Physical disk number, logical disk name, OS type, mount point volume name, and drive letter accessed by users or path name of the NTFS folder.
- Flush Normal End   *YYYY/MM/DD hh:mm:ss*
- File system flush end message and end time

The command flushes the volume with the physical disk number 4 and drive letter "R":

```
C:\>MOUNTVOL R: /D
C:\>iSMrc_flush -mvol \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
Flush Start 2001/02/06 20:32:43
    disk4     rpl302_7WN
    \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
    R:
Flush Normal End    2001/02/06 20:32:43
    disk4     rpl302_7WN
    \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
    R:
C:\>
```

- The operation target volume must have been registered in the Volume List.
- The operation target volume must be available for Read/Write.
- A dynamic disk cannot be specified.
- The drive of the specified name must be mounted.
- This command flushes only the Windows file system. Therefore, it cannot flush the data of an application which processes its own cache. To flush the data from the application to the disk, flush the data of the application first, and then use this command to flush the file system.
- The command cannot be executed if the update prevention state of the target volume is Prevent by the volume update prevention function.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- A parameter is invalid.
- The system function (Win32API) fails.

iSMrc_umount (Windows)

The iSMrc_mount command mounts the specified mount point volume name, drive letter, or NTFS folder to the Windows file system.When mounting a volume to which a mount point (drive letter or NTF folder name) is not set, specify the name of the mount point volume to be mounted and the mount point to be set to the volume. In this case, set the specified mount point to the volume to be mounted and mount the volume.If the access restriction state of the disk of interest has been set to the Not Ready state by unmounting the disk with the iSMrc_umount command, the volume is automatically released from the Not Ready state before it is mounted.

[Synopsis]
```
iSMrc_umount -mvol volume_name [-force] [-offline]
iSMrc_umount -drv drive: [-force] [-offline]
iSMrc_umount -mdir path [-force] [-offline]
iSMrc_umount -ver
iSMrc_umount -?
```

Options

The iSMrc_umount command recognizes the following options.

- -mvol *volume_name* Specify the name of the mount point volume to be unmounted.

- -drv *drive:* Specify the name of the drive to be unmounted.

- -mdir *path* Specify the name of the NTFS folder to be unmounted.

- -force Unmount a target drive/mount point volume/NTFS folder forcibly even if the target volume cannot be locked.
  When the unmount command is issued to an RV or LV with the -force option omitted, it always behaves as if the -force option were specified.

- -offline Deletes a mount point to disable automatic mounting. The target volume is forcibly unmounted even if it cannot be locked.
  When the unmount command is issued to an LV with the -offline option omitted, it always behaves as if the -offline option were specified. When the unmount command is issued to an RV with the -offline option omitted, it operates according to the UMOUNT_RVACC parameter in the replication option setting file.

- -ver Displays the version information of this command.

- -? Displays the usage of this command.

```
C:\>iSMrc_mount -mvol volume_name  -drv drive:
Mount Start   YYYY/MM/DD hh:mm:ss
  disk_number   ld_name type
  volume_name
  path

iSMrc_mount: Info:  iSM13220: Setting drive letter (drive:) has succeeded.

Mount Normal End     YYYY/MM/DD hh:mm:ss
  disk_number   ld_name type
  volume_name
  path

C:\>
```

Description of message:

- *drive*:
  Drive letter

- Mount Start   *YYYY/MM/DD hh:mm:ss*
  Physical disk mount starting message and Start Time

disk_number   ld_name   type
volume_name
path

  Physical disk number, logical disk name, OS type, mount point volume name, and drive letter accessed by users or path name of the NTFS folder.

- Mount Normal End   *YYYY/MM/DD hh:mm:ss*
  Physical disk mount end message and end time

The command mounts the volume with the drive name "R:":

```
C:\>iSMrc_mount -mvol
\\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\  -drv R:
Mount Start    2001/02/06 20:32:43
   disk4     rpl302_7 WN
   \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
   R:

iSMrc_mount: Info:  iSM13220: Setting drive letter (R:) has succeeded.

Mount Normal End  2001/02/06 20:32:43
   disk4     rpl302_7 WN
   \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
   R:

C:\>
```

- The target volume must be registered in the Volume List.
- The operation target volume must be available for Read/Write.
- A dynamic disk cannot be specified.
- The command cannot be executed if the update prevention state of the target volume is Prevent by the volume update prevention function.
- When restarting a server with the disk access restriction set to the Not Ready state, the relevant disk is not recognized by OS. In this case, it is necessary to make OS recognize the relevant disk and volume with the `iSMrc_scan` command after a server is started.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- A parameter is invalid.
- The system function (Win32API) fails.

iSMrc_signature (Windows)

The iSMrc_signature command performs save, restoration, deletion, initialization, and display of disk signature. It also writes the disk signature information to a file or reads it from a file.

[Synopsis]

```
iSMrc_signature {-read | -set | -del | -init | -list} {-dskn
disk_number | -all}
iSMrc_signature {-export | -import} file_name {-dskn disk_number | -
all}
iSMrc_signature -ver
iSMrc_signature -?
```

Options

The iSMrc_signature command recognizes the following options.

- -read Saves the signature of the physical disk currently recognized by Windows. If -all is specified, all signature information is saved. If *disk_number* is specified, only the signatures of the target physical disks are saved.

Saved signatures are recorded in the signature map file managed by the iSMrc_signature command.

- -set

  Recovers the disk signatures saved in the map file by -read to the disk. If -all is specified, all signature information saved is recovered to the physical disk. If *disk_number* is specified, only the signatures of the target physical disks are recovered.

- -del

  Deletes the disk signatures saved in the map file by −read. If -all is specified, signature information of all disks is deleted. If *disk_number* is specified, only the signatures of the target physical disks are deleted.

- -init

  Initializes the signature on the physical disk. If -all is specified, signature information of all disks is initialized. If *disk_number* is specified, only the signatures of the target physical disks are initialized.

- -list

  Displays the list of disk signatures saved by -read, signatures on the physical disk, and signatures saved in the disk array. If -all is specified, signature information of all disks is displayed. If *disk_number* is specified, only the signatures of the target physical disks are displayed.

- -export

  Writes the disk signature information to the specified file. If -all is specified, signature information of all disks is written to the file. If *disk_number* is specified, only the signatures of the target physical disks are written to the file.

- -import

  Reads the disk signature information recorded in the specified file from the file and registers it. If -all is specified, signature information of all disks is read from the file and registered. If *disk_number* is specified, only the signatures of the target physical disks are read from the file and registered.

- *file_name*

  Specify the file name to which the disk signature information is written, or from which it is read.

- -dskn *disk_number*

  Specify the disk number of the physical disk to which the disk signature operation is performed.

- -all

  Performs the disk signature operation for all the physical disks connected to the host.
- -ver

  Displays the version information of this command.
- -?

  Displays the usage of this command.

[DISPLAYED INFORMATION]

```
C:\>iSMrc_signature  -list -all
   Disk  Map  Disk Saved    LV Link
  Disk Array Name   No.  LDN  Signature   Signature   Signature   Attribute
        Status
-----------------------              - ------    ------    ------------      ------------      ------------     ------------
- ---------------
   disk_array_name   dskn   ldn   map_sig  disk_sig  saved_sig   attribute
   link_status

C:\>
```

The command saves signature information about all physical disks connected to the server and then lists the signature information.

```
C:\>iSMrc_signature  -read -all
iSMrc_signature:  Info:  iSM13222: Reading signature succeeded. 2 records
C:\>iSMrc_signature  -list -all
   Disk     Map  Disk  Saved        LV Link
  Disk Array Name   No.  LDN  Signature   Signature   Signature  Attribute
          Status
-----------------------              - ------    ------    ------------      ------------      ------------     ------------
- ---------------
Storage2800    4    001f  AA6143BD  AA6143BD  AA6143BD  RV       -
Storage2800    5    0030  81288D0A  81288D0A  -   LV      link

C:\>
```

- The value of the disk signature reported by means of the iSMrc_signature command may seem to be different from the value of the disk signature reported by means of Windows or other disk management tools because the byte order is handled differently.
  Therefore, pay special attention when using the value of the disk signature displayed or saved by the iSMrc_signature command for another disk management tool.
- Target volume must have been registered in the volume list.
- The command cannot be executed if the target volume is in the Not Ready state.
- A dynamic disk or the partition disk in GPT format cannot be specified.
- When the update prevention state of the target volume is Prevent by the volume update prevention function, operations to initialize the signature on the physical disk and to restore the disk signature saved in the map file cannot be performed.

- The control volume attribute is displayed only for the control volume bound in the disk array that can identify the control volume attribute. For a logical disk defined as a control volume on the server, the attribute is not displayed.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- A parameter is invalid.
- The system function (Win32API) fails.

iSMrc_scan (Windows)

The iSMrc_scan command scans devices and allows the system to recognize the available devices.If the access restriction state of the target volume has been changed to the Not Ready state (both reference and write access are inhibited) when it is unmounted using the iSMrc_umount, the device is scanned after the volume is released from the Not Ready state.

[Synopsis]
```
iSMrc_scan
iSMrc_scan -ver
iSMrc_scan -?
```

Options

The iSMrc_scan command recognizes the following options:

- -ver Displays the version information of this command.
- -? Displays the usage of this command.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- A parameter is invalid.
- The system function (configuration manager API) fails.

Hyper-V Virtual Machine

iSMpassthrough_enabler (Windows)

The iSMpassthrough_enabler command enables the issuance of SCSI pass through I/O from a Hyper-V virtual machine and displays whether such issuance is enabled.By enabling the issuance of SCSI pass through I/O, you can create and display a volume list and use replication operation commands from a Hyper-V virtual machine.To use these functions, you must execute this command on the host once before using a Hyper-V virtual machine. This command must also be executed when a new Hyper-V virtual machine is added to your operating environment.

[Synopsis]

```
iSMpassthrough_enabler
iSMpassthrough_enabler -l
iSMpassthrough_enabler –ver
iSMpassthrough_enabler –?
```

Options

The iSMpassthrough_enabler command recognizes the following options:

- (No option) Enables the issuance of SCSI pass through I/O from all the Hyper-V virtual machines set up on the host where this command is executed.
- `-l` Displays whether SCSI pass through I/O can be issued from all the Hyper-V virtual machines set up on the host where this command is executed.
- `-ver` Displays the version information of this command.
- -? Displays the usage of this command.

```
C:\>iSMrc_mount -mvol volume_name   -drv drive:
Mount Start   YYYY/MM/DD  hh:mm:ss
   disk_number   ld_name type
   volume_name
   path

iSMrc_mount: Info:  iSM13220:  Setting drive letter (drive:) has succeeded.

Mount Normal End     YYYY/MM/DD  hh:mm:ss
   disk_number   ld_name type
   volume_name
   path

C:\>
```

Description of message:

- *drive*:

  Drive letter

- Mount Start *YYYY/MM/DD hh:mm:ss*

  - Physical disk mount starting message and Start Time

    disk_number   ld_name   type
    volume name
    path

  - Physical disk number, logical disk name, OS type, mount point volume name, and drive letter accessed by users or path name of the NTFS folder.

- Mount Normal End *YYYY/MM/DD hh:mm:ss*

  Physical disk mount end message and end time

The command mounts the volume with the drive name "R:":

```
C:\>iSMrc_mount -mvol
\\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\  -drv R:
Mount Start   2001/02/06 20:32:43
   disk4    rpl302_7 WN
   \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
   R:

iSMrc_mount: Info:  iSM13220:  Setting drive letter (R:) has succeeded.

Mount Normal End  2001/02/06 20:32:43
   disk4    rpl302_7 WN
   \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
   R:

C:\>
```

- The target volume must be registered in the Volume List.
- The target volume must be in the Read/Write enabled state or must have been changed to the Not Ready state, when unmounting using the iSMrc_umount command.
- A dynamic disk cannot be specified.
- The command cannot be executed if the update prevention state of the target volume is Prevent by the volume update prevention function.
- When restarting a server with the disk access restriction set to the Not Ready state by unmounting, the volume is not recognized by OS. In this case, it is necessary to make OS recognize the volume in advance and mount the volume by releasing the Not Ready state and scanning devices with the iSMrc_scan command after a server is started.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases:

- A parameter is invalid.
- The conditions to execute this command are not satisfied.
- Operations for a Hyper-V virtual machine failed.

2: Abnormal termination because operations for some Hyper-V virtual machines failed.

Data Replication Function

Replication Operation File

To perform batch setting of paired volumes by a command of the data replication function with the -file option, use the replication operation file. Also to perform batch setting of operation target volumes by the iSMrc_sense command of the common function with the -file option, the replication operation file can be used.

The replication operation file is described below.

[File Location And Name]

Can be freely specified.

[Description]

The replication operation file is used to perform batch setting of multiple pairs by using a data replication command.

[Synopsis]

This file is described in the following synopsis:

```
MV_Type:MV              RV_Type:RV
```

To describe the MV and RV, use a colon (:) to connect the volume type (*MV_Type* or *RV_Type*) with the volume (*MV* or *RV*).

Specifying volume types (MV_Type, RV_Type)

The following values can be specified as a volume type by using either a numerical value or a character string.

Volume Types

Target Volume	Volume Types		Target System	
	By Number	By Characters	Windows	UNIX
Logical Disk Name	0	ld	✓	✓
Special File Name	1	sfn	-	✓

Target Volume	Volume Types		Target System	
	By Number	By Characters	Windows	UNIX
Volume Group Name	2	vg	-	✓
Drive Letter	4	drv	✓	-
Disk Group Name	5	dg	-	-
Mount Point Volume Name	6	mvol	-	-
Ntfs Folder Name	7	mdir	-	-

Specifying a Volume (MV, RV)

Specify the name of the target volume that has an attribute specified as a volume type.

The maximum number of characters is as follows:

Target Volume	Maximum Number of Characters
Logical disk name	24 single-byte characters
Special file name	32 single-byte characters (Linux) 64 single-byte characters
Volume group name	32 single-byte characters
Disk group name	
Mount point volume name	52 single-byte characters
Path name (drive letter or NTFS folder name)	260 single-byte characters

Rules

- Start description from the first column of the line.
- A line break shall be a partition of records.
- Up to 1,024 single-byte characters can be described per record.
- One pair can be described per record.
- When one MV and one RV exist, description of the RV can be omitted.
- Normally, when one MV and multiple RVs exist, description of the RVs cannot be omitted. It can be omitted only when the iSMrc_query command or the iSMrc_wait command is used.

- Use a blank space or a tab character to separate the description of the MV from the description of the RV.
- Text displayed from the sharp (#) character to the end of the record is recognized as a comment.
- If there is an error in the file syntax, operations to all pairs described in the file become invalid.
- When using the iSMrc_sense or iSMrc_updprevent command, specify the volume type and the volume name for MV_Type and MV, respectively. Descriptions of RV_Type and RV are ignored.
- When describing a pair that combines a volume group or a disk group with a special file name (or logical disk name), multiple volumes can be specified by describing multiple special file names (or logical disk names) separated by a comma (,).
- When specifying a pair that combines a volume group or a disk group with a special file name (or logical disk name), the number of logical volumes that consist of the volume group or the disk group must coincide with the number of special file names to be described.
- If a character string, such as an NTFS folder name, includes a blank space ( ) or colon (:), enclose the entire character string in double quotation marks (").
- Specify a file path name by a relative or absolute path name within 256 one-byte characters.

The following is an example of a description of the replication operation file:

An example for the Windows system

```
#Type:MV              Type:RV
ld:dev000             ld:dev001
drv:E                 drv:F
0:dev006              4:G
4:H                   0:dev007

# Parallel configuration
ld:dev002             ld:dev003
ld:dev002             ld:dev004

# Serial configuration
ld:dev012             ld:dev013
ld:dev013             ld:dev014

# Remote operation
ld:dev032             ld:dev023
ld:dev013             ld:dev014

# MV:RV=1:1
ld:dev005
```

An example for the UNIX system

```
#Type:MV                        Type:RV
sfn:/dev/rdsk/c16t1d0           sfn:/dev/rdsk/c16t1d1
1:/dev/rdsk/c16t1d2             1:/dev/rdsk/c16t1d3
vg:vgvol                        sfn: /dev/rdsk/c16t1d4,/dev/rdsk/c16t1d5
dg:dg_name
ld:dev001                       ld:dev002
0:dev003                        1:/dev/rdsk/c23t2d0

# Parallel configuration
sfn:/dev/rdsk/c16t2d0           sfn:/dev/rdsk/c16t2d1
sfn:/dev/rdsk/c16t2d0           sfn:/dev/rdsk/c16t2d2

# Serial configuration
sfn:/dev/rdsk/c16t12d0          sfn:/dev/rdsk/c16t12d1
sfn:/dev/rdsk/c16t12d1          sfn:/dev/rdsk/c16t12d2

# Remote operation
ld:dev032                       ld:dev023
ld:dev013                       ld:dev014

# MV:RV=1:1
sfn:/dev/rdsk/c22t3d0
```

Replication Operations

iSMrc_replicate

[Name]

```
iSMrc_replicate
```

Starts pair or ATgroup replication.

[Synopsis]

iSMrc_replicate -mv *volume* -mvflg *mv_flg*
    [-rv *volume* -rvflg *rv_flg*]
    [-cprange *copy_range*] [-cpmode *copy_mode*]
    [-rvacc *rv_access*] [-wait [*second*] | -nowait]
    [-iopath *iopath*]
iSMrc_replicate -file *file_name*
    [-cprange *copy_range*] [-cpmode *copy_mode*]
    [-rvacc *rv_access*] [-wait [*second*] | -nowait]
    [-iopath *iopath*]
iSMrc_replicate -atg *atgroup*
    [-atmode *atomic_mode*] [-cpmode *copy_mode*]

```
        [-cprange copy_range]
        [-rvacc rv_access] [-wait [second] | -nowait]
        [-arrayname diskarray]
        [-iopath iopath]
```

iSMrc_replicate -ver
iSMrc_replicate -?
iSMrc_replicate -help

[Description]

The iSMrc_replicate command copies data from the paired MV to RV.

If an ATgroup is specified, MV-to-RV replication is performed for all Remote Replication pairs belonging to the ATgroup.

The RV file system must be unmounted just before replication.

For the Windows system, the RV file system is unmounted before replication if the RV has been recognized by the server where the replication is to be performed.

Options

The iSMrc_replicate command recognizes the following options.

- -mv volume Specify volume of MV.
- -mvflg mv_flg Specify the volume type specified in -mv.

This argument must be specified together with -mv.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

- -rv volume Specify volume of RV.
- -rvflg rv_flg Specify the volume type specified in -rv.

This argument must be specified if -rv is specified.

The only volume type usable in j oint operation with SnapSAN Manager is logical disk name.

- -atg atgroup Specify the name of ATgroup to be operated.
- -atmode atomic_mode

Specify the Atomic-break mode for the ATgroup.

One of the following can be specified in atomic_mode.

- stop MV access stop

  If an Atomic break is put into effect, the synchronization state of the ATgroup changes to Rpl/suspend, and each pair enters the abnormal suspend state. In this case, I/O operations for the MV are rejected; resulting in an abnormal termination.

  The user may be required to perform forced separation if necessary when using the RV. The forced separation enables I/O operations for the MV.

- continue MV access continuation

If an Atomic break is put into effect, the synchronization state of the ATgroup changes to Fault, and each pair is automatically separated, leading to fault state. In this case, I/O operations for the MV are continued. The user does not have to separate pairs.

This value is default if the parameter is omitted.

If this parameter is specified, no background copy can be selected with -cpmode.

-cpmode copy_mode

Specify how to reflect the MV update to RV.

In copy_mode, one of the following can be specified.

sync Sync mode

This value is default if this parameter is omitted.

semi Semi-sync mode

For ATgroups, the copy mode of order guarantee is selected.

bg Background copy mode

If a background copy is selected for ATgroups, it is impossible to specify -atmode. Selecting a background copy disables the Atomic-break mode. In this case, no Atomic break is put into effect if a copy failure occurs and only the copy of the relevant pair stops.

-cprange copy_range

Specify the range of copy from MV to RV.

In copy_range, one of the following can be specified.

- diff Differences between MV and RV are copied from MV to RV.
- full Copies all area of MV to RV.

  If this argument is omitted, the operation is the same as the operation when diff is specified.

-rvacc rv_access

Specify the access restrictions for RV.

In rv_access, one of the following can be specified.

- ro Only read is allowed for RV.
- nr Access to RV is not allowed.

If this argument is omitted, the operation is the same as the operation when nr is specified.

-wait [second] | -nowait

If -wait is specified, the system waits for replication to be completed while monitoring the pair or ATgroup sync state at regular intervals. For second, monitoring time interval can be specified within a range of 1 to 30 (integer) seconds. The default is 5 seconds. This value can be changed in the replication operation option setting file on the Windows system and in the environment variable on the UNIX system. If any abnormality is detected during sync state transition, the wait operation is stopped immediately; resulting in an abnormal termination.

Specifying -nowait only starts replication; no wait operation is performed for the completion of replication.

If this argument is omitted, the operation is the same as the operation when -nowait is specified.

-arrayname diskarray

If -atg is used to specify an ATgroup, it is possible to specify the disk array name (nickname) of an operation target.

-iopath iopath

Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- direct Replication I/O commands are issued directly to disk arrays.
- manager SnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-file file_name

To specify multiple pairs, describe the pairs of MV/RV in file_name.

When multiple pairs are specified, if an error occurs in some pairs, the process is continued until it is terminated in all the specified pairs.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[Displayed Information]

On the Windows system

When pair replication terminates normally with the -wait specification, the following information is displayed.

```
C:\>iSMrc_replicate -mv ld_name -mvflg ld -rv ld_name -rvflg ld -wait 2

Replicate Start          YYYY/MM/DD hh:mm:ss
                         MV:disk_number  ld_name    type
                           volume name
                           path
                         RV:disk_number  ld_name    type
                           volume name
                           path
Replicating.....
Replicate Normal End     YYYY/MM/DD hh:mm:ss
                         MV:disk_number  ld_name    type
                           volume name
                           path
                         RV:disk_number  ld_name    type
                           volume name
                           path

C:\>
```

(2) When ATgroup replication terminates normally with the –wait specification, the following information is displayed.

```
C:\>iSMrc_replicate -atg atgroup -wait

Replicate Start          YYYY/MM/DD hh:mm:ss
                         ATG:atgroup
Replicating.....
Replicate Normal End     YYYY/MM/DD hh:mm:ss
                         ATG:atgroup

C:\>
```

The following information is displayed when the paired MV and RV information is output by setting an option. For details on the option setting, refer to 8.1 "Operation Option Setting File".

```
C:\>iSMrc_replicate -atg atgroup -wait
```

```
C:\>iSMrc_replicate -mv ld_name -mvflg ld -rv ld_name -rvflg ld -wait 2

Replicate Start              YYYY/MM/DD  hh:mm:ss
                             MV:disk_number  ld_name    type
                                volume name
                                path
                             RV:disk_number  ld_name   type
                                volume name
                                path
Replicating.....
Replicate Normal End         YYYY/MM/DD hh:mm:ss
                             MV:disk_number  ld_name   type
                                volume name
                                path
                             RV:disk_number  ld_name   type
                                volume name
                                path

C:\>
```

(2) When ATgroup replication terminates normally with the −wait specification, the following information is displayed.

```
C:\>iSMrc_replicate -atg atgroup -wait

Replicate Start              YYYY/MM/DD  hh:mm:ss
                             ATG:atgroup
Replicating.....
Replicate Normal End         YYYY/MM/DD hh:mm:ss
                             ATG:atgroup

C:\>
```

```
Replicate Start              YYYY/MM/DD  hh:mm:ss
                             ATG:atgroup
                             MV:disk_number  ld_name   type
                             volume name
                             path
                             RV:disk_number  ld_name      type
                             volume name
                             path
Replicating.....
Replicate Normal End         YYYY/MM/DD hh:mm:ss
                             ATG:atgroup
                             MV:disk_number  ld_name   type
                             volume name
                             path
                             RV:disk_number    ld_name type
                             volume name
                             path

C:\>
```

Description of messages:

- Replicate Start *YYYY/MM/DD hh:mm:ss*

  Replicate starting message and Start Time

```
ATG: atgroup
ATgroup name
MV: disk_number    ld_name                    type
    volume name
     path
RV: disk_number    ld_name                    type
    volume name
     path
```

MV/RV physical disk number, logical disk name, OS type, mount point volume name, and drive letters or path name mounted to the folder of the NTFS volume accessed by users

Replicating.....

Message in Replicate execution

The display of this message can be suppressed by setting an option. Replicate Normal End *YYYY/MM/DD hh:mm:ss*

Replicate end message and end time

On the UNIX system

When pair replication terminates normally with the -wait specification, the following information is displayed.

```
# iSMrc_replicate -mv special_file_name -mvflg sfn -rv
special_file_name -rvflg sfn -wait 2
Replicate Start YYYY/MM/DD hh:mm:ss
MV: special_file_name LD Name type
RV: special_file_name LD Name type
Replicating.....
Replicate Normal End YYYY/MM/DD hh:mm:ss
MV: special_file_name LD Name type
RV: special_file_name LD Name type
  #
```

When ATgroup replication terminates normally with the -wait specification, the following information is displayed.

```
# iSMrc_replicate -atg atgroup -wait
Replicate Start YYYY/MM/DD hh:mm:ss
ATG: atgroup
Replicating.....
Replicate Normal End YYYY/MM/DD hh:mm:ss
ATG: atgroup
#
```

The following information is displayed when the paired MV and RV information is output by setting an option.

```
# iSMrc_replicate -atg atgroup -wait
Replicate Start YYYY/MM/DD hh:mm:ss
ATG: atgroup
MV: special_file_name LD Name type
RV: special_file_name LD Name type
Replicating.....
Replicate Normal End YYYY/MM/DD hh:mm:ss
ATG: atgroup
MV: special_file_name LD Name type
RV: special_file_name LD Name type
#
```

Description of messages:

- Replicate Start   *YYYY/MM/DD hh:mm:ss*

  Replicate start message and start time

- ATG: atgroup

  ATgroup name

- MV: *special_file_name*   *LD Name*   *type*

  RV: *special_file_name*   *LD Name*   *type*

  MV/RV's special file name, logical disk name, OS type

  The special file name is displayed as a 32-byte item on Linux.

- Replicating.....

  Message that appears during Replicate execution

  The display of this message can be suppressed by setting an option.

- Replicate Normal End   *YYYY/MM/DD hh:mm:ss*

  Replicate end message and end time

[USAGE]

On the Windows system

(1) Pair replication is performed with a monitoring time interval of 2 seconds specified with -wait.

```
C:\>iSMrc_replicate -mv dev001 -mvflg 1d -rv dev002 -rvflg 1d -wait 2

Replicate Start        2001/01/28 17:33:17
                       MV:1   dev001  WN
                       \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                       G:
                       RV:- dev002  WN
                       -
                       -
Replicating.....
Replicate Normal End   2001/01/28 17:33:19
                       MV:1   dev001  WN
                       \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                       G:
                       RV:- dev002  WN
                       -
                       -

C:\>
```

(2) Replication is performed for more than one pair, using the replication operation file. In this case, a monitor time interval of 2 seconds is specified with -wait.

```
C:\>iSMrc_replicate -file volume_file -wait 2

Replicate Start        2001/01/28 17:33:17
                       MV:3   dev002  WN
                       \\?\Volume{70facee0-58a7-11d5-ad3e-806d6172696f}\
                       E:
                       RV:- dev102  WN
                       -
                       -

Replicate Start        2001/01/28 17:33:17
                       MV:5   dev003  WN
                       \\?\Volume{71facee0-58a7-11d5-ad3e-806d6172696f}\
                       G:
                       RV:-   dev103  WN
                       -
                       -
Replicating.....
Replicate Normal End   2001/01/28 17:38:15
```

```
                    MV:3   dev002  WN
                    \\?\Volume{70facee0-58a7-11d5-ad3e-806d6172696f}\
                    F:
                    RV:- dev102  WN
                    -
                    -
Replicate Normal End   2001/01/28 17:38:17
                    MV:5   dev003  WN
                    \\?\Volume{71facee0-58a7-11d5-ad3e-806d6172696f}\
                    G:
                    RV:- dev103  WN
                    -
                    -
C:\>
```

• The end messages are displayed in the order Replicate commands terminate.

(3) Replication is started for an ATgroup.

```
C:\>iSMrc_replicate -atg ATmdb_test

Replicate Start            2003/08/13 00:05:21
  ATG:ATmdb_test

C:\>
```

On the UNIX system

```
# iSMrc_replicate -mv /dev/vg100 -mvflg vg -rv disk221 disk222 -rvflg
ld -wait 2
Replicate Start 2000/10/10 09:11:23
MV:/dev/rdsk/c1t1d0 disk001 NX
RV:- disk221 NX
Replicate Start 2000/10/10 09:11:23
MV:/dev/rdsk/c1t1d1 disk002 NX
RV:- disk222 NX
Replicating.....
Replicate Normal End 2000/10/10 09:16:12
MV:/dev/rdsk/c1t1d0 disk001 NX
RV:- disk221 NX
Replicate Normal End 2000/10/10 09:16:35
MV:/dev/rdsk/c1t1d1 disk002 NX
RV:- disk222 NX
#
```

Replication is started for an ATgroup.

```
# iSMrc_replicate -atg ATG01
Replicate Start 2003/08/13 10:06:32
ATG:ATG01
#
```

<Pair replication>

• The target MV and RV must be paired.

- The activity state of the target pair must be Separate. However, the command cannot be executed if the sync state is Separate Preparing.
- The Semi-Sync copy mode cannot be specified for pairs set in the same disk array. Specify the Semi-Sync copy mode for pairs set in different disk arrays when required.
- Specify the back ground copy mode when using the asynchronous Overland Remote Replication function (Replication and Mirroring Asynchronous) for the pair set in different disk arrays.
- The command cannot be executed if the disk array that contains the MV and RV is in the freeze state.
- The command cannot be executed if the activity state of a pair of the specified MV and the paired RV is in Restore.
- If the specified MV is used as a BV (base-volume) for snapshot, the command cannot be executed when restoration from the SV (snapshot-volume) is in progress or a restore fault occurs.
- If the specified RV is used as a BV (base-volume) for snapshot, the command cannot be executed when restoration from the SV (snapshot-volume) is in progress or a restore fault occurs.
- If the specified RV is used as a BV (base-volume) for snapshot, the command cannot be executed when link setting of the BV is in progress.
- If the specified RV is used as a BV (base-volume) for snapshot, the copy control state of the pair must be the background copy mode.
- The sync state of the pair of the specified MV and the paired upper MV must be Separated, replication execution, or sync state.
- If the activity state of a pair of the specified MV and the paired upper MV is Replicate, specify the background copy mode for the target pair.
- The sync state of the pair of the specified RV and the paired lower RV must be in the Separated state, replicate execution, or sync state.
- If the activity state of the pair of the specified RV and the paired lower RV is Replicate, the copy control state of the replicated lower pair must be in the background copy mode.
- The command cannot be executed if the MV is NotAccessible, or RV is in the protection state (ReadOnly or NotAccessible) by the WORM function.
- A dynamic disk cannot be used.
- RV must be unmounted.
- No pair belonging to an ATgroup can be operated.
- The command cannot be executed if the logical disk of MV or RV is in the not in use state or the pool to which the logical disk belongs is in the rotation stop state by the power saving function.
- The command cannot be executed if the update prevention state of the RV is Prevent by the volume update prevention function.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target MV or RV must have been registered in the volume list.
  When a remote-side volume is to be operated in remote operation, the target volume must satisfy the following conditions:
- A paired upper or lower volume for the target pair must have been registered in the volume list.

- When the MV or RV of the target pair is used also as a BV (base-volume) for snapshot, the BV or the LV linked to the BV must have been registered in the volume list.

- The command cannot be executed when the volume list is being created.

- When specifying the combination of a volume group or a disk group with a special file name (logical disk name), for an MV(RV), specify the same number of logical volumes that constitute a volume group or a disk group on the specified special file name (logical disk name) side. In this case, copying is performed in the specified order.

- To specify a volume group, the target volume group must be active.

- To specify a disk group, the target disk group must be active.

- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

<ATgroup replication>

- The operation target must be in one of the following ATgroup sync states:
  Separation completed (Separated)
  Failure separation (Fault)
  Replicate start (Rpl/start)
  Replicate suspend (Rpl/suspend)

- If the background copy mode (asynchronous) is selected, the Atomic-break mode is disabled, and, when replication is completed, the Non-atomic Rpl/sync state is entered.

- If the Atomic-break mode, copy mode, or RV access restriction is not specified, the values specified at the start of replication are taken over when replication is restarted for the ATgroup in the Rpl/start or Rpl/suspend state.

- If the Atomic-break mode, copy mode, and RV access restriction are specified, the values must coincide with the values specified at the start of replication when replication is restarted for the ATgroup in the Rpl/start or Rpl/suspend state.
  If mismatch occurs, replication restart results in an abnormal termination.

- Since the number of ATgroups to be replicated in semi-synchronization mode (order guarantee) is limited for the disk arrays, replication over the limit cannot be executed.

- The command cannot be executed if the replication function of the disk array to which the target ATgroup belongs is in the freeze state.

- A dynamic disk cannot be used.

- The RV must have been unmounted.

- The command cannot be executed if the logical disk of MV or RV included in the ATgroup is in the not in use state or the pool to which the logical disk belongs is in the rotation stop state by the power saving function.

- The command cannot be executed if the update prevention state of the RV in the ATgroup is Prevent by the volume update prevention function.

The following notes do not apply to joint operation with SnapSAN Manager.

- When the secure mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, MVs or RVs of all the pairs that belong to the target ATgroup must have been registered in the volume list.

- When the standard mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, at least one logical disk that belongs to the target ATgroup must have been registered in the volume list.

- The command cannot be executed when the volume list is being created.

- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

<Pair replication>

0: Operation for all the paired volumes terminated normally.

1: Operation for all the paired volumes terminated abnormally.

This command terminates abnormally in the following cases.

A parameter is invalid.

A condition for operation is not satisfied.

An attempt to operate a disk array fails.

2: Operation for some paired volumes terminated abnormally.

3: The command terminated abnormally because all or some of the paired volumes were already in Replicate State.

<ATgroup replication>

0: ATgroup operation terminated normally.

1: ATgroup operation terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.
- An attempt to operate some pairs fails.
- A wait for replication to be completed is discontinued.
- Transition occurs to an ATgroup sync state other than Rpl/exec or Rpl/sync during a wait for replication to be completed.

2: ATgroup operation terminated abnormally because operation for some paired volumes terminated abnormally.

3: ATgroup operation terminated abnormally because the current ATgroup sync state is already Rpl/exec or Rpl/sync.

isMrc_separate

[Name]

```
iSMrc_separate
```

Separates pairs or ATgroups.

[Synopsis]

```
iSMrc_separate   -mv volume -mvflg mv_flg
   [-rv volume -rvflg rv_flg]
   [-rvacc rv_access]
   [-rvuse rv_use | -force force_arg]
   [-wait [second] | -nowait]
   [-iopath iopath]
iSMrc_separate   -file file_name
   [-rvacc rv_access]
   [-rvuse rv_use | -force force_arg]
   [-wait [second] | -nowait]
   [-iopath iopath]
iSMrc_separate   -atg atgroup
   [-force]
   [-wait [second] | -nowait]
   [-arrayname diskarray]
   [-iopath iopath]
iSMrc_separate   -ver
iSMrc_separate   -?
iSMrc_separate   -help
```

[Description]

The iSMrc_separate command separates the paired MV and RV.

If an ATgroup is specified, the MVs and RVs in all Remote Replication pairs belonging to the ATgroup are separated.

Options

The iSMrc_separate command recognizes the following options and arguments.

-mv volume

Specify volume of MV.

-mvflg mv_flg

Specify the volume type specified in -mv.

This argument must be specified with -mv.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

-rv volume

Specify volume of RV.

-rvflg rv_flg

Specify the volume type specified in -rv.

This argument must be specified if -rv is specified.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

-atg atgroup

Specify the name of ATgroup to be operated.

-rvacc rv_access

Specify the access restrictions for RV.

In rv_access, one of the following can be specified.

- ro Read Only is allowed for RV
- rw Read/write are allowed for RV

If this argument is omitted, the operation is the same as the operation when rw is specified.

If -force is specified, this argument is not required.

-rvuse rv_use

Determine when to make the RV available.

One of the following can be specified for rv_use:

- immediate After Separate execution, the RV is immediately available while the difference between the MV and RV contents is being reflected into the RV (Separate(immediate)).

  This function can be specified only for Volume Cloningpair.

- complete After Separate execution, the RV becomes available when the difference between the MV and RV contents has been reflected into the RV (Separate(completion)).

  default This value can be changed in the replication operation option setting file on the Windows system and in the environment variable on the UNIX system.

  If this argument is omitted, the system performs the same operation as when default is selected.

  Do not specify the -rvuse option with the -force option.

-force force_arg

Separate the relevant pair forcibly (forced separate) if a copy error occurs in the MV/RV, and the replication state cannot be continued.

One of the following can be specified for force_arg to separate the pair.

- all Performs Forced Separate for MV/RV
- mv Performs Forced Separate only for MV
- rv Performs Forced Separate only for RV

Do not specify the -force option with the -rvuse option.

force_arg can be used also to specify that all MVs on the concentrator belonging to an ATgroup or all RVs on the distributor side be forcibly separated. It cannot be used for ATgroups.

-wait [second] | -nowait

- Specifying -wait causes the pair sync state or ATgroup sync state to be monitored at regular intervals to wait for separation to be completed. For second, monitoring time interval can be specified within a range of 1 to 30 (integer) seconds. The default is 5 seconds. This value can be changed in the replication operation option setting file on the Windows system and in the environment variable on the UNIX system. If an abnormality occurs in sync state transition during a wait, the wait is discontinued immediately; resulting in an abnormal termination.

- Specifying -nowait simply starts separation; it does not wait for separation to be completed.

- If this argument is omitted, the operation is the same as the operation when -nowait is specified.

-arrayname diskarray

> If -atg is used to specify an ATgroup, it is possible to specify the disk array name (nickname) of an operation target.

-iopath iopath

Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- direct Replication I/O commands are issued directly to disk arrays.
- manager SnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-file file_name

- To specify multiple pairs, describe the pairs of MV/RV in file_name.
- When multiple pairs are specified, if an error occurs in some pairs, the process is continued until it is terminated in all the specified pairs.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[DISPLAYED INFORMATION]

On the Windows system

(1) When pair separation terminates normally with -wait specified, the following information is displayed.

```
C:\>iSMrc_separate -mv ld_name -mvflg ld -rv ld_name -rvflg ld -wait 2

Separate Start            YYYY/MM/DD hh:mm:ss
                          MV:disk_number ld_name   type
                          volume name
                          path
                          RV:disk_number  ld_name   type
                          volume name
                          path
Separating.....
Separate Normal End       YYYY/MM/DD hh:mm:ss
                          MV:disk_number ld_name   type
                          volume name
                          path
                          RV:disk_number  ld_name   type
                          volume name
                          path

C:\>
```

```
Separate  Start                   YYYY/MM/DD  hh:mm:ss
Separate  starting  message  and  Start  Time
ATG:atgroup
ATgroup  name
MV:disk_number    ld_name                        type
        volume  name
        path
RV:disk_number    ld_name                        type
        volume  name
        path
MV/RV  physical  disk  number,  logical  disk  name,  OS  type,  mount  point
volume  name,  and  drive  letters  or  path  name  mounted  to  the  folder  of
the  NTFS  volume  accessed  by  users
Separating.....
Message  in  Separate  execution
The  display  of  this  message  can  be  suppressed  by  setting  an  option.
Separate  Normal  End             YYYY/MM/DD  hh:mm:ss
Separate  end  message  and  end  time
```

On the UNIX system

When pair separation terminates normally with -wait specified, the following information is displayed.

```
# iSMrc_separate -mv special_file_name -mvflg sfn -rv special_file_name
-rvflg sfn -wait 2
 Separate Start YYYY/MM/DD hh:mm:ss
 MV:special_file_name LD Name type
  RV:special_file_name LD Name type
 Separating.....
 Separate Normal End YYYY/MM/DD hh:mm:ss
 MV:special_file_name LD Name type
 RV:special_file_name LD Name type
#
```

When ATgroup separation terminates normally with -wait specified, the following information is displayed.

```
# iSMrc_separate -atg atgroup -wait
  Separate Start YYYY/MM/DD hh:mm:ss
 ATG:atgroup
 Separating.....
 Separate Normal End YYYY/MM/DD hh:mm:ss
 ATG:atgroup
 #
```

The following information is displayed when the paired MV and RV information is output by setting an option.

```
# iSMrc_separate -atg atgroup -wait
 Separate Start YYYY/MM/DD hh:mm:ss
 ATG: atgroup
 MV: special_file_name LD Name type
 RV: special_file_name LD Name type
 Separating.....
 Separate Normal End YYYY/MM/DD hh:mm:ss
 ATG: atgroup
 MV: special_file_name LD Name type
 RV: special_file_name LD Name type
 #
```

Description of messages:

```
Separate Start                   YYYY/MM/DD hh:mm:ss
Separate start message and start time
ATG: atgroup
ATgroup name
MV: special_file_name                LD Name          type
RV: special_file_name                LD Name          type
MV/RV's special file name, logical disk name, OS type
```

The special file name is displayed as a 32-byte item on Linux.

Separating.....

Message that appears during Separate execution

The display of this message can be suppressed by setting an option.

```
Separate Normal End          YYYY/MM/DD hh:mm:ss
Separate end message and end time
```

[USAGE]

On the Windows system

(1) This command separates a pair with a monitoring time interval of 2 seconds specified with –wait.

```
C:\>iSMrc_separate -mv dev001 -mvflg ld -rv dev002 -rvflg ld -wait 2

                        Separate Start  2001/01/28 17:56:23
                        MV:1    dev001  WN
                        \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                        G:
                        RV:- dev002  WN
                        -
                        -
                        Separating.....
                        Separate Normal End   2001/01/28 17:56:23
                        MV:1    dev001  WN
                        \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                        G:
                        RV:- dev002     WN
                        -
                        -

C:\>
```

(2) This command separates more than one pair, using the replication operation file. In this example, a monitoring time interval of 2 seconds is specified with –wait.

```
C:\>iSMrc_separate -file volume_file -wait 2
                        Separate Start  2001/01/28 17:56:17
                        MV:3   dev002     WN
                        \\?\Volume{70facee0-58a7-11d5-ad3e-806d6172696f}\
                        F:
                        RV:- dev102  WN
                        -
                        -

                        Separate Start  2001/01/28 17:56:17
                        MV:5   dev003  WN
                        \\?\Volume{71facee0-58a7-11d5-ad3e-806d6172696f}\
                        G:
                        RV:- dev103  WN
                        -
                        Separating.....
                        Separate Normal End   2001/01/28 17:56:21
                        MV:3   dev002     WN
                        \\?\Volume{70facee0-58a7-11d5-ad3e-806d6172696f}\
                        F:
                        RV:- dev102     WN
                        -
                        -
```

```
                        Separate Normal End   2001/01/28 17:56:23
                        MV:5    dev003  WN
                        \\?\Volume{71facee0-58a7-11d5-ad3e-806d6172696f}\
                        G:
                        RV:- dev103  WN
                        -
                        -

C:\>
```

• The end messages are displayed in the order Separate commands terminate.

(3) This command performs ATgroup separation.

```
C:\>iSMrc_separate -atg ATmdb_test

Separate Start              2003/08/13 00:05:21
                            ATG:ATmdb_test

C:\>
```

On the UNIX system

```
# iSMrc_separate -file volume_file -wait 2
Separate Start 2000/10/10 09:11:23
MV:/dev/rdsk/c0t1d1 disk101 NX
RV:- disk102 NX
Separate Start 2000/10/10 09:11:23
MV:/dev/rdsk/c0t1d2 disk201 NX
RV:- disk202 NX
Separating.....
Separate Normal End 2000/10/10 09:16:12
MV:/dev/rdsk/c0t1d2 disk201 NX
RV:- disk202 NX
Separate Normal End 2000/10/10 09:16:35
MV:/dev/rdsk/c0t1d1 disk101 NX
RV:- disk102 NX
#
```

The end messages are displayed in the order Separate commands terminate.This command forcibly separates ATgroups and waits for separation to be completed.

```
# iSMrc_separate -atg ATmdb_test -force -wait
Separate Start2003/10/10 09:11:23
ATG:ATmdb_test
Separating.....
Separate Normal End2003/10/10 09:15:32
ATG:ATmdb_test
#
```

<Pair separation>

- The target MV and RV must be paired.
- The command cannot be executed if the sync state of the target pair is in the Replicate Preparing, Separate Preparing, Restore Preparing, or restore execution state.
- The command cannot be executed if the sync state of the upper pair, which is paired with MV of the target pair, is in the separate execution state.
- The command cannot be executed if the sync state of the lower pair, which is paired with RV of the target pair, is in the Separate Preparing or separate execution state.
- The command cannot be executed if the disk array that contains the specified MV and RV is in the freeze state. Note that a forced separation to a Remote Replication pair can forcibly separate an MV or an RV in the local disk array individually even if the replication function is in the freeze state in the remote disk array.
- Separate(immediate) function is not available for Remote Replication pair.
- A dynamic disk cannot be used.
- When Separate starts, flush the file system cache used by MV before the instruction is executed or unmount MV in order to finish updates to MV.
- No pair belonging to an ATgroup can be operated.
- The command cannot be executed if the logical disk of MV or RV is in the not in use state or the pool to which the logical disk belongs is in the rotation stop state by the power saving function. However, only the MV or RV that are neither in the not in use state nor rotation stop state can be forcibly separated individually.
- The following notes do not apply to joint operation with SnapSAN Manager.

- The target MV or RV must have been registered in the volume list.

    When a remote-side volume is to be operated in remote operation, the target volume must satisfy the following conditions:

    - A paired upper or lower volume for the target pair must have been registered in the volume list.
    - When the MV or RV of the target pair is used also as a BV (base-volume) for snapshot, the BV or the LV linked to the BV must have been registered in the volume list.

- The command cannot be executed when the volume list is being created.

- When specifying the combination of a volume group or a disk group with a special file name (logical disk name), for an MV(RV), specify the same number of logical volumes that constitute a volume group or a disk group on the specified special file name (logical disk name) side.

- To specify a volume group, the target volume group must be active.

- To specify a disk group, the target disk group must be active.

- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

<ATgroup separation>

ATgroups to be separated must be in any of the following states except for forced separation specified with the -force option.

- Replicate state (Rpl/sync) in the Atomic or Non-atomic state
- Replicate execution (Rpl/exec) in the Non-atomic state
- Separate start (Sep/start) in the Non-atomic state

To keep data consistent throughout an ATgroup, separate it in the following ATgroup state. Forced separation does not maintain data consistency.

- Replicate state (Rpl/sync) in the Atomic state.

- After separation (except forced separation), the RV access restriction becomes the Read/Write enabled state.

- The RV access restriction stays in the ReadOnly or NotReady state at forced separation. In this case, the RV access restriction can be shifted to the Read/Write enabled state by forcibly changing (iSMrc_change) the ATgroup and pair sync state on the distributor side to put the ATgroup in Separated state.

- The command cannot be executed if the replication function of the disk array to which the target ATgroup belongs is in the freeze state. If the replication function is in the freeze state in the remote disk array, the command forcibly separates only the concentrator or distributor in the local disk array.

- A dynamic disk cannot be used.

- The file system used by the MV has been flushed or the MV must have been unmounted.

- The command cannot be executed when logical disk of MV or RV included in the ATgroup is not in use state or that the pool to which the logical disk belongs is in the rotation stop state for the power saving function. However, only the MV or RV that are neither in the not in use state nor rotation stop state can be forcibly separated individually.

- The command cannot be executed if the logical disk of MV or RV included in the ATgroup is in the not in use state and the pool to which the logical disk belongs is in the rotation stop state by the power saving function. However, only the MV or RV that are neither in the not in use state nor rotation stop state can be forcibly separated individually.

The following notes do not apply to joint operation with SnapSAN Manager.

- When the secure mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, MVs or RVs of all the pairs that belong to the target ATgroup must have been registered in the volume list.
- When the standard mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, at least one logical disk that belongs to the target ATgroup must have been registered in the volume list.
- The command cannot be executed when the volume list is being created.
- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

<Pair separation>

0: Operation for all the paired volumes terminated normally.

1: Operation for all the paired volumes terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

2: Operation for some paired volumes terminated abnormally.

3: The command terminated abnormally because all or some of the paired volumes were already in Replicate State.

<ATgroup separation>

0: ATgroup operation terminated normally.

1: ATgroup operation terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.
- An attempt to operate some pairs fails.
- A wait for separation to be completed is discontinued.

2: An attempt to operate some pairs fails and ATgroup operation terminated abnormally.

3: ATgroup operation terminated abnormally because the current ATgroup sync state is already Sep/exec, Separated, Fault/recovering, or Fault.

iSMrc_restore

[Name]
```
iSMrc_restore
```

Starts restoring pairs or ATgroups.

[Synopsis]
```
iSMrc_restore -mv volume -mvflg mv_flg
[-rv volume -rvflg rv_flg]
```

Options
```
[-cprange copy_range] [-cpmode copy_mode]
[-rvacc rv_access] [-wait [second] | -nowait]
[-mode operation_mode ]
[-iopath iopath]
iSMrc_restore -file file_name
[-cprange copy_range] [-cpmode copy_mode]
[-rvacc rv_access] [-wait [second] | -nowait]
[-mode operation_mode ]
[-iopath iopath]
iSMrc_restore -atg atgroup
[-cprange copy_range]
[-rvacc rv_access] [-wait [second] | -nowait]
[-arrayname diskarray]
[-iopath iopath]
iSMrc_restore -ver
iSMrc_restore -?
iSMrc_restore -help
```

[Description]

The iSMrc_restore command restores data from the paired RV to MV.

If an ATgroup is specified, restoration is performed from the RV to the MV in all Remote Replication pairs belonging to the ATgroup. Restore (protect) is applied to the ATgroup. Performing restoration requires unmounting the MV and RV file system previously.

If the MV has been recognized by the server where restoration is to be performed, on the Windows system, unmount MV, flush the file system buffer, and then start Restore. After starting Restore, re-mount the MV. On the UNIX system, if MV's file system has been mounted, the system does not start Restore and terminates operation abnormally. Therefore, it is necessary to unmount the MV's file system before executing Restore.

Options

The iSMrc_restore command recognizes the following options and arguments.

```
-mv volumeSpecify volume of MV.
-mvflg mv_flgSpecify the volume type specified in -mv.
```

This argument must be specified with -mv.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

```
-rv volume Specify volume of RV.
-rvflg rv_flg Specify the volume type specified in -rv.
```

This argument must be specified if -rv is specified.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

```
-atg atgroup Specify the name of ATgroup to be operated.
-cprange copy_range Specify the range of copy from RV to MV.
```

In copy_range, one of the following can be specified.

```
diffDifferences between the MV and RV are copied from the RV to the MV.
fullRestore all area from RV to MV.
```

If this argument is omitted, the operation is the same as the operation when diff is specified.

```
-cpmode copy_mode Specify how to reflect the MV update to RV (copy
mode).
```

In copy_mode, one of the following can be specified.

```
sync Sync mode
semi Semi-sync mode
bg Background copy mode
```

If this argument is omitted, the operation is the same as the operation when sync is specified.

If the Restore (protect) is carried out, this argument specification becomes invalid.

```
-rvacc rv_access Specify the access restrictions for RV.
```

In rv_access, one of the following can be specified.

```
roOnly read is allowed for RV.
nrAccess to RV is not allowed.
```

If this argument is omitted, the operation is the same as the operation when nr is specified:

```
-wait [second] | -nowaitSpecifying -wait
```

- This causes the pair sync state or ATgroup sync state to be monitored at regular intervals to wait for restoration to be completed. Restore (protect) is applied to the ATgroup. Therefore, the ATgroup state automatically shifts to Separated as restoration sync is completed.

- For second, monitoring time interval can be specified within a range of 1 to 30 (integer) seconds. The default is 5 seconds. This value can be changed in the replication operation option setting file on the Windows system and in the environment variable on the UNIX system. If an abnormality occurs in sync state transition, the wait is discontinued immediately; resulting in an abnormal termination.

- Specifying -nowait simply starts restoration; it does not wait for restoration to be completed. If this argument is omitted, the operation is the same as the operation when -nowait is specified.

-mode operation_mode

Specify an operation mode for RV at execution of Restore.

One of the following can be specified for operation_mode:

- update:Performs restoration while reflecting the updated data of the MV into the RV. When the restoration is completed, the state changes to Sync State (rst/sync).

- protect: Performs restoration without reflecting the updated data of the MV into the RV. When the restoration is completed, Separate is automatically executed and then the state changes to Separated State.

- default:This value can be changed in the replication operation option setting file on the Windows system and in the environment variable on the UNIX system.

If this argument is omitted, the system performs the same operation as when default is selected.

-arrayname diskarrayIf -atg

is used to specify an ATgroup, it is possible to specify the disk array name (nickname) of an operation target.

-iopath iopath

Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- directReplication I/O commands are issued directly to disk arrays.
- managerSnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-file file_name

To specify multiple pairs, describe the pairs of MV/RV in file_name.

When multiple pairs are specified and if an error occurs in some pairs, the process is continued until it is terminated in all the specified pairs.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[DISPLAYED INFORMATION]

On the Windows system

(1) When pair restoration terminates normally with −wait specified, the following information is displayed.

```
C:\>iSMrc_restore -mv ld_name -mvflg ld -rv ld_name -rvflg ld -wait 2

iSMrc_restore: Info:        iSM13224: MV is restored.
                            Volume Name: volume name

                            MountPoint: drive letter or mount point

Umount Start                YYYY/MM/DD hh:mm:ss
Umount Normal End           YYYY/MM/DD hh:mm:ss
Restore Start               YYYY/MM/DD hh:mm:ss
                            MV:disk_number ld_name   type
                            volume name
                            path
                            RV:disk_number  ld_name   type
                            volume name
                            path


Restoring.....
Restore Normal End          YYYY/MM/DD hh:mm:ss
                            MV:disk_number ld_name   type
                            volume name
                            path
                            RV:disk_number  ld_name   type
                            volume name
                            path

C:\>
```

(2) When ATgroup restoration terminates normally with −wait specified, the following information is displayed.

```
C:\>iSMrc_restore -atg atgroup -wait

Restore Start               YYYY/MM/DD hh:mm:ss
                            ATG:atgroup
                            MV:disk_number ld_name   type
                            volume name
                            path
                            RV:disk_number  ld_name   type
                            volume name
                            path

Restoring.....
Restore Normal End          YYYY/MM/DD hh:mm:ss
```

```
                            ATG:atgroup
                            MV:disk_number ld_name   type
                            volume name
                            path
                            RV:disk_number  ld_name   type
                              volume name
                              path

C:\>
```

Description of messages:

iSM13224: MV

is restored.

```
Volume Name: Volume_name
Mount Point: drive letter or mount point
Mount point volume name of MV, and drive letter or NTFS folder name
Umount Start                    YYYY/MM/DD hh:mm:ss
```

Message indicating the start of unmounting MV, and start time

```
Umount Normal End               YYYY/MM/DD hh:mm:ss
```

Message indicating the end of unmounting MV, and end time

```
Restore Start                   YYYY/MM/DD hh:mm:ss
```

Message indicating the start of restore, and start time

```
ATG:atgroup
ATgroup name
MV:disk_number    ld_name                          type
    volume name
    path
RV:disk_number    ld_name                          type
    volume name
    path
MV/RV physical disk number, logical disk name, OS type, mount point
volume name, and drive letters or path name mounted to the folder of
the NTFS volume accessed by users
Restoring.....
```

Message in Restore execution

This option setting enables this message to be output.

```
Restore Normal End              YYYY/MM/DD hh:mm:ss
Restore end message and end time
```

On the UNIX system

When pair restoration terminates normally with -wait specified, the following information is
displayed.

```
# iSMrc_restore -mv special_file_name -mvflg sfn -rv special_file_name
-rvflg sfn -wait 2
Restore StartYYYY/MM/DD hh:mm:ss
 MV:special_file_name LD Nametype
 RV:special_file_name  LD Nametype
Restoring.....
Restore Normal EndYYYY/MM/DD hh:mm:ss
 MV:special_file_name LD Nametype
 RV:special_file_name LD Nametype
#
```

When ATgroup restoration terminates normally with -wait specified, the following information is displayed.

```
# iSMrc_restore -atg atgroup -wait
Restore StartYYYY/MM/DD hh:mm:ss
 ATG:atgroup
 MV:special_file_name LD Nametype
 RV:special_file_name LD Nametype
Restoring.....
Restore Normal EndYYYY/MM/DD hh:mm:ss
 ATG:atgroup
 MV:special_file_name LD Nametype
 RV:special_file_name LD Nametype
#
```

Description of messages:

```
Restore Start                   YYYY/MM/DD hh:mm:ss
Restore start message and start time
ATG:atgroup
ATgroup name
MV:special_file_name                 LD Name         type
RV:special_file_name                 LD Name         type
MV/RV's special file name, logical disk name, OS type
```

The special file name is displayed as a 32-byte item on Linux.

```
Restoring.....
Message that appears during Restore execution
The display of this message can be suppressed by setting an option.
Restore Normal End        YYYY/MM/DD hh:mm:ss
Restore end message and end time
```

[USAGE]

On the Windows system

(1) This command restores a pair with a monitoring time interval of 2 seconds specified with -wait.

```
C:\>iSMrc_restore -mv dev001 -mvflg ld -rv dev002 -rvflg ld -wait 2

iSMrc_restore: Info:     iSM13224: MV is restored.
   Volume Name: \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
   MountPoint: G:\
Umount Start          2001/01/28 17:55:11
Umount Normal End     2001/01/28 17:55:12
Restore Start         2001/01/28 17:55:13
                      MV:1   dev001        WN
                      \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                      G:
                      RV:- dev002        WN
                      -
                      -

Restoring.....
Restore Normal End    2001/01/28 17:55:19
                      MV:1   dev001        WN
                      \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                      G:
                      RV:- dev002        WN
                      -
                      -


C:\>
```

(2) This command restores more than one pair, using the replication operation file. In this example, a monitoring time interval of 2 seconds is specified with -wait.

```
C:\>iSMrc_restore -file volume_file -wait 2

iSMrc_restore: Info:      iSM13224: MV is restored.
                          Volume Name:
\\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                          MountPoint: E:\
Umount Start              2001/01/28 17:55:16
Umount Normal End         2001/01/28 17:55:17
Restore Start             2001/01/28 17:55:17
                          MV:1  dev001  WN

                          \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                            E:
                          RV:-   dev101  WN
                            .
                            .

iSMrc_restore: Info:      iSM13224: MV is restored.
                          Volume Name:
\\?\Volume{70facee0-58a7-11d5-ad3e-806d6172696f}\
     MountPoint:  F:\
Umount Start              2001/01/28 17:55:20
Umount Normal End         2001/01/28 17:55:21
Restore Start             2001/01/28 17:55:21
                          MV:3  dev002    WN

                          \\?\Volume{70facee0-58a7-11d5-ad3e-806d6172696f}\
                          F:
                          RV:- dev102     WN
                          .
                          .

Restoring.....

Restore Normal End        2001/01/28 17:55:51
                          MV:3  dev002    WN
                          \\?\Volume{70facee0-58a7-11d5-ad3e-806d6172696f}\
                          F:
                          RV:- dev102     WN
                          .
                          .

Restore Normal End        2001/01/28 17:55:58
                          MV:1  dev001    WN
                          \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                          E:
                          RV:- dev101     WN
                          .
                          .

C:\>
```

The end messages are displayed in the order Restore commands terminate.

On the UNIX system

```
The command is executed by specifying a volume group that consists of
two logical volumes, /dev/rdsk/c1t1d0 and /dev/rdsk/c1t1d1, for an MV.
# iSMrc_restore -mv /dev/vg100 -mvflg vg -rv disk221 disk222 -rvflg ld
-wait 2
Restore Start2000/10/10 09:11:23
MV:/dev/rdsk/c1t1d0 disk001        NX
RV:-            disk221            NX
Restore Start    2000/10/10 09:11:23
MV:/dev/rdsk/c1t1d1   disk002      NX
RV:-    disk222        NX
Restoring.....
Restore Normal End 2000/10/10 09:16:12
MV:/dev/rdsk/c1t1d0      disk001       NX
RV:-            disk221   NX
Restore Normal End2000/10/10 09:16:35
MV:/dev/rdsk/c1t1d1 disk002 NX
RV:-    disk222        NX
#
```

This command starts restoring an ATgroup.

```
# iSMrc_restore -atg ATG01
Restore Start2000/10/10 09:11:23
ATG:ATG01
MV:/dev/rdsk/c28t0d4 NX_1126_0331h_MV      NX
RV:-          NX_0010_051dh_RV      NX
MV:/dev/rdsk/c28t0d5   NX_1126_0332h_MV  NX
RV:-          NX_0010_051eh_RV            NX
#
```

<Pair restoration>

- The target MV and RV must be paired.

- The activity state of the target pair must be Separate. However, the command cannot be executed if the sync state is Separate Preparing or Separating.

- The Semi-Sync copy mode cannot be specified for pairs set in the same disk array. Specify the Semi-Sync copy mode for pairs set in different disk arrays when required.

- The command cannot be executed if the disk array that contains the specified MV and RV is in the freeze state.

- The activity state of the pair of the specified MV and the paired upper RV must be Separated state.

- If the specified MV is used as a BV (base-volume) for snapshot, the command cannot be executed when a restore fault occurs.

- If the specified MV is used as a BV (base-volume) for snapshot, the snapshot for all SVs (snapshot- volumes) paired with the BV must be snapshot-inactive.

- If the specified RV is used as a BV (base-volume) for snapshot, the command cannot be executed when restoration from the SV (snapshot-volume) is in progress or a restore fault occurs.

- If the specified RV is used as a BV (base-volume) for snapshot, the RV update restore cannot be executed.

- If the specified MV or RV is used as a BV (base-volume) for snapshot, the command cannot be executed when link setting of the BV is in progress.

- The activity state of the pair of the specified MV and the paired upper MV must be Separated state.
- The sync state of the pair of the specified RV and the paired lower RV must be in the Separated state.
- When MV or RV is in the protection state (ReadOnly or NotAccessible) by the WORM function, Restore (update) cannot be executed.
- When MV is in the protection state (ReadOnly or NotAccessible) or RV is NotAccessible by the WORM function, Restore (protect) cannot be executed.
- A dynamic disk cannot be used.
- MV and RV must be unmounted.
- No pair belonging to an ATgroup can be operated.
- The command cannot be executed if the logical disk of MV or RV is in the not in use state or the pool to which the logical disk belongs is in the rotation stop state by the power saving function.
- Restore(update) cannot be executed if the update prevention state of the MV or RV is Prevent by the volume update prevention function.
- Restore(protect) cannot be executed if the update prevention state of the MV is Prevent by the volume update prevention function.
- The following notes do not apply to joint operation with SnapSAN Manager.
    - The target MV or RV must have been registered in the volume list.
    - When a remote-side volume is to be operated in remote operation, the target volume must satisfy the following conditions:
        - A paired upper or lower volume for the target pair must have been registered in the volume list.
        - When the MV or RV of the target pair is used also as a BV (base-volume) for snapshot, the BV or the LV linked to the BV must have been registered in the volume list.
- The command cannot be executed when the volume list is being created.
- When specifying the combination of a volume group or a disk group with a special file name (logical disk name), for an MV(RV), specify the same number of logical volumes that constitute a volume group or a disk group on the specified special file name (logical disk name) side. In this case, copying is performed in the specified order.
- To specify a volume group, the target volume group must be active.
- To specify a disk group, the target disk group must be active.
- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

<ATgroup restoration>

The ATgroup sync state of the target ATgroup must be either of the following.

- Separate completed (Separated)
- Restore suspend (Rst/suspend)

The command cannot be executed if the replication function of the disk array to which the target ATgroup belongs is in the freeze state.

- A dynamic disk cannot be used.
- Both the MV and RV must have been used

- The command cannot be executed if logical disk of MV or RV included in the ATgroup is not in use state or that the pool to which the logical disk belongs is in the rotation stop state for the power saving function.
- The command cannot be executed if the update prevention state of the MV in the ATgroup is Prevent by the volume update prevention function.

The following notes do not apply to joint operation with SnapSAN Manager.

- When the secure mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, MVs or RVs of all the pairs that belong to the target ATgroup must have been registered in the volume list.
- When the standard mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, at least one logical disk that belongs to the target ATgroup must have been registered in the volume list.
- The command cannot be executed when the volume list is being created.
- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

<Pair restoration>

0: Operation for all the paired volumes terminated normally.

1: Operation for all the paired volumes terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

2: Operation for some paired volumes terminated abnormally.

3: The command terminated abnormally because all or some of the paired volumes were already in Restore State.

<ATgroup restoration>

0: ATgroup operation terminated normally.

1: ATgroup operation terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.
- An attempt to operate some pairs fails.
- A wait for restoration to be completed is discontinued.
- Transition occurs to an ATgroup sync state other than Rst/exec or Separated (that accompanies the completion of restoration) during a wait for restoration to be completed.
- In restoration from the MV, the MV is in use (Windows) or is being mounted (UNIX).

2: An attempt to operate some pairs fails and ATgroup operation terminated abnormally.

3: ATgroup operation terminated abnormally because the current ATgroup sync state is already Rst/exec.

iSMrc_change

```
iSMrc_change
```

-Changes copy control state of a pair or recovers from fault separation state by ATgroup state change.

[Synopsis]

```
iSMrc_change {-suspend | -resume | -sync | -semi | -bg}
-mv volume -mvflg mv_flg
[-rv volume -rvflg rv_flg]
[-iopath iopath]
iSMrc_change  -file file_name
{-suspend | -resume | -sync | -semi | -bg}
[-iopath iopath]
iSMrc_change  -atg atgroup
-force force_state
[-arrayname diskarray]
[-iopath iopath]
iSMrc_change  -ver
iSMrc_change  -?
iSMrc_change  -help
```

[Description]

The iSMrc_change command changes the copy control state of the paired MV/RV.

In Restore (protect), copy mode changes (Overland Mirroring, and background copy mode) do not take effect because updates to the MV are not reflected on the RV.

If an ATgroup is specified, changing the ATgroup sync state from Fault to Separated makes the MV or RV usable.

To continue operations using the RV on the distributor side in case of a system failure on the concentrator (MV) side and so on, you must change the ATgroup sync state forcibly to Separated state using this command on the distributor side and make the RV usable.

In addition, when you perform Restore after the ATgroup sync state becomes Fault due to ATgroup forced separation and so on, you must change the ATgroup sync state to Separated state using this command on the concentrator side before executing Restore.

Options

The iSMrc_change command recognizes the following options and arguments.

-suspend

Suspends all the copy control states of the Sync Copy mode, Semi-Sync Copy mode, and Background Copy mode.

-resume

Selects the foreground copy mode.

-sync

Executes with the Sync Copy mode as the copy control state.

-semi

Executes with the Semi-Sync Copy mode as the copy control state.

-bg

Selects the background copy mode to perform copy operations asynchronously from I/O operations.

-mv

volume

Specify volume of MV

-mvflg mv_flg

Specify the volume type specified in -mv.

This argument must be specified with -mv.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

-rv volume

Specify volume of RV.

-rvflg rv_flg

Specify the volume type specified in -rv.

This argument must be specified if -rv is specified.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

-atg atgroup

Specify the name of ATgroup to be operated.

-arrayname diskarray

If -atg is used to specify an ATgroup, it is possible to specify the disk array name (nickname) of an operation target.

-force force_state

Used to forcibly change the ATgroup sync state.

The following value is specified for force_state.

separated

The ATgroup sync state is changed from Fault to Separated. (Recovery from fault separation state)

-iopath iopath

Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- direct Replication I/O commands are issued directly to disk arrays
- manager SnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-file file_name

To specify multiple pairs, describe the pairs of MV/RV in file_name.

When multiple pairs are specified and if an error occurs in some pairs, the process is continued until it is terminated in all the specified pairs.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[DISPLAYED INFORMATION]
On the Windows system
(1) When a change to the copy control state of a pair terminates normally with –suspend specified, the following information is displayed.

```
C:\>iSMrc_change -suspend -mv Id_name -mvflg Id -rv Id_name -rvflg Id

Change Start            YYYY/MM/DD hh:mm:ss
                        MV:disk_number   Id_name        type
                        volume name
                        path
                        RV:disk_numberId_name        type
                        volume name
                        path

Change Normal End       YYYY/MM/DD hh:mm:ss
                        MV:disk_number   Id_name        type
                        volume name
                        path
                        RV:disk_numberId_name        type
                        volume name
                        path

C:\>
```

(2) When changes to an ATgroup state terminate normally, the following information is displayed.

```
C:\>iSMrc_change -atg atgroup  -force force_state

Change Start            YYYY/MM/DD hh:mm:ss
                        ATG:atgroup
                          MV:disk_number  Id_name   type
                          volume name
                          path
                          RV:disk_number  Id_name   type
                          volume name
                          path

Change Normal End       YYYY/MM/DD hh:mm:ss
                        ATG:atgroup
                          MV:disk_number  Id_name   type
                          volume name
                          path
                          RV:disk_number  Id_name   type
                          volume name
                          path

C:\>
```

Description of messages:

```
Change Start                    YYYY/MM/DD hh:mm:ss
Change Copy Control State starting message and Start Time
ATG: atgroup
ATgroup name
MV: disk_number    ld_name                        type
    volume name
    path
RV: disk_number    ld_name                        type
    volume name
    path
MV/RV physical disk number, logical disk name, OS type, mount point
volume name, and drive letters mounted to the folder of the NTFS volume
accessed by users
Change Normal End               YYYY/MM/DD hh:mm:ss
Change Copy Control State end message and end time
```

On the UNIX system

When a change to the copy control state of a pair terminates normally with -suspend specified, the following information is displayed.

```
# iSMrc_change -suspend -mv special_file_name -mvflg sfn -rv
special_file_name -rvflg sfn
Change Start YYYY/MM/DD hh:mm:ss
MV: special_file_name LD Name type
RV: special_file_name LD Name type
Change Normal End YYYY/MM/DD hh:mm:ss
MV: special_file_name LD Name type
RV: special_file_name LD Name type
#
```

When changes to an ATgroup state terminate normally, the following information is displayed.

```
# iSMrc_change -atg atgroup -force force_state
Change Start YYYY/MM/DD hh:mm:ss
ATG: atgroup
MV: special_file_name LD Name type
RV: special_file_name LD Name type
Change Normal EndYYYY/MM/DD hh:mm:ss
ATG: atgroup
MV: special_file_nameLD Nametype
RV: special_file_nameLD Nametype
#
```

Description of messages:

```
Change Start                    YYYY/MM/DD hh:mm:ss
Change Copy Control State start message and start time
ATG: atgroup
ATgroup name
MV: special_file_name                  LD Name          type
RV: special_file_name                  LD Name          type
MV/RV's special file name, logical disk name, OS type
The special file name is displayed as a 32-byte item on Linux.
Change Normal End               YYYY/MM/DD hh:mm:ss
```

Change Copy Control State end message and end time

[USAGE]

On the Windows system

(1) The command suspends the copy control state of a pair temporarily.

```
C:\>iSMrc_change -suspend -mv dev001 -mvflgId -rv dev101 -rvflgId

ChangeStart             2001/01/28 18:14:44
                        MV:1dev001     WN
                        \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                        E:
                        RV:- dev101        WN
                        -
                        -

ChangeNormalEnd         2001/01/28 18:14:45
                        MV:1dev001     WN
                        \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                        E:
                        RV:- dev101        WN
                        -
                        -

C:\>
```

(2) The command restarts the copy control state of a pair at stop in the synchronous copy mode.

```
C:\>iSMrc_change -sync -mv dev001 -mvflgId -rv dev101 -rvflgId

Change Start            2001/01/28 18:14:44
                        MV:1dev001      WN
                        \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                        E:
                        RV:-    dev101      WN
                        -
                        -

Change Normal End       2001/01/28 18:14:44
                        MV:-    dev001      WN
                        \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                        E:
                        RV:- dev101         WN
                        -
                        -

C:\>
```

(3) The command changes the ATgroup state to Separated.

```
C:\>iSMrc_change -atg ATmdb_test -force separated

Change Start            2003/08/13 10:06:32
                        ATG:ATmdb_test
                          MV:1dev001      WN
                        \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                          E:
                          RV:- dev101     WN
                          -
                          -

                          MV:1dev002          WN
                        \\?\Volume{69facee0-58ae-11d6-ad3e-806d6172696f}\
                          F:
                          RV:- dev102     WN
                          -
                          -
Change Normal End       2003/08/13 10:06:35
                        ATG:ATmdb_test
                          MV:1dev001      WN

                        \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                          E:
                          RV:- dev101     WN
                          -
                          -
                          MV:1  dev002    WN
                        \\?\Volume{69facee0-58ae-11d6-ad3e-806d6172696f}\
```

```
                          F:
                          RV:- dev102     WN
                          -
                          -
C:\>
```

On the UNIX system

The command suspends the copy control state of a pair temporarily.

```
# iSMrc_change -suspend -mv /dev/rdsk/c0t1d0 -mvflg sfn -rv disk002 -
rvflg ld
Change Start 2000/10/10 09:11:23
MV:/dev/rdsk/c0t1d0 disk001NX
RV:-disk002NX
Change Normal End2000/10/10 09:11:24
MV:/dev/rdsk/c0t1d0 disk001NX
RV:-disk002NX
#
```

The command temporarily suspends the copy control state of a pair by specifying a persistent special file name.

```
# iSMrc_change -suspend -mv /dev/rdisk/disk150 -mvflg sfn
Change Start2008/01/30 05:11:17
MV:/dev/rdisk/disk150 disk001NX
RV:-disk002NX
Change Normal End2008/01/30 05:11:17
MV:/dev/rdisk/disk150 disk001NX
RV:-disk002NX
#
```

The command restarts the copy control state of a pair at stop in the Overland Mirroring.

```
# iSMrc_change -sync -mv /dev/rdsk/c0t1d0 -mvflg sfn -rv disk002 -rvflg
ld
Change Start2000/10/10 09:11:30
MV:/dev/rdsk/c0t1d0 disk001NX
RV:-disk002NX
Change Normal End2000/10/10 09:11:31
MV:/dev/rdsk/c0t1d0 disk001NX
RV:-disk002NX
#
```

The command changes the copy control state of the pair to the background copy mode.

```
# iSMrc_change -bg -mv disk100 -mvflg ld -rv disk200 -rvflg ld
Change Start2000/10/10 09:11:30
MV:/dev/rdsk/c1t2001003013840874d1disk100CX
RV:-disk200CX
Change Normal End2000/10/10 09:11:31
MV:/dev/rdsk/c1t2001003013840874d1disk100CX
RV:-disk200CX
#
```

The command changes the ATgroup state to Separated.

```
# iSMrc_change -atg ATmdb_test -force separated
Change Start2003/08/13 10:06:32
ATG: ATmdb_test
MV: -NX_1126_0331h_MVNX
RV: /dev/rdsk/c30t0d6 NX_0010_051dh_RVNX
MV: - NX_1126_0332h_MVNX
  RV: /dev/rdsk/c30t0d7   NX_0010_051eh_RVNX
Change Normal End2003/08/13 10:06:35
ATG: ATmdb_test
MV: -NX_1126_0331h_MVNX
RV: /dev/rdsk/c30t0d6 NX_0010_051dh_RVNX
MV: -NX_1126_0332h_MVNX
RV: /dev/rdsk/c30t0d7 NX_0010_051eh_RVNX
#
```

<Changing the copy control state of a pair>

- The target MV and RV must be paired.

- The activity state of the target pair must be Replicate or Restore. However, the command cannot be executed if the sync state is Replicate Preparing or Restore Preparing.

- The Semi-Sync copy mode cannot be specified for pairs set in the same disk array.

  - When the asynchronous Overland Remote Replication function (Replication and Mirroring Asynchronous) is used for the pair, set in different disk arrays, of which activity state is Replicate, the copy control state of the pair must be the background copy mode.

  - Specify the Semi-Sync copy mode for pairs set in different disk arrays when required.

  - The command cannot be executed if the disk array that contains the specified MV and RV is in the freeze state.

  - Changing from Sync to Semi-Sync copy mode or from Semi-Sync to Sync copy mode is disabled.

- If the activity state of the target pair and a pair of the specified MV and the upper paired MV is Replicate, the copy control state of the pair must be the background copy mode.

- If the specified RV is used as a BV (base-volume) for snapshot, the copy control state of the pair must be the background copy mode.

  - The copy control state cannot be changed when the activity state of the pair of the specified MV and the paired upper MV is separate execution.

  - The copy control state cannot be changed when the activity state of the pair of the specified RV and the paired lower RV is Separate Preparing, Replicate Preparing, or separate execution.

- A dynamic disk cannot be used.

- No pair belonging to an ATgroup can be operated.

- The command cannot be executed if the logical disk of MV or RV is in the not in use state or the pool to which the logical disk belongs is in the rotation stop state by the power saving function.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target MV or RV must have been registered in the volume list.

- When a remote-side volume is to be operated in remote operation, the target volume must satisfy the following conditions:
  - A paired upper or lower volume for the target pair must have been registered in the volume list.
  - When the MV or RV of the target pair is used also as a BV (base-volume) for snapshot, the BV or the LV linked to the BV must have been registered in the volume list.
- The command cannot be executed when the volume list is being created.
- When specifying the combination of a volume group or a disk group with a special file name (logical disk name), for an MV (RV), specify the same number of logical volumes that constitute a volume group or a disk group on the specified special file name (logical disk name) side.
- To specify a volume group, the target volume group must be active.
- To specify a disk group, the target disk group must be active.
- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

<Changing the copy control state of an ATgroup>

- If the sync state of an ATgroup and pair is to be changed forcibly, the sync state of the target ATgroup must be Fault.
- If the distributor forcibly changed the sync state of an ATgroup and pair, the access restriction of the RV shifts to the Read/Write enabled state.
  - The command cannot be executed if the replication function of the disk array to which the target ATgroup belongs is in the freeze state.

A dynamic disk cannot be used.

The following notes do not apply to joint operation with SnapSAN Manager.

- When the secure mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, MVs or RVs of all the pairs that belong to the target ATgroup must have been registered in the volume list.
- When the standard mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, at least one logical disk that belongs to the target ATgroup must have been registered in the volume list.
- The command cannot be executed when the volume list is being created.
- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

<Changing the copy control state of a pair>

0: Operation for all the paired volumes terminated normally.

1: Operation for all the paired volumes terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

2: Operation for some paired volumes terminated abnormally.

3: The command terminated abnormally because all or some of the paired volumes were already in Replicate State.

- Operation with -suspend specified for paired volumes for which Copy has been suspended
- Operation with -resume, -sync, or -semi specified for paired volumes for which Foreground Copy is in progress
- Operation with -bg specified for paired volumes for which Background Copy is in progress

<Changing the state of an ATgroup>

0: ATgroup operation terminated normally.

1: ATgroup operation terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

3: An attempt to forcibly change the sync state of an ATgroup and pair terminated abnormally because the current ATgroup sync state is already Fault/recovering or Separated.

iSMrc_wait

[Name]
```
iSMrc_wait
```

Waits for a pair and ATgroup to enter the Rpl/sync, Rst/sync, or Separated state.

[Synopsis]
```
iSMrc_wait   -cond condition
-mv volume -mvflg mv_flg
[-rv volume -rvflg rv_flg]
[-interval interval_time ] [-limit limit_time ]
[-iopath iopath]
iSMrc_wait-cond condition
-rv volume -rvflg rv_flg
[-interval interval_time] [-limit limit_time]
[-iopath iopath]
iSMrc_wait-cond condition
-file file_name
[-interval interval_time] [-limit limit_time]
[-iopath iopath]
iSMrc_wait-cond condition
-atg atgroup
[-interval interval_time]
[-limit limit_time]
[-arrayname diskarray]
[-iopath iopath]
iSMrc_wait-ver
iSMrc_wait-?
iSMrc_waithelp
```

[Description]

The iSMrc_wait command waits for a specified pair of volumes to enter the Sync State (rpl/sync), Sync State (rst/sync), or Separated State.It also waits for a specified ATgroup to enter the Rpl/sync or Separated State, which accompanies the completion of separation or restoration.

Options

The iSMrc_wait command recognizes the following options:

- MV and/or RV can be specified in any of the combinations below.
- MV and RV: Waits for a specified pair of volumes to enter a target state.
- MV only: If an MV is paired with an RV on a 1:1 basis, the RV can be omitted. The command waits for the relevant pair to enter a target state in the same manner as when both MV and RV are specified.
- RV only: Same operation as when MV and RV are specified

  -mv volumeSpecify a volume of MV.

  -mvflg mv_flgSpecify the type of the volume specified for -mv.

This argument must be specified with -mv.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

  -rv volumeSpecify a volume of RV.

  -rvflg rv_flgSpecify the type of the volume specified for -rv.

This argument must be specified if -rv is specified. The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

  -atg atgroupSpecify the name of ATgroup to be operated.

  -cond conditionSpecify a wait end condition. This argument cannot be omitted. Either of the following can be specified as condition to wait for a pair to enter a target state.

syncWaits for Sync State (rpl/sync) or Sync State (rst/sync).

sepWaits for Separated State (separated).

One of the following can be specified as condition to wait for an ATgroup to enter a target state.

- syncWaits for:
  - Rpl/sync in the Atomic state
  - Rpl/sync in the Non-atomic state
- sepWaits for:
  - Separated in the Atomic state
  - Separated in the Non-atomic state

The command terminates abnormally if transition occurs to Fault during the wait, however:

- faultWaits for:
  - Separated in the Atomic state
  - Fault in the Atomic state
  - Separated in the Non-atomic state
  - Fault in the Non-atomic state
- atsepWaits for:
  - Separated in the Atomic state

The command terminates abnormally if transition occurs to one of the following states during the wait, however.

- Fault in the Atomic state
  - Separated in the Non-atomic state
- Fault in the Non-atomic state
- Fault/recovering in Non-atomic state
- atfaultWaits for:
  - Separated in the Atomic state
- Fault in the Atomic state

The command terminates abnormally if transition occurs to one of the following states during the wait, however.

- Separated in the Non-atomic state
- Fault in the Non-atomic state
- Fault/recovering in Non-atomic state

-interval interval_time

- Specify an interval (in seconds) at which the state of paired volumes or ATgroup is to be monitored.
- The value can be specified from 1 to 30 seconds (integer).
- This value can be changed in the replication operation option setting file on the Windows system and in the environment variable on the UNIX system.
- The default is an interval of 5 seconds.

-limit limit_time

Specify a wait time limit.

Either of the following can be specified for limit_time.

- numeric-value
- Waits until the specified time elapses since the wait starts. A value 0 to 86,400 seconds (integer) can be specified.

-nolimUnlimited wait

- If the end condition specified for the -cond option is not satisfied before the specified time passes after the wait starts, the wait is discontinued and the command terminates abnormally.
- This value can be changed in the replication operation option setting file on the Windows system and in the environment variable on the UNIX system.
- The default is unlimited wait.

-arrayname diskarray

If -atg is used to specify an ATgroup, it is possible to specify the disk array name (nickname) of an operation target.

-iopath

Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- directReplication I/O commands are issued directly to disk arrays.
- managerSnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.
- If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-file file_name

- To specify more than a pair of volumes, specify the volume names for file_name.
- If multiple pairs of volumes are specified and an error occurs in a pair of volumes, the system does not discontinue operation. The system continues operation until processing for all the specified pairs of volumes is completed.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[DISPLAYED INFORMATION]

On the Windows system

(1) When the command executed to wait for a pair to enter the Rpl/sync, Rst/sync, or Separated state terminates normally, the following information is displayed.

```
C:\> iSMrc_wait -mv ld_name -mvflg ld  -rv ld_name -rvflg ld  -cond sync
Waiting.....
activity Normal End          YYYY/MM/DD hh:mm:ss
                             MV:disk_number ld_name   type
                             volume name
                             path
                             RV:disk_number  ld_name   type
                             volume name
                             path

C:\>
```

(2) When the command executed to wait for an ATgroup to enter the Rpl/sync or Separated state, which accompanies the completion of restoration or separation terminates normally, the following information is displayed.

```
C:\> iSMrc_wait -atg atgroup -cond condition
Waiting.....
activity Normal End          YYYY/MM/DD hh:mm:ss
                             ATG:atgroup
                                MV:disk_number  ld_name   type
                                volume name
                                path
                                RV:disk_number  ld_name   type
                                volume name
                                path

C:\>
```

Description of messages:
- Waiting.....
Message during execution of the wait command
The display of this message can be suppressed by setting an option. For details on the option setting, refer to 8.1 "Operation Option Setting File".
- activity Normal End   YYYY/MM/DD hh:mm:ss
Message indicating the end of a wait, and date and time of the end
activity represents one of the following:
Replicate: Wait for Rpl/sync

Description of messages:

Waiting.....

Message during execution of the wait command

The display of this message can be suppressed by setting an option.

activity Normal End   YYYY/MM/DD hh:mm:ss

Message indicating the end of a wait, and date and time of the end

Activity represents one of the following:

- Replicate: Wait for Rpl/sync
- Restore: Wait for Rst/sync
- Separate: Wait for Separated (including Separated that accompanies the completion of Restore (protect)).

```
ATG: atgroup
ATgroup name
MV: disk_number    ld_name                         type
    volume name
    path
RV: disk_number    ld_name                         type
    volume name
    path
```

MV/RV physical disk number, logical disk name, OS type, mount point volume name, and drive letter of the drive mounted in the folder of the NTFS volume accessed by the user

On the UNIX system

When the command executed to wait for a pair to enter the Rpl/sync, Rst/sync, or Separated state terminates normally, the following information is displayed.

```
# iSMrc_wait -cond sync -mv ld_name -mvflg ld  -rv ld_name -rvflg ld
Waiting.....
activity Normal EndYYYY/MM/DD hh:mm:ss
MV:  special_file_name LD Name type
RV: special_file_name LD Name type
#
```

When the command executed to wait for an ATgroup to enter the Rpl/sync or Separated state, which accompanies the completion of restoration or separation terminates normally, the following information is displayed.

```
# iSMrc_wait -cond condition  -atg atgroup
Waiting.....
activity Normal End YYYY/MM/DD hh:mm:ss
ATG: atgroup
MV: special_file_name LD Name type
RV: special_file_name  LD Name type
#
```

Description of messages:

Waiting.....

Message that appears during execution of the wait command

The display of this message can be suppressed by setting an option.

activity Normal End   YYYY/MM/DD hh:mm:ss

Message indicating the end of a wait, and date and time of the end activity represents one of the following:

- Replicate: Wait for Rpl/sync
- Restore: Wait for Rst/sync
- Separate: Wait for Separated (including Separated that accompanies the completion of Restore (protect)).

ATG: atgroup

ATgroup name

```
MV:  special_file_name                      LD  Name          type
RV:  special_file_name                      LD  Name          type
```

MV/RV's special file name, logical disk name, OS type

The special file name is displayed as a 32-byte item on Linux.

[USAGE]

On the Windows system

(1) With 1 second specified as the monitoring interval in the -interval option, the command is executed to wait for paired volume to enter the Separated State.

```
C:\>iSMrc_wait -mv dev001 -mvflg ld -rv dev002 -rvflg ld -cond sep -interval 1
Waiting.....
Separate Normal End 2001/01/28 17:56:23
                        MV:1   dev001  WN

                        \\?\Volume{69facee0-58a7-11d5-ad3e-806d6172696f}\
                        G:
                        RV:-   dev002       WN
                        -
                        -

C:\>
```

(2) The command waits for an ATgroup to enter the Separated state.

```
C:\>iSMrc_wait -atg ATmdb_test -cond sep
Waiting.....
Separate Normal End     2003/08/13 10:52:48
                        ATG:ATmdb_test
                        MV:9   WN_1126_0331h_MV      WN

                        \\?\Volume{fe357b40-757c-11d7-92f4-00004c7929e8}\
                        F:
                        RV:-   WN_0010_051dh_RV   WN
                        -
                        -

                        MV:10  WN_1126_0332h_MV   WN

                        \\?\Volume{fe357b3a-757c-11d7-92f4-00004c7929e8}\
                        G:
                        RV:- WN_0010_051eh_RVWN
                        -
                        -

C:\>
```

On the UNIX system

With the monitoring time interval of one second, the command is executed to wait for paired volumes to enter the Separated state.

```
# iSMrc_wait -cond sep -mv disk001 -mvflg ld -rv disk002 -rvflg ld -
interval 1
   Waiting.....
   Separate Normal End2000/10/10 09:11:24
       MV:/dev/rdsk/c0t1d0 disk001NX
       RV: -disk002NX
   #
```

With a persistent special file name specified and the monitoring time interval of one second set in the -interval option, the command is executed to wait for paired volumes to enter the Separated state.

```
# iSMrc_wait -cond sep -mv /dev/rdisk/disk150 -mvflg sfn -interval 1
   Waiting.
   Separate Normal End2008/01/30 05:15:43
       MV: /dev/rdisk/disk150disk001NX
       RV: - disk002NX
   #
```

With the monitoring time interval of 3 seconds specified in the -interval option, the command is executed to wait for pair replication.

```
# iSMrc_wait -cond sync -mv disk100 -mvflg ld -rv disk200 -rvflg ld -
interval 3
   Waiting.....
   Replicate Normal End2000/10/10 09:11:24
       MV: /dev/rdsk/c1t2001003013840874d1disk100CX
       RV: - disk200CX
   #
```

The command waits for an ATgroup to enter the Separated state.

```
# iSMrc_wait -cond sep -atg ATmdb_test
   Waiting.....
   Separate Normal End2003/08/13 10:52:48
     ATG: ATmdb_test
     MV: -NX_1126_0331h_MVNX
     RV: /dev/rdsk/c30t0d6 NX_0010_051dh_RVNX
     MV: -NX_1126_0332h_MVNX
     RV: /dev/rdsk/c30t0d7NX_0010_051eh_RVNX
   #
```

<Waiting for a pair to enter a target state>

- The MV and RV to be operated must be set as a pair.
- A dynamic disk cannot be used.
- The following notes do not apply to joint operation with SnapSAN Manager.
- The MV or RV to be operated must be registered in the volume list.
- When a remote-side volume is to be operated in remote operation, the target volume must satisfy the following conditions:
    - A paired upper or lower volume for the target pair must have been registered in the volume list.

- When the MV or RV of the target pair is used also as a BV (base-volume) for snapshot, the BV or the LV linked to the BV must have been registered in the volume list.

The command cannot be executed when the volume list is being created.

When specifying the combination of a volume group or a disk group with a special file name (logical disk name), for an MV(RV), specify the same number of logical volumes that constitute a volume group or a disk group on the specified special file name (logical disk name) side.

- To specify a volume group, the target volume group must be active.
- To specify a disk group, the target disk group must be active.

The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

<Waiting for an ATgroup to enter a target state>

- If an ATgroup link path failure occurs or if a difference between ATgroup copies cannot be obtained normally, the wait is discontinued and processing is discontinued, leading to an abnormal termination.
- If an ATgroup enters the Rpl/suspend or Rst/suspend state during a wait, the wait is discontinued and processing is discontinued, leading to an abnormal termination.
- The command cannot be executed if the replication function of the disk array to which the target ATgroup belongs is in the freeze state. If a freeze state is detected during a wait, the wait is discontinued and processing is discontinued, leading to an abnormal termination.
- A dynamic disk cannot be used.

The following notes do not apply to joint operation with SnapSAN Manager.

- When the secure mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, MVs or RVs of all the pairs that belong to the target ATgroup must have been registered in the volume list.
- When the standard mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, at least one logical disk that belongs to the target ATgroup must have been registered in the volume list.
- The command cannot be executed when the volume list is being created.
- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

<Waiting for a pair to enter a target state>

0: Operation for all the paired volumes terminated normally.

If the state specified for the wait end condition is already placed, normal termination is assumed.

1: Operation for all the paired volumes terminated abnormally.

The wait command terminates abnormally in the following cases:

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

- The state specified for the wait end condition is not placed before the specified time limit.

2: Operation for some paired volumes terminated abnormally.

<Waiting for an ATgroup to enter a target state>

0: ATgroup operation terminated normally.

Normal termination occurs if a target wait state is already satisfied.

1: ATgroup operation terminated abnormally.

Abnormal termination occurs in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.
- If a wait end condition is not satisfied within a specified time interval.

iSMrc_query

[NAME]

```
iSMrc_query
```

Displays the copy state of a pair or ATgroup.

[Synopsis]

```
iSMrc_query -mv volume -mvflg mv_flg
[-rv volume -rvflg rv_flg]
[-iopath iopath]
iSMrc_query -rv volume -rvflg rv_flg
[-iopath iopath]
iSMrc_query -file file_name
[-iopath iopath]
iSMrc_query-atg atgroup
[-arrayname diskarray]
[-iopath iopath]
iSMrc_query-ver
iSMrc_query -?
iSMrc_query -help
```

[Description]

The iSMrc_query command displays the copy state of the specified paired volumes.

It also displays the state values of an ATgroup and the Remote Replication pair that belongs to the ATgroup if the ATgroup is specified.

Options

The iSMrc_query command recognizes the following options and arguments.

MV and RV can be specified in one of the following combinations:

- MV and RVDisplays the state of the specified pair of volumes.
- MV onlyDisplays the state of all volumes paired with MV.

- RV onlyDisplays the state of volumes in the same way as when specifying MV and RV.

   -mv volumeSpecify volume of MV.

   .-mvflg mv_flgSpecify the volume type specified in -mv.

This argument must be specified with -mv.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

   -rv volumeSpecify volume of RV.

   -rvflg rv_flgSpecify the volume type specified in -rv.

This argument must be specified if -rv is specified.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

   -atg atgroupSpecify the name of ATgroup to be operated.

   -arrayname diskarrayIf -atg is used to specify an ATgroup, it is possible to specify the disk array name (nickname) of an operation target.

   -iopath iopathSpecify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- direct Replication I/O commands are issued directly to disk arrays.
- manager SnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

   -file file_name To specify multiple pairs, describe the pairs of MV/RV in file_name.

When multiple pairs are specified, if an error occurs in some pairs, an error message indicating that is displayed, and the process is continued until it is terminated in all the specified pairs.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[DISPLAYED INFORMATION]

On the Windows system

(1) This command displays the following information about the copy state of a pair.

```
C:\>iSMrc_query -mv dev001 -mvflg ld
MV: Disk No.              mv_disk_number
                          LD Name  mv_ld_name
                          Type mv_type
                          Volume Name   mv_volume_name
                          Path mv_path
RV: Disk No.              rv_disk_number
                          LD Name  rv_ld_name
                          Type rv_type
                          Volume Name   rv_volume_name
                          Path rv_path
Activity State            activity_state
Sync State                sync_state
Copy Control State        copycontrol_state
<state> Start Time        YYYY/MM/DD hh:mm:ss
<state> End Time          YYYY/MM/DD hh:mm:ss
Separate Diff             eeeeKB
Copy Diff                 ffffKB
RV Access                 gg
Previous Active           previous_active_state

C:\>
```

(2) This command displays the following.

```
C:\>iSMrc_query -atg atgroup
ATG: atgroup
                          Disk Array Name arrayname
                          Site site
                          ATG State   atg_consistency_state(atg_sync_state)
                          ATG Path State atg_path_state
                          Atomic-break Mode  atmode
                          Copy Mode  cpmode
                          ATG Copy Diff  bbb.bBB
                          Pair Entry   entry
MV: Disk No.              mv_disk_number
                          LD Name mv_ld_name
                          Type mv_type
                          Volume Name  mv_volume_name
                          Path   mv_path
RV: Disk No.              rv_disk_number
                          LD Name   rv_ld_name
                          Type   rv_type
                          Volume Name  rv_volume_name
                          Path   rv_path
Activity State            activity_state
Sync State                sync_state
Copy Control State        copycontrol_state
<state> Start Time        YYYY/MM/DD hh:mm:ss
```

```
<state> End Time          YYYY/MM/DD hh:mm:ss
Separate Diff             eeeeKB
Copy Diff                 ffffKB
RV Access                 gg
Previous Active           previous_active_state

C:\>
```

Description of messages:

ATGATgroup name

Disk Array NameDisk array name

SiteATgroup location

concentrator: Concentrator

distributor: Distributor

ATG StateATgroup consistency state and ATgroup sync state

The ATgroup sync state display is enclosed in parentheses, following the ATgroup consistency state display.

ATgroup consistency state

AtomicState in which data consistency is kept throughout an ATgroup

Non-atomicState in which data consistency is not kept throughout an ATgroup

- State in which no pair is registered with the ATgroup, which, therefore, does not function (Invalid state)

ATgroup sync state

- State in which no pair is registered with the ATgroup (Invalid state)

Separated Separation completed

All pairs in the ATgroup are in the following state and sync is at stop

- separate (separated)
- Fault/recovering Recovery from fault separation in progress

Each pair in the ATgroup is in one of the following states and being transited from Fault to Separated.

- separate (separated)
- separate (fault)
- separate (cancel)

FaultFailure separation

Each pair in the ATgroup is in one of the following states and sync is at stop

- separate (separated)
- separate (fault)
- separate (cancel)

Sep/startSeparate start

State in which some pairs in the ATgroup have been separated, that is, the activity state of some pairs is separate and that of others is replicate

Sep/execSeparate execution

State in which all pairs in the ATgroup have started separating and they are in one of the following states

- separate (sep/exec)
- separate (separated)
- Rpl/startReplicate start

State in which some pairs in the ATgroup have started or restarted sync, that is, the activity state of some pairs is separate and that of others is replicate

Rpl/execReplicate execution

State in which all pairs in the ATgroup have started replicating and in one of the following states

- replicate (rpl/exec)

- replicate (rpl/sync)
- Rpl/syncReplicate synchronous

State in which all pairs in the ATgroup are in the following state, that is, they have been replicated and are in sync

- replicate (rpl/sync)
- Rpl/suspendReplicate suspend

At least one pair in the ATgroup has stopped replicating and its copy control state is the following:

- abnormal suspend
- Rst/execRestore execution

At least one pair in the ATgroup has started restoring and its state is the following:

- restore (rst/exec)
- Rst/suspendRestore suspend

At least one pair in the ATgroup has stopped restoring and its copy control state is the following:

- abnormal suspend
- ATG Path State ATgroup link path state

State in which no pair is registered with the ATgroup

- online There is a normal link path.
- freeze The connected disk array is in the freeze state.
- fault All link paths are abnormal.

Atomic-break ModeAtomic-break mode

This display appears if the current ATgroup sync state is Rpl/start, Rpl/exec, Rpl/sync, or Rpl/suspend. "-" (hyphen) is displayed in the other sync states. "-" is displayed if the current copy mode is the background copy mode, because the atomic break function is disabled.

- stopMV access stop
- continueMV access continuation

Copy Mode Copy mode

This display appears if the current ATgroup sync state is Rpl/start, Rpl/exec, Rpl/sync, or Rpl/suspend. "-" (hyphen) is displayed in the other sync states.

- syncOverland Mirroring copy mode
- semiOverland Replication
- bgBackground copy mode
- ATG Copy Diff

This display is an update difference value in the ATgroup followed by a measurement unit symbol ("MB", "GB", "TB", "PB", or "EB"). 1 kilobyte is 1024 bytes. For 1 GB and above, the displayed value is rounded up to the first decimal place. If the current ATgroup link path state is "fault", "-" (hyphen) is displayed.

Pair EntryNumber of pairs registered with the ATgroup

Allowed ResponseThe allowed time for the MV delay that is an ATgroup attribute is displayed with the unit (s: second). Only the allowed time of the concentrator is displayed. A hyphen (-) is displayed for the allowed time of the distributer or when this function is not supported.

MV: Disk No.MV physical disk number

LD Name Logical disk name

Type OS type

Volume Name Mount point volume name

Path Drive name mounted to the folder of the NTFS volume accessed by users

RV: Disk No.RV physical disk number

LD Name Logical disk name

Type OS type

Volume Name Mount point volume name

Path Drive name mounted to the folder of the NTFS volume accessed by users

Activity State Indicates the activity state.

- replicate Replicate state
- restore   Restore state
- restore (protect) Restore state with RV protection specified
- separate Separate state

Sync State Indicates the paired operation state.

- separated Separated
- sep/preparing Separate Preparing
- sep/exec Separate execution
- cancel Separate state (forced separate)
- faultSeparate state (fault separate)
- rpl/sync Replicate complete
- rpl/preparing Replicate Preparing
- rpl/exec Replicate execution
- rst/sync Restore complete
- rst/preparing Restore Preparing
- rst/exec Restore execution

Copy Control State

Indicates the copy control state.

When Restore (protect) specified is executed, the updated data of the MV is not reflected into the RV. Therefore, the information of Copy Mode (foreground copy or background copy of Overland Mirroring and semi Mirroring) is invalid and "-" is displayed.

- foreground copy (sync) Foreground copy state (sync copy mode)
- foreground copy (semi) Foreground copy state (semi-sync copy mode)
- normal suspend Suspend state
- abnormal suspend Suspend state (fault)

- background copy Background copy state
- freeze Freeze state

<state> Start Time, <state> End Time

Indicates the start and end times of the last replication operation executed (Replicate, Restore, or Separate). When an error or Forced Separate has occurred, its occurrence time is displayed. The <state> shows "Replicate", "Restore", "Separate", "Fault" (for fault), or "Forced Separate" (for Forced Separate). When "Fault" or "Forced Separate" is displayed, the "End Time" does not appear.

Separate Diff

Indicates the amount of copy difference in the Separate state in kilobyte.

The amount of copy difference is separately managed for MV-side update difference and RV-side update difference. Executing the command with MV specified displays the MV-side amount of difference; and executing it with only RV specified displays the RV-side amount of difference.

Copy Diff

Indicates the amount of copy difference in the Replicate or Restore state in kilobyte.

RV Access

Indicates the access restrictions for RV.

rwRead/Write Permit (Read/Write are allowed)

roReadOnly (Only Read is allowed)

nrNotReady (Access is not available)

naNot Available (Volume cannot be recognized)

Previous Active

Operation state before the state transition

If the pair of volumes enters the Separated State after Sync State when Restore (protect) is executed, the following is displayed as the pair's operation state before the state transition:

rst/sync (protect) Completion of Restore (protect) specified

On the UNIX system

This command displays the following information about the copy state of a pair.

```
#iSMrc_query -mv mv_special_file_name -mvflg sfn -rv
rv_special_file_name -rvflg sfn
MV: Special File   mv_special_file_name
LD Name          mv_ld_name
Type             mv_type
RV: Special File   rv_special_file_name
LD Name          rv_ld_name
Type             rv_type
Activity State    activity_state
Sync State         sync_state
Copy Control State copycontrol_state
<state> Start Time YYYY/MM/DD hh:mm:ss
<state> End Time    YYYY/MM/DD hh:mm:ss
Separate Diff     eeeeKB
Copy Diff         ffffKB
RV Access           gg
Previous Active previous_active_state
#
```

This command displays the following information about the copy state of an ATgroup.

```
#iSMrc_query -atg atgroup
ATG: atgroup
Disk Array Name arrayname
Site site
ATG Stateatg_consistency_state(atg_sync_state)
ATG Path Stateatg_path_state
Atomic-break Modeatmode
Copy Modecpmode
ATG Copy Diffbbb.bBB
Pair Entry entry
Allowed Response allowed_response_time
MV: Special File mv_special_file_name
LD Name mv_ld_name
Type mv_type
RV: Special File rv_special_file_name
LD Name rv_ld_name
Type rv_type
Activity State activity_state
Sync State sync_state
Copy Control Statecopycontrol_state
<state> Start TimeYYYY/MM/DD hh:mm:ss
<state> End TimeYYYY/MM/DD hh:mm:ss
Separate Diff eeeeKB
Copy DiffffffKB
RV Access gg
Previous Active previous_active_state
#
```

Description of messages:

ATG ATgroup name

Disk Array Name Disk array name

SiteATgroup location

- concentrator: Concentrator
- distributor: Distributor

ATG State ATgroup consistency state and ATgroup sync state

The ATgroup sync state display is enclosed in parentheses, following the ATgroup consistency state display.

- ATgroup consistency state
  Atomic State in which data consistency is kept throughout an ATgroup
- Non-atomic State in which data consistency is not kept throughout an ATgroup
  State in which no pair is registered with the ATgroup, which, therefore, does not function (Invalid state)
- ATgroup sync state
  State in which no pair is registered with the ATgroup (Invalid state)
  SeparatedSeparation completed

All pairs in the ATgroup are in the following state and sync is at stop

- separate (separated)
- Fault/recovering
  Recovery from fault separation in progress

Each pair in the ATgroup is in one of the following states and being transited from Fault to Separated.

- separate (separated)
- separate (fault)
- separate (cancel)

FaultFailure separation

Each pair in the ATgroup is in one of the following states and sync is at stop

- separate (separated)
- separate (fault)
- separate (cancel)

Sep/startSeparate start

State in which some pairs in the ATgroup have been separated, that is, the activity state of some pairs is separate and that of others is replicate

Sep/execSeparate execution

State in which all pairs in the ATgroup have started separating and they are in one of the following states

- separate (sep/exec)
- separate (separated)

Rpl/startReplicate start

State in which some pairs in the ATgroup have started or restarted sync, that is, the activity state of some pairs is separate and that of others is replicate

Rpl/execReplicate execution

State in which all pairs in the ATgroup have started replicating and in one of the following states

- replicate (rpl/exec)
- replicate (rpl/sync)

Rpl/syncReplicate synchronous

State in which all pairs in the ATgroup are in the following state, that is, they have been replicated and are in sync

- replicate (rpl/sync)
- Rpl/suspendReplicate suspend

At least one pair in the ATgroup has stopped replicating and its copy control state is the following:

abnormal suspend

Rst/execRestore execution

At least one pair in the ATgroup has started restoring and its state is the following:

- restore (rst/exec)
- Rst/suspendRestore suspend

At least one pair in the ATgroup has stopped restoring and its copy control state is the following:

- abnormal suspend
- ATG Path StateATgroup link path state

-State in which no pair is registered with the ATgroup

- online There is a normal link path
- freeze The connected disk array is in the freeze state
- fault All link paths are abnormal

Atomic-break Mode Atomic-break mode

This display appears if the current ATgroup sync state is Rpl/start, Rpl/exec, Rpl/sync, or Rpl/suspend. "-" (hyphen) is displayed in the other sync states. "-is displayed if the current copy mode is the background copy mode, because the atomic break function is disabled.

- stopMV access stop
- continueMV access continuation
- Copy Mode Copy mode

This display appears if the current ATgroup sync state is Rpl/start, Rpl/exec, Rpl/sync, or Rpl/suspend. "-" (hyphen) is displayed in the other sync states.

- syncOverland Mirroring
- semiOverland Replication
- bgBackground copy mode

ATG Copy Diff

This display indicates the amount of copy difference in the ATgroup followed by a measurement unit symbol ("MB", "GB", "TB", "PB", or "EB"). 1 kilobyte is 1024 bytes. For 1 GB and above, the displayed value is rounded up to the first decimal place. If the current ATgroup link path state is "fault", "-" (hyphen) is displayed.

Pair Entry Number of pairs registered with the ATgroup

Allowed Response

The allowed time for the MV delay that is an ATgroup attribute is displayed with the unit (s: second). Only the allowed time of the concentrator is displayed. A hyphen (-) is displayed for the allowed time of the distributer or when this function is not supported.

MV: Special File, LD Name, Type

Displays the MV's special file name, logical disk name, and OS type.

The special file name is displayed as a 32-byte item on Linux.

RV: Special File, LD Name, Type

Displays the RV's special file name, logical disk name, and OS type.

The special file name is displayed as a 32-byte item.

Activity State

Indicates the activity state.

replicate Replicate state

restore Restore state

restore (protect) Restore (protect) specification

separate Separate state

Sync State

Indicates the pair operation state.

separated Separated

sep/preparing Separate Preparing

sep/exec Separate execution

cancel Separate state (forced separate)

fault Separate state (fault separate)

rpl/sync Replicate complete

rpl/preparing Replicate Preparing

rpl/exec Replicate execution

rst/sync Restmpleteore co

rst/preparing Restore Preparing

rst/exec Restore execution

Copy Control State

Indicates the Copy Control State

For Separate, "-" is displayed.

When Restore with the RV protection specification is executed, the updated data of the MV is not reflected into the RV. Therefore, the information of Copy Mode (foreground copy or background copy of the Overland Mirroring and the Overland Replication) is invalid and "-" is displayed.

foreground copy (sync)Foreground copy state (Overland Mirroring)

foreground copy (semi)Foreground copy state (Replication)

normal suspend Suspend state

abnormal suspend Suspend state (fault)

background copy   Background copy state

freeze Freeze state

<state> Start Time, <state> End Time

Indicates the start and end times of the last replication operation (Replicate, Restore, or Separate) executed. If an error or Forced Separate has occurred, the time of its occurrence is displayed.

The <state> shows "Replicate", "Restore", "Separate", "Fault" (for fault), or "Forced Separate" (for Forced Separate). When "Fault" or "Forced Separate" is displayed, the "End Time" does not appear.

Separate Diff

Indicates the amount of copy difference in the Separate state in kilobytes.

The amount of copy difference is separately managed for MV-side update difference and RV-side update difference. Executing the command with MV specified displays the MV-side amount of difference; and executing it with only RV specified displays the RV-side amount of difference.

Copy Diff

Indicates the amount of copy difference in the Replicate or Restore state in kilobytes.

RV Access

Indicates the access restriction for RV.

rw Read/Write Permit (Read and Write are allowed)

roReadOnly (Only Read is allowed)

nrNotReady (Access is not available)

na Not Available (Volume cannot be recognized)

Previous Active

Pair operation state before the state transition

If the paired volumes enter the Sync State(rst/sync) as the result of Restore with the RV protection specification and then enter the Separated state, the following is displayed as the pair's operation state before the state transition.

rst/sync (protect)Completion of Restore with the RV protection specification.

[USAGE]

On the Windows system

(1) The command displays the information about the copy state of a pair.

```
C:\>iSMrc_query-mv dev001 -mvflg Id

MV: Disk No.              25
                          LD Name  20000000000010350018
                          TypeWN
                          Volume Name   -
                          Path -
RV: Disk No.              26
                          LD Name  20000000000010350019
                          TypeWN
                          Volume Name   -
                          Path -
Activity State            separate
Sync State                separated
Copy Control State        -
Separate Start Time       2001/05/03   17:19:38
Separate End Time         2001/05/03   17:19:38
Separate Diff             0 KB
Copy Diff                 0 KB
RV Access                 rw
Previous Active           sep/exec

C:\>
```

[USAGE]

On the Windows system

(1) The command displays the information about the copy state of a pair.

```
C:\>iSMrc_query-mv dev001 -mvflg Id

MV: Disk No.              25
                          LD Name  20000000000010350018
                          TypeWN
                          Volume Name   -
                          Path -
RV: Disk No.              26
                          LD Name  20000000000010350019
                          TypeWN
                          Volume Name   -
                          Path -
Activity State            separate
Sync State                separated
Copy Control State        -
Separate Start Time       2001/05/03   17:19:38
Separate End Time         2001/05/03   17:19:38
Separate Diff             0 KB
Copy Diff                 0 KB
RV Access                 rw
Previous Active           sep/exec

C:\>
```

(2) The command displays the copy state of an ATgroup.

```
C:\>iSMrc_query -atg ATmdb_test

ATG: ATmdb_test
                    Disk Array Name StorageS4300/1126
                    Site concentrator
                    ATG StateNon-atomic(Separated)
                    ATG Path Stateonline
                    Atomic-break Mode  -
                    Copy Mode       -
                    ATG Copy Diff  186 MB
                    Pair Entry    1
                    Allowed Response-

MV: Disk No.        9
                    LD Name     WN_1126_0331h_MV
                    Type    WN
                    Volume Name
                    \\?\Volume{fe357b40-757c-11d7-92f4-00004c7929e8}\
                    Path F:
RV: Disk No.        -
                    LD Name WN_0010_051dh_RV
                    TypeWN
                    Volume Name  -
                    Path-
Activity State      separate
Sync State          separated
Copy Control State  -
Separate Start Time 2003/08/13 10:52:48
Separate End Time   2003/08/13 11:54:01
Separate Diff       0 KB
Copy Diff           0 KB
RV Access           rw
Previous Active     sep/exec

C:\>
```

On the UNIX system

The command displays the information about the copy state of a pair.

```
# iSMrc_query -mv /dev/rdsk/c1t2d0 -mvflg sfn
 MV: Special File  /dev/rdsk/c1t2d0
LD Name    disk001
Type           NX
 RV: Special File -dev-rdsk-c1t2d1
LD Name         disk002
Type           NX
 Activity State    separate
 Sync State        separated
 Copy Control State   -
 Separate Start Time-
 Separate End Time2001/06/03   13:37:24
 Separate Diff    2177024 KB
 Copy Diff        0 KB
 RV Access        rw
 Previous Active   -
#
```

The command displays the information about the copy state of a pair by specifying a persistent special file name.

```
# iSMrc_query -mv /dev/rdisk/disk150 -mvflg sfn
 MV: Special File/dev/rdisk/disk150
LD Namedisk001
TypeNX
 RV: Special File-
LD Namedisk002
TypeNX
 Activity Stateseparate
 Sync State separated
 Copy Control State-
 Separate Start Time2008/01/25 21:41:48
 Separate End Time 2008/01/25 21:41:48
 Separate Diff0 KB
 Copy Diff0 KB
 RV Accessrw
 Previous Active sep/exec
#
```

The command displays the following information about the copy state of a pair.

```
# iSMrc_query -mv /dev/rdsk/c1t2001003013840874d1 -mvflg sfn
 MV: Special File/dev/rdsk/c1t2001003013840874d1
LD Name disk100
Type  CX
 RV: Special File -
LD Namedisk200
TypeCX
 Activity State replicate
 Sync State rpl/sync
 Copy Control Stateforeground copy(sync)
 Replicate Start Time2001/10/20 11:41:33
 Replicate End Time2001/10/20 11:41:33
 Separate Diff0 KB
 Copy Diff 0 KB
 RV Access nr
 Previous Active rpl/exec
#
```

The command displays the copy state of an ATgroup.

```
# iSMrc_query -atg ATmdb_test
ATG: ATmdb_test
Disk Array Name StorageS4300/1126
Site concentrator
ATG State Atomic(Rpl/sync)
ATG Path Stateonline
Atomic-break Modecontinue
Copy Modesync
ATG Copy Diff0 MB
Pair Entry2
Allowed Response-
  MV: Special File/dev/rdsk/c29t4d3
LD NameNX_1126_0122h_MV
TypeNX
  RV: Special File-
LD NameNX_0010_051bh_RV
Type NX
  Activity Statereplicate
  Sync Staterpl/sync
  Copy Control Stateforeground copy (sync)
  Replicate Start Time 2003/08/13 00:02:34
  Replicate End Time2003/08/13 00:02:36
  Separate Diff0 KB
  Copy Diff0 KB
  RV Accessnr
  Previous Activerpl/exec
  MV: Special File/dev/rdsk/c29t4d4
LD NameNX_1126_0123h_MV
Type NX
  RV: Special File-
LD NameNX_0010_051ch_RV
Type NX
  Activity State replicate
  Sync Staterpl/sync
  Copy Control Stateforeground copy (sync)
  Replicate Start Time2003/08/13 00:02:35
  Replicate End Time2003/08/13 00:02:36
  Separate Diff 0 KB
  Copy Diff0 KB
  RV Accessnr
  Previous Activerpl/exec
#
```

<Displaying the copy state of a pair>

- The target MV and RV must be paired.
- A dynamic disk cannot be used.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target MV or RV must be registered in the Volume List.When a remote-side volume is to be operated in remote operation, the target volume must satisfy the following conditions:
- A paired upper or lower volume for the target pair must have been registered in the volume list.

- When the MV or RV of the target pair is used also as a BV (base-volume) for snapshot, the BV or the LV linked to the BV must have been registered in the volume list.
  - The command cannot be executed when the volume list is being created.
  - When specifying the combination of a volume group or a disk group with a special file name (logical disk name), for an MV(RV), specify the same number of logical volumes that constitute a volume group or a disk group on the specified special file name (logical disk name) side.
  - To specify a volume group, the target volume group must be active.
  - To specify a disk group, the target disk group must be active.
  - The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

<Displaying the copy state of an ATgroup>

- An ATgroup having no registered pair can be a display target. In this case, information about the ATgroup is displayed; no information about the MV, RV or pair states is displayed, however.
- A dynamic disk cannot be used.

The following notes do not apply to joint operation with SnapSAN Manager.

- When the secure mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, MVs or RVs of all the pairs that belong to the target ATgroup must have been registered in the volume list.
- When the standard mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, at least one logical disk that belongs to the target ATgroup must have been registered in the volume list.
- The command cannot be executed when the volume list is being created.
- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

<Displaying the copy state of a pair>

0: Operation for all the paired volumes terminated normally.

1: Operation for all the paired volumes terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

2: Operation for some paired volumes terminated abnormally.

<Displaying the copy state of an ATgroup>

0: ATgroup operation terminated normally.

1: ATgroup operation terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.

- An attempt to operate a disk array fails.

iSMrc_rvmode

[Name]

iSMrc_rvmode - Makes a change for the RV access restriction or RV data status.

[Synopsis]

```
iSMrc_rvmode -rv volume  -rvflg rv_flg
{ -rvacc rv_access [-force] | -cancel }
[-rvdata rv_datastate]
[-iopath iopath]
iSMrc_rvmode -rv volume  -rvflg rv_flg
-rvdata rv_datastate
[-iopath iopath]
iSMrc_rvmode -ver
iSMrc_rvmode-?
iSMrc_rvmode-help
```

[Description]

The iSMrc_rvmode command makes a change for the access restriction to a specified RV or data status of a specified RV.

Options

The iSMrc_rvmode command recognizes the following options and arguments.

-rv volume Specify an RV volume.

-rvflg rv_flg Specify the type of the volume specified with -rv.

The type of volume usable in joint operation with SnapSAN Manager is only the logical disk name.

-rvacc rv_access

Specify the access restriction to be set to the specified RV.

rv_access must be any of the following:

rw Makes the RV readable/writable (Read/Write).

ro Makes the RV readable (Read Only).

nr Makes the RV unreadable/unwritable (Not Ready).

na Makes the RV invalidated as an LU and unidentifiable from the system (Not Available). The na argument always requires the -force option to be specified together.

Omitting the argument for this option does not make any change for the RV access restriction.

-force

Specify to set the RV access restriction to Not Ready or Not Available.

Any RV access restriction specified by this option remains kept regardless of the status of the pair. To cancel the RV access restriction specified by the -force option, execute the command using the -cancel option.

-cancel

Specify to cancel the RV access restriction specified by the -force option. Canceling the RV access restriction using this option resumes the access restriction to it when the pair is replicated, separated, or restored.

Executing the command with the -cancel option to the RV access restriction without the -force option applied, the command abnormally ends.

-rvdata rv_datastate

Specify to make a change to the data status of the RV.

The data status of the RV is the information automatically controlled by the disk array's hardware provider in joint operation with Windows Server 2003 or Windows Server 2008 VSS (Volume Shadow copy Service), so the user usually does not need to operate it.

rv_datastate can be either of the following:

- validMakes the data status of the RV valid.
- invalidMakes the data status of the RV invalid.

Omitting this argument does not make any change to the data status of the RV.

-iopath iopath

Specify a replication I/O path for the disk arrays. The path specified with this option overrides the setting in the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- directReplication I/O commands are issued directly to disk arrays.
- manager SnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager. This argument cannot be specified in remote operations.

Omitting this argument applies the setting in the replication operation option setting file on Windows and the settings of environment variables on UNIX.

-ver Displays the version of this command.

-? Displays the usage of this command (on Windows).

-help Displays the usage of this command (on UNIX).

[Displayed Information]

On the Windows system

This command displays information about the execution when it successfully changes the RV access restriction or RV data status as follows.

```
C:\>iSMrc_rvmode  -rv ld_name  -rvflg ld  -rvacc rv_access  -rvdata
rv_datastate
iSMrc_rvmode: Info:       iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)

C:\>
```

Description of messages:

```
iSM13247: Command has completed successfully. (code=aaaa-bbbb-bbbb-
bbbb)
```

Indicates that the RV access restriction or data status of the RV was successfully changed. aaaa is a process number, and bbbb is the internal code for maintenance.

On the UNIX system

This command displays information about the execution when it successfully changes the RV access restriction or RV data status as follows.

```
# iSMrc_rvmode -rv volume  -rvflg rvtype  -cancel -rvdata datastate
iSM13247: Command has completed successfully. (code=aaaa-bbbb-bbbb-
bbbb)
#
```

Description of messages:

```
iSM13247: Command has completed successfully. (code=aaaa-bbbb-bbbb-
bbbb)
```

Indicates that the RV access restriction or data status of the RV was successfully changed. aaaa is a process number, and bbbb is the internal code for maintenance.

[Usage]

On the Windows system

To make the RV access restriction only readable (Read Only):
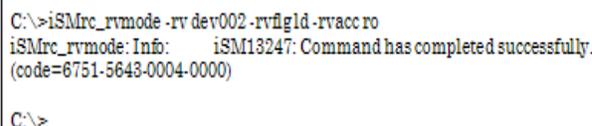
```
C:\>iSMrc_rvmode -rv dev002 -rvflg ld -rvacc ro
iSMrc_rvmode: Info:      iSM13247: Command has completed successfully.
(code=6751-5643-0004-0000)

C:\>
```

On the UNIX system

This command changes the RV access restriction to a status where volume cannot be confirmed (Not Available) and the RV data state is invalid.

```
# iSMrc_rvmode  -rv RV01 -rvflg ld -rvacc na -force -rvdata invalid
iSM13247: Command has completed successfully. (code=1862-0d03-0004-
0000)
#
```

- The target RV must be paired.
- To make an RV readable/writable (Read/Write), the activity state of the target pair must be Separate.
- The command cannot be executed if the sync state of the target pair is Replicate Preparing, Separate Preparing, or Restore Preparing.
- The command cannot be executed if the sync state of the specified RV and the paired lower RV is Replicate Preparing, Separate Preparing, or Restore Preparing.
- The command cannot be executed if the disk array that contains the target RV and paired MV is in the freeze state.
- A dynamic disk cannot be used.

- Any paired RV belonging to an ATgroup cannot be operated.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target RV must have been registered in the volume list.
  - The no remote operation is allowed to volumes in the remote disk array.
- The command cannot be executed when the volume list is being created.
- To specify a volume group, the target volume group must be active.
- To specify a disk group, the target disk group must be active.
- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

0: The command successfully changed the RV access restriction or data status of the RV.

1: The command failed to change the RV access restriction or data status of the RV.

The command terminates abnormally in the following cases:

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array failed.

iSMrc_updprevent

[Name]
```
iSMrc_updprevent
```
Cancels the update prevention state of the specified volume.

[Synopsis]
```
iSMrc_updprevent -vol volume -volflg vol_flg
-mode cancel -force
[ -iopath iopath ]
iSMrc_updprevent -file file_name
-mode cancel -force
[ -iopath iopath ]
iSMrc_updprevent -ver
iSMrc_updprevent -?
iSMrc_updprevent -help
```

[Description]

The iSMrc_updprevent command cancels the update prevention state of the specified volume. This command must be executed for both MV and RV that constitute a Remote Replication pair. This command can be executed for IV that has been removed from a Remote Replication pair. If a trouble occurs in the disk array or the link path between disk arrays failed while the swap function of Remote Replication pair is being executed, the update prevention state of the volume may be Prevent. In this case, as recovery operation, it is necessary to cancel the update prevention state of the specified volume.

Options

The iSMrc_updprevent command recognizes the following options.

```
-vol volumeSpecify a volume name.
-volflg vol_flgSpecify the volume type specified in -vol.
```

This argument must be specified together with -vol.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

-mode cancel

Specify cancellation of update prevention for a volume.

This argument must be specified together with the -force option.

-force

Specify forced cancellation of update prevention.

This argument must be specified together with the -mode option.

-iopath iopath

Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified in iopath:

- direct Replication I/O commands are issued directly to disk arrays.
- manager SnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-file file_name

To specify multiple volumes, describe the volume names in file_name.

When multiple volumes are specified, if an error occurs in some volumes, the process is not suspended but continued until it is terminated in all the specified volumes.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[Displayed Information]

On the Windows system

This command specifies a volume and performs forced cancellation of update prevention.

```
C:\> iSMrc_updprevent -vol ld-name -volflg ld --mode cancel -force
iSMrc_updprevent: Info: iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)

C:\>
```

On the UNIX system

This command specifies a volume and performs forced cancellation of update prevention.

```
#iSMrc_updprevent -vol ld-name -volflg ld –mode cancel -force
iSMrc_updprevent: Info: iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)

#
```

Description of messages:

"iSM13247: Command has completed successfully. (code=aaaa-bbbb-bbbb-bbbb)

Indicates that forcible cancel operation of update prevention has been normally completed.

aaaa represents a process number, and bbbb, an internal code for maintenance.

[Usage]

On the Windows system

The command specifies a volume and cancels update prevention forcibly.

```
C:\> iSMrc_updprevent -vol LD01 -volflg ld –mode cancel -force
iSMrc_updprevent: Info: iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)

C:\>
```

On the UNIX system

The command releases forced update prevention by batch specification.

```
#iSMrc_updprevent -file prevent_file.txt –mode cancel -force
iSMrc_updprevent: Info: iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)

#
```

- The command cannot be executed if the disk array that contains the volume to be operated is in the freeze state.
- The forced cancellation of update prevention cannot be performed for the volume being swapped by the swap function for Remote Replication pair. Except during recovery from a fault, do not perform cancellation of update prevention.
- A dynamic disk cannot be used.
- If the target volume is used as MV, the command cannot be executed when the pair sync state is Replicate Preparing or Separate Preparing.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target volume or the volume to be paired with the target volume must have been registered in the volume list.

  When a remote side volume is to be operated in remote operation, the target volume must satisfy the following conditions:

  - When the target volume is set as a pair and the paired upper or lower volume must have been registered in the volume list.

  - When the target volume is set as a pair and the MV or the RV is used also as a BV (base-volume) for snapshot, the BV or the LV linked to the BV must have been registered in the volume list.

  - When the target volume is used as BV (base-volume) for snapshot, the BV or the LV linked to the BV must have been registered in the volume list.

- The command cannot be executed when the volume list is being created.

- To specify a volume group, the target volume group must be active.

- To specify a disk group, the target disk group must be active.

- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

0: Operation for all volumes terminated normally.

1: Operation for all volumes terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

2: Operation for some volumes terminated abnormally.

3: The command terminated abnormally because all or some volumes have already been in the Not Prevent state.

Pair Operations

iSMrc_pair

[Name]
```
iSMrc_pair
```

Pair setting, unpair or forced unpair.

[Synopsis]

```
iSMrc_pair-pair
-mv volume -mvflg mv_flg
-rv volume -rvflg rv_flg
[-iopath iopath]
iSMrc_pair-unpair
-mv volume -mvflg mv_flg
[-rv volume -rvflg rv_flg ]
[-force force_arg]
[-iopath iopath]
iSMrc_pair{-pair | -unpair [-force force_arg]}
-file file_name
[-iopath iopath]
iSMrc_pair-ver
iSMrc_pair-?
iSMrc_pair-help
```

[Description]

The iSMrc_pair command performs pair setting, unpair, or forced unpair operation for the specified pair.

Options

The iSMrc_pair command recognizes the following options and arguments:

- pair Performs the pair setting for the logical disks specified as an MV and an RV
- unpair Unpair the logical disks specified as an MV and an RV
- mv volume Specify the volume of MV
- mvflg mv_flg Specify the volume type specified in -mv.

This argument must be specified together with -mv.

The pair setting and canceling operation is performed on a single logical volume basis. Therefore, neither an LVM volume group nor a VxVM disk group can be specified as volume. The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

-rv volume

Specify the volume of RV.

At unpairing, if multiple RVs are paired with one MV, the RV specification cannot be omitted.

-rvflg rv_flg

Specify the volume type specified in -rv.

This argument must be specified together with -rv.

The pair setting and canceling operation is performed on a single logical volume basis. Therefore, neither an LVM volume group nor a VxVM disk group can be specified as volume. The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

-iopath iopath

Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- direct Replication I/O commands are issued directly to disk arrays.
- managerSnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-force force_argForced unpair. If a failure occurred on the MV side or RV side disk array and the regular unpair is impossible, forced unpair of either the MV or the RV. After the cause of the failure has been removed, be sure to perform forced unpair of the other MV or RV.

One of the following can be specified in force_arg.

- all Forced unpair of both the MV and the RV.
  The target MV and RV must have been recognized by the OS.
- mv Forced unpair of the MV.
  The target MV must have been recognized by the OS.
- rv Forced unpair of the RV.
  The target RV must have been recognized by the OS.

-file file_name

To specify multiple pairs, describe the paired MV and RV in file_name.

When multiple pairs are specified, if an error occurs in any of the pairs, the process is continued until processing of all the specified pairs has been completed.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[Displayed Information]

The pair setting operation is performed.

On the Windows system

```
C:\> iSMrc_pair -pair -mv ld_name -mvflg ld -rv ld_name -rvflg ld
iSMrc_pair: Info:        iSM13247: Command has completed successfully. (code=
aaaa-bbbb-bbbb-bbbb)
C:\>
```

On the UNIX system

```
# iSMrc_pair -pair -mv ld_name -mvflg ld -rv ld_name -rvflg ld
iSMrc_pair: Info:        iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)
#
```

Description of messages:

- iSM13247: Command has completed successfully. (code=*aaaa-bbbb-bbbb-bbbb*)

Indicates that the pair operation has been normally completed.
aaaa represents a process number, and *bbbb*, an internal code for maintenance.

[Usage]

On the Windows system, this command specifies the MV and the RV and cancels the pair relation.

```
On the UNIX system, this command performs the pair setting by batch
```

```
C:\> iSMrc_pair -unpair -mv MV01 -mvflg ld -rv RV01 -rvflg ld
iSMrc_pair: Info:        iSM13247: Command has completed successfully. (code =
1862-0d03-0004-0000)
C:\>
```

```
setting.
# iSMrc_pair -pair -file pair_file.txt
iSMrc_pair: Info:        iSM13247: Command has completed successfully.
(code = 1874-0d03-0004-0000)
#
```

The command cannot be executed if the disk array that contains the MV and RV is in the freeze state.

- To perform the pair setting, the capacity and OS type of the MV must coincide with those of the RV.
- A pair cannot be set to a logical disk exceeding the maximum capacity of the volume to which a pair can be set.
- The command cannot be executed if an RV specified for pair setting is already paired as RV.
- The pair to be unpair must be in the Separated state.
- A logical disk registered with a reserve group cannot be specified for pair setting.
- No LV (link-volume) can be specified for pair setting.
- Neither SV (snapshot-volume) nor SDV (snapshot data volume) for snapshot can be specified for pairing.
- No System Volume can be specified for pair setting.
- A logical disk locked by the operation guard setting cannot be specified for pair setting as MV or RV.
- When an MV or RV is locked by the operation guard setting, it cannot be unpaired. However, an unlocked MV or RV can be forcibly unpaired individually.
- A dynamic disk cannot be used.
- It is possible to additionally specify a pair in Volume Cloning configuration to an MV already registered with an ATgroup. However, it is impossible to additionally specify a pair in Remote Replication configuration.
- It is impossible to perform unpairing and forced unpairing for a pair with that MV in Remote Replication configuration which is registered with the ATgroup. Unpairing requires unregistering the pair from the ATgroup previously. It is possible to perform unpairing and forced unpairing for that MV in Volume Cloning configuration which is registered with the ATgroup.
- Pair setting and unpairing cannot be executed if the pool to which the logical disk of MV or RV belongs is in the rotation stop state by the power saving function. However, only the MV or RV that are not in the rotation stop state can be forcibly unpaired individually.

- If volume comparing/identity certified is being executed by Remote Replication quick sync, unpair cannot be executed. But forced unpair can be executed to MV or RV for which volume comparing/identity certified has not been executed.

- The pair for which the swap is being executed by the swap function for Remote Replication pair cannot be unpaired. However, forced unpair can be executed.

- Pair setting cannot be executed if the RV to be specified as a pair has been set as the MV of other pair and the pair is being swapped by the swap function for Remote Replication pair.

- Do not perform pair setting of the logical disk having been bound as a control volume as RV. The disk array that can identify the control volume attribute cannot perform pair setting of the logical disk having been bound as a control volume as RV.

- For the SnapSAN S3000/S5000 disk arrays, the remaining capacity must be sufficient for creating a pair.

- A L2 cache volume cannot be paired.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target volume (MV) must have been registered in the volume list.

  In remote operations, it is impossible to perform pair setting, unpairing, and forced unpairing for volumes on a disk array on the remote end.

- The command cannot be executed when the volume list is being created.

- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

0: Operation for all the paired volumes terminated normally.

1: Operation for all the paired volumes terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- The instruction fails due to a disk array error.

2: Operation for any of the paired volumes terminated abnormally.

3: The command terminated abnormally because all or some of the paired volumes had already been in pair setting state when the pair setting operation was attempted, or the pair relation had already been unpair when the unpairing operation was attempted.

iSMrc_swap

[Name]
```
iSMrc_swap  -  Swaps an Remote Replication pair or resumes swap
 iSMrc_swap-mv volume -mvflg mv_flg
-rv volume -rvflg rv_flg
[-iopath iopath]
iSMrc_swap-file file_name
[-iopath iopath]
iSMrc_swap  -ver
iSMrc_swap -?
iSMrc_swap -help
```

[Description]

The iSMrc_swap command swaps the specified Remote Replication pair or resumes the swap. When swapping operation is suspended due to abnormality, the swap operation is executed again after recovery. This is the resumption of the swap.

The file system of the MV and the RV needs to be unmounted before the swap.

On the Windows system, when the MV or the RV is recognized on the server where swap operation for the pair is executed, unmount the file system of the MV or the RV before swapping the pair. On the UNIX system, be sure to unmount the file system of the MV or the RV, because if the file system of the MV or the RV is mounted on the server where swap operation of the pair is executed, the swap operation for the pair is not started but terminated abnormally.

Options

The iSMrc_swap command recognizes the following options.

-mv volume

Specify MV before pair swap.

-mvflg mv_flg

Specify the type of volume specified with -mv.

This argument must be specified together with -mv.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

-rv volume

Specify an RV before pair swap.

When multiple RVs are set to the MV, RV specification cannot be omitted.

-rvflg rv_flg

Specify the type of volume specified with -rv.

This argument must be specified together with -rv.

The only volume type usable in joint operation with SnapSAN Manager is logical disk name.

-iopath iopath

Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified in iopath.

- directReplication I/O commands are issued directly to disk arrays.
- managerSnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-file file_name

To specify multiple pairs, describe the pairs of MV/RV in file_name.

For the description format of file_name, refer to 3.1 "Replication Operation File".

When multiple pairs are specified, if an error occurs in some pairs, the process is not suspended but continued until it is terminated in all the specified pairs.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[Displayed Information]

On the Windows system

> This command swaps an Remote Replication pair or resumes the swap.

```
C:\> iSMrc_swap -mv ld-name -mvflg ld -rv ld-name -rvflg ld
iSMrc_swap: Info:      iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)
C:\>
```

On the UNIX system

> This command swaps an Remote Replication pair or resumes the swap.
>
> # iSMrc_swap -mv ld-name -mvflg ld -rv ld-name -rvflg ld
>
> iSMrc_swap: Info: iSM13247: Command has completed successfully.
>
> (code=aaaa-bbbb-bbbb-bbbb)
>
> #

Description of messages:

> iSM13247: Command has completed successfully. (code=aaaa-bbbb-bbbb-
>
> bbbb)
>
> Indicates that the swap of the Remote Replication pair or the resumption of
>
> the swap has normally been completed.
>
> aaaa represents a process number, and bbbb, an internal code for
>
> maintenance.

[Usage]

On the Windows system, the command specifies the MV and the RV and swaps the Remote Replication pair or resumes the swap.

On the UNIX system, the command swaps the Remote Replication pair or resumes the swapping by batch specification.

```
C:\> iSMrc_swap -mv MV01 -mvflg ld -rv RV01 -rvflg ld
iSMrc_swap: Info:        iSM13247: Command has completed successfully.
(code=1862-2704-0000-0000)
C:\>
```

```
# iSMrc_swap -file pair_file.txt
iSMrc_swap: Info:        iSM13247: Command has completed successfully.
(code=1874-2704-0000-0000)
```

To perform swap for Remote Replication pair, the following conditions must be satisfied.

- The target MV and RV must be paired.

- The target pair must be an Remote Replication pair.

- The target pair must be the top-level pair.

- The command cannot be executed if the number of pairs with the lower RVs, which are paired with the specified RV, reaches the upper limit number of settable pairs.

- The command cannot be executed if the disk array that contains the specified MV and RV is in the freeze state.

- The sync state of the target pair must be in the sync state for replication.

- The command cannot be executed if the sync state of the pair with the lower RV, which is paired with the specified RV, is the Separate Preparing, Replicate Preparing, or separate execution state.

- The command cannot be executed, if a pair with other RV, which is paired with the specified MV, exists, when the sync state of the pair is Separate Preparing, Replicate Preparing, separate execution state or swap operation is being executed.

- A dynamic disk cannot be used.

- MV and RV must be unmounted.

- This command cannot be executed if volume comparing/identity certified is being executed for the target pair or the pair set with other RV, which is paired with the specified MV, by the Remote Replication quick sync function.

- The command cannot be executed when the target pair is being swapped.

- No pair belonging to an ATgroup can be operated.

- The command cannot be executed if the logical disk of MV or RV is in the not in use state or the pool to which the logical disk belong is in the rotation stop state by the power saving function.

- The resumption of swap is used as the recovery operation from a failure in swap.

- The following notes do not apply to joint operation with SnapSAN Manager.

- The target MV or RV must have been registered in the volume list.

- When a remote-side pair is to be operated in remote operation, the target pair must satisfy the following conditions:

  - An upper or lower volume to be paired of the target pair has been registered in the volume list.

  - When the MV or RV of the target pair is also used as a BV (base-volume) for snapshot, the BV or the LV linked to the BV must have been registered in the volume list.

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The command cannot be executed when the volume list is being created.

When specifying the combination of a volume group or a disk group with a special file name (logical disk name), for an MV (RV), specify the same number of logical volumes that constitute a volume group or a disk group on the specified special file name (logical disk name) side. In this case, pairs are swapped in the specified order.

To specify a volume group, the target volume group must be active.

To specify a disk group, the target disk group must be active.

The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

[Return Values]

0: Operation for the swap for all Remote Replication pairs or operation for resumption of the swap terminated normally.

1: Operation for the swap for all Remote Replication pairs or operation for resumption of the swap terminated abnormally.

This command terminated abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An instruction fails due to abnormal disk array.

2: Operation for the swap for some Remote Replication pairs or operation for resumption of the swap terminated abnormally.

iSMrc_atg

[Name]
```
iSMrc_atg  -ATgroup
```

creation and deletion, attribute updating, pair registration and deletion with an ATgroup.

[Synopsis]
```
iSMrc_atg-create  -atg atgroup  -arrayname diskarray
 [-linkarrayname linkdiskarray]
 [-allowedresponse allowedresponsetime]
 [-iopath iopath]
iSMrc_atg-delete  -atg atgroup  -arrayname diskarray
 [-force]
 [-iopath iopath]
iSMrc_atg-add    -atg atgroup
 -mv mv_volume  -mvflg mv_flg  [-rv rv_volume  -rvflg
 rv_flg]
 [-arrayname diskarray]
 [-iopath iopath]
iSMrc_atg-add    -atg atgroup
 -file file_name
 [-arrayname diskarray]
 [-iopath iopath]
iSMrc_atg-remove     -atg atgroup
 -mv mv_volume  -mvflg mv_flg  [-rv rv_volume  -rvflg
 rv_flg]
 [-arrayname diskarray]
 [-iopath iopath]
iSMrc_atg-remove     -atg atgroup
 -file file_name
 [-arrayname diskarray]
 [-iopath iopath]
iSMrc_atg-update     -atg atgroup
 -allowedresponse allowedresponsetime
 [-arrayname diskarray]
 [-iopath iopath]
iSMrc_atg-ver
iSMrc_atg-?
iSMrc_atg-help
```

[Description]
```
iSMrc_atg
```

Command creates and deletes an ATgroup. It also registers pairs with an ATgroup and deletes them.

Options

The iSMrc_atg command recognizes the following options.

-create Creates an ATgroup

-delete Deletes an ATgroup

Deleting an ATgroup requires previously deleting all pair registrations from the ATgroup.

-add Registers pairs with an ATgroup.

-remove Deletes pairs from an ATgroup.

-update Updates the allowed time for the MV delay that is an ATgroup attribute.

-atg atgroup Specifies an ATgroup name as an operation target.

-force Specifies to perform forced deletion of ATgroup information from the concentrator or the distributor. (Forced deletion of ATgroup)

If a remote disk array failure or its recovery has erased information from the concentrator or distributor, or if an MV-side disk array failure or its recovery has erased information from the concentrator; resulting in discrepancy with the ATgroup information held on the disk array of the local system, it is necessary to forcibly delete the ATgroup information from the local system, using this option.

-mv mv_volume Specifies an MV for a pair to be registered with an ATgroup.

-mvflg mv_flgSpecifies the type of a volume specified with the -mv option.

The -mvflg option must be specified together with the -mv option.

It is impossible to specify the LVM volume group and VxVM disk group, because each ATgroup is built in units of a single logical volume. Note that the type of volume usable in joint operation with SnapSAN Manager is only the logical disk name.

-rv rv_volume Specifies an RV for a pair to be registered with the ATgroup. The RV must have been paired in Remote Replication configuration.

-rvflg rv_flg Specifies the type of a volume specified with the -rv option.

The -rvflg option must be specified together with the -rv option.

It is impossible to specify the LVM volume group and VxVM disk group, because each ATgroup is built in units of a single logical volume. Note that the type of volume usable in joint operation with SnapSAN Manager is only the logical disk name.

-file file_name Registering more than one pair with an ATgroup at a time or deleting more than one pair from an ATgroup at a time requires previously describing all volumes in the target pairs in the replication operation file and specifying the file with the file_name option.

If a failure is detected during processing of pairs, the command terminates abnormally, aborting the processing.

-arrayname diskarray Specifies the disk array name (nickname) of the operation target.

-linkarrayname link diskarray

When creating an ATgroup with the disk array which supports the function specifying the link disk array as a concentrator, specify link disk array name (nickname) configuring the ATgroup.

With the disk array which does not support this function, it is not required to specify this function. It is ignored even if specified.

To check whether the operation target disk array supports the function specifying the link disk array, refer to the disk array properties of the disk array on the replication screen of the SnapSAN Manager.

-allowedresponse allowedresponsetime

Specifies the allowed time for the MV delay that is an ATgroup attribute in seconds. The specifiable range is 1 to 18 (seconds). The default value is 18.

-iopath iopath Specifies the I/O issuance path for disk array replication. This argument overrides the replication operation option setting file (Windows) and the environment variable settings (UNIX).

The following can be specified for iopath.

direct Directly issues a replication I/O command to a disk array.

SnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[DISPLAYED INFORMATION]

On the Windows system

(1) The command creates an ATgroup and registers a pair with it.

```
C:\> iSMrc_atg -create -atg ATGmdb01 -arrayname LocalArray -linkarrayname
RemoteArray
-allowedresponse AllowedResponseTime
iSMrc_atg: Info:          iSM13247: Command has completed successfully.
                          (code=aaaa-bbbb-bbbb-bbbb)

C:\> iSMrc_atg -add -atg ATGmdb01 -mv MVDB001 -mvflgld -arrayname
LocalArray
iSMrc_atg: Info:          iSM13247: Command has completed successfully.
                          (code=aaaa-bbbb-bbbb-bbbb)


C:\>
```

(2) The command updates the allowed time for the MV delay for the ATgroup.

```
C:\> iSMrc_atg -update -atg ATGmdb01 -allowedresponse AllowedResponseTime
iSMrc_atg: Info:          iSM13247: Command has completed successfully.
                          (code=aaaa-bbbb-bbbb-bbbb)

C:\>
```

(3) The command cancels registration of pairs from an ATgroup and deletes the ATgroup.

```
C:\> iSMrc_atg -remove -atg ATGmdb01 -mv MVDB001 -mvflgld -arrayname
LocalArray
iSMrc_atg: Info:          iSM13247: Command has completed successfully.
                          (code=aaaa-bbbb-bbbb-bbbb)

C:\> iSMrc_atg -delete -atg ATGmdb01 -arrayname LocalArray
iSMrc_atg: Info:          iSM13247: Command has completed successfully.
                          (code=aaaa-bbbb-bbbb-bbbb)


C:\>
```

Description of messages:

    iSM13247

Command has completed successfully. (code=aaaa-bbbb-bbbb-bbbb)

The message means that the operations for a target ATgroup were completed normally.

aaaa represents a process number, and bbbb, an internal code for maintenance.

On the UNIX system

The command creates an ATgroup and registers a pair with it.

```
# iSMrc_atg -create -atg ATGmdb01 -arrayname LocalArray -linkarrayname
RemoteArray -allowedresponse AllowedResponseTime
iSMrc_atg: Info: iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)
# iSMrc_atg -add -atg ATGmdb01 -mv MVDB001 -mvflg ld -arrayname
LocalArray
iSMrc_atg: Info:iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)
#
```

The command updates the allowed time for the MV delay for the ATgroup.

```
# iSMrc_atg -update -atg ATGmdb01 -allowedresponse AllowedResponseTime
iSMrc_atg: Info:iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)
#
```

The command cancels registration of pairs from an ATgroup and deletes the ATgroup.

```
# iSMrc_atg -remove -atg ATGmdb01 -mv MVDB001 -mvflg ld -arrayname
LocalArray
iSMrc_atg: Info:iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)
# iSMrc_atg -delete -atg ATGmdb01 -arrayname LocalArray
iSMrc_atg: Info:iSM13247: Command has completed successfully.
(code=aaaa-bbbb-bbbb-bbbb)
#
```

Description of messages:
```
iSM13247
```

Command has completed successfully. (code=aaaa-bbbb-bbbb-bbbb)

The message means that the operations for a target ATgroup were completed normally.

aaaa represents a process number, and bbbb, an internal code for maintenance.

- It is possible to create and delete ATgroups, update the attributes, and register pairs with an ATgroup and cancel the registration of pairs from an ATgroup only from the concentrator on the MV side.
- The name of each ATgroup to be created must be unique throughout the system. Only alphanumeric characters, "_" (underbar), and "/" (slash) can be used in ATgroup names; any other characters cannot be used.
- To create an ATgroup, it is required to specify a link disk array using the "-linkarrayname" option when the disk array on the concentrator side supports the function specifying the link disk array.
- To delete an ATgroup, all the pair registrations must have been deleted from the ATgroup and the ATgroup sync state must be Invalid.
- To update the allowed time for the MV delay that is an ATgroup attribute, the ATgroup sync state must be Invalid, Separated, or Fault.

- Forcibly deleting an ATgroup from the concentrator requires previously setting the ATgroup sync state to Invalid, Separated, or Fault.

- It is possible to forcibly delete an ATgroup from the concentrator while the disk array on the distributor side has been struck (the link path status is abnormal) but it may take several minutes to complete the forced deletion. Although a SCSI I/O error (detailed code SenseKey=4 or b, ASC=98, ASCQ=0a) may be returned for the forced deletion and recorded to syslog and the like, the ATgroup has been deleted.

- When having forcibly deleted an ATgroup from the concentrator while the disk array on the distributor side has been struck (the link path status is abnormal), before rebuilding the ATgroup, restore the disk array on the distributor side and link path to the normal status. It is impossible to create an ATgroup while the disk array on the distributor side has been struck (the link path status is abnormal).

- Pairs to be registered with ATgroups must be in Remote Replication configuration. Only one RV in Remote Replication configuration can be specified for a single MV.

- When a pair in Remote Replication configuration is to be registered with an ATgroup, if the RV of the pair has been used as a BV (base-volume) for snapshot, the pair cannot be registered with the ATgroup.

- When a pair in Remote Replication configuration is to be registered with an ATgroup, if the MV or RV of the pair has been protected by the WORM function, the pair cannot be registered with the ATgroup.

- When a pair in Remote Replication configuration to be registered with an ATgroup is being swapped by the swap function for Remote Replication pair, the pair cannot be registered with the ATgroup.

- When pairs are to be registered with an ATgroup, the sync state of the ATgroup must be Invalid, Separated, or Fault.

- Deleting the registration of pairs from an ATgroup requires that the sync state of the ATgroup be Separated or Fault.

- The command cannot be executed if the replication function of a disk array to which the target ATgroup belongs is in the freeze state.

- A dynamic disk cannot be used.

- The following notes do not apply to joint operation with SnapSAN Manager.

- The MV or RV of a pair to be registered with an ATgroup must have been registered in the volume list.

- At least one logical disk on the disk array to which the target ATgroup belongs must have been registered in the volume list.

- The command cannot be executed when the volume list is being created.

- The command cannot be executed when the SnapSAN Manager-only special file is being created (Linux only).

- When the secure mode is set as the operation mode from the relevant system for the disk array or link disk array including the ATgroup to be operated, MVs or RVs of all the pairs that belong to the target ATgroup must have been registered in the volume list in order to use any of the following functions.

  - Forced deletion of ATgroup

  - Deleting a pair from an ATgroup

  - Registering a pair to an ATgroup

[Return Values]

0: The operations of an ATgroup or all pairs terminated normally.

1: The operations of an ATgroup or all pairs terminated abnormally.

This command terminates abnormally in the following cases.

- A parameter is invalid.
- A condition for operation is not satisfied.
- An attempt to operate a disk array fails.

2: Operation for some pairs terminated abnormally.

3: The ATgroup create operation terminated abnormally because another ATgroup having the same name has already been created.

Alternatively, the pair registration operation to the ATgroup terminated abnormally because the all pairs or some pairs have already been registered to the ATgroup.

Disk Array Operations

iSMrc_arrayinfo

[Name]
```
iSMrc_arrayinfo
```

Displays information about the disk array replication function.

[Synopsis]
```
iSMrc_arrayinfo -arrayname diskarray  {-dinfo | -linfo}
[-iopath iopath]
iSMrc_arrayinfo-ver
iSMrc_arrayinfo-?
iSMrc_arrayinfo-help
```

[Description]

The iSMrc_arrayinfo command obtains and displays information about the disk array replication function.

Options

The iSMrc_arrayinfo command recognizes the following options.

-arrayname diskarray

Specifies the disk array name (nickname) of an operation target.

- dinfo Obtains and displays the settings of the replication function.
- linfo As for disk arrays having the Replication and Mirroring function, obtains and displays information about disk array connections and the state of each link path.
- iopath iopath Specify a replication I/O path for a disk array. The specification with this argument overrides the replication operation option setting file on Windows and the settings of environment variables on UNIX.

One of the following can be specified for iopath.

- direct Replication I/O commands are issued directly to disk arrays.
- SnapSAN Manager being operated in the same server is connected and replication I/O commands are issued to disk arrays from SnapSAN Manager.

If this argument is omitted, the replication operation option setting file (Windows) or the environment variable settings (UNIX) are used.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[Displayed Information]

Information about the disk array replication function

Given below is an example of executing the command on Windows.

Description of messages:

```
C:\> iSMrc_arrayinfo -arrayname diskarray -dinfo
Disk Array Name          ddddddddddddddddddddddddddddddddd
SAA                      aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa ... aaa
Differential Map         mmmmmmmm
Replication Status       ssssssss
Back Ground Copy Level c
Max Number of RV Setting r
Max Capacity of Pair Volume  volume_capacity

C:\>
```

Disk Array Name Disk array name

SAA Subsystem Absolute Address

Indicates the value that can identify the disk array of interest uniquely.

Differential Map Differential map mounted/not

Indicates whether the differential management function for holding the status of copy differences between the MV and RV is available.

- Build Differential map mounted
- Not Build Differential map not mounted

Replication Status Status of the disk array replication function

- Ready The function is usable.
- Freeze The function is unusable.

Indicates whether the disk array replication function is frozen or the disk array power is turned off.

Back Ground Copy Level Background copy level

Indicates the priority of the background copy mode.

Max Number of RV Setting

Maximum number of RVs that can be specified

Indicates the maximum number of RVs that can be specified for one MV.

Max Capacity of Pair Volume

Maximum capacity

Indicates the maximum capacity of a volume to which a pair can be set in GB.

Disk array connections and the state of each link path

Given below is an example of executing the command on UNIX.

-ver Displays the version information of this command.

-? Displays the usage of this command (Windows).

-help Displays the usage of this command (UNIX).

[DISPLAYED INFORMATION]

(1) Information about the disk array replication function

Given below is an example of executing the command on Windows.

```
C:\> iSMrc_arrayinfo -arrayname diskarray -dinfo
Disk Array Name        dddddddddddddddddddddddddddddddd
SAA                    aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa ... aaa
Differential Map       mmmmmmmm
Replication Status     ssssssss
Back Ground Copy Level c
Max Number of RV Setting r
Max Capacity of Pair Volume  volume_capacity

C:\>
```

Description of messages:

- **Disk Array Name**   Disk array name
- **SAA**   Subsystem Absolute Address

Indicates the value that can identify the disk array of interest uniquely.

- **Differential Map**   Differential map mounted/not

Indicates whether the differential management function for holding the status of copy differences between the MV and RV is available.

Build	Differential map mounted
Not Build	Differential map not mounted

- **Replication Status** Status of the disk array replication function

Ready	The function is usable.
Freeze	The function is unusable.

Indicates whether the disk array replication function is frozen or the disk array power is turned off.

- **Back Ground Copy Level** Background copy level

Indicates the priority of the background copy mode.

- **Max Number of RV Setting**

Maximum number of RVs that can be specified

Indicates the maximum number of RVs that can be specified
for one MV.

- **Max Capacity of Pair Volume**

    Maximum capacity

    Indicates the maximum capacity of a volume to which a pair

    can be set in GB.

(2) Disk array connections and the state of each link path

Given below is an example of executing the command on UNIX.

```
# iSMrc_arrayinfo -arrayname diskarray -linfo
Link Disk Array Name    dddddddddddddddddddddddddddddddd
Link SAA                aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa ... aaa
Link Type               link_type
Link No                 llh
Link Mode               link_mode
Path No                 pph
Path State              ssssssss
Director No             ddh

Link Disk Array Name    dddddddddddddddddddddddddddddddd
Link SAA                aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa ... aaa
Link Type               link_type
Link No                 llh
Link Mode               link_mode
Path No                 pph
Path State              ssssssss
Director No             ddh

    : (repetition)

#
```

Description of messages:

- **Link Disk Array Name**   Name of a disk array linked to the specified disk array
- **Link SAA**   Subsystem Absolute Address of a disk array linked to the
    specified disk array
- **Link Type**   Link type
    Indicates the type of link between disk arrays.
    FC   Linked by FC
    iSCSI   Linked by iSCSI
- **Link No**   Link number
    Number (link number) assigned to a linked disk array,
    starting at 0
- **Link Mode**   Link mode

	Indicates the link mode between different disk arrays.
	Low — Operates with a low-speed network
	Normal — Operates with a normal-speed network.
• Path No	Path number
	Connection number assigned to each linked disk array, starting at 0
• Path State	Link path state
	Connection state of each path identified with a path number
	Ready — Normal
	Freeze — The replication function of the connected disk array is in the freeze state.
	Offline — Link state not checked (disk array being started)
	Link Check — Checking the link state as a failure has occurred.
	Fault — Link failure
• Director No	Number of the replication director or host director to which a path identified with a path number is connected

If more than one path is connected or more than one disk array is linked, all the information about each link path is displayed.

For disk arrays with no RemoteDataReplication function, the following message is displayed; resulting in an abnormal termination.

- iSM13747: Specified Disk Array does not have link information.
   (code=aaaa-bbbb-bbbb-bbbb)

aaaa represents a process number, and *bbbb*, an internal code for maintenance.

[USAGE]

(1) The command can be used to display information about the disk array replication function for confirmation purposes.

Given below is an example of executing the command on Windows.

```
C:\> iSMrc_arrayinfo -arrayname StorageS3300/1035 -dinfo
Disk Array Name       StorageS3300/1035
SAA                   0200200000004c517b220000000000000000 ... 0000
Differential Map      Build
Replication Status    Ready
Back Ground Copy Level 3
Max Number of RV Setting 4
Max Capacity of Pair Volume  2046GB

C:\>
```

(2) The command can be used to display the connections of disk arrays and the link path state for confirmation purposes.
Given below is an example of executing the command on UNIX.

```
# iSMrc_arrayinfo -arrayname StorageS3300/1035 -linfo
Link Disk Array Name    StorageS4300/1126
Link SAA                0200200000301384291c0000000000000000 ... 0000
Link Type               FC
Link No                 00h
Link Mode               Normal
Path No                 00h
Path State              Ready
Director No             05h

Link Disk Array Name    StorageS4300/1126
Link SAA                0200200000301384291c0000000000000000 ... 0000
Link Type               FC
Link No                 00h
Link Mode               Normal
Path No                 01h
Path State              Ready
Director No             0dh

Link Disk Array Name    StorageS4100/1126
Link SAA                0200200000004c7f08670000000000000000 ... 0000
Link Type               FC
Link No                 01h
Link Mode               Normal
Path No                 00h
Path State              Ready
Director No             1fh

#
```

[NOTES]

The following notes do not apply to joint operation with iSM.

- At least one logical disk on the target disk array must have been registered in the volume list.
- This command cannot be executed when the volume list is being created.
- This command cannot be executed when the iSM-only special file is being created (HP-UX and Linux only).
- This command cannot be executed when the secure mode is set to the disk array to be operated as the operation mode from the relevant system.

[RETURN VALUES]

- 0: Disk array operation terminated normally.
- 1: Disk array operation terminated abnormally.

Snapshot Function

Snapshot Operation File

To perform batch setting of paired volumes by a snapshot command with the -file option, use the snapshot operation file.

The snapshot operation file is described below.

[File Location and Name]

Can be freely specified.

[Description]

The snapshot operation file is used to perform batch setting of multiple pairs by using a snapshot command.

[Synopsis]

This file is described in the following synopsis:

- For the snapshot operation commands (iSMsc_create, iSMsc_delete, iSMsc_restore, iSMsc_wait, and iSMsc_svguard)
- For the snapshot information acquisition command (iSMsc_query)

```
BV_Type:BV               SV_Type:SV
```

```
BV_Type:BV
```

To describe the BV and SV, use a colon (":") to connect the volume type (BV_Type or SV_Type) with the volume (BV or SV). When the SV can be omitted, describe only the BV information.

For the link operation commands (iSMsc_link and iSMsc_unlink)

```
LV_Type:LV               BV_Type:BV
```

```
LV_Type:LV               SV_Type:SV
```

```
LV_Type:LV
```

Describe the LV and BV/SV, with the volume type (LV_Type or BV_Type/SV_Type) and the volume (LV or BV/SV) connected using a colon (":"). When the BV/SV can be omitted, describe only the LV information.

For the link information acquisition command (iSMsc_linkinfo)

```
VOL_Type:VOL
```

To display the link information, describe the volume, with the volume type (VOL_Type) and the volume (VOL) connected using a colon (":").

Specifying volume types

The following values can be specified as a volume type (BV_Type or SV_Type) by using either a numerical value or a character string.

Volume Types (BV_Type or SV_Type)

Target Volume	Volume Types		Target System	
	By Number	By Characters	Windows	UNIX
Logical Disk Name	0	ld	✓	✓
Special File Name	1	sfn	-	✓
Volume Group Name	2	vg	-	✓
Drive Letter	4	drv	✓	-
Disk Group Name	5	dg	✓	-
Mount Point Volume Name	6	mvol	✓	✓
Ntfs Folder Name	7	mdir	✓	-
Relative Generation (SV Only)	10	relgen	✓	-
Cyclic Generation (SV Only)	11	cyclic	✓	✓
Auto Selection (SV Only)	12	auto	✓	✓
SV Batch Operation (SV Only)	13	all	✓	✓

When cyclic generation, auto selection or SV batch deletion is specified, the volume name is not described (no data is described after ":").

The following values can be specified as a volume type (LV_Type or VOL_Type) by using either a numerical value or a character string.

Volume Types (LV_Type and VOL_Type)

Target Volume	Volume Types		Target System	
	By Number	By Characters	Windows	UNIX
Logical disk name	0	ld	✓	✓
Special file name	1	sfn	-	✓
Drive letter	4	drv	✓	-
Mount point volume name	6	mvol	✓	-
NTFS folder name	7	mdir	✓	-

A volume type (SV_Type or VOL_Type) can also be specified as [BV volume type + relative generation]. The following values can be specified using either a numerical value or a character string.

Volume Types (SV_Type and VOL_Type)

Target Volume	Volume Types		Target System	
	By Number	By Characters	Windows	UNIX
Logical disk name	100	ld.relgen	✓	✓
Special file name	101	sfn.relgen	-	✓
Drive letter	104	drv.relgen	✓	-
Mount point volume name	106	mvol.relgen	✓	-
NTFS folder name	107	mdir.relgen	✓	-

Describe the volume type (character string) with the character string representing the relative generation (relgen) connected using a period ("."). Likewise, describe the volume with the character string connected using a period (".").

A description example is as follows: ld.relgen:volume-LD-name.-1

Specifying a Volume (BV, SV, LV, VOL)

Specify the name of the target volume that has an attribute specified as a volume type.

The maximum number of characters is as follows:

Specifying a Volume

Target Volume	Maximum Number of Characters
Logical disk name	32 single-byte characters
Volume group name	
Drive letter	
Disk group name	
Special file name	32 single-byte characters (Linux)
Mount point volume name	52 single-byte characters
NTFS folder name	260 single-byte characters
Relative generation	4 single-byte characters * ".-n" format (n = 1 to 16)

Rules

- Start description from the first column of the line.
- A line break shall be a partition of records.
- Up to 1,024 single-byte characters can be described per record.
- One pair can be described per record.
- When there is one BV and one SV, description of the SV can be omitted.
- Normally, when there is one BV and multiple SVs, description of the SVs cannot be omitted.
- Use a blank space or a tab character to separate the description of the BV (LV) from the description of the SV.
- Text displayed from the sharp (#) character to the end of the record is recognized as a comment.
- If there is an error in the file syntax, operations to all pairs described in the file become invalid.
- When describing a pair that combines a volume group or a disk group with a special file name (or logical disk name), multiple volumes can be specified by describing multiple special file names (or logical disk names) separated by a comma (,).
- When specifying a pair that combines a volume group or a disk group with a special file name (or logical disk name), the number of logical volumes that consist of the volume group or the disk group must coincide with the number of special file names to be described.
- If a character string, such as an NTFS folder name, includes a blank space ( ), colon (:), or period (.), enclose the entire character string in double quotation marks (").

The following is an example of a volume description of the snapshot operation file:

For the snapshot command (Windows)

```
(Specify the BV and SV.)
ld:bv000                          ld:sv001
0:bv000                           0:sv001
drv:E                             ld:bv001
mdir:"c:\mnt q\vol\"              ld:sv001
mvol:\\?\Volume{c619c48b-1234-11d8-5678-00e018fa017d}ld:sv001
ld:bv000                          relgen:.-1

(Specify cyclic generation.)
ld:bv000                          cyclic #iSMsc_create command only
0:bv000                           11 #iSMsc_create command only

(Specify deleted SV auto selection.)
ld:bv011                          auto  #iSMsc_delete command only

(Specify SV batch operation.)
ld:bv012                          all #iSMsc_delete or iSMsc_svguard
                                      command only

(When the number of SV generations for the BV is 1)
ld:bv000
```

For the link operation command (Windows)

```
(Specify the LV and destination-volume.)
ld:lv001                          ld:sv001
ld:lv001                          drv:E
ld:lv001                          mdir:"c:\mnt q\vol\"
ld:lv001
                                  mvol:\\?\Volume{c619c48b-1234-11d8-5678-00
e018fa017d}

(Specify [BV + generation] as the destination-volume.)
ld:lv001                          ld.relgen:bv007.-2
ld:lv001                          mdir.relgen:"c:\mnt q\vol\".-2
0:lv001                           100:bv007.-2

(Specify only the LV.)
ld:lv005
```

For the link information acquisition command (Windows)

```
(Specify a specific volume.)
ld:sv001
drv:E
mdir:"c:\mnt q\vol\"
mvol:\\?\Volume{c619c48b-1234-11d8-5678-00e018fa017d}

(Specify [BV + generation].)
ld.relgen:bv007.-2
mdir.relgen:"c:\mnt q\vol\".-2
100:bv007.-2
```

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For the snapshot command (UNIX)

```
(Specify the BV and SV.)
ld:bv000                        ld:sv001
0:bv000                         0:sv001
sfn:/dev/rdsk/c16t1d0           ld:sv001
vg:/dev/vgvol                   ld:sv001, sv002
ld:dev000                       relgen:.-1

(Specify cyclic generation.)
ld:bv000                        cyclic  #iSMsc_create command only
0:bv000                         11  #iSMsc_create command only

(Specify deleted SV auto selection.)
ld:bv011                        auto   #iSMsc_delete command only

(Specify SV batch operation.)
ld:bv012                        all #iSMsc_delete or iSMsc_svguard
                                     command only

(When the number of SV generations for the BV is 1)
ld:bv000
```

For the link operation command (UNIX)

```
(Specify the LV and destination-volume.)
ld:lv001                        ld:sv001
ld:lv001                        sfn:/dev/rdsk/c16t1d0

(Specify [BV + generation] as the destination-volume.)
ld:lv001                        ld.relgen:bv007.-2
ld:lv001                        sfn.relgen:/dev/rdsk/c16t1d0.-2

(Specify only the LV.)
ld:lv005
```

For the link information acquisition command (UNIX)

```
(Specify a specific volume.)
ld:sv001
sfn:/dev/rdsk/c16t1d0

(Specify [BV + generation].)
ld.relgen:bv007.-2
100:bv007.-2
```

iSMsc_create

[Name]
iSMsc_create

Creates the current image of the BV in the specified SV.

[Synopsis]
```
iSMsc_create    -bv volume -bvflg bv_flg
[-sv volume -svflg sv_flg | -cyclic]
iSMsc_create    -file file_name
iSMsc_create    -ver
iSMsc_create    -help(UNIX)
iSMsc_create    -?(Windows)
```

[Description]

The iSMsc_create command creates the current image of the BV in the specified SV.If the specified SV stores any data, the command deletes the stored data before creating the BV image.

When snapshots have been created in all the SVs and the oldest SV has been linked with a LV, a snapshot creation by cyclic creation of the iSMsc_create command fails. When SnapControl is operated in corporation with SnapSAN Manager, a snapshot will be created in the next oldest generation except the linked SV.

Options

The iSMsc_create command recognizes the following options.

- -bv *volume*

  Specify the volume of the BV. As the volume, specify a logical disk name, special file name, drive letter, mount point volume name, NTFS folder name, volume group for the file system using LVM, or disk group for the file system using VxVM.

- -bvflg *bv_flg*

  Specify the type of the volume specified in -bv.
  In *bv_flg*, one of the following can be specified.
  ld Logical disk name

<For UNIX>

```
sfn Special file name
vg Volume group
dg Disk group
```

<For Windows>

```
drv Drive letter
mvol Mount point volume name
mdir NTFS folder name
```

This argument must be specified together with -bv.
If a volume group or disk group is specified, the same disk configuration as -bv must be specified in -sv.
Also, if a volume group or disk group is specified, that specified volume group or disk group must be active.
If the BV cannot be identified by the host on which the command is executed (the BV has not been registered in the volume list), only an ld (logical disk name) can be specified.

- -sv *volume*

  Specify the volume of the SV.
  As the volume, specify a logical disk name or relative generation.
  When specifying a relative generation, use .-1 as the latest generation, with the subsequent generations represented by .-n (n = 2 to 16).
  If the number of generations is 1 (the BV and SV correspond on a one-to-one basis), both the -sv/-svflg and -cyclic options can be omitted.

- -svflg *sv_flg*

  Specify the type of the volume specified in -sv.
  In *sv_flg*, one of the following can be specified.

ld Logical disk name
relgen Relative generation

This argument must be specified when -sv is specified.

For a derived SV without a generation number, only ld (logical disk name) can be specified.

- -cyclic

  Maintains the number of created SV generations and creates a snapshot in an SV of free generation. A snapshot is created in the SV of the oldest generation except the protected SV and derived SVs without a generation number (SV of the oldest generation through time among the SVs including the derived SVs with a generation number). If there are two or more free SVs, snapshots are created in the order of logical disk numbers.
  If the number of generations is 1 (the BV and SV correspond on a one-to-one basis), both the -sv/-svflg and -cyclic options can be omitted.

- -file *file_name*

  Specify sets of BVs and SVs in *file_name* if it is necessary to specify more than one set. If an error occurs with any set when multiple sets are specified, an error message is output and the processing continues until all the specified sets are done.

- -ver Displays the version information of this command.

- -help Displays the usage of this command (for UNIX system).

- -? Displays the usage of this command (for Windows system).

[DISPLAYED INFORMATION]

On the Windows system

(1) Upon normal termination, the command displays the following information.

```
C:\>iSMsc_create -bv ld_name -bvflg ld -sv ld_name -svflg ld

iSMsc_create:Info: iSM19010: iSMsc_create has normally terminated.
                              BV:ld_name    type
                               Volume Name: volume name
                               Path : path
                              SV:ld_name    type
                               Generation: generation
                               Status   : snap_status [YYYY/MM/DD
hh:mm:ss]

C:\>
```

Description of messages:

- iSMsc_create:Info: iSM19010: iSMsc_create has normally terminated.
  Snapshot creation end message

- BV: ld_name type

   Volume Name : volume name

   Path : path

   The BV logical disk name, OS type, mount point volume name, and drive letter mounted to the folder of the NTFS volume accessed by users are displayed.

- SV:ld_name type

   Generation : generation

   Status : snap_status [YYYY/MM/DD hh:mm:ss]

   The SV logical disk name, OS type, SV relative generation number (after successful snapshot creation, -1 is displayed indicating the latest generation), SV snapshot status (snap/active), and snapshot creation time are displayed.

   Upon abnormal termination, the command displays the following information.

```
C:\>iSMsc_create -bv ld_name -buflg ld -sv ld_name -suflg ld

iSMsc_create:Error:iSM19104:    The volume is not paired cannot be specified.
iSMsc_create:Info               :iSM19012: iSMsc_create has abnormally
terminated.

                                BV:volume name
                                SV:volume name


C:\>
```

Description of messages:

The following error messages are output.

```
iSMsc_create:Error:iSM19104: The volume is not paired cannot be
specified.
iSMsc_create:Info :iSM19012: iSMsc_create has abnormally terminated.
BV:volume name
SV:volume name
```

The logical disk name, drive letter, mount point volume name, NTFS folder name, or SV relative generation number of the BV/SV specified on the command line is displayed.

On the UNIX system

Upon normal termination, the command displays the following information.

```
#iSMsc_create -bv special-file-name -bvflg sfn -sv ld_name -svflg ld

iSMsc_create:Info: iSM19010: iSMsc_create has normally terminated.
                          BV:ld_name          type
                           Special File   : special-file-name
                          SV:ld_name          type
                           Generation: generation
                           Status   : snap_status [YYYY/MM/DD
hh:mm:ss]

#
```

Description of messages:

- iSMsc_create:Info: iSM19010: iSMsc_create has normally terminated.
  Snapshot creation end message
- BV: ld_name type
  Special File : special-file-name
  The BV logical disk name, OS type, and special file name are displayed.
- SV:ld_name type
  Generation : generation
  Status : snap_status [YYYY/MM/DD hh:mm:ss]
  The SV logical disk name, OS type, SV relative generation number (after successful snapshot creation, -1 is displayed indicating the latest generation), SV snapshot status (snap/active), and snapshot creation time are displayed.

Upon abnormal termination, the command displays the following information.

```
#iSMsc_create -bv ld_name -bvflg ld -sv ld_name -svflg ld

iSMsc_create:Error:iSM19104: The volume is not paired cannot be specified.
iSMsc_create:Info                :iSM19012: iSMsc_create has abnormally
terminated.

                          BV:volume name
                          SV:volume name

#
```

Description of messages:

The following error messages are output.

- iSMsc_create:Error:iSM19104: The volume is not paired cannot be specified.
- iSMsc_create:Info :iSM19012: iSMsc_create has abnormally terminated.
- BV:volume name

- SV:volume name

  The logical disk name or special file name of the BV/SV specified on the command line is displayed.

[Example]

The command is executed with specific BV and SV specified.

```
#iSMsc_create -bv dev001 -bvflg ld -sv dev002 -svflg ld

iSMsc_create:Info: iSM19010: iSMsc_create has normally terminated.
                          BV:dev001      NX
                           Special File : /dev/rdsk/c0t1d0
                          SV:dev002      NX
                           Generation: -1
                           Status   : snap/active [2003/08/08 12:34:56]


#
```

(2)   The command is executed with the SV generation specified.

```
#iSMsc_create  -bv dev001 -buflg ld -sv .-1 -svflg relgen

iSMsc_create:Info:  iSM19010:iSMsc_create  has normally terminated.
                            BV:dev001      NX
                             Special File : /dev/rdsk/c0t1d0
                            SV:dev002      NX
                             Generation : -1
                             Status    : snap/active [2003/08/11 15:36:58]

#
```

(3)   The command is executed with all BVs and SVs specified.

```
#iSMsc_create  -file volume_file

iSMsc_create:Info:  iSM19010:iSMsc_create  has normally terminated.
                            BV:dev001      NX
                             Special File : /dev/rdsk/c0t1d0
                            SV:dev101      NX
                             Generation : -1
                             Status    : snap/active [2003/09/01 08:52:36]

iSMsc_create:Info:  iSM19010:iSMsc_create  has normally terminated.
                            BV:dev002      NX
                             Special File : /dev/rdsk/c0t2d0
                            SV:dev102      NX
                             Generation : -1
                             Status    : snap/active [2003/09/01 08:53:11]

iSMsc_create:Info:  iSM19010:iSMsc_create  has normally terminated.
                            BV:dev003      NX
                             Special File : /dev/rdsk/c0t3d0
                            SV:dev103      NX
                             Generation : -1
                             Status    : snap/active [2003/09/01 08:53:31]

#
```

The end messages are displayed in the order the snapshot creation terminates.
• The content of volume_file is as follows.

```
#Type:BV                    Type:SV
ld:dev001                   ld:dev101
0:dev002                    ld:dev102
0:dev003                    0:dev103
```

- The SV corresponding to the target BV must be bound in advance (that is, the state must not be SV preparing, or SV prepare fault).
- The target volume must not be being deleted, restored, or prepared for restoration.
- The specified BV must not be being restored or prepared for restoration from another generation.
- The target SV must not be protected.

- The target SV must not be linked with the LV.
- If the target BV is paired as MV for replication, replication must not be in the restore state Replicate Preparing, Restore Preparing, or Separate Preparing
- If the target BV is paired as RV for replication, replication must be in the Separated state.
- Data of the target BV is not in the data migration state (that is, the target BV is neither a source- nor destination-volume for the data migration).
- The disk array storing the target volume must not be in the freeze state.
- The target volume must not be a dynamic disk volume (for Windows system).

The following notes do not apply to joint operation with SnapSAN Manager.

- The target BV must be registered in the volume list.
- If the target BV is not registered in the volume list, the following conditions must be satisfied:
  - The LV associated with the target BV must be registered in the volume list.
  - If the target BV is paired as the RV for replication, the MV to be paired with the RV must be registered in the volume list.
- The volume list must not be being created.
- When specifying the combination of a volume group or a disk group with a logical disk name, the same number of logical volumes as those constituting a volume group or disk group must be specified to SV on the side where the logical disk name is specified. In this case, snapshot creation is performed in the specified order.
- When a volume group is specified, the target volume group must be active.
- When a disk group is specified, the target disk group must be active.
- The SnapSAN Manager-only special file must not be being created for Linux.

[Return Values]

0: The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

iSMsc_delete

[Name]
    iSMsc_delete

Deletes specified snapshot data.

[Synopsis]
    iSMsc_delete   -bv volume -bvflg bv_flg
    [-sv volume -svflg sv_flg | -auto| -all]
    iSMsc_delete -file file_name
    iSMsc_delete   -ver
    iSMsc_delete -help(UNIX)
    iSMsc_delete -?(Windows)

[Description]

- The iSMsc_delete command deletes snapshot data from the specified SV.

Options

The iSMsc_delete command recognizes the following options.

- -bv *volume*

    Specify the volume of the BV.
    As the volume, specify a logical disk name, special file name, drive letter, mount point volume name, NTFS folder name, or volume group for the file system using LVM or disk group for the file system using VxVM.

- -bvflg *bv_flg*

    Specify the type of the volume specified in -bv.
    In *bv_flg*, one of the following can be specified.

ld Logical disk name

<For UNIX>
```
sfn Special file name
vg Volume group
dg Disk group
```

<For Windows>
```
drv Drive letter
mvol Mount point volume name
mdir NTFS folder name
```

This argument must be specified together with -bv. If a volume group or disk group is specified, the same disk configuration as -bv must be specified in -sv. Also, if a volume group or disk group is specified, that specified volume group or disk group must be active. If the BV cannot be identified by the host on which the command is executed (the BV has not been registered in the volume list), only an ld (logical disk name) can be specified.

- -sv *volume*

    Specify the volume of the SV.
    As the volume, specify a logical disk name or relative generation.
    When specifying a relative generation, use .-1 as the latest generation, with the subsequent generations represented by .-n (where n = 2 to 16).
    If the number of generations is 1 (the BV and SV correspond on a one-to-one basis), the -sv/-svflg, -auto, and -all options can be omitted together.-svflg *sv_flg* Specify the type of the volume specified in -sv.
    In *sv_flg*, one of the following can be specified.

- ld Logical disk name

- relgen Relative generation

    This argument must be specified when -sv is specified.
    For a derived SV without a generation number, only ld (logical disk name) can be specified.

- -auto

    Automatically select the SV from which snapshot data is deleted.
    If snapshots have been created for all SV generations, the SV of the oldest generation except the protected SV and derived SVs without a generation number (SV of the oldest generation through time among the SVs including the derived SVs with a generation number) is selected. If there already exists an SV for which no snapshot has been created, the snapshot deletion will not be done.
    If the number of generations is 1 (the BV and SV correspond on a one-to-one basis), the -sv/-svflg , -auto, and -all options can be omitted together.

- -all

  Perform batch deletion of all snapshots.
  When there exists the protected SV, the SV in process of link setting or the SV in process of deletion/restoration, snapshot deletion is not performed.
  If the number of generations is 1 (the BV and SV correspond on a one-to-one basis), the -sv/-svflg, -auto, and -all options can be omitted together.

- -file *file_name*

  Specify sets of BVs and SVs in *file_name* if it is necessary to specify more than one set. If an error occurs with any set when multiple sets are specified, an error message is output and the processing continues until all specified sets are done.

- -ver Displays the version information of this command.

- -help Displays the usage of this command (for UNIX system).

- -? Displays the usage of this command (for Windows system).

[Displayed Information]

On the Windows system

Upon normal termination, the command displays the following information.

(Individual Specification)

```
C:\>iSMsc_delete -bv ld_name -bvflg ld -sv ld_name -svflg ld

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                BV:ld_name          type
                 Volume Name : volume name
                 Path     : path
                SV:ld_name          type
                 Generation : generation
                 Status   : snap_status

C:\>
```

Description of messages:

- iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated. Deletion end message

- BV:ld_name type

  Volume Name: *volume name*

  Path: *path*

  The BV logical disk name, OS type, mount point volume name, and drive letter mounted to the folder of the NTFS volume accessed by users are displayed.

- SV:ld_name type

  Generation: *generation*

  Status: *snap_sts*

  The SV logical disk name, OS type, deleted SV's relative generation, and SV snapshot status (snap/inactive, etc.) are displayed.

Upon normal termination of the snapshot deletion with auto option, the command displays the following information

```
C:\>iSMsc_delete -bv ld_name -bvflg ld -auto

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                                      BV:ld_name        type
                                       Volume Name : volume name
                                       Path     : path
                                      SV:ld_name        type
                                       Generation : generation
                                       Status    : snap_status

C:\>
```

Description of messages:

- iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.

  Deletion end message
- BV:ld_name type

  Volume Name: volume name

  Path: path
- SV:ld_name type

  Generation: generation

  Status: snap_sts

  The BV/SV logical disk name, OS type, mount point volume name, drive letter mounted to the folder of the NTFS volume accessed by users, deleted SV's relative generation, and SV snapshot status (snap/inactive, etc.) are displayed.

Upon normal termination of the snapshot deletion with all option, the command displays the following information.

```
C:\>iSMsc_delete -bv ld_name -bvflg ld -all

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                                      BV:ld_name        type
                                       Volume Name : volume name
                                       Path  : path

                                       LD Name   Type Generation Status
                                      SV:ld_name1  type  -xx    status
                                      SV:ld_name2  type  -xx    status

C:\>
```

Description of messages:

- iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.

   Deletion end message
- BV:ld_name type

  Volume Name: volume name

   Path: path

- LD Name Type Generation Status

  SV:ld_name1 type -xx status

  SV:ld_name2 type -xx status

  The BV logical disk name, OS type, mount point volume name, drive letter mounted to the folder of the NTFS volume accessed by users, deleted SV's logical disk name, OS type, deleted generation, and status after deletion are displayed. All the deleted SVs are displayed for all option.

On the UNIX system

Upon normal termination, the command displays the following information.

(Individual specification)

```
#iSMsc_delete -bv ld_name -bvflg ld -sv ld_name -svflg ld

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                              BV:ld_name        type
                              Special File    : special-file-name
                              SV:ld_name        type
                              Generation : generation
                              Status    : snap_sts

#
```

Description of messages:

- iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.

  Deletion end message
- BV:ld_name type

  Special File: special-file-name

  The BV logical disk name, OS type, and special file name are displayed.
- SV:ld_name type

  Generation: generation

  Status: snap_sts

  The SV logical disk name, OS type, deleted SV's relative generation, and SV snapshot status (snap/inactive, etc.) are displayed.

Upon normal termination of the snapshot deletion with auto option, the command displays the following information.

```
#iSMsc_delete -bv ld_name -bvflg ld -auto

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                              BV:ld_name        type
                              Special File    : special-file-name
                              SV:ld_name        type
                              Generation : generation
                              Status    : snap_sts

#
```

Description of messages:

- iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.

  Deletion end message

- BV:ld_name type

  Special File: special-file-name

- SV:ld_name type

  Generation: generation

  Status: snap_sts

  The BV special file name, the BV/SV logical disk name, OS type, deleted SV's relative generation, and SV snapshot status (snap/inactive, etc.) are displayed.

Upon normal termination of the snapshot deletion with all option, the command displays the following information.

```
#iSMsc_delete -bv ld_name -bvflg ld -all

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                            BV:ld_name    type
                            Special File : special-file-name

                            LD Name   Type Generation Status
                            SV:ld_name1 type  -xx    status
                            SV:ld_name2 type  -xx    status

#
```

Description of messages:

- iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.

   Deletion end message

- BV:ld_name type

  `Special File`: special-file-name

- LD Name Type Generation Status

  `SV`:ld_name1 type -xx status

  `SV`:ld_name2 type -xx status

The BV special file name, the BV/SV logical disk name, OS type, deleted SV's logical disk name, OS type, deleted generation, and status after deletion are displayed. All the deleted SVs are displayed for all option.

[Usage]

The command is executed with specific BV and SV specified.

```
#iSMsc_delete -bv dev001 -bvflg ld -sv dev002 -svflg ld

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                            BV:dev001     LX
                            Special File   : /dev/rdsk/c0t1d0
                            SV:dev002     LX
                            Generation : -4
                            Status    : snap/inactive

#
```

The command is executed with all BVs and SVs specified.

```
#iSMsc_delete -file volume_file

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                    BV:dev001    LX
                      Special File   : /dev/rdsk/c0t1d0
                      SV:dev101    LX
                      Generation : -1
                      Status   : snap/inactive

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                    BV:dev002  LX
                      Special File   : /dev/rdsk/c0t2d0
                      SV:dev102  LX
                      Generation : -3
                      Status   : snap/inactive

iSMsc_delete:Info:iSM19020: iSMsc_delete has normally terminated.
                    BV:dev003  LX
                      Special File   : /dev/rdsk/c0t3d0
                      SV:dev103  LX
                      Generation : -2
                      Status    snap/inactive

#
```

The end messages are displayed in the order the deletion process terminates

- The SV corresponding to the target BV must be bound in advance.
- The activity state of the target volume must be snapshot-active.
- Any other SV set in the specified BV must not be being deleted, restored, or prepared for restoration.
- The target SV must not be protected.
- The target SV must not be linked with the LV.
  - The SV of the oldest generation except for the protected SV and derived SVs without a generation number (SV of the oldest generation through time among the SVs including the derived SVs with a generation number) is selected at deleted SV auto selection.
  - The target SVs are not in process of setting protection or setting link at SV batch deletion.
- If the target BV is paired as MV for replication, replication must not be in the Replicate Preparing, Restore Preparing, or Separate Preparing.
- The disk array storing the target volume must not be in the freeze state.
- The target volume must not be a dynamic disk volume (for Windows system).

The following notes do not apply to joint operation with SnapSAN Manager.

- The target BV must be registered in the volume list.
- If the target BV is not registered in the volume list, the following conditions must be satisfied:
  - The LV associated with the target BV must be registered in the volume list.
  - If the target BV is paired as the RV for replication, the MV to be paired with the RV must be registered in the volume list.
- The volume list must not be being created.
- When specifying the combination of a volume group or a disk group with a logical disk name, the same number of logical volumes as those constituting a volume group or disk group must be specified to SV on the side where the logical disk name is specified. In this case, snapshot data is deleted in the specified order.
- When a volume group is specified, the target volume group must be active.
- When a disk group is specified, the target disk group must be active.

- The SnapSAN Manager-only special file must not be being created for Linux.

[Return Values]

0: The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

The command terminated normally because operation for a specified volume or all volumes was already completed.

iSMsc_restore

[Name]

```
iSMsc_restore
```

Restores snapshot data from SV to BV.

[Synopsis]

```
iSMsc_restore    -bv volume -bvflg bv_flg
[-sv volume -svflg sv_flg]
[-derivsv derivsv_flg ]
[-wait | -nowait]
iSMsc_restore    -file file_name
[-derivsv derivsv_flg ]
[-wait | -nowait]
iSMsc_restore    -ver
iSMsc_restore    -help(UNIX)
iSMsc_restore    -?(Windows)
```

[Description]

- `iSMsc_restore`

  The `iSMsc_restore` command restores snapshot data from SV to BV. When there are multiple generations of snapshot data if the data of any intermediate generation is restored, you can specify whether to automatically delete or retain the snapshot data of later generation than the restored one.

Options

The iSMsc_restore command recognizes the following options.

- -bv *volume*

  Specify the volume of the BV.
  As the volume, specify a logical disk name, special file name, drive letter, mount point volume name, NTFS folder name, or volume group for the file system using LVM or disk group for the file system using VxVM.

- -bvflg *bv_flg*

  Specify the type of the volume specified in -bv.In *bv_flg*, one of the following can be specified.

ld Logical disk name

<For UNIX>

- sfn Special file name
- vg Volume group
- dg Disk group

<For Windows>

- drv Drive letter
- mvol Mount point volume name
- mdir NTFS folder name
  This argument must be specified when -bv is specified.
  If a volume group or disk group is specified, the same disk configuration as -sv must be specified in -bv.
  Also, if a volume group or disk group is specified, that specified volume group or disk group must be active.
  If the BV cannot be identified by the host on which the command is executed (the BV has not been registered in the volume list), only an ld (logical disk name) can be specified.
- -sv *volume*
- Specify the volume of the SV. As the volume, specify a logical disk name or relative generation.
  When specifying a relative generation, use .-1 as the latest generation, with the subsequent generations represented by .-n (where n = 2 to 16).
  If the number of generations is 1 (the BV and SV correspond on a one-to-one basis), both the -sv and -svflg options can be omitted.
- -svflg *sv_flg*

  Specify the type of the volume specified in -sv.
  In *sv_flg*, one of the following can be specified.

**ld Logical disk name
relgen**

Relative generation This argument must be specified when -sv is specified. For a derived SV without a generation number, only ld (logical disk name) can be specified.

- -derivsv *derivsv_flg*

  Specify whether to automatically delete the derived generation or to retain the data at execution of restoration. In *derivsv_flg*, one of the following can be specified. keep Retains the data of derived SV.
  delete Automatically deletes the derived SV. default Complies with the operation option setting file (Windows) or environment variable settings (UNIX). If -derivsv is omitted, the command behaves in the same way as when the default is specified.

- -wait

  Specify this option to instruct the command to wait until the data restoration process is completed.This option cannot be specified simultaneously with the -nowait option.

[Displayed Information]

On the Windows system

Upon normal termination, the command displays the following information.

(Individual specification)

```
C:\>iSMsc_restore -bv ld_name -bvflg ld -sv ld_name -svflg ld

iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.
                          BV:ld_name          type
                          Volume Name : volume name
                          Path      : path
                          SV:ld_name          type
                          Generation    : generation
                          Status       : snap_sts [YYYY/MM/DD
hh:mm:ss]

C:\>
```

Description of messages:

- iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.

  Snapshot restoration end message

- BV:ld_name type

  Volume Name: volume name

  Path: path

  The BV logical disk name, OS type, mount point volume name, and drive letter mounted to the folder of the NTFS volume accessed by users are displayed.

- SV:ld_name type

  Generation: generation

  Status: snap_sts [YYYY/MM/DD hh:mm:ss]

  The SV logical disk name, OS type, relative generation, and snapshot status (rst/exec, etc.) are displayed. When the status is snap/active or rst/exec, the snapshot creation time of the specified SV is also displayed.

In the derived generation auto delete mode, upon normal termination of the snapshot restoration for any intermediate generation, the command displays the following information.

(Individual specification)

```
C:\>iSMsc_restore -bv ld_name   -bvflg ld -sv .-n -svflg relgen  -derivsv delete

iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.
                          BV:ld_name          type
                          Volume Name : volume name
                          Path      : path
                          SV:ld_name          type
                          Generation    : generation
                          Status       : snap_sts [YYYY/MM/DD
hh:mm:ss]

iSMsc_restore:Info: iSM19125: Snapshot has been nullified.
                          ld_name1          type
                          ld_name2          type
                          ......

C:\>
```

Description of messages:

- iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.

    Snapshot restoration end message

- BV:ld_name   type

    Volume Name: volume name

    Path: path

    The BV logical disk name, OS type, mount point volume name, and drive letter mounted to the folder of the NTFS volume accessed by users are displayed.

- SV:ld_name   type

    Generation: generation

    Status: snap_sts [YYYY/MM/DD hh:mm:ss]

    The SV logical disk name, OS type, relative generation, and snapshot status (rst/exec, etc.) are displayed. When the status is snap/active or rst/exec, the snapshot creation time of the specified SV is also displayed.

- iSMsc_restore:Info: iSM19125: Snapshot has been nullified.

    Ld_name   type

    Information indicating that the snapshot data of later generation than the restored one has been deleted. The deleted snapshot's logical disk name and OS type are displayed.

In the derived generation retain mode, upon normal termination of the snapshot restoration for any intermediate generation, the command displays the following information.

(Individual specification)

```
C:\>iSMsc_restore -bv ld_name   -bvflg ld -sv .-n -svflg relgen -derivsv keep

iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.
                        BV:ld_name          type
                        Volume Name : volume name
                        Path     : path
                        SV:ld_name          type
                        Generation   : generation
                        Status     : snap_sts [YYYY/MM/DD
hh:mm:ss]

iSMsc_restore:Info: iSM19129: Snapshot data is kept.
                        ld_name1       type
                        ld_name2       type

C:\>
```

Description of messages:

- iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.

    Snapshot restoration end message

- BV:ld_name   type

    Volume Name: volume name

    Path: path

    The BV logical disk name, OS type, mount point volume name, and drive letter mounted to the folder of the NTFS volume accessed by users are displayed.

- SV:ld_name   type

  Generation: generation

  Status: snap_sts [YYYY/MM/DD hh:mm:ss]

  The SV logical disk name, OS type, relative generation, and snapshot status (rst/exec, etc.) are displayed. When the status is snap/active or rst/exec, the snapshot creation time of the specified SV is also displayed.

- iSMsc_restore:Info: iSM19129: Snapshot data is kept.

  Ld_name   type

  Information retained as derived generation of the snapshot data of later generation than the restored one. The retained snapshot's logical disk name and OS type are displayed.

On the UNIX system

Upon normal termination, the command displays the following information.

(Individual specification)

```
#iSMsc_restore -bv ld_name  -bvflg ld ld_name  -svflg ld

iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.

                          BV:ld_name      type
                          Special File   : special_file_name
                          SV:ld_name      type
                          Generation : generation
                          Status   : snap_sts [YYYY/MM/DD  hh:mm:ss]

#
```

Description of messages:

- iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.

  Snapshot restoration end message

- BV:ld_name type

  Special File: special_file_name

  The BV logical disk name, OS type, and special file name are displayed.

- SV:ld_name type

  Generation: generation

  Status: snap_sts [YYYY/MM/DD hh:mm:ss]

  The SV logical disk name, OS type, relative generation, and snapshot status (rst/exec, etc.) are displayed. When the status is snap/active or rst/exec, the snapshot creation time of the specified SV is also displayed.

  In the derived generation auto delete mode, upon normal termination of the snapshot restoration for any intermediate generation, the command displays the following information.

(Individual specification)

```
#iSMsc_restore -bv ld_name   -bvflg ld -sv .-n -svflg relgen -derivsv delete

iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.

                                   BV:ld_name       type
                                   Special File   : special_file_name
                                   SV:ld_name       type
                                   Generation : generation
                                   Status    : snap_sts [YYYY/MM/DD  hh:mm:ss]

iSMsc_restore:Info: iSM19125: Snapshot has been nullified.
                                   ld_name1     type
                                   ld_name2     type
                                   ......

#
```

Description of messages:

- iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.

  Snapshot restoration end message

- BV:ld_name   type

  Special File: special_file_name

  The BV logical disk name, OS type, and special file name are displayed.

- SV:ld_name   type

  Generation: generation

  Status: snap_sts [YYYY/MM/DD hh:mm:ss]

  The BV/SV logical disk name, OS type, mount point volume name, and drive letter mounted to the folder of the NTFS volume accessed by users, relative generation, and snapshot status (rst/exec, etc.) are displayed. When the status is snap/active or rst/exec, the snapshot creation time of the specified SV is also displayed.

- iSMsc_restore:Info: iSM19125: Snapshot has been nullified.

  Ld_name   type

  Information indicating that the snapshot data of later generation than the restored one has been deleted. The deleted snapshot's logical disk name and OS type are displayed.

In the derived generation retain mode, upon normal termination of the snapshot restoration for any intermediate generation, the command displays the following information.

(Individual specification)

```
#iSMsc_restore -bv ld_name   -bvflg ld -sv .-n -svflg relgen -derivsv keep

iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.
                                   BV:ld_name       type
                                   Special File   : special_file_name
                                   SV:ld_name       type
                                   Generation : generation
                                   Status    : snap_sts [YYYY/MM/DD  hh:mm:ss]

iSMsc_restore:Info: iSM19125: Snapshot data is kept.
                                   ld_name1     type
                                   ld_name2     type
                                   ......

#
```

Description of messages:

- iSMsc_restore:Info: iSM19030: iSMsc_restore has normally terminated.

  Snapshot restoration end message

- BV:ld_name   type

  Special File: special_file_name

  The BV logical disk name, OS type, and special file name are displayed.

- SV:ld_name   type

  Generation: generation

  Status: snap_sts [YYYY/MM/DD hh:mm:ss]

  The BV/SV logical disk name, OS type, mount point volume name, and drive letter mounted to the folder of the NTFS volume accessed by users, relative generation, and snapshot status (rst/exec, etc.) are displayed. When the status is snap/active or rst/exec, the snapshot creation time of the specified SV is also displayed.

- iSMsc_restore:Info: iSM19129: Snapshot data is kept.

  Ld_name   type

  Information retained as derived generation of the snapshot data of later generation than the restored one. The retained snapshot's logical disk name, and OS type are displayed.

[Usage]

The command is executed with specific BV and SV specified.

- The SV corresponding to the target BV must be bound in advance.
- The activity state of the target volume must be snapshot-active.
- Any other SV set in the specified BV must not be being deleted
- , restored, or prepared for restoration.
- In the derived generation auto delete mode, any protected SV of the later generation than the target one must not exist.
- The link to the target BV must be unlinked.
- The target SV must not be linked with the LV.
- The BV must be unmounted from the host (for UNIX system).
- The SV must not be linked with any other LV.
- The target BV must not be in the update prevention state.
- If the target BV is paired as volume (MV or RV) for replication, replication must be in the Separated state.
- Data of the target BV is not in the data migration state (that is, the target BV is neither a source- nor destination-volume for the data migration).
- The disk array storing the target volume must not be in the freeze state.
- The target volume must not be a dynamic disk volume (for Windows system).

The following notes do not apply to joint operation with SnapSAN Manager.

- The target BV must be registered in the volume list.
- If the target BV is not registered in the volume list, the following conditions must be satisfied:
- The LV associated with the target BV must be registered in the volume list.
- If the target BV is paired as the RV for replication, the MV to be paired with the RV must be registered in the volume list.

- The volume list must not be being created.
- When specifying the combination of a volume group or a disk group with a logical disk name, the same number of logical volumes as those constituting a volume group or disk group must be specified to SV on the side where the logical disk name is specified. In this case, restoration is started in the specified order.
- When a volume group is specified, the target volume group must be active.
- When a disk group is specified, the target disk group must be active.
- The SnapSAN Manager-only special file must not be being created for Linux.

[Return Values]

0:The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

iSMsc_wait

[Name]
   iSMsc_wait - Waits for snapshot state

[Synopsis]
```
iSMsc_wait -cond condition
-bv volume -bvflg bv_flg
[-sv volume -svflg sv_flg]
[-interval interval_time ]
[-limit limit_time ]
iSMsc_wait -cond condition
-file file_name
[-interval interval_time ]
[-limit limit_time ]
iSMsc_wait   -ver
iSMsc_wait    -help(UNIX)
iSMsc_wait    -?(Windows)
```

[Description]

The iSMsc_wait command waits till the snapshot state changes to the snapshot active for the specified pair.

Options

The iSMsc_wait command recognizes the following options:

- -cond *condition*

  Specify a wait end condition. This argument cannot be omitted. In *condition*, you can specify the following value: active: Waits till the snapshot status changes to active (snapshot/active).

- -bv *volume*

  Specify the volume of the BV. In *volume*, specify a logical disk name, special file name, drive letter, mount point volume name, NTFS folder name, volume group for the file system using LVM, or disk group for the file system using VxVM.

- -bvflg *bv_flg*

    Specify the type of the volume specified in -bv. In *bv_flg*, one of the following can be specified.

ld Logical disk name

<For UNIX>

- sfn Special file name
- vg Volume group
- dg Disk group

<For Windows>

- drv Drive letter
- mvol Mount point volume name
- mdir NTFS folder name
- -bv

    This argument must be specified when -bv is specified.

    If a volume group or disk group is specified, the same disk configuration as -sv must be specified in -bv.

    Also, if a volume group or disk group is specified, that specified volume group or disk group must be active.

    If the BV cannot be identified by the host on which the command is executed (the BV has not been registered in the volume list), only ld (logical disk name) can be specified.

- -sv *volume*

    Specify the volume of the SV. As the *volume*, specify a logical disk name or relative generation.

    When specifying a relative generation, use .-1 as the latest generation, with the subsequent generations represented by .-n (where n = 2 to 16).

    If the number of generations is 1 (the BV and SV correspond on a one-to-one basis), -sv and -svflg options can be omitted.

- -svflg *sv_flg*

    Specify the type of the volume specified in -sv.

    In *sv_flg*, one of the following can be specified.

ld Logical disk name

- relgen Relative generation

    This argument must be specified when -sv is specified. For a derived SV without a generation number, only ld (logical disk name) can be specified.

- -interval *interval_time*

```
Specify, in seconds, the intervals at which the snapshot state is
monitored.
1 to 30 seconds (integer) can be specified.
You can change this value by using the operation option setting file
(Windows) or environment variable settings (UNIX).
By default, the snapshot status is monitored at intervals of 5 seconds.
```

- -limit *limit_time*

    Specify waiting limit time.

    In *limit_time*, you can specify any of the following:

    Numeral Waits from waiting start to the specified time. 0 to 86400 seconds (integer) can be specified.

    nolim Waits endlessly.

    If the end condition specified in the -cond option is not met during the period from waiting start to the specified time, the iSMsc_wait command cancels waiting and ends abnormally.

    If this argument is omitted, you can change waiting limit time by using the operation option setting file (Windows) or environment variable settings (UNIX). By default, the iSMsc_wait command waits endlessly.

- -file *file_name*

    Specify sets of BVs and SVs in *file_name* if it is necessary to specify more than one set.

    If an error occurs in any of the specified sets when multiple sets are specified, the iSMsc_wait command outputs the error message and continues processing till all the sets are completed without interrupting processing.

- -ver Displays the version information of this command.
- -help Displays the usage of this command (UNIX).
- -? Displays the usage of this command (Windows).

[Displayed Information]

On the Windows system

Upon normal termination, the command displays the following information.

(Individual specification)

```
C:\> iSMsc_wait -cond active -bv ld_name -bvflg ld -sv ld_name -svflg ld
Waiting....
iSMsc_wait:Info: iSM19050: iSMsc_wait has normally terminated.
                            BV:ld-name    type
                             Volume Name : volume name
                             Path  : path
                            SV:ld-name    type
                             Generation : generation
                             Status   : snap_sts [YYYY/MM/DD  hh:mm:ss]

C:\>
```

Description of messages:

- `Waiting....`
  Waiting message

    You can suppress the output of this message via option settings.

- iSMsc_wait:Info: iSM19050: iSMsc_wait has normally terminated.
  Waiting termination message

- BV:*ld-name   type*
  Volume Name: *volume name*
  Path: *path*

  The BV logical disk name, OS type, mount point volume name, and drive letter mounted to the folder of the NTFS volume accessed by users are displayed.

- SV:ld-name   type
  Generation: generation
  Status: snap_sts [YYYY/MM/DD hh:mm:ss]

  The SV logical disk name, OS type, relative generation, and snapshot status are displayed. The snapshot creation time of the specified SV is also displayed.

Upon abnormal termination, the command displays the following information.

```
C:\> iSMsc_wait -cond active -bv ld_name -bvflg ld -sv ld_name -svflg ld
Waiting....
iSMsc_wait:Info: iSM19050: iSMsc_wait has normally terminated.
                           BV:ld-name    type
                            Volume Name : volume name
                            Path  : path
                           SV:ld-name    type
                            Generation : generation
                            Status   : snap_sts [YYYY/MM/DD  hh:mm:ss]


C:\>
```

Description of messages:

- Waiting....

  Waiting message

  The command displays the following error messages:

- iSMsc_wait:Error:iSM19409: Specified time limit has been reached.

  (limit_time sec)

  iSMsc_wait:Info: iSM19052: iSMsc_wait has abnormally terminated.

- BV:volume name

  SV:volume name

  The logical disk name, drive letter, mount point volume name, NTFS folder name, or SV relative generation number of the BV/SV specified on the command line is displayed.

On the UNIX system

Upon normal termination, the command displays the following information.

(Individual specification)

```
#iSMsc_wait -cond active -bv ld_name -bvflg ld -sv ld_name -svflg ld
Waiting....
iSMsc_wait:Info: iSM19050: iSMsc_wait has normally terminated.
    BV:ld_name                type
        Special File          : special_file_name
    SV:ld_name                type
        Generation            : generation
        Status                : snap_sts [YYYY/MM/DD  hh:mm:ss]
#
```

Description of messages:

- Waiting....
  Waiting message

  You can suppress the output of this message via option settings.

- iSMsc_wait:Info: iSM19050: iSMsc_wait has normally terminated.
  Waiting termination message

- BV:*ld_name*   *type*
  Special File: *special_file_name*
  The BV logical disk name, OS type, and special file name are displayed.

- SV:ld_name   type
  Generation:: generation
  Status: snap_sts [YYYY/MM/DD hh:mm:ss]

  The SV logical disk name, OS type, relative generation, and snapshot status are displayed. The snapshot creation time of the specified SV is also displayed.

Upon abnormal termination, the command displays the following information.

(Individual specification)

```
#iSMsc_wait -cond active -bv ld_name -bvflg ld -sv ld_name -svflg ld -limit
limit_time
Waiting....
iSMsc_wait:Error:iSM19409: Specified time limit has been reached. (limit_time
sec)
iSMsc_wait:Info: iSM19052: iSMsc_wait has abnormally terminated.
    BV:volume name
    SV:volume name
#
```

Description of messages:

- Waiting....
  Waiting message

- The command displays the following error messages:

  iSMsc_wait:Error:iSM19409: Specified time limit has been reached. (limit_time sec)

  iSMsc_wait:Info: iSM19052: iSMsc_wait has abnormally terminated.

- BV:volume name
  SV:volume name

  The logical disk name or special file name of the BV/SV specified on the command line is displayed.

[Usage]

The command is executed with specific BV and SV specified.

Restoration completion is made to wait at the monitoring intervals specified in the -interval option (in this example, 1 second).

```
#iSMsc_wait -cond active -file wait_file.txt -interval 1
Waiting....
iSMsc_wait:Info: iSM19050: iSMsc_wait has normally terminated.
    BV:dev001                    LX
        Special File : /dev/rdsk/c29t4d3
    SV:dev002                    LX
        Generation : -1
        Status      : snap/active [2008/01/08  14:32:15]
iSMsc_wait:Info: iSM19050: iSMsc_wait has normally terminated.
    BV:dev003                    LX
        Special File : /dev/rdsk/c29t4d4
    SV:dev004                    LX
        Generation : -1
        Status      : snap/active [2008/01/08  14:33:15]
iSMsc_wait:Info: iSM19050: iSMsc_wait has normally terminated.
    BV:dev005                    LX
        Special File : /dev/rdsk/c29t4d5
    SV:dev006                    LX
        Generation : -1
        Status      : snap/active [2008/01/08  14:34:15]
#
```

The messages are displayed in the order restoration processes are completed.

[Return Values]

0: The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

The SV corresponding to the target BV must be bound in advance.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target BV must be registered in the volume list.
- If the target BV is not registered in the volume list, the following conditions must be satisfied:
- The LV associated with the target BV must be registered in the volume list.
- If the target BV is paired as the RV for replication, the MV to be paired with the RV must be registered in the volume list.
- The volume list must not be being created.
- When specifying a combination of a volume group or disk group and a logical disk name, specify logical volumes, the number of which is the same as the logical volumes constituting the volume or disk group on the side where the logical disk name is specified, in BV(SV). In this case, snapshots are made to wait in the order they are specified.
- When a volume group is specified, the target volume group must be active.
- When a disk group is specified, the target disk group must be active.
- The SnapSAN Manager-only special file must not be being created for Linux.

iSMsc_svguard

[Name]

```
iSMsc_svguard
```

Sets/cancels SV guard classification.

[Synopsis]

```
iSMsc_svguard -bv volume -bvflg bv_flg
[-sv volume -svflg sv_flg | -all ]
 -mode {set|cancel}
iSMsc_svguard -file file_name
 -mode {set|cancel}
iSMsc_svguard -ver
iSMsc_svguard -help(UNIX)
iSMsc_svguard -?(Windows)
```

[Description]

The iSMsc_svguard command sets/cancels guard classification of the specified SV.
The volume for guard classification's set/cancel needs to be SV.

Options

The iSMsc_svguard command recognizes the following options.

- -bv *volume*

  Specify the volume of the BV.

  In *volume*, specify a logical disk name, special file name, drive letter, mount point volume name, NTFS folder name, or volume group for the file system using LVM or disk group for the file system using VxVM.

- -bvflg *bv_flg*

  Specify the type of the volume specified in -bv.

  In *bv_flg*, one of the following can be specified.

ld Logical disk name

<For UNIX only>

- sfn Special file name
- vg Volume group
- dg Disk group

<For Windows only>

- drv Drive letter
- mvol Mount point volume name

- mdir NTFS folder name

  This argument must be specified when -bv is specified.If a volume group or disk group is specified, the same disk configuration as -sv must be specified for -bv.
  Also, if a volume group or disk group is specified, that specified volume group or disk group must be active.

  If the BV cannot be identified by the host on which the command is executed (the BV has not been registered in the volume list), only an ld (logical disk name) can be specified.

- -sv *volume*

  Specify the volume of the SV.

  As the volume, specify a logical disk name or relative generation.
  When specifying a relative generation, use .-1 as the latest generation, with the subsequent generations represented by .-n (where n = 2 to 16).

  If the number of generations is 1 (the BV and SV correspond on a one-to-one basis), -sv/-svflg and -all options can be omitted.

- -svflg *sv_flg*

  Specify the type of the volume specified in -sv.

  In *sv_flg*, one of the following can be specified.

  ld Logical disk name

  relgen Relative generation

  The argument must be specified whenever -sv is specified.
  For a derived SV without a generation number, only ld (logical disk name) can be specified.

- -mode {set|cancel}

  Specify whether to set or cancel the guard classification.

  One of the following can be specified.

  set Sets the guard classification of a specified SV.

  cancel Cancels the guard classification of a specified SV.

  -all Cancels all SV guard classifications under a BV together.
  If the number of generations is 1 (the BV and SV correspond on a one-to-one basis), -sv/-svflg and -all options can be omitted together.
  This option is specifiable only when cancel is specified for -mode.

  -file file_name Specify sets of BVs and SVs in file_name if it is necessary to specify more than one set. If an error occurs with any set when multiple sets are specified, an error message is output and the processing continues until all specified sets are done.

- -ver Displays the version information of this command.
- -help Displays the usage of this command (for UNIX system).
- -? Displays the usage of this command (for Windows system).

[Displayed Information]

On the Windows system

Upon normal termination, the command displays the following information.

(Individual specification)

```
C:\>iSMsc_svguard -bv ld_name -bvflg ld -sv ld_name -svflg ld -mode set

iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.
                        BV:ld_name        type
                         Volume Name : volume name
                          Path  : path
                        SV:ld_name        type
                        Generation  : generation
                        Status    : snap_status [YYYY/MM/DD
hh:mm:ss]

C:\>
```

Description of messages:

- iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.

  Message about the guard classification successfully set or canceled

- BV:ld_name type

  Volume Name: volume name

  Path: path

  The BV logical disk name, OS type, mount point volume name, and drive letter mounted to the folder of the NTFS volume accessed by users are displayed.

  SV:ld_name type

  Generation: generation

  Status: snap_sts [YYYY/MM/DD hh:mm:ss]

  The SV logical disk name, OS type, relative generation, and snapshot status (snap/active, etc.) are displayed. When the status is snap/active, rst/exec, or rst/preparing, the snapshot creation time of the specified SV is also displayed.

  Upon abnormal termination, the command displays the following information.

```
C:\>iSMsc_svguard -bv ld_name -bvflg ld -sv ld-name -svflg ld -mode set

iSMsc_svguard:Error:        iSM19104: The volume is not paired cannot be
specified.
iSMsc_svguard:Info:         iSM19042: iSMsc_svguard has abnormally
terminated.

                            BV:volume name
                            SV:volume name

C:\>
```

Description of messages:

The following error messages are output.

- iSMsc_svguard:Error:iSM19104: The volume is not paired cannot be specified.

  iSMsc_svguard:Info:iSM19042: iSMsc_svguard has abnormally terminated.

- BV:volume name

SV:volume name

The logical disk name, drive letter, mount point volume name, NTFS folder name, or SV relative generation number of the BV/SV specified on the command line is displayed.

Upon normal termination of the batch cancellation of all guard classifications with all option, the command displays the following information.

```
C:\>iSMsc_svguard -bv ld_name -bvflg ld -all -mode cancel

iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.
    BV:ld_name                  type
                                Volume Name : volume name
                                Path  : path


    LD Name                 Type  Generation Status
    SV:ld_name1             type  -xx    status
    SV:ld_name2             type  -xx    status

C:\>
```

Description of messages:

- iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.

Message about the guard classification successfully set or canceled

- BV:ld_name type

Volume Name: *volume name*

Path: *path*

- LD Name Type Generation Status

SV:ld_name1 type -xx status

SV:ld_name2 type -xx status

The BV logical disk name, OS type, mount point volume name, drive letter mounted to the folder of the NTFS volume accessed by users, guard-classification-canceled SV logical disk names, OS types, relative generations, and snapshot statuses are displayed.

All the guard-classification-canceled SVs are displayed for all option.

On the UNIX system

Upon normal termination, the command displays the following information.(Individual specification)

```
#iSMsc_svguard -bv ld_name -bvflg ld -sv ld_name -svflg ld -mode set

iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.
            BV:ld_name        type
            Special File  : special_file_name
            SV:ld_name        type
            Generation : generation
            Status   : snap_sts [YYYY/MM/DD  hh:mm:ss]

#
```

Description of messages:

- iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.

Message about the guard classification successfully set or canceled

- BV: ld_name type

  Special File: special_file_name

  The BV logical disk name, OS type, and special file name are displayed.

- SV:ld_name type

  Generation: generation

  Status: snap_sts [YYYY/MM/DD hh:mm:ss]

  The SV logical disk name, OS type, relative generation, and snapshot status (snap/active, etc.) are displayed. When the status is snap/active, rst/exec, or rst/preparing, the snapshot creation time of the specified SV is also displayed.

Upon abnormal termination, the command displays the following information.

```
#iSMsc_svguard -bv ld_name -bvflg ld -sv ld_name -svflg ld -mode set

iSMsc_svguard:Error:iSM19104: The volume is not paired cannot be specified.
iSMsc_svguard:Info: iSM19042: iSMsc_svguard has abnormally terminated.
                              BV:volume name
                              SV:volume name

#
```

Description of messages:

- iSMsc_svguard:Error:iSM19104: The volume is not paired cannot be specified.

  iSMsc_svguard:Info:iSM19042: iSMsc_svguard has abnormally terminated.

- BV:volume name

  SV:volume name

  The logical disk name, special file name, or relative generation number of the BV/SV specified on the command line is displayed.

Upon normal termination of batch cancellation of all guard classifications with all option, the command displays the following information.

```
#iSMsc_svguard -bv ld_name -bvflg ld -all -mode cancel

iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.
                              BV:ld_name    type
                               Special File : special_file_name

                              LD Name    Type Generation Status
                              SV:ld_name1  type  -xx    status
                              SV:ld_name2  type  -xx    status

#
```

Description of messages:

- iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.

  Message about the guard classification successfully set or canceled

- BV:ld_name type

  Special File: special-file-name

- LD Name Type Generation Status

  SV:ld_name1 type -xx status

  SV:ld_name2 type -xx status

The BV logical disk name, OS type, special file name, guard-classification-canceled SV logical disk names, OS types, relative generations, and snapshot statuses are displayed.

All the guard-classification-canceled SVs are displayed for all option.

[Usage]

The command is executed for a specific BV and SV specified.

```
#iSMsc_svguard -bv dev001 -bvflg ld -sv dev101 -svflg ld -mode set

iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.
              BV:dev001     NX
                Special File   : /dev/rdsk/c0t1d0
              SV:dev101     NX
                Generation : -1
                Status    : snap/active  [2003/09/01 08:52:36]


#
```

The command is executed with all BVs and SVs specified.

```
#iSMsc_svguard -file volume_file -mode cancel

iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.
              BV:dev001     NX
                Special File   : /dev/rdsk/c0t1d0
              SV:dev101     NX
                Generation : -1
                Status    : snap/active [2003/09/01 08:52:36]

iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.
              BV:dev002     NX
                Special File   : /dev/rdsk/c0t2d0
              SV:dev102     NX
                Generation : -2
                Status    : snap/active [2003/09/01 08:53:11]

iSMsc_svguard:Info: iSM19040: iSMsc_svguard has normally terminated.
              BV:dev003     NX
                Special File   : /dev/rdsk/c0t3d0
              SV:dev103     NX
                Generation : -1
                Status    : snap/active [2003/09/01 08:53:31]


#
```

- The activity state of the target volume must be snapshot-active or being restored.
- The disk array storing the target volume must not be in the freeze state.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target BV must be registered in the volume list.
- If the target BV is not registered in the volume list, the following conditions must be satisfied:
  - The LV associated with the target BV must be registered in the volume list.
  - If the target BV is paired as the RV for replication, the MV to be paired with the RV must be registered in the volume list.
- The volume list must not be being created.
- When specifying the combination of a volume group or a disk group with a logical disk name, the same number of logical volumes as those constituting a volume group or disk group must be specified to SV on the side where the logical disk name is specified. In this case, SV guard classifications are set or canceled in the specified order.
- When a volume group is specified, the target volume group must be active.
- When a disk group is specified, the target disk group must be active.
- The SnapSAN Manager-only special file must not be being created for Linux.

[Return Values]

0: The command terminated normally.

1: Operation for all pairs failed.

2: Operation for some pairs failed.

3: Although there are some or all SVs already handled, the command terminated normally.

iSMsc_query

[Name]

iSMsc_query - Displays the snapshot status.

[Synopsis]

```
iSMsc_query    -bv volume -bvflg bv_flg
[-sv volume -svflg sv_flg]
[-summary | -detail]
iSMsc_query    -sv volume -svflg sv_flg
[-summary | -detail]
iSMsc_query    -file file_name
[-summary | -detail]
iSMsc_query    -ver
iSMsc_query    -help(UNIX)
iSMsc_query    -?(Windows)
```

[Description]

```
iSMsc_query command displays the status of the specified volume
```

Options

The iSMsc_query command recognizes the following options.

The BV and SV can be specified in one of the following combinations.

- BV and SV: Displays the volume status of the specified BV and SV.
- BV only: Displays the volume status of all generations associated with the BV.
- SV only: Displays the volume status in the same way as when the BV and SV are both specified.
- -bv *volume*

  Specify the volume of the BV.As the volume, specify a logical disk name, special file name, drive letter, mount point volume name, NTFS folder name, or volume group name for the file system using LVM or disk group for the file system using VxVM.
- -bvflg *bv_flg*

  Specify the type of the volume specified in -bv.
  In *bv_flg*, one of the following can be specified.

Id Logical disk name

<For UNIX>

- sfn Special file name
- vg Volume group
- dg Disk group

<For Windows>

- drv Drive letter
- mvol Mount point volume name
- mdir NTFS folder name

    This argument must be specified together with -bv.
    If a volume group or disk group is specified, the same disk configuration as -bv must be specified in -sv.
    Also, if a volume group or disk group is specified, that specified volume group or disk group must be active.-sv *volume* Specify the volume of the SV.
    As the volume, specify a logical disk name, relative generation, special file name, drive letter, mount point volume name, NTFS folder name, or volume group name for the file system using LVM or disk group for the file system using VxVM.If this argument is omitted, the command displays the status of SVs of all generations associated with the BV. Depending on whether the volume is linked or not, the specifiable SV volume types differ as follows.

Volume Type	SV Not Linked	SV Linked
Logical disk name	✓	✓
Relative generation	✓	✓
Special file name	-	✓ (U)
Volume group name	-	✓ (U)
Disk group name	-	✓ (U)
Drive letter	-	✓ (W)
Mount point volume name	-	✓ (W)
NTFS folder name	-	✓ (W)

(W) Specifiable on the Windows system

(U) Specifiable on the UNIX system

- `-svflg` *sv_flg*

    Specify the type of the volume specified in `-sv`.
    In *sv_flg*, one of the following can be specified.

ld Logical disk name

- relgen Relative generation

<For UNIX>

- sfn Special file name
- vg Volume group
- dg Disk group

<For Windows>

- drv Drive letter

- mvol Mount point volume name

- mdir NTFS folder name

  This argument must be specified when −sv is specified.
  For a derived SV without a generation number, only ld (logical disk name) can be specified.
  If a volume group or disk group is specified, the same disk configuration as −bv must be specified in −sv.
  Also, if a volume group or disk group is specified, that specified volume group or disk group must be active.

- -summary

  Specify this option to display a summary of snapshot volume data. This option cannot be specified simultaneously with the -detail option.

- -detail

  Specify this option to display detailed snapshot volume data. This option cannot be specified simultaneously with the -summary option.
  If the -summary and -detail options are both omitted, the command behaves in the same way as when the -summary option is specified.

- -file *file_name*

  Specify sets of BVs and SVs in *file_name* if it is necessary to specify more than one set. If an error occurs with any set when multiple sets are specified, an error message is output and the processing continues until all specified sets are done.

- -ver Displays the version information of this command.

- -help Displays the usage of this command (for UNIX system).

- −? Displays the usage of this command (for Windows system).

Displayed Information

On the Windows system

The -detail option is specified to display detailed link information.

```
C:\>iSMsc_query -bv bv_ld_name -bvflg ld -detail

BV Information
                                    LD Name    : bv_ld_name
                                    Type    : bv_type
                                    Volume Name : volume_name
                                    Path   : path
                                    State   : bv_state

Pair Information
                                    SV:LD Name   : sv_ld_name
                                    Type    : sv_type
                                    Generation(Attribute)  : -n (eeeeee)
                                    Snap State   : aaaaaaaa [YYYY/MM/DD
hh:mm:ss]
                                    State Start Time : YYYY/MM/DD  hh:mm:ss
                                    State End Time  : YYYY/MM/DD  hh:mm:ss
                                    Processing Data Size  : bbbbbbbbKB
                                    Snapshot Data Size: ddddddddKB
                                    SV Guard  : preserve_mode
                                    LV Link Status  : link_sts
                                    LV:LD Name   : lv_ld_name
                                    Type    : lv_type
                                    Volume Name : volume_name
                                    Path   : path
                                    LV Access   : access_mode

C:\>
```

Description of messages:

- BV Information

  The BV information is displayed.

  LD Name: Logical disk name

  TypeOS type

  Volume Name: Mount point volume name

  Path: NTFS folder name

  State: BV state

  - normal: Normal

  - restore fault: Restore fault

  - SV fault: Snapshot fault

Pair Information

The detailed information about the generation (SV) for the BV and the LV is displayed.

- SV: Indicates the SV information.

- LD Name: Logical disk name

Type: OS type

Generation(Attribute)
Generation displays the SV relative generation. The latest generation is represented as -1, with the subsequent generations represented by -n (where n = 2 to 16).

If no snapshot has been created, or if a derived SV does not have a generation number, "-" is displayed for the generation number.
The volume classification is displayed for Attribute. The derived classification is displayed as "derived" and the normal generation is displayed as "normal".

Snap State [YYYY/MM/DD hh:mm:ss]

If the snapshot operation state is snap/active, rst/exec, rst/suspended, or rst/preparing, the snapshot creation time of the specified SV is displayed.

- snap/active: Snapshot active
- snap/inactive: Snapshot inactive
- rst/exec: Restore execution
- rst/suspended: Restore suspended
- snap/deleting: Deleting
- snap/fault: Snapshot fault
- rst/preparing: Restore preparing
- snap/preparing: SV preparing
- snap/prepare-fault: SV prepare fault

State Start Time: Displays the start time of the last snapshot operation (create, restore, or delete). In State, "Create", "Restore", or "Delete" is displayed. This is not displayed if no operation has been performed.

State End Time: Displays the end time of the last snapshot operation (restore or delete). In State, "Restore", or "Delete" is displayed. This is not displayed during snapshot creation or if no operation has been performed.

Processing Data Size: Displays in KB the amount of copied data different from the original when restoring data or the amount of deleted data when deleting data.

Snapshot Data Size: Displays the size of the SV difference management area.
* Depending on the size, the unit changes (KB, MB, GB, or TB).

SV Guard: Displays the guard mode.

- on: Guarded
- off: Not guarded

LV Link Status: Displays the link status.
link: Link established
unlink: Link not established

LV: Indicates the LV information. When the SV link status is "link", the information about the link-volume (LV) linked with the specified SV is displayed.

LD Name: Logical disk name

Type: OS type

Volume Name: Mount point volume name

Path: NTFS folder name

LV Access: Displays the LV access restrictions.

- rw: The LV can be accessed both for input and output.
- ro: The LV can be accessed for reference only.
- nr: The LV cannot be accessed.

The SVs are displayed in the following order.

- Snapshot fault (snap/fault)
- Restore suspended (rst/suspended)
- SV prepare fault (snap/prepare-fault)
- Snapshots created (snap/active, rst/exec, and rst/preparing) in descending order of snapshot creation time
- Snapshot deleting (snap/deleting)

- Snapshot inactive (snap/inactive)
- SV preparing (snap/preparing)

The -summary option is specified to display summary information.

```
C:\>iSMsc_query -bv bv_ld_name -bvflg ld -summary

BV Information
                                    LD Name    : bv_ld_name
                                    Type   : bv_type
                                    Volume Name  : volume_name
                                    Path   : path
                                    State  : bv_state

SV Information
*                                   Type:LdName1   (---)   snap/state
[YYYY/MM/DD hh:mm:ss] link_sts
*                                   Type:LdName2   (-1)  snap/state
[YYYY/MM/DD hh:mm:ss] link_sts
                                    Type:LdName3   (-m)  snap/state
[YYYY/MM/DD hh:mm:ss] link_sts
                                    Type:LdName4   (-n)  snap/state
[YYYY/MM/DD hh:mm:ss] link_sts

C:\>
```

Description of messages:

- BV Information
  The BV information is displayed.
  LD Name Logical disk name
  Type OS type
  Volume NameMount point volume name
  Special File: Special file name
  State: BV state
  - normal: Normal
  - restore fault: Restore fault
  - SV fault: Snapshot fault
  - SV Information

A summary of the generation (SV) information for the BV is displayed.

If the derived classification is granted to the SV, it is indicated by "".

Type OS type

*LdName1(-n)*Logical disk name (relative generation)

If the snapshot is not active, or if a derived SV does not have a generation number, "---" is displayed for the relative generation.

snap/state [*YYYY/MM/DD hh:mm:ss*]
Displays the snapshot operation state.
If the state is snap/active, rst/exec, rst/suspended, or rst/preparing, the snapshot creation time of the specified SV is displayed.

- snap/activeSnapshot active
- snap/inactiveSnapshot inactive
- rst/execRestore execution
- rst/suspendedRestore suspended
- snap/deletingDeleting
- snap/faultSnapshot fault
- rst/preparingRestore preparing
- snap/preparingSV preparing
- snap/prepare-faultSV prepare fault
- *link_sts*Displays the link status.
  - linkLink established
  - unlinkLink not established

The SVs are displayed in the following order.

- Snapshot fault (snap/fault)
- Restore suspended (rst/suspended)
- SV prepare fault (snap/prepare-fault)
- Snapshots created (snap/active, rst/exec, and rst/preparing) in descending order of snapshot creation time
- Snapshot deleting (snap/deleting)
- Snapshot inactive (snap/inactive)
- SV preparing (snap/preparing)

[Usage]

The detailed information about the generation that is defined as BV dev001 is displayed.

```
#iSMsc_query -bv dev001 -bvflg ld -detail

BV Information
                                LD Name    : dev001
                                Type   : NX
                                Special File : /dev/rdsk/c0t1d0
                                State  : normal

Pair Information
                                SV:LD Name   : dev101
                                 Type  : NX
                                 Generation(Attribute)  : -1 (Normal)
                                 Snap State : snap/active  [2001/06/03
13:37:24]
                                 Create Start Time   : 2001/06/03 13:37:24
                                 Processing Data Size   : 0 KB
                                 Snapshot Data Size : 32 KB
                                 SV Guard  : on
                                 Link Status    : link
                                 LV:LD Name   : dev201
                                 Type     : NX
                                 Special File   : /dev/rdsk/c0t3d0
                                 LV Access   : rw

#
```

A summary of the information about the generation that is defined as BV dev002 is displayed.

```
# iSMsc_query -bv dev002 -bvflg ld -summary

BV Information
                                    LD Name    : dev002
                                    Type   : NX
                                    Special File : /dev/rdsk/c0t2d0
                                    State  : normal

SV Information
*                                   NX:dev102  ( -1) rst/exec  [2003/08/18
23:58:01]
                                    link
                                    NX:dev103  ( -2) snap/active    [2003/08/18
21:00:19]
                                    link
                                    NX:dev101  (---) snap/inactive     unlink


#
```

The SV corresponding to the target BV must be bound in advance.

The following notes do not apply to joint operation with SnapSAN Manager.

- The volume list must not be being created.
- When specifying the combination of a volume group or a disk group with a special file name (logical disk name), the same number of logical volumes as those constituting a volume group or disk group must be specified to BV(SV) on the side where the special file name (logical disk name) is specified. In this case, the snapshot status is displayed in the specified order.
- When a volume group is specified, the target volume group must be active.
- When a disk group is specified, the target disk group must be active.
- The SnapSAN Manager-only special file must not be being created for Linux.

[Return Values]

0: The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

Link Operations

iSMsc_link

[Name]
   iSMsc_link

Establishes an LV link.

[Synopsis]

```
iSMsc_link  -lv volume -lvflg lv_flg
-bv volume -bvflg bv_flg
[-lvacc lv_access]
iSMsc_link  -lv volume -lvflg lv_flg
-sv volume -svflg sv_flg
[-lvacc lv_access]
iSMsc_link  -file file_name
[-lvacc lv_access]
iSMsc_link  -ver
iSMsc_link  -help(UNIX)
iSMsc_link  -?(Windows)
```

[Description]

The `iSMsc_link` command establishes a link from a specified LV to a specified volume.

The target volume must be registered in advance in the link control list (LCL).

Options

The iSMsc_link command recognizes the following options.

- -lv *volume*

  Specify the volume of the LV.
  As the volume, specify a logical disk name.

- `-lvflg lv_flg`

  Specify the type of the volume specified in -lv.
  In *lv_flg*, one of the following can be specified.

ldLogical disk name

This argument must be specified together with -lv.

- -bv *volume*

  When linking the volume as the BV, specify the volume of the BV.
  As the volume, specify a logical disk name, special file name, drive letter, mount point volume name, or NTFS folder name.
  If the volume specified in this option is not the BV, the command terminates abnormally.

- -bvflg *bv_flg*

  Specify the type of the volume specified in -bv.
  In *bv_flg*, one of the following can be specified.

ldLogical disk name

<For UNIX>

sfnSpecial file name

<For Windows>

- drvDrive letter
- mvolMount point volume name
- mdirNTFS folder name

This argument must be specified together with -bv.

- -sv *volume*

    Specify the volume of the SV.
    As the volume, specify an SV logical disk name or BV volume name + relative generation.
    If the volume specified in this option is not the SV, the command terminates abnormally.

- -svflg *sv_flg*

    Specify the type of the volume specified in -sv.
    In *sv_flg*, one of the following can be specified.

ldLogical disk name

ld.relgen BV logical disk name + relative generation

<UNIX>

sfn.relgen BV special file name + relative generation

<Windows>

- drv.relgen BV drive letter + relative generation

- mvol.relgen BV mount point volume name + relative generation

    mdir.relgen BV NTFS folder name + relative generation
    This argument must be specified together with -sv.
    For a derived SV without a generation number, only ld (logical disk name) can be specified.

- -lvacc *lv_access*

    Specify the LV access restrictions.

    In *lv_access*, one of the following can be specified.

- rw The LV can be accessed for both input and output

- ro The LV can be accessed for reference only

- nr The LV cannot be accessed

    If this argument is omitted, the command behaves in the same way as when rw is specified.

- -file *file_name*

    Specify sets of BVs and SVs in `file_name` if it is necessary to specify more than one set. If an error occurs with any set when multiple sets are specified, an error message is output and the processing continues until all specified sets are done.

- `-ver` Displays the version information of this command.

- `-help` Displays the usage of this command (for UNIX system).

- `-?` Displays the usage of this command (for Windows system).

[Displayed Information]

Upon normal termination of the link establishment, the following information is displayed.

```
C:\>iSMsc_link -lv ld_name -lvflg ld   -sv ld_name -svflg ld

iSMsc_link:Info:                iSM20020: iSMsc_link has normally
terminated.

C:\>
```

Description of messages:

iSMsc_link:Info: iSM20020: iSMsc_link has normally terminated.

Displays the command execution result.

[Usage]

The link is established with an LV and a BV specified.

(Individual specification)

```
C:\>iSMsc_link -lv LV01 -lvflg ld -bv BV01 -bvflg ld

iSMsc_link:Info:                iSM20020: iSMsc_link has normally
terminated.

C:\>
```

The link is established with an LV and an SV specified.
(Individual specification)

```
C:\>iSMsc_link -lv LV01 -lvflg ld -sv SV01 -svflg ld

iSMsc_link:Info:                iSM20020: iSMsc_link has normally
terminated.

C:\>
```

The link is established with an LV and an SV (BV + relative generation) specified.

(Individual specification)

```
C:\>iSMsc_link -lv LV01 -lvflg ld -sv BV01.-3 -svflg ld.relgen

iSMsc_link:Info:                iSM20020: iSMsc_link has normally
terminated.

C:\>
```

The link is established through batch specification.

(Batch specification)

```
C:\>iSMsc_link -file volume_file

iSMsc_link:Info:              iSM20020: iSMsc_link has normally
terminated.

iSMsc_link:Info:              iSM20020: iSMsc_link has normally
terminated.

iSMsc_link:Info:              iSM20020: iSMsc_link has normally
terminated.

C:\>
```

If part of the operation fails while the link is established through batch specification.

(Batch specification)

```
C:\>iSMsc_link -file volume_file

iSMsc_link:Info :             iSM20020: iSMsc_link has normally
terminated.

iSMsc_link:Error:             iSM20022: iSMsc_link has abnormally
terminated.

iSMsc_link:Info :             iSM20020: iSMsc_link has normally
terminated.

C:\>
```

- The target volume must be registered in advance in the link control list.
- The logical disk capacity and OS type of the specified LV must match those of the destination-volume.
- The specified LV has not been linked.
- The specified destination-volume has not been linked.
- The specified destination-volume must be a BV or SV.
- If the specified destination-volume is an SV, the operation state on the destination SV must be the Snapshot active state.
- If the specified destination-volume is a BV, it must not be being restored or prepared for restoration.
- If the specified destination-volume is a BV, the replication status must not be Replicate Preparing, Restore Preparing, or Separate Preparing.
- If the specified destination-volume is paired as RV for replication, replication state must be the Separated state.
- If the specified destination-volume is a BV, it must not be in the update prevention state.

- Data of the target BV is not in the data migration state (that is, the target BV is neither a source- nor destination-volume for the data migration).
- The disk array storing the target volume must not be in the freeze state.

The following notes do not apply to joint operation with SnapSAN Manager.

- The target LV must be a volume controlled by the local host.
- The volume list must not be being created.
- The SnapSAN Manager-only special file must not be being created for Linux.

[Return Values]

0: The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

iSMsc_unlink

[Name]

```
iSMsc_unlink
```

Releases an LV link.

[Synopsis]

```
iSMsc_unlink -lv volume -lvflg lv_flg
[-bv volume -bvflg bv_flg]
iSMsc_unlink -lv volume -lvflg lv_flg
[-sv volume -svflg sv_flg]
iSMsc_unlink -file file_name
iSMsc_unlink -ver
iSMsc_unlink -help(UNIX)
iSMsc_unlink -?(Windows)
```

[Description]

The iSMsc_unlink command releases the link to the volume set for a specified LV.

Options

The iSMsc_unlink command recognizes the following options.

- -lv *volume*
  Specify the volume of the LV.As the volume, specify a logical disk name.
- -lvflg *lv_flg*
  Specify the type of the volume specified in -lv.
  In *lv_flg*, the following can be specified.

ldLogical disk name

This argument must be specified together with -lv.

- -bv *volume*
  Specify the volume of the BV. As the volume, specify a logical disk name, special file name, drive letter, mount point volume name, or NTFS folder name.
  If this argument is omitted, the command releases the link to the currently linked

volume.
If the volume specified in this option is not the BV, the command terminates abnormally.

- -bvflg bv_flg

  Specify the type of the volume specified in -bv.In *bv_flg*, one of the following can be specified.

ldLogical disk name

<For UNIX>

sfnSpecial file name

<For Windows>

- drv Drive letter
- mvol Mount point volume name
- mdir NTFS folder name

  This argument must be specified together with -bv.

- -sv *volume*

  Specify the volume of the SV.
  As the volume, specify an SV logical disk name or BV volume name + relative generation.If this argument is omitted, the command releases the link to the currently linked volume.If the volume specified in this option is not the SV, the command terminates abnormally.

- -svflg *sv_flg*

  Specify the type of the volume specified in -sv.
  In *sv_flg*, one of the following can be specified.

ldLogical disk name

ld.relgenBV logical disk name + relative generation

<For UNIX>

sfn.relgenBV special file name + relative generation

<For Windows>

- drv.relgenBV drive letter + relative generation
- mvol.relgenBV mount point volume name + relative generation
- mdir.relgenBV NTFS folder name + relative generation

  This argument must be specified together with -sv. For a derived SV without a generation number, only ld (logical disk name) can be specified.

- -file *file_name*

  Specify sets of BVs and SVs in *file_name* if it is necessary to specify more than one set. If an error occurs with any set when multiple sets are specified, an error message is output and the processing continues until all specified sets are done.

- -help Displays the usage of this command (for UNIX system).
- -? Displays the usage of this command (for Windows system).

[Displayed Information]

Upon normal termination of the link release operation, the following information is displayed.

```
C:\>iSMsc_unlink -lv ld_name -lvflg ld

iSMsc_unlink:Info                : iSM20030:iSMsc_unlink has normally
terminated.

C:\>
```

Description of messages:

iSMsc_unlink:Info: iSM20030: iSMsc_unlink has normally terminated.

Displays the command execution result.

[Usage]

Release the link with an LV specified.

(Individual specification)

```
C:\>iSMsc_unlink -lv LV01 -lvflg ld

iSMsc_unlink:Info                : iSM20030:iSMsc_unlink has normally
terminated.

C:\>
```

Release the link with an LV and a BV specified.

(Individual specification)

```
C:\>iSMsc_unlink -lv LV01 -lvflg ld -bv BV01 -bvflg ld

iSMsc_unlink:Info                : iSM20030:iSMsc_unlink has normally
terminated.

C:\>
```

Release the link with an LV and an SV specified.

(Individual specification)

```
C:\>iSMsc_unlink -lv LV01 -lvflg ld -sv SV01 -svflg ld

iSMsc_unlink:Info            : iSM20030:iSMsc_unlink has normally
terminated.

C:\>
```

Release the link through batch specification.

(Batch specification)

```
C:\>iSMsc_unlink -file volume_file

iSMsc_unlink:Info            : iSM20030:iSMsc_unlink has normally
terminated.

iSMsc_unlink:Info            : iSM20030:iSMsc_unlink has normally
terminated.

iSMsc_unlink:Info            : iSM20030:iSMsc_unlink has normally
terminated.

C:\>
```

If part of the operation fails while the link release operation is performed through batch specification

(Batch specification)

```
C:\>iSMsc_unlink -file volume_file

iSMsc_unlink:Info            : iSM20030:iSMsc_unlink has normally
terminated.

iSMsc_unlink:Info            : iSM20032:iSMsc_unlink has abnormally
terminated.

iSMsc_unlink:Info            : iSM20030:iSMsc_unlink has normally
terminated.

C:\>
```

[Notes]

- The specified volume must be linked.
- The disk array storing the target volume must not be in the freeze state.
- The specified LV must be unmounted from the host (for UNIX).

The following notes do not apply to joint operation with SnapSAN Manager.

- The target LV must be registered in the volume list.
- The volume list must not be being created.
- The SnapSAN Manager -only special file must not be being created for Linux.

[Return Values]

0: The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

iSMsc_linkinfo

[Name]
```
iSMsc_linkinfo
```
Displays the LV link information.

[Synopsis]
```
iSMsc_linkinfo -vol volume -volflg vol_flg [-lcl]
iSMsc_linkinfo -file file_name [-lcl]
iSMsc_linkinfo -ver
iSMsc_linkinfo -help(UNIX)
iSMsc_linkinfo -?(Windows)
```

[Description]

The iSMsc_linkinfo command displays the link information of the specified volume.

Options

The iSMsc_linkinfo command recognizes the following options.

- -vol volume

  Specify the volume of the LV or the destination-volume.

  As the volume, specify a logical disk name, special file name, drive letter, mount point volume name, or NTFS folder name.

  As the destination-volume, a BV or SV can be specified. Also, as the SV, specify an SV logical disk name or a BV volume name + relative generation.

- -volflg vol_flg

  Specify the type of the volume specified in -vol.

  In vol_flg, one of the following can be specified.

ld Logical disk name

ld.relgen BV logical disk name + relative generation

<For UNIX only>

- sfn Special file name
- sfn.relgen BV special file name + relative generation

<For Windows only>

- drv Drive letter
- mvol Mount point volume name

- mdir NTFS folder name
- drv.relgen BV drive letter + relative generation
- mvol.relgen BV mount point volume name + relative generation
- mdir.relgen BV NTFS folder name + relative generation

This argument must be specified together with -vol.

- -file file_name
  Specify sets of BVs and SVs in file_name if it is necessary to specify more than one set.

Snapshot Operation File

If an error occurs with any set when multiple sets are specified, an error message is output and the processing continues until all specified sets are done.

- -lcl Displays a list of volumes that can be linked from the specified volume.
- -ver Displays the version information of this command.
- -help Displays the usage of this command (for UNIX system).
- -? Displays the usage of this command (for Windows system).

[Displayed Information]

On the Windows system

If the volume specified in the -vol option is an LV, the command displays a summary list of the volumes (BVs or SVs) that can be linked from the LV specified in the -lcl option.

```
C:\>iSMsc_linkinfo -vol lv_ld_name -volflg ld -lcl

                        Specified Volume Information
                        aa: LD Name   : lv_ld_name
                         Type : lv _type
                         Volume Name: volume_name
                         Path : path
                         State : link_sts (ld_name)
                         Mode: access_mode

                        Destination Volume Information
                         bb:ld_name   type  link_state (ld_name)
                        access_mode
                         bb:ld_name   type  link_state (ld_name)
                        access_mode

C:\>
```

Description of messages:

Specified Volume Information

Displays the information of the specified volume.

aa Displays the type (LV) of the specified volume.

LD Name Logical disk name

Type OS type

Volume Name Mount point volume name

Path NTFS folder name

State Link state

- link Linked
- - unlink Not linked

If the link state is "link", the logical disk name of the destination-volume is also displayed.

Mode Access restrictions of the source volume

- rw Both input and output allowed
- ro Only reference allowed
- nr Access not allowed

If the link is not established, "-" is displayed.

Destination Volume Information

If the specified volume is an LV, the information of the destination-volume (BV or SV) is displayed.

bb Displays the type (BV/SV) of the destination-volume.

ld_name Logical disk name

type OS type

link_state Link state

- link Linked
- unlink Not linked

If the link state is "link", the logical disk name of the source volume is also displayed.

access_mode Access restrictions of the destination-volume

- rw Both input and output allowed
- nr Access not allowed

If the volume specified in the -vol option is an LV, the command displays the link information of the specified LV.

```
C:\>iSMsc_linkinfo -vol lv_ld_name -volflg ld

                              Specified Volume Information
                         aa: LD Name   : lv_ld_name
                           Type : lv _type
                           Volume Name: volume_name
                           Path : path
                           State : link_sts (ld_name)
                           Mode: access_mode

C:\>
```

Description of messages:

Specified Volume Information

Displays the information of the specified volume.

aa Displays the type (LV) of the specified volume.

LD Name Logical disk name

Type OS type

Volume Name Mount point volume name

Path NTFS folder name

State Link state

- link Linked
- unlink Not linked

If the link state is "link", the logical disk name of the destination-volume is also displayed.

Mode Access restrictions of the source volume

- rw Both input and output allowed
- ro Only reference allowed
- nr Access not allowed

If the link is not established, "-" is displayed.

If the volume specified in the -vol option is the destination-volume, the command displays a list of the volumes (LVs) that can be linked to the destination-volume specified in the -lcl option.

```
C:\>iSMsc_linkinfo -vol sv_ld_name -volflg ld -lcl

                              Specified Volume Information
                              aa: LD Name   : sv_ld_name
                               Type : sv_type
                               Volume Name: volume_name
                               Path : path
                               State : link_sts (ld_name)
                               Mode: access_mode

                              Destination Volume Information
                               bb:ld_name    type  link_state  (ld_name)
                              access_mode
                               bb:ld_name    type  link_state  (ld_name)
                              access_mode
                               bb:ld_name    type  link_state  (ld_name)
                              access_mode

C:\>
```

Description of messages:

Specified Volume Information

Displays the information of the specified volume.

aa Displays the type (BV/SV) of the specified volume.

LD Name Logical disk name

Type OS type

Volume Name Mount point volume name

Path NTFS folder name

State Link state

- link Linked

- unlink Not linked

If the link state is "link", the logical disk name of the source volume is also displayed.

Mode Access restrictions of the destination-volume

- rw Both input and output allowed
- nr Access not allowed

Destination Volume Information

If the specified volume is the destination-volume, the LV information is displayed.

bb Indicates a link-volume (LV).

ld_name Logical disk name

type OS type

link_state Link state

- link Linked
- unlink Not linked

If the link state is "link", the logical disk name of the source volume is also displayed.

access_mode Access restrictions of the source volume

- rw Both input and output allowed
- ro Only reference allowed
- nr Access not allowed

If the link is not established, "-" is displayed.

If the volume specified in the -vol option is the destination-volume, the command displays the link information of the specified destination-volume.

```
C:\>iSMsc_linkinfo -vol sv_ld_name -volflg ld

                        Specified Volume Information
                        aa: LD Name  : sv_ld_name
                         Type : sv_type
                         Volume Name: volume_name
                         Path : path
                         State    : link_sts (ld_name)
                         Mode: access_mode

C:\>
```

Description of messages:

Specified Volume Information

Displays the information of the specified volume.

aa Displays the type (BV/SV) of the specified volume.

LD Name Logical disk name

Type OS type

Volume Name Mount point volume name

Path NTFS folder name

State Link state

- link Linked
- unlink Not linked

If the link state is "link", the logical disk name of the source volume is also displayed.

Mode Access restrictions of the destination-volume

- rw Both input and output allowed
- nr Access not allowed

On the UNIX system

If the volume specified in the -vol option is an LV, the command displays a summary list of the volumes (BVs or SVs) that can be linked from the LV specified in the -lcl option.

```
#iSMsc_linkinfo -vol lv_ld_name -volflg ld -lcl

                        Specified Volume Information
                        aa: LD Name  : lv_ld_name
                         Type : lv_type
                         Special File  : special_file_name
                         State : link_sts (ld_name)
                         Mode: access_mode

                        Destination Volume Information
                         bb:ld_name   type  link_state  (ld_name)
                        access_mode
                         bb:ld_name   type  link_state  (ld_name)
                        access_mode

#
```

Description of messages:

Specified Volume Information

Displays the information of the specified volume.

aa Displays the type (LV) of the specified volume.

LD Name Logical disk name

Type OS type

Special File Special file name

State Link state

- link Linked
- unlink Not linked

If the link state is "link", the logical disk name of the destination-volume is also displayed.

Mode Access restrictions of the source volume

- rw Both input and output allowed
- ro Only reference allowed
- nr Access not allowed

If the link is not established, "-" is displayed.

Destination Volume Information

If the specified volume is an LV, the information of the destination-volume (BV or SV) is displayed.

bb Displays the type (BV/SV) of the destination-volume.

ld_name Logical disk name

type OS type

link_state Link state

- link Linked
- unlink Not linked

If the link state is "link", the logical disk name of the source volume is also displayed.

access_mode Access restrictions of the destination-volume

- rw Both input and output allowed
- nr Access not allowed

If the volume specified in the -vol option is an LV, the command displays the link information of the specified LV.

```
#iSMsc_linkinfo -vol lv_ld_name -volflg ld -lcl

                              Specified Volume Information
                              LV:LD Name   : lv_ld_name
                               Type : lv_type
                               Special File   : special_file_name
                               State : link_sts (ld_name)
                               Mode: access_mode


#
```

Description of messages:

Specified Volume Information

Displays the information of the specified volume.

aa Displays the type (LV) of the specified volume.

LD Name Logical disk name

Type OS type

Special File Special file name

State Link state

- link Linked
- unlink Not linked

If the link state is "link", the logical disk name of the destination-volume is also displayed.

Mode Access restrictions of the source volume

- rw Both input and output allowed
- ro Only reference allowed
- nr Access not allowed

If the link is not established, "-" is displayed.

If the volume specified in the -vol option is the destination-volume, the command displays a list of the volumes (LVs) that can be linked to the destination-volume specified in the -lcl option.

```
#iSMsc_linkinfo -vol sv_ld_name -volflg ld -lcl

                              Specified Volume Information
                              aa: LD Name   : sv_ld_name
                               Type     : sv_type
                               Special File   : special_file_name
                               State : link_sts (ld_name)
                               Mode: access_mode

                              Destination Volume Information
                               bb:ld_name   type   link_state  (ld_name)
                              access_mode
                                bb:ld_name   type   link_state  (ld_name)
                              access_mode
                                bb:ld_name   type   link_state  (ld_name)
                              access_mode

#
```

Description of messages:

Specified Volume Information

Displays the information of the specified volume.

aa Displays the type (BV/SV) of the specified volume.

LD Name Logical disk name

Type OS type

Special File Special file name

State Link state

- link Linked
- unlink Not linked

If the link state is "link", the logical disk name of the source volume is also displayed.

Mode Access restrictions of the destination-volume

- rw Both input and output allowed
- nr Access not allowed

Destination Volume Information

If the specified volume is the destination-volume, the LV information is displayed.

bb Indicates a link-volume (LV).

ld_name Logical disk name

type OS type

link_state Link state

- link Linked

- unlink Not linked

If the link state is "link", the logical disk name of the source volume is also displayed.

access_mode Access restrictions of the source volume

- rw Both input and output allowed
- ro Only reference allowed
- nr Access not allowed

If the link is not established, "-" is displayed.

If the volume specified in the -vol option is the destination-volume, the command displays the link information of the destination-volume.

```
#iSMsc_linkinfo -vol sv_ld_name -volflg ld

                          Specified Volume Information
                          aa: LD Name   : sv_ld_name
                           Type : sv_type
                           Special File   : special_file_name
                           State : link_sts (ld_name)
                           Mode: access_mode

#
```

Specified Volume Information

Displays the information of the specified volume.

aa Displays the type (BV/SV) of the specified volume.

LD Name Logical disk name

Type OS type

Special File Special file name

State Link state

- link Linked
- unlink Not linked

If the link state is "link", the logical disk name of the source volume is also displayed.

Mode Access restrictions of the destination-volume

- rw Both input and output allowed
- nr Access not allowed

[Usage]

The usage example assumes the following relationship between the LV and the destination-volume.

LV1(ldn_l1) BV1(ldn_bv1)

LV2(ldn_l2) SV1(ldn_sv1)

LV3(ldn_l3)
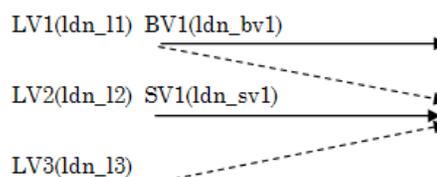
- Shown within the parentheses is a logical disk name.
- A solid line represents the currently established link.
- A dotted line represents the relationship registered as information in the link control list (LCL).
- The command is executed with a particular LV (LV1) specified.

```
#iSMsc_linkinfo -vol ldn_l1 -volflg ld -lcl

                         Specified Volume Information
                         LV:LD Name  : ldn_l1
                          Type : NX
                          Special File   : /dev/rdsk/c16t1d1
                          State : link (ldn_bv1)
                          Mode: rw

                         Destination Volume Information
                         BV:ldn_bv1      NX   link  (ldn_l1) rw
                         SV:ldn_sv1      NX   link  (ldn_l2) rw

#
```

Description of messages:

- LV1 is registered to be linked with BV1 and SV1.
- LV1 is currently linked with BV1.
- SV1 is currently linked from LV2.

The command is executed with a particular destination-volume (SV1) specified.

```
#iSMsc_linkinfo -vol ldn_sv1 -volflg ld

                         Specified Volume Information
                         SV:LD Name   : ldn_sv1
                          Type : NX
                          Special File   : -
                          State    : link (ldn_l2)
                          Mode: rw

#
```

Description of messages:

SV1 is currently linked from LV2.

A list is displayed using the -lcl option, with a particular destination-volume (SV1) specified.

```
#iSMsc_linkinfo -vol ldn_sv1 -volflg ld -lcl

                              Specified Volume Information
                              SV:LD Name  : ldn_d2
                               Type : NX
                               Special File   : -
                               State    : link (ldn_l2)
                               Mode: rw

                              Destination Volume Information
                               LV:ldn_l1        NX link (ldn_bv1)  rw
                               LV:ldn_l2        NX link (ldn_sv1)  rw
                               LV:ldn_l3        NX unlink    -

#
```

An LV or link-permitted volume must be specified as the target volume.

The following note does not apply to joint operation with SnapSAN Manager.

- The volume list must not be being created.
- The SnapSAN Manager-only special file must not be being created for Linux.

[Return Values]

0: The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

[Usage]

The detailed information about the generation that is defined as BV dev001 is displayed.

WORM Function

Operation File

To perform batch setting of paired volumes by a WORM function command with the -file option, use the WORM operation file.

The WORM operation file is described below.

[File Location And Name]

Can be freely specified.

[Description]

The WORM operation file is used to perform batch setting of multiple pairs by using a data replication command.

[Synopsis]

This file is described in the following synopsis:

```
VOL_Type:VOL
```

To describe the target volume, use a colon (:) to connect the volume type (VOL_Type) with the volume identifier (VOL).

Specifying volume types

The following values can be specified as a volume type (VOL_Type) by using either a numerical value or a character string.

Volume Types (VOL_Type)

Target Volume	Volume Types		Target System	
	By Number	By Characters	Windows	UNIX
Logical disk name	0	ld	✔	✔
Special file name	1	sfn	-	✔
Physical disk number	3	dskn	✔	-
Mount point volume name	6	mvol	✔	-

Specifying a Volume

Specify the name of the target volume that has an attribute specified as a volume type.

The maximum number of characters is as follows:

Target Volume	Maximum Number of Characters
Logical disk name	32 single-byte characters
Special file name	
Physical disk number	3 single-byte characters (0 to 255)
Mount point volume name	52 single-byte characters

Rules

- Start description from the first column of the line.
- A line break shall be a partition of records.
- Up to 1,024 single-byte characters can be described per record.
- One volume can be described per record.
- Text displayed from the sharp (#) character to the end of the record is recognized as a comment.
- If there is an error in the file syntax, operations to all volumes described in the file become invalid.

The following is an example of a description of a volume in the WORM operation file:

On the Windows system

```
#Type:VOL
ld:dev000
0:dev001
ld:dev006
mvol:\\?\Volume{c621c48b-1234-11d8-5678-00e018fa017d}
dskn:12
```

On the Linux system

```
#Type:VOL
ld:dev000
0:dev001
sfn:/dev/sdd
1:/dev/sdf
ld:dev002
```

WORM Operation

iSMpc_protect

[Name]

    iSMpc_protect

Sets or changes the WORM settings

[Synopsis]

    iSMpc_protect-vol volume -volflg vol_flg
    [-set protection_state]
    [-expire expire_time]
    [-mode retention_mode]
    iSMpc_protect -file file_name
    [-set protection_state]
    [-expire expire_time]
    [-mode retention_mode]
    iSMpc_protect -ver
    iSMpc_protect -help (Linux)
    iSMpc_protect -? (Windows)

[Description]

The iSMpc_protect command sets or changes the WORM settings.

Options

The `iSMpc_protect` command recognizes the following options.

- -vol *volume*

Specifies volume name

The logical disk name or the physical disk number or the mount point volume name can be specified in `volume`.

- -volflg *vol_flg*

Specify the volume type specified in `-vol` by `vol_flg`.

One of the following can be specified.

ldLogical disk name

<For Linux only>

- sfnSpecial file name

<For Windows only>

- dsknPhysical disk number
- mvolMount point volume name
  This argument must be specified with `-vol`.
- -set *protection_state*

Specifies protection state

One of the following can be specified in `protection_state`.

- ro   Sets protection state to ReadOnly

- na   Sets protection state to NotAccessible

If the current retention mode is normal or secure, protection state can be changed to either ro or na. If the current retention mode is strict, protection state cannot be changed.
If this argument is omitted, protection state will be set to ro if the target volume is not protected, or remains unchanged if the target volume is being protected.

- -expire *expire_time*

Specifies retention period

One of the following can be specified in `expire_time`.

`YYYYMMDD`

- Specifies year, month, date of the retention date.
- A maximum year of 9999 can be specified.
  - Do not omit zeros.
- A month of 01-12 can be specified.
  - Do not omit zeros.
- A date of 01-12 can be specified.
  - Do not omit zeros.

`+[xxY][xxM][xxxD]`

- Specifies year, month, day of the retention period.
- The retention date is the current date plus the specified retention period.
- A maximum number of 99 years can be specified. Add a character of 'Y' or 'y' after the number.
- A maximum number of 99 months can be specified. Add a character of 'M' or 'm' after the number.
- A maximum number of 999 days can be specified. Add a character of 'D' or 'd' after the number.

Permanent

- Retention will not expire.
- Retention expires at 24:00 on the specified retention date.
- If the current retention mode is normal, retention period can either be shortened or lengthened.
  - If the current retention mode is secure, retention period can only be lengthened.
  - If the current retention mode is strict, retention period cannot be changed.
- If this argument is omitted, retention period will be set to zero if the target volume is not protected, or remains unchanged if the target volume is being protected.
  - For example, if +3y6m is specified at April 1, 2005, the retention date is set to October 1, 2008. If +1m is specified at January 31,2005, the retention date is set to February 28, 2005.
- -mode `retention_mode`

Specifies retention mode.
One of the following can be specified in `retention_mode`.

- normalnormal mode
- securesecure mode

- strictstrict mode
- If the current retention mode is normal, retention mode can be changed to either secure or strict.
  - If the current retention mode is secure, retention mode can be changed to strict.
  - If the current retention mode is strict, retention mode cannot be changed.

If this argument is omitted, retention mode will be set to normal if the target volume is not protected, or remains unchanged if the target volume is being protected.

- -file *file_name*

To specify multiple volumes, describe the volume names in `file_name`.
For the description format of `file_name`, refer to ""。
When multiple volumes are specified, if an error occurs in some volumes, the process is continued until it is terminated in all the specified volumes.

- `-ver` Displays the version information of this command.
- `-help` Displays the usage of this command (Linux).
- `-?` Displays the usage of this command (Windows).

[Displayed Information]

On the Windows system

Upon normal termination of the WORM setting, the command displays the following information.

(Individual specification)

```
C:\>iSMpc_protect -vol ld-name -volflg ld -set ro -expire YYYYMMDD -mode
secure

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:ld-name
 Protection State: RO
 Retention Mode : secure
 Begin Date   : YYYY/MM/DD
 Retention Date : YYYY/MM/DD

C:\>
```

Description of messages:

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.

Message indicating that the WORM setting has normally terminated

- VOL:ld-name
- Protection State: RO
- Retention Mode: secure
- Begin Date: YYYY/MM/DD
- Retention Date : YYYY/MM/DD

The name of volume to be protected, protection state, retention mode, begin date, and retention date are displayed.

Upon abnormal termination of the WORM setting, the command displays the following information.

(Individual specification)

```
C:\> iSMpc_protect -vol ld-name -volflg ld -set ro -expire YYYYMMDD -mode
secure

iSMpc_protect:   Error:   iSM21100:Specified volume cannot be protected. VOL:
ld-name
iSMpc_protect:   Info: iSM21012:iSMpc_protect has abnormally terminated.

C:\>
```

Description of messages:

The following error messages are output.

- iSMpc_protect:Error:iSM21100: Specified volume cannot be protected. VOL: ld-name
- iSMpc_protect:Info: iSM21012: iSMpc_protect has abnormally terminated.

Message indicating that the WORM setting has abnormally terminated

Upon normal termination of the WORM changing, the command displays the following information.

(Individual specification)

```
C:\>iSMpc_protect -vol ld-name -volflg ld -set na -expire YYYYMMDD -mode
strict

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
 VOL:ld-name
 Before change:
    Protection State: RO
    Retention Mode    : secure
    Begin Date   : YYYY/MM/DD
    Retention Date : YYYY/MM/DD
 After change:
    Protection State: NA
    Retention Mode : strict
    Begin Date   : YYYY/MM/DD
    Retention Date : YYYY/MM/DD

C:\>
```

Description of messages:

```
iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
```

Message indicating that changing the WORM setting has normally terminated

- VOL: ld-name
- Before change:
- Protection State: RO
- Retention Mode: secure
- Begin Date: YYYY/MM/DD
- Retention Date: YYYY/MM/DD
- After change:
- Protection State: NA
- Retention Mode: strict
- Begin Date: YYYY/MM/DD
- Retention Date: YYYY/MM/DD

The name of volume to be protected, protection state before and after changing the WORM setting, retention mode, begin date, and retention date are displayed.

Upon abnormal termination of WORM changing, the command displays the following information.

(Individual specification)

```
C:\> iSMpc_protect -vol ld-name -volflg ld -set ro -expire YYYYMMDD -mode
normal

iSMpc_protect:  Error:  iSM21107:The volume's retention mode cannot be
changed. (mode=secure) VOL:ld-name
iSMpc_protect:  Info: iSM21012:iSMpc_protect has abnormally terminated.

C:\>
```

Description of messages:

The following error messages are output.

- iSMpc_protect:Error:iSM21107: The volume's retention mode cannot be changed. (mode=secure) VOL:ld-name
- iSMpc_protect:Info: iSM21012: iSMpc_protect has abnormally terminated.

Message indicating that changing the WORM setting has abnormally terminated

VOL:ld-name

A logical disk name, physical disk number, or mount point volume name of a volume specified at a command line is displayed.

On the Linux system

Upon normal termination of the WORM setting, the command displays the following information.

(Individual specification)

```
#iSMpc_protect -vol ld-name -volflg ld -set ro -expire YYYYMMDD -mode secure

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:ld-name
 Protection State: RO
 Retention Mode    : secure
 Begin Date  : YYYY/MM/DD
 Retention Date : YYYY/MM/DD

#
```

Description of messages:
    iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.

Message indicating that the WORM setting has normally terminated

```
VOL:ld-name
Protection State: RO
Retention Mode: secure
Begin Date: YYYY/MM/DD
Retention Date: YYYY/MM/DD
```

The name of volume to be protected, protection state, retention mode, begin date, and retention date are displayed. Upon abnormal termination of the WORM setting, the command displays the following information.

(Individual specification)

```
#iSMpc_protect -vol ld-name -volflg ld -set ro -expire YYYYMMDD -mode secure

iSMpc_protect:   Error:   iSM21100:Specified  volume cannot be protected. VOL:
ld-name
iSMpc_protect:   Info: iSM21012:iSMpc_protect has abnormally terminated.

#
```

Description of messages:

The following error messages are output.

- iSMpc_protect:Error:iSM21100: Specified volume cannot be protected. VOL: ld-name
- iSMpc_protect:Info: iSM21012: iSMpc_protect has abnormally terminated.

Message indicating that the WORM setting has abnormally terminated

Upon normal termination of the WORM changing, the command displays the following information.

(Individual specification)

```
#iSMpc_protect -vol ld-name -volflg ld -set na -expire YYYYMMDD -mode strict

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:ld-name
Before change:
 Protection State: RO
 Retention Mode : secure
 Begin Date   : YYYY/MM/DD
 Retention Date : YYYY/MM/DD
After change:
 Protection State: NA
 Retention Mode : strict
 Begin Date   : YYYY/MM/DD
 Retention Date : YYYY/MM/DD

#
```

Message indicating that the WORM setting has normally terminated

```
VOL:ld-name
Protection State: RO
Retention Mode: secure
Begin Date: YYYY/MM/DD
Retention Date: YYYY/MM/DD
```

The name of volume to be protected, protection state, retention mode, begin date, and retention date are displayed.

Upon abnormal termination of the WORM setting, the command displays the following information.

(Individual specification)

```
#iSMpc_protect -vol ld-name -volflg ld -set ro -expire YYYYMMDD -mode secure

iSMpc_protect:  Error:  iSM21100:Specified volume cannot be protected. VOL:
ld-name
iSMpc_protect:  Info: iSM21012:iSMpc_protect has abnormally terminated.

#
```

Description of messages:

The following error messages are output.

- iSMpc_protect:Error: iSM21100: Specified volume cannot be protected. VOL: *ld-name*
- iSMpc_protect:Info: iSM21012: iSMpc_protect has abnormally terminated.

Message indicating that the WORM setting has abnormally terminated

Upon normal termination of the WORM changing, the command displays the following information.

(Individual specification)

```
#iSMpc_protect -vol ld-name -volflg ld -set na -expire YYYYMMDD -mode strict

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:ld-name
Before change:
 Protection State: RO
 Retention Mode : secure
 Begin Date   : YYYY/MM/DD
 Retention Date : YYYY/MM/DD
After change:
 Protection State: NA
 Retention Mode : strict
 Begin Date   : YYYY/MM/DD
 Retention Date : YYYY/MM/DD

#
```

Description of messages:

- iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.

Message indicating that changing the WORM setting has normally terminated

```
VOL:ld-name
Before change:
Protection State: RO
Retention Mode: secure
Begin Date: YYYY/MM/DD
Retention Date: YYYY/MM/DD
After change:
Protection State: NA
Retention Mode: strict
Begin Date: YYYY/MM/DD
Retention Date: YYYY/MM/DD
```

The name of volume to be protected, protection state before and after changing the WORM setting, retention mode, begin date, and retention date are displayed.

Upon abnormal termination of the WORM changing, the command displays the following information.

(Individual specification)

```
#iSMpc_protect -vol ld-name -volflg ld -set ro -expire YYYYMMDD -mode normal

iSMpc_protect:  Error:  iSM21107:The volume's retention mode  cannot be
changed. (mode=secure) VOL:ld-name
iSMpc_protect:  Info: iSM21012:iSMpc_protect has abnormally terminated.

#
```

Description of messages:

The following error messages are output.

- iSMpc_protect:Error:iSM21107: The volume's retention mode cannot be changed. (mode=secure) VOL:*ld-name*
- iSMpc_protect:Info: iSM21012: iSMpc_protect has abnormally terminated.

Message indicating that changing the WORM setting has abnormally terminated

[Usage]

Volume vol1 will be protected until January 1, 2008.

```
#iSMpc_protect -vol vol1 -volflg ld -set ro -expire 20080101 -mode secure

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol1
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2008/01/01

#
```

Volume vol2 will be protected for 3 years.

```
#iSMpc_protect -vol vol2 -volflg ld -set ro -expire +3y -mode secure

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol2
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2008/03/01

#
```

Volume vol3 will be protected for 60 days.

```
#iSMpc_protect -vol vol3 -volflg ld -set ro -expire +60d -mode secure

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol3
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2008/04/30

#
```

Volume vol4 will be protected for 3 years, 3 months and 3 days.

```
#iSMpc_protect -vol vol4 -volflg ld -set ro -expire +3y3m3d -mode secure

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol4
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2008/06/04

#
```

Volume vol5 will be protected in normal mode without the retention date specification.

```
#iSMpc_protect -vol vol5 -volflg ld -set ro -mode normal

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol5
 Protection State: RO
 Retention Mode : normal
 Begin Date   : 2005/03/01
 Retention Date : -

#
```

Volume vol6 will be protected indefinitely.

```
#iSMpc_protect -vol vol6 -volflg ld -set ro -expire permanent -mode secure

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol6
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : permanent

#
```

Protection state of volume vol1 is changed to na.

```
C:\>iSMpc_protect -vol vol1 -volflg ld -set na

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol1   [WN]
Before change:
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2008/01/01
After change:
 Protection State: NA
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2008/01/01

#
```

Retention date of volume vol1 is changed to January 1, 2010.

```
#iSMpc_protect -vol vol1 -volflg ld -expire 20100101

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol1
Before change:
 Protection State: NA
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2008/01/01
After change:
 Protection State: NA
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2010/01/01

#
```

Retention mode of volume vol1 is changed to strict.

```
#iSMpc_protect -vol vol1 -volflg ld -mode strict

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol1
Before change:
 Protection State: NA
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2010/01/01
After change:
 Protection State: NA
 Retention Mode : strict
 Begin Date   : 2005/03/01
 Retention Date : 2010/01/01

#
```

Protection state, retention date, and retention mode are changed at the same time.

```
#iSMpc_protect -vol vol2 -volflg ld -set na -expire 20100101 -mode strict

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol2
Before change:
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2008/03/01
After change:
 Protection State: NA
 Retention Mode : strict
 Begin Date   : 2005/03/01
 Retention Date : 2010/01/01

#
```

Two or more volume is specified to be protected at the same time

```
#iSMpc_protect -file volume_file -set ro -expire 20100101 -mode secure

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol8
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2010/01/01

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol9
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2010/01/01

iSMpc_protect:Info: iSM21010: iSMpc_protect has normally terminated.
VOL:vol10
 Protection State: RO
 Retention Mode : secure
 Begin Date   : 2005/03/01
 Retention Date : 2010/01/01

#
```

The end messages are displayed in the order the WORM setting terminates.

The content of volume_file is as follows

```
#Type:VOL
ld:vol8
ld:vol9
ld:vol10
```

- A volume being used by the snapshot function cannot be operated.
- The target volume must be unmounted.
- If the target volume is paired as MV or RV for replication, replication must be in the Separated state.
- A volume that is registered in an ATgroup cannot be operated.
- A volume that is being moved by for performance optimization cannot be operated.
- A volume that is not in use by the power saving function cannot be operated.
- A control volume cannot be operated.
- The target volume must not be a dynamic disk volume (for Windows only).
- The target volume must be registered in the volume list.
- Alternatively, if the target volume is paired as RV for replication, the MV to be paired with the RV must be registered in the volume list.
- The volume list must not be being created or updated.
- The iSM-only special file must not be being created (for Linux only).

[Return Values]

0: The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

iSMpc_release

[Name]

    iSMpc_release

Cancels the WORM settings

[Synopsis]

    iSMpc_release -vol *volume* -volflg *vol_flg*
    [-reinit]
    iSMpc_release -file *file_name*
    [-reinit]
    iSMpc_release -ver
    iSMpc_release -help(Linux)
    iSMpc_release -?(Windows)

[Description]

The `iSMpc_release` command releases protection state of the specified volume. If the target volume is not being used by the data replication function, users may also re-initialize the target volume to clear all data on the volume at protection release. If the current retention mode is normal, protection state can be released at anytime. If the current retention mode is secure or strict, protection state cannot be released within retention period.

Options

The `iSMpc_release` command recognizes the following options.

- vol *volume*

  Specifies volume name.

  The logical disk name or the physical disk number or the mount point volume name can be specified in `volume.`

- volflg *vol_flg*

  Specifies the volume type specified in `-vol` by `vol_flg.`

One of the following can be specified.

ldLogical disk name

<For Linux only>

- sfnSpecial file name

<For Windows only>

- dsknPhysical disk number
- mvolMount point volume name

This argument must be specified with `-vol`.

- reinit

  Reinitializes the volume and clears the data while releasing the WORM.
  This argument cannot be specified for a volume being used by the data replication function. If this argument is omitted, data will not be cleared when protection state is released.

- file *file_name*

    To specify multiple volumes, describe the volume names in *file_name*.
    For the description format of *file_name*, refer to "".
    When multiple volumes are specified, if an error occurs in some volumes, the process is continued until it is terminated in all the specified volumes.

- -ver Displays the version information of this command.

- -help Displays the usage of this command (Linux).

- -? Displays the usage of this command (Windows).

[Displayed Information]

On the Windows system

Upon normal termination of the WORM releasing, the command displays the following information.

(Individual specification)

```
C:\>iSMpc_release -vol ld-name -volflg ld

iSMpc_release:Info: iSM21020: iSMpc_release has normally terminated.
VOL:ld-name
 Reinitialize   : No

C:\>
```

Description of messages:

- iSMpc_release: Info: iSM21010: iSMpc_release has normally terminated.

Message indicating that the WORM releasing has normally terminated

- VOL: ld-name
- Reinitialize: No

The name of volume for which protection is released and whether the volume will be reinitialized or not are displayed.

Upon abnormal termination of the WORM releasing, the command displays the following information.

(Individual specification)

```
C:\>iSMpc_release -vol ld-name -volflg ld

iSMpc_release:   Error:iSM21101:   The volume which is not protected cannot be
specified. VOL:ld-name
iSMpc_release:   Info: iSM21022: iSMpc_release has abnormally terminated.

C:\>
```

Description of messages:

The following error messages are output.

```
iSMpc_protect:Error:iSM21101: The volume which is not protected cannot
be specified. VOL: ld-name
iSMpc_protect:Info: iSM21022: iSMpc_protect has abnormally terminated.
```

Message indicating that the WORM releasing has abnormally terminated

On the Linux system

Upon normal termination of the WORM releasing, the command displays the following information.

(Individual specification)

```
#iSMpc_release -vol ld-name -volflg ld

iSMpc_release:Info: iSM21020: iSMpc_release has normally terminated.
VOL:ld-name
 Reinitialize   : No

#
```

Description of messages:

- iSMpc_release:Info: iSM21010: iSMpc_release has normally terminated.

Message indicating that the WORM releasing has normally terminated

- VOL:ld-name
- Reinitialize: No

The name of volume for which protection is released and whether the volume will be reinitialized or not are displayed.

Upon abnormal termination of the WORM releasing, the command displays the following information.

(Individual specification)

```
#iSMpc_release -vol ld-name -volflg ld

iSMpc_release:   Error:   iSM21101:The volume which is not protected cannot be
specified. VOL:ld-name
iSMpc_release:   Info:  iSM21022:iSMpc_release has abnormally terminated.

#
```

Description of messages:

The following error messages are output.

- iSMpc_protect:Error:iSM21101: The volume which is not protected cannot be specified. VOL: ld-name
- iSMpc_protect:Info: iSM21022: iSMpc_protect has abnormally terminated.

Message indicating that WORM releasing has abnormally terminated

[Usage]

Protection for volume vol1 is released. Its data is not deleted.

```
#iSMpc_release -vol vol1 -volflg ld

iSMpc_release:Info: iSM21020: iSMpc_release has normally terminated.
VOL:vol1
 Reinitialize  : No

#
```

Protection for volume vol1 is released. Its data is deleted.

```
#iSMpc_release -vol vol2 -volflg ld -reinit

iSMpc_release:Info: iSM21020: iSMpc_release has normally terminated.
VOL:vol2
 Reinitialize  : Yes

#
```

Protection for two or more volumes is specified to be released at the same time.

```
#iSMpc_release -file volume_file

iSMpc_release:Info: iSM21020: iSMpc_release has normally terminated.
VOL:vol3
 Reinitialize  : No

iSMpc_release:Info: iSM21020: iSMpc_release has normally terminated.
VOL:vol4
 Reinitialize  : No

iSMpc_release:Info: iSM21020: iSMpc_release has normally terminated.
VOL:vol5
 Reinitialize  : No

#
```

The end messages are displayed in the order the WORM setting terminates.

The content of volume_file is as follows.

```
#Type:VOL
ld:vol3
ld:vol4
ld:vol5
```

- A volume being used by the snapshot function cannot be operated.
- The target volume must be protected.
- The target volume must be unmounted.
- If the target volume is paired as MV or RV for replication, replication must be in the Separated state.
- A volume that is registered in an ATgroup cannot be operated.
- A volume being used by the data replication function cannot be reinitialized.
- A volume that is not in use by the power saving function cannot be operated.

- The target volume must not be a dynamic disk volume (for Windows only).
- The target volume must be registered in the volume list.

Alternatively, if the target volume is paired as RV for replication, the MV to be paired with the RV must be registered in the volume list.

The volume list must not be being created or updated.

The SnapSAN Manager-only special file must not be being created (for Linux only).

[Return Values]

0: The command terminated normally.

1: Operation for all volumes failed.

2: Operation for some volumes failed.

Power Saving Function

Power Saving Operation File

To perform batch setting of volumes by the power saving function command with the -file option, use the power saving operation file.

The power saving operation file is described below.

[File Location And Name]

Can be freely specified.

[Description]

The power saving operation file is used to perform batch setting of multiple volumes by using the power saving command.

[Synopsis]

This file is described in the following synopsis:

```
VOL_Type:VOL
```

To describe the target volume, use a colon (:) to connect the volume type (VOL_Type) with the volume identifier (VOL).

Specifying Volume Types

The following values can be specified as a volume type (VOL_Type) by using either a numerical value or a character string.

Target Volume	Volume Types		Target System	
	By Number	By Characters	Windows	UNIX
Logical Disk Name	0	ld	✓	✓
Special File Name	1	sfn	-	✓
Drive Letter	4	drv	✓	-
Mount Point Volume Name	6	mvol	✓	-
Ntfs Folder Name	7	mdir	✓	-

Specifying a volume

Specify the name of the target volume that has an attribute specified as a volume type.

The maximum number of characters is as follows:

Target Volume	Maximum Number of Characters
Logical disk name	32 single-byte characters
Special file name	
Drive letter	
Mount point volume name	52 single-byte characters
NTFS folder name	260 single-byte characters

Rules

- Start description from the first column of the line.
- A line break shall be a partition of records.
- Up to 1,024 single-byte characters can be described per record.
- One volume can be described per record.
- Text displayed from the sharp (#) character to the end of the record is recognized as a comment.
- If there is an error in the file syntax, all operations to volumes described in the file become invalid.
- If a character string, such as an NTFS folder name, includes a blank space ( ), colon (:), or period (.), enclose the entire character string in double quotation marks (").
- Pool cannot be specified.

The following is an example of a description of a volume in the power saving operation file:

On the Windows system

```
#Type:VOL
ld:vol1
0:vol2
ld:vol3
mvol:\\?\Volume{c621c48b-1234-11d8-5678-00e018fa017d}
```

On the Linux system

```
#Type:VOL
ld:vol1
0:vol2
sfn:/dev/sdd
1:/dev/sdf
ld:vol3
```

Power Saving Operation

[Name]
```
iSMec_start
```
Starts using volumes or starts rotation of a pool

[Synopsis]
```
iSMec_start -vol volume -volflg vol_flg
iSMec_start -file file_name
iSMec_start -pool poolnum -arrayname diskarray [-reset]
iSMec_start -ver
iSMec_start -help(UNIX)
iSMec_start -?(Windows)
```

[Description]

The `iSMec_start` command starts using the specified volume or starts rotation of the specified pool. If the pool to which the specified volume belongs is in the rotation stop state, the command starts rotation of the pool.

Options

The `iSMec_start` command recognizes the following options.

- -vol *volume*

  Specify the volume name.
  A logical disk name, special file name, drive letter, mount point volume name, or NTFS folder name can be specified in `volume`.

- -volflg *vol_flg*

  Specify the volume type specified in `-vol` by `vol_flg`.
  One of the following can be specified.

ldLogical disk name

<For UNIX only>
```
sfnSpecial file name
```

<For Windows only>

- drvDrive letter
- mvolMount point volume name
- mdirNTFS folder name

This argument must be specified with `-vol`.

- `-file file_name`

  To specify multiple volumes, describe the volume names in `file_name`.
  When multiple volumes are specified, if an error occurs in some volumes, an error message is output and the process is continued until it is terminated in all the specified volumes.

- `-pool poolnum`

  Specify the pool.
  For `poolnum`, specify the pool number.

- -arrayname *diskarray*

  Specify the target disk array name (nickname).
  This argument must be specified with -pool.

- -reset

  Changes the use state of the all volumes configured in the specified pool to in use.
  This argument must be specified with -pool.

- -ver Displays the version information of this command.

- -help Displays the usage of this command (UNIX).

- -? Displays the usage of this command (Windows).

[Displayed Information]

On the Windows system

Upon normal termination of the start of using volumes, the command displays the following information.

(Individual specification)

```
C:\>iSMec_start -vol ld-name -volflg ld

iSMec_start:Info: iSM25030: Starting Pool:poolnum Disk Array:diskarray...
iSMec_start:Info: iSM25031: Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:Info: iSM25010: iSMec_start has normally terminated.

C:\>
```

Description of messages:

```
iSMec_start:Info: iSM25030: Starting Pool:poolnum Disk
Array:diskarray...
iSMec_start:Info: iSM25031: Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:Info: iSM25010: iSMec_start has normally terminated.
Message indicating the start of using volumes
Pool:poolnum
```

The pool number of the pool in which the specified volume is configured is displayed.

```
Disk Array:diskarray
```

The disk array name of the disk array in which the specified volume is configured is displayed.

Upon abnormal termination of the start of using volumes, the command displays the following information.

(Individual specification)

```
C:\> iSMec_start -vol ld-name -volflg ld

iSMec_start:  Error:  iSM25103:Specified volume does not exist.
iSMec_start:  Info:   iSM25012:iSMec_start has abnormally terminated.

C:\>
```

Description of messages:

The following error messages are output.

```
iSMec_start:Error:iSM25103: Specified volume does not exist.
iSMec_start:Info: iSM25012: iSMec_start has abnormally terminated.
```

Message indicating abnormal termination of the start of using volumes

Upon normal termination of the rotation start of the pool, the command displays the following information.

```
C:\>iSMec_start -pool poolnum -arrayname diskarray

iSMec_start:   Info: iSM25030:Starting Pool:poolnum Disk Array:diskarray...
iSMec_start:   Info: iSM25031:Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:   Info: iSM25011:iSMec_start has normally terminated.

C:\>
```

Description of messages:

iSMec_start:Info: iSM25030: Starting Pool:*poolnum* Disk Array:*diskarray…*
iSMec_start:Info: iSM25031: Rotation started for pool. Pool:*poolnum*
Disk Array:*diskarray*
iSMec_start:Info: iSM25011: iSMec_start has normally terminated.

Message indicating the rotation start of the pool

- Pool:`poolnum`

   The pool number of the specified pool is displayed.

- Disk Array:`diskarray`

   The disk array name of the disk array in which the specified pool is configured is displayed.

Upon normal termination of the rotation start of the pool with the `-reset` option specified, the command displays the following information.

```
C:\>iSMec_start -pool poolnum -arrayname diskarray -reset

iSMec_start:   Info: iSM25030:Starting Pool:poolnum Disk Array:diskarray...
iSMec_start:   Info: iSM25031:Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:   Info: iSM25032:The use state of all volumes in specified pool will
be reset to in use. Pool:poolnum
iSMec_start:   Info: iSM25010:iSMec_start has normally terminated.

C:\>
```

Description of messages:

```
iSMec_start:Info: iSM25030: Starting Pool:poolnum Disk
Array:diskarray...
iSMec_start:Info: iSM25031: Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:Info: iSM25032: The use state of all volumes in specified
```

```
pool will be reset to in use. Pool:poolnum
iSMec_start:Info: iSM25010: iSMec_start has normally terminated.
Message indicating the rotation start of the pool when the -reset
option is specified
Pool:poolnum
The pool number of the specified pool is displayed.
Disk Array:diskarray
```

The disk array name of the disk array in which the specified pool is configured is displayed.

Upon abnormal termination of the rotation start of the pool, the command displays the following information.

```
C:\>iSMec_start -pool poolnum -arrayname diskarray

iSMec_start:  Error:  iSM25110:Specified diskarray does not exist.
Disk Array:diskarray
iSMec_start:  Info: iSM25012:iSMec_start has abnormally terminated.

C:\>
```

Description of messages:

The following error messages are output.

```
iSMec_start:Error:iSM25110: Specified diskarray does not exist.
Disk Array:diskarray
iSMec_start:Info: iSM25012: iSMec_start has abnormally terminated.
Message indicating abnormal termination of the rotation start of the
pool
Disk Array:diskarray
```

The disk array name of the disk array in which the specified pool is configured is displayed.

On the UNIX system

Upon normal termination of the rotation start of volumes, the command displays the following information.

(Individual specification)

```
#iSMec_start -vol ld-name -volflg ld

iSMec_start:  Info: iSM25030:Starting Pool:poolnum Disk Array:diskarray...
iSMec_start:  Info: iSM25031:Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:  Info: iSM25010:iSMec_start has normally terminated.

#
```

Description of messages:

```
iSMec_start:Info: iSM25030: Starting Pool:poolnum Disk Array:diskarray.
iSMec_start:Info: iSM25031: Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:Info: iSM25010: iSMec_start has normally terminated.
Message indicating the start of using volumes
Pool:poolnum
The pool number of the pool in which the specified volume is configured
is displayed.
Disk Array:diskarray
The disk array name of the disk array in which the specified volume
is configured is displayed.
```

Upon abnormal termination of the start of using volumes, the command displays the following information.

(Individual specification)

```
#iSMec_start -vol ld-name -volflg ld

iSMec_start:   Error:   iSM25103:Specified volume does not exist.
iSMec_start:   Info: iSM25012:iSMec_start has abnormally terminated.

#
```

Description of messages:

The following error messages are output.

```
iSMec_start:Error:iSM25103: Specified volume does not exist.
iSMec_start:Info: iSM25012: iSMec_start has abnormally terminated.
Message indicating abnormal termination of the start of using volumes
```

Upon normal termination of the rotation start of the pool, the command displays the following information.

```
# iSMec_start -pool poolnum -arrayname diskarray

iSMec_start:   Info: iSM25030:Starting Pool:poolnum Disk Array:diskarray...
iSMec_start:   Info: iSM25031:Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:   Info: iSM25011:iSMec_start has normally terminated.

#
```

Description of messages:

```
iSMec_start:Info: iSM25030: Starting Pool:poolnum Disk
Array:diskarray...
iSMec_start:Info: iSM25031: Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:Info: iSM25011: iSMec_start has normally terminated.
```

Message indicating the rotation start of the pool

- Pool:poolnum

   The pool number of the specified pool is displayed.

- Disk Array:diskarray

   The disk array name of the disk array in which the specified pool is configured is displayed.

Upon normal termination of rotation start of the pool with the -reset option specified, the command displays the following information

```
# iSMec_start -pool poolnum -arrayname diskarray -reset

iSMec_start:   Info: iSM25030: Starting Pool:poolnum Disk Array:diskarray...
iSMec_start:   Info: iSM25031: Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:   Info: iSM25032: The use state of all volumes in specified pool will
be reset to in use. Pool:poolnum
iSMec_start:   Info: iSM25010: iSMec_start has normally terminated.

#
```

Description of messages:

```
iSMec_start:Info: iSM25030: Starting Pool:poolnum Disk Array:diskarray.
iSMec_start:Info: iSM25031: Rotation started for pool. Pool:poolnum
Disk Array:diskarray
iSMec_start:Info: iSM25032: The use state of all volumes in specified
pool will be reset to in use. Pool:poolnum
iSMec_start:Info: iSM25010: iSMec_start has normally terminated.
```

Message indicating the rotation start of the pool when the -reset option is specified

- Pool:poolnum

  The pool number of the specified pool is displayed.

- Disk Array:diskarray

  The disk array name of the disk array in which the specified pool is configured is displayed.

Upon abnormal termination of the rotation start of the pool, the command displays the following information.

```
# iSMec_start -pool poolnum -arrayname diskarray

iSMec_start:   Error:   iSM25110: Specified diskarray does not exist.
Disk Array:diskarray
iSMec_start:   Info: iSM25012: iSMec_start has abnormally terminated.

#
```

Description of messages:

The following error messages are output.

```
iSMec_start:Error:iSM25110: Specified diskarray does not exist.
Disk Array:diskarray
iSMec_start:Info: iSM25012 iSMec_start has abnormally terminated.
```

Message indicating abnormal termination of the rotation start of the pool

- Disk Array:diskarray

  The disk array name of the disk array in which the specified pool is configured is displayed.

[Usage]

This command starts using volume vol1.

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```
#iSMec_start -vol vol1 -volflg ld

iSMec_start:   Info: iSM25030: Starting Pool:0001 Disk Array:diskarray1...
iSMec_start:   Info: iSM25031: Rotation started for pool. Pool:0001
Disk Array:diskarray1
iSMec_start:   Info: iSM25010: iSMec_start has normally terminated.

#
```

```
# iSMec_start -pool 0002 -arrayname diskarray1

iSMec_start:   Info: iSM25030: Starting Pool:0002 Disk Array:diskarray1...
iSMec_start:   Info: iSM25031: Rotation started for pool. Pool:0002
Disk Array:diskarray1
iSMec_start:   Info: iSM25011: iSMec_start has normally terminated.

#
```

This command changes the use state of all the volumes configured in the pool of pool number 0003 in disk array diskarray1 to in use.

```
# iSMec_start -pool 0003 -arrayname diskarray1 -reset

iSMec_start:   Info: iSM25030: Starting Pool:0003 Disk Array:diskarray1...
iSMec_start:   Info: iSM25031: Rotation started for pool. Pool:0003
Disk Array:diskarray1
iSMec_start:   Info: iSM25032: The use state of all volumes in specified pool will
be reset to in use. Pool:0003
iSMec_start:Info: iSM25010: iSMec_start has normally terminated.

#
```

This command starts using multiple volumes by batch setting.

```
#iSMec_start -file volume_file

iSMec_start:   Info: iSM25030: Starting Pool:0004 Disk Array:diskarray1...
iSMec_start:   Info: iSM25031: Rotation started for pool. Pool:0004
Disk Array:diskarray1
iSMec_start:   Info: iSM25010: iSMec_start has normally terminated.

iSMec_start:   Info: iSM25030: Starting Pool:0005 Disk Array:diskarray1...
iSMec_start:   Info: iSM25031: Rotation started for pool. Pool:0005
Disk Array:diskarray1
iSMec_start:   Info: iSM25010: iSMec_start has normally terminated.

iSMec_start:   Info: iSM25030: Starting Pool:0006 Disk Array:diskarray2...
iSMec_start:   Info: iSM25031: Rotation started for pool. Pool:0006
Disk Array:diskarray2
iSMec_start:   Info: iSM25010: iSMec_start has normally terminated.

#
```

The end messages are displayed in the order in which the volumes are started being used.

The contents of volume_file are as follows.

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```
#Type:VOL
ld:vol2
ld:vol3
ld:vol4
```

[Return Values]

0: The operation for all the volumes or pools terminated normally.

1: The operation for all the volumes or pools terminated abnormally.

2: The operation for some volumes terminated abnormally.

- The target volume must be unmounted.
- The disk array storing the target volume or pool must not be in the freeze state.
- When specifying a volume identifier other than logical disk name, the target volume must be registered in the volume list.
- The command cannot be executed while the iSM-only special file is being created (for UNIX only).
- The command cannot be executed while the volume list is being created or updated.

iSMec_stop

[Name]

iSMec_stop - Stops using volumes

[Synopsis]

```
iSMec_stop  -vol volume -volflg vol_flg
iSMec_stop  -file file_name
iSMec_stop  -ver
iSMec_stop -help(UNIX)
iSMec_stop -?(Windows)
```

[Description]

The iSMec_stop command stops using the specified volumes. If all the volumes configured in the pool to which the specified volume belongs are not in use, rotation is stopped for the pool.

Options

The iSMec_stop command recognizes the following options.

- -vol *volume*

  Specify the volume name.
  A logical disk name, special file name, drive letter, mount point volume name, or NTFS folder name can be specified in *volume*.

- -volflg *vol_flg*

  Specify the volume type specified in -vol by *vol_flg*.

One of the following can be specified.

ldLogical disk name

<For UNIX only>

sfnSpecial file name

<For Windows only>

- drvDrive letter
- mvolMount point volume name
- mdirNTFS folder name

This argument must be specified with `-vol`.

- -file *file_name*

  To specify multiple volumes, describe the volume names in `file_name`. For the description format of `file_name`, refer to 6.1 "Power Saving Operation File". When multiple volumes are specified, if an error occurs in some volumes, an error message is output and the process is continued until it is terminated in all the specified volumes.

- -verDisplays the version information of this command.
- `-help`Displays the usage of this command (UNIX).
- `-?`Displays the usage of this command (Windows).

[Displayed Information]

On the Windows system

Upon normal termination of the stop of using volumes, the command displays the following information.

(Individual specification)

```
C:\>iSMec_stop -vol ld-name -volflg ld

iSMec_stop:   Info: iSM25020: iSMec_stop has normally terminated.

C:\>
```

Description of messages:

  iSMec_stop:Info: iSM25020: iSMec_stop has normally terminated.

Message indicating termination of the stop of using volumes

Upon normal termination of the rotation stop of the pool because the volumes are not in use, the command displays the following information.

(Individual specification)

```
C:\>iSMec_stop -vol ld-name -volflg ld

iSMec_stop:   Info: iSM25033: Rotation will stop for pool. Pool:poolnum
Disk Array:diskarray
iSMec_stop:   Info: iSM25020: iSMec_stop has normally terminated.

C:\>
```

Description of messages:

```
iSMec_stop:Info: iSM25033: Rotation will stop for pool. Pool:poolnum
Disk Array:diskarray
iSMec_stop:Info: iSM25020: iSMec_stop has normally terminated.
Message indicating rotation stop of the pool because volumes are not
in use
```

- `Pool:poolnum`

  The pool number of the pool in which the specified volume is configured is displayed.

- `Disk Array:diskarray`

  The disk array name of the disk array in which the specified volume is configured is displayed.

Upon abnormal termination of the stop of using volumes, the command displays the following information.

(Individual specification)

```
C:\>iSMec_stop -vol ld-name -volflg ld

iSMec_stop:   Error:   iSM25103: Specified volume does not exist.
iSMec_stop:   Info: iSM25022: iSMec_stop has abnormally terminated.

C:\>
```

Description of messages:

The following error messages are output.

```
iSMec_stop:Error:iSM25103: Specified volume does not exist.
iSMec_stop:Info: iSM25022: iSMec_stop has abnormally terminated.
Message indicating abnormal termination of the stop of using volumes
```

On the UNIX system

(Individual specification)

```
#iSMec_stop -vol ld-name -volflg ld

iSMec_stop:   Info: iSM25020: iSMec_stop has normally terminated.

#
```

Description of messages:

```
iSMec_stop:Info: iSM25020: iSMec_stop has normally terminated.
```

Message indicating termination of the stop of using volumes

Upon normal termination of rotation stop of the pool because volumes are not in use, the command displays the following information.

(Individual specification)

```
#iSMec_stop -vol ld-name -volflg ld

iSMec_stop:   Info: iSM25033: Rotation will stop for pool. Pool:poolnum
Disk Array:diskarray
iSMec_stop:   Info: iSM25020: iSMec_stop has normally terminated.

#
```

Description of messages:

```
iSMec_stop:Info: iSM25033: Rotation will stop for pool. Pool:poolnum
Disk Array:diskarray
iSMec_stop:Info: iSM25020: iSMec_stop has normally terminated.
Message indicating termination of rotation stop of the pool because
volumes are not in use
Pool:poolnum
The pool number of the pool in which the specified volume is configured
is displayed.
Disk Array:diskarray
```

The disk array name of the disk array in which the specified volume is configured is displayed.

Upon abnormal termination of the stop of using volumes, the command displays the following information.

(Individual specification)

```
#iSMec_stop -vol ld-name -volflg ld

iSMec_stop:   Error:   iSM25103: Specified volume does not exist.
iSMec_stop:   Info: iSM25022: iSMec_stop has abnormally terminated.

#
```

Description of messages:

The following error messages are output.

```
iSMec_stop:Error:iSM25103: Specified volume does not exist.
iSMec_stop:Info: iSM25022: iSMec_stop has abnormally terminated.
Message indicating abnormal termination of the stop of using volumes
```

[Usage]

This command stops using volume vol1.

```
# iSMec_stop -vol vol1 -volflg ld

iSMec_stop:   Info: iSM25020: iSMec_stop has normally terminated.

#
```

This command stops using volume vol2 and, if all the volumes configured in the pool to which vol2 belongs are not in use, rotation is stopped for the pool.

```
#iSMec_stop -vol vol2 -volflg ld

iSMec_stop:   Info: iSM25033: Rotation will stop for pool. Pool:0001
Disk Array:diskarray1
iSMec_stop:   Info: iSM25020: iSMec_stop has normally terminated.

#
```

This command stops using multiple volumes by batch setting.

If all the volumes configured in the pool to which the specified volume belongs are not in use, rotation is stopped for the pool.

```
#iSMec_stop -file volume_file

iSMec_stop:Info: iSM25033:  Rotation will stop for pool. Pool:0002
Disk Array:diskarray1
iSMec_stop:Info: iSM25020:  iSMec_stop has normally terminated.

iSMec_stop:Info: iSM25033:  Rotation will stop for pool. Pool:0003
Disk Array:diskarray1
iSMec_stop:Info: iSM25020:  iSMec_stop has normally terminated.

iSMec_stop:Info: iSM25033:  Rotation will stop for pool. Pool:0004
Disk Array:diskarray2
iSMec_stop:Info: iSM25020:  iSMec_stop has normally terminated.

#
```

The end messages are displayed in the order in which the stop of using volumes is terminated.

The contents of volume_file are as follows.

```
#Type:VOL
ld:vol3
ld:vol4
ld:vol5
```

[Return Values]

0: The operation for all the volumes terminated normally.

1: The operation for all the volumes terminated abnormally.

2: The operation for some volumes terminated abnormally.

- The volume being used by the snapshot function cannot be operated.
- The disk array storing the target volume must not be in the freeze state.
- The control volume or System Volume cannot be operated.
- The target volume must be unmounted.
- If the target volume is paired as MV or RV for replication, the replication state must be Separated.
- The volume being moved for performance optimization cannot be operated.

- When specifying a volume identifier other than logical disk name, the target volume must be registered in the volume list.
- The command cannot be executed while the iSM-only special file is being created (for UNIX only).
- The command cannot be executed while the volume list is being created or updated.
- For the pool to which the target volume belongs, the eco mode must be ON.
- When the secure mode is set as the operation mode from the relevant system for the disk array or link disk array including the volume to be operated, either of the volume to be operated or the volume to be paired with it must have been registered in the volume list.

iSMec_sense

[Name]

```
iSMec_sense
```

Displays the use state and rotation state

[Synopsis]

```
iSMec_sense  -vol volume -volflg vol_flg
iSMec_sense  -file file_name
iSMec_sense  -pool poolnum  -arrayname diskarray [-all]
iSMec_sense  -ver
iSMec_sense -help(UNIX)
iSMec_sense -?(Windows)
```

[Description]

The iSMec_sense command displays the use state of the specified volume or rotation state of the specified pool.

Options

The `iSMec_sense` command recognizes the following options.

- `-vol volume`

  Specify the volume name.
  A logical disk name, special file name, drive letter, mount point volume name, or NTFS folder name can be specified in volume.

- -volflg *vol_flg*

  Specify the volume type specified in `-vol` by `vol_flg`.

One of the following can be specified.

ldLogical disk name

<For UNIX only>

sfnSpecial file name

<For Windows only>

- drvDrive letter
- mvolMount point volume name
- mdirNTFS folder name

This argument must be specified with `-vol`.

- -file *file_name*

  To specify multiple volumes, describe the volume names in `file_name`. For the description format of `file_name`, refer to 6.1 "Power Saving Operation File". When multiple volumes are specified, if an error occurs in some volumes, an error message is output and the process is continued until it is terminated in all the specified volumes.

- `-pool` *poolnum*

  Specify the pool.
  For *poolnum*, specify the pool number.

- `-arrayname` *diskarray*

  Specify the target disk array name (nickname).
  This argument must be specified with `-pool`.

- -all

  Lists the use state of all the volume configured in the specified pool.
  This argument must be specified with `-pool`.

- `-ver`Displays the version information of this command.

- `-help`Displays the usage of this command (UNIX).

- `-?`Displays the usage of this command (Windows).

[Displayed Information]

On The Windows System

For displaying the use state of a volume, the command displays the following information.

```
C:\>iSMec_sense -vol ld-name -volflg ld

Volume Rotation Information
 LD Name  ld_name
 Pool Num  poolnum
 Disk Array Name  diskarray
 Rotation State  rotation_state
 Use State  use_state
 Access State  access_state

C:\>
```

Description of messages:

Volume Rotation Information

Displays the information related to the use state of volume.

LD NameLogical disk name

Pool NumPool number

Disk Array NameDisk array name

Rotation StateRotation state of pool

Ready:Normal state

Attn.(stop):Rotation stop

Use StateUse state of volume

In use:In use

Not in use:Not in use

Access StateAccess state

Accessible:Accessible

NotAccessible:Not accessible

For displaying the rotation state of a pool, the command displays the following information.

```
C:\>iSMec_sense -pool poolnum -arrayname diskarray

Pool Rotation Information
 Pool Num  poolnum
 Disk Array Name  diskarray
 Rotation State  rotation_state
 Eco Mode  eco_mode

C:\>
```

```
C:\>iSMec_sense -pool poolnum -arrayname diskarray -all

Pool Rotation Information
 Pool Num  poolnum
 Disk Array Name  diskarray
 Rotation State  rotation_state
 Eco Mode  eco_mode

Volume Rotation Information List
 LD Name  Use State  Access State
 ld_name   use_state  access_state

C:\>
```

Description of messages:

Pool Rotation Information

Displays the information related to the rotation state of a pool.

Pool NumPool number

Disk Array NameDisk array name

Rotation StateRotation state of pool

Eco ModeEco mode

On:Eco mode is enabled.

Off:Eco mode is disabled.

Volume Rotation Information List

Displays the information related to the use state of all the volumes configured in the pool.

LD NameLogical disk name

Use StateUse state of volume

Access StateAccess state

On the UNIX system

For displaying the use state of a volume, the command displays the following information.

```
#iSMec_sense -vol ld-name -volflg ld

Volume Rotation Information
 LD Name  ld_name
 Pool Num  poolnum
 Disk Array Name  diskarray
 Rotation State  rotation_state
 Use State  use_state
 Access State  access_state

#
```

Description of messages:

Volume Rotation Information

Displays the information related to the use state of a volume.

LD NameLogical disk name

Pool NumPool number

Disk Array NameDisk array name

Rotation StateRotation state of the pool

Ready: Normal state

Attn.(stop): Rotation stop

Use StateUse state of the volume

In use: In use

Not in use: Not in use

Access StateAccess state

Accessible:Accessible

NotAccessible:Not accessible

For displaying the rotation state of a pool, the command displays the following information.

```
#iSMec_sense -pool poolnum -arrayname diskarray

Pool Rotation Information
 Pool Num  poolnum
 Disk Array Name  diskarray
 Rotation State  rotation_state
 Eco Mode  eco_mode

#
```

```
#iSMec_sense -pool poolnum -arrayname diskarray -all

Pool Rotation Information
 Pool Num  poolnum
 Disk Array Name  diskarray
 Rotation State  rotation_state
 Eco Mode  eco_mode

Volume Rotation Information List
 LD Name  Use State  Access State
 ld_name  use_state  access_state

#
```

Description of messages:

Pool Rotation Information

Displays the information related to the rotation state of a pool.

Pool NumPool number

Disk Array NameDisk array name

Rotation StateRotation state of the pool

Eco ModeEco mode

On:Eco mode is enabled.

Off:Eco mode is disabled.

Volume Rotation Information List

Displays the information related to the use state of all the volumes configured in the pool.

LD NameLogical disk name

Use StateUse state of volume

Access StateAccess state

[Usage]

This command displays the use state of volume vol1.

```
#iSMec_sense -vol vol1 -volflg ld

Volume Rotation Information
 LD Name  vol1
 Pool Num  0001
 Disk Array Name  diskarray1
 Rotation State   Attn.(stop)
 Use State  Not in use
 Access State  NotAccessible

#
```

This command displays the rotation state of the pool of pool number 0001 in disk array diskarray.

```
#iSMec_sense -pool 0001 -arrayname diskarray1

Pool Rotation Information
 Pool Num  0001
 Disk Array Name  diskarray1
 Rotation State   Attn.(stop)
 Eco Mode  On

#
```

This command displays the use state of all the volumes configured in the pool of pool number 0001 in disk array diskarray1.

```
#iSMec_sense -pool 0001 -arrayname diskarray1 -all

Pool Rotation Information
 Pool Num  0001
 Disk Array Name  diskarray1
 Rotation State   Ready
 Eco Mode  On

Volume Rotation Information List
 LD Name  Use State  Access State
 vol1  Not in use NotAccessible
 vol2  In use   Accessible
 vol3  Not in use NotAccessible

#
```

This command displays the use state of all the volumes configured in the pool of pool number 0001 in disk array diskarray1.

```
#iSMec_sense -pool 0001 -arrayname diskarray1 -all

Pool Rotation Information
 Pool Num  0001
 Disk Array Name  diskarray1
 Rotation State   Ready
 Eco Mode  On

Volume Rotation Information List
 LD Name  Use State  Access State
 vol1  Not in use  NotAccessible
 vol2  In use    Accessible
 vol3  Not in use  NotAccessible

#
```

This command displays the use state of multiple volumes by batch setting.

```
#iSMec_sense -file volume_file

Volume Rotation Information
 LD Name  vol1
 Pool Num  0001
 Disk Array Name  diskarray1
 Rotation State   Attn.(stop)
 Use State  Not in use
 Access State  NotAccessible

 LD Name  vol2
 Pool Num  0001
 Disk Array Name  diskarray1
 Rotation State   Ready
 Use State  In use
 Access State  Accessible

 LD Name  vol3
 Pool Num  0001
 Disk Array Name  diskarray1
 Rotation State   Attn.(stop)
 Use State  Not in use
 Access State  NotAccessible

#
```

The contents of volume_file are as follows.

```
#Type:VOL
ld:vol1
ld:vol2
ld:vol3
```

[Return Values]

0:The operation for all the volumes or pools terminated normally.

1:The operation for all the volumes or pools terminated abnormally.

2:The operation for some volumes terminated abnormally.

- When specifying a volume identifier other than logical disk name, the target volume must be registered in the volume list.
- The command cannot be executed while the iSM-only special file is being created (for UNIX only).
- This command cannot be executed while the volume list is being created or updated.

Link Function

SQL Server Linkage

Database Operation File

To perform batch setting of databases by a ReplicationControl SQL Option command with the -dbfile option, use the database operation file.

The database operation file is described below.

[File Location And Name]

Can be freely specified.

[Description]

The database operation file is used to perform batch setting of multiple databases by using a ReplicationControl SQL Option command.

[Synopsis]

This file is described in the following synopsis:

```
db:db_name [ Option_Type:[value] ] [...]
```

For description, use a colon (:) to connect "db" with a database name (db_name) and to connect an option type (Option_Type) with the preset value (value).

Description of each option can be omitted or can be in arbitrary order.

Specifying a database name (db_name)

Specify a name of the database which is a Snapshot Backup or Snapshot Restore target with a character string within 128 bytes.

If the database name includes any of the following eleven characters, an error occurs.

    \   /   :   ,   ;   *   ?   "   <   > |

Specifying an option type (Option_Type) and a preset value (value)

The following character strings can be specified as an option type.

Specifying an Option Type and Preset Value

Option Type	Description
uid	Specify a user ID for connecting to the Microsoft SQL Server.
pass	Specifies a password for the user ID for connecting to the Microsoft SQL Server.
input	Specifies for entering a user ID and a password from the input screen.
dmkpass	When the database master key of an encrypted database is encrypted with a password, specify that password.
server	Specify a computer name and an instance name for connecting to a named instance.
remod	Specify the mode during the database recovery. Description of this option is effective only during Snapshot Restore execution, and becomes invalid during Snapshot Backup execution.
refile	Specifies the standby database file. Description of this option is effective only during Snapshot Restore execution, and becomes invalid during Snapshot Backup execution.
move	When executing Restore by using a physical file that has a different path from the backed up physical file, specify the data file path name and the log file path name. Description of this option is effective only during Snapshot Restore execution, and becomes invalid during Snapshot Backup execution.

Specify the following preset values for each option type:

uid: user_id

- Specify a user ID for connecting to the Microsoft SQL Server with a character string within 128 bytes. Specify the pass option together with this option.
- If this option is omitted, the system uses a user name and a password for the Windows login account.
- This option and the input option cannot be simultaneously specified.

pass: [password]

- Specify a password for connecting to the Microsoft SQL Server with a character string within 128 bytes. If the password is omitted, the system recognizes that there is no password. Specify the uid option together with this option.
- This option and the input option cannot be simultaneously specified.

input

- Enters a user ID and a password from the input screen when connecting to the Microsoft SQL Server. This option does not have a preset value.
- This option and the uid and pass options cannot be simultaneously specified.

dmkpass

- dmkpassword If the database is encrypted and the database master key is also encrypted with a password specify that password with a character string within 128 bytes.

- If this option is omitted, the system will operate assuming that the master database key is not encrypted with a password or the database is not encrypted.

server

- instance_name Specify a computer name and an instance name in the following format with a character string within 272 bytes when connecting to a named instance. Specify the computer name within 255 bytes and instance name within 16 bytes.

computer_name\instance_name

- If this option is omitted, a connection is made to the predetermined instance.
- The computer name must be either a local computer name, or a virtual computer name in the MSCS (Microsoft Cluster Server) or MSFC (Microsoft Failover Cluster) environment.

remod:{recovery | norecovery | standby}

- Specify the mode during the database recovery.

recovery

- Executes a command and simultaneously recovers the database.

norecovery

- Recovers the target database in the state so that the transaction log is applicable.

standby

- Recovers the database as a standby database. A standby database file is specified by the refile option.

    If this option is omitted, the operation is the same as the operation when recovery is specified.

refile:restore_file

- Specify a standby database undo file (standby file) with a character string within 256 bytes.

    This option can be specified only when standby is specified by the remod option. If recovery or norecovery is specified, or if the remod option is omitted, an error occurs.

move:os_file_name[,...]

- When executing Snapshot Restore by the -norestore option and when executing Restore by using a physical file that has a different path from the backed up physical file, specify the database's data file path name and log file path name with a character string within 512 bytes. Specify the database's data file and log file in the absolute path by separating them by a comma.

Rules

- Start description from the first column of the line.
- A line break shall be a partition of records.
- Up to 1,024 single-byte characters can be described per record.
- Information of one database can be described per record.
- The same option type cannot be specified twice per record.
- Description of the database name cannot be omitted.
- The operation target database must be unique.

- Use a blank space or a tab character to separate the descriptions of the database name or the option type.
- Text displayed from the sharp (#) character to the end of the record is recognized as a comment.
- If there is an error in the file syntax, operations to all databases described in the file become invalid.
- If a character string includes a blank space (Δ), enclose the entire character string in double quotation marks (").

The following is an example of a description of the database operation file:

```
# db:db_name
db:db01

# db:db_name     uid:user_id     pass:password
# db:db_name     uid:user_id     pass:password      dmkpass:dmkpassword
# db:db_name     uid:user_id     pass:password      server:instance_name
db:db01     uid:sa          pass:sapass
db:db02     uid:sa          pass:sapass      dmkpass:dmk_strongpassword
db:db03     uid:sa          pass:sapass      server:localmachine\user_inst

# db:db_name     input:
db:db01     input:

# db:db_name     remod:restore_mode
# db:db_name     remod:restore_mode     refile:restore_file
db:db01     remod:norecovery
db:db03     remod:standby         refile:"d:\db_folder\db03_standby.dat"

# db:db_name     move:os_file_name[,...]
db:db01     move:"f:\db folder\db01_Data2.mdf,g:\db_folder\db01_Log2.ldf"
```

iSMsql_snapshotbkup (Windows)

[Name]

    iSMsql_snapshotbkup

Makes a copy of the Microsoft SQL Server database.

[Synopsis]

```
iSMsql_snapshotbkup -db dbname  -metafile metafile_name
 [-server instance_name]
 [{-uid userid -pass [password]| -input}]
 [-dmkpass dmkpassword]
 [-nocheck]
 [{-mv volume -mvflg mv_flg [-rv volume -rvflg
rv_flg] | -file file_name }]
 [-rvuse rv_use] [-rvacc rv_access]
  [{-wait [second] | -nowait}]
iSMsql_snapshotbkup -dbfile dbfile_name -metafolder metafolder_name
 [-nocheck]
 [{-mv volume -mvflg mv_flg [-rv volume
-rvflg rv_flg] | -file file_name }]
 [-rvuse rv_use] [-rvacc rv_access]
  [{-wait [second] | -nowait}]
iSMsql_snapshotbkup -db dbname  -metafile metafile_name
 [-server instance_name]
 [{-uid userid -pass [password]| -input}]
 [-dmkpass dmkpassword]
 [-nocheck]
 [{-bv volume -bvflg bv_flg [{ -sv volume -svflg
  sv_flg | -cyclic } ] | -file file_name }]
iSMsql_snapshotbkup -dbfile dbfile_name -metafolder metafolder_name
 [-nocheck]
 [{-bv volume -bvflg bv_flg [{ -sv volume -svflg
  sv_flg | -cyclic } ] | -file file_name }]
iSMsql_snapshotbkup -ver
iSMsql_snapshotbkup -?
```

[Description]

    iSMsql_snapshotbkup

The `iSMsql_snapshotbkup` command freezes the update I/O to the Microsoft SQL Server database, creates a metafile in the specified path and records the database configuration and the state of the transaction log.

If the data replication is in use, the command separates the MV from the RV and makes a copy of the MV on the RV to store the specified database. If the snapshot function is in use, a snapshot of a BV is created on an SV to store the specified database.

After separation or snapshot creation, the Microsoft SQL Server creates history information on the MSDB.

Options

The iSMsql_snapshotbkup command recognizes the following options.

-db *dbname*

- Specify a database name.

-dbfile *dbfile_name*

- To simultaneously perform Snapshot Backup on multiple databases, describe the database names and the option specification for each database in *dbfile_name.*

  When multiple databases are specified, Snapshot Backup is simultaneously performed on all of the databases.

  When multiple databases are specified, if an error occurs in any of the databases, the process is canceled.

-metafile *metafile_name*

- Specify the name of the file that stores the metafile with its absolute path name.

  The metafile can be created in any shared disk, MV, or local disk.

  However, it cannot be created in the volume in which data files and log files for the Snapshot Backup target database are located.

-metafolder *metafolder_name*

- To simultaneously perform Snapshot Backup on multiple databases, specify the name of the folder that stores the metafile with its absolute path name.

  Immediately under the specified folder, a metafile is created for each database with the name "*database name*_metafile.dat".

  The metafile can be created in any shared disk, MV, or local disk.

  However, it cannot be created in the volume in which data files and log files for the Snapshot Backup target database are located.

-server *instance_name*

Specify a computer name and an instance name in connecting to a named instance. Specify the computer name and the instance name in the following format.

computer_name\instance_name

If this option is omitted, a connection is made to the predetermined instance. The computer name must be either a local computer name, or a virtual computer name in the MSCS (Microsoft Cluster Server) or MSFC (Microsoft Failover Cluster) environment.

-uid *userid*

- Specify a user ID for connecting to the Microsoft SQL Server.
- If this option is omitted, the system uses a user name and a password used for the Windows login account.

-pass [*password***]**

- Specify a password for connecting to the Microsoft SQL Server.
- This option must be specified when -uid is specified.
- When *password* is omitted, the system recognizes that there is no password.

-input

- Enter a user ID and a password from the input screen when connecting to the Microsoft SQL Server.
- A password can be hidden.

-dmkpass

- dmkpassword If the database is encrypted and the database master key is also encrypted with a password, specify that password.

- If this option is omitted, the system will operate assuming that the master database key is not encrypted with a password or the database is not encrypted.

-nocheck

- Used if only some databases placed on an MV or BV are to be operated. No check is made to see if all databases on the MV or BV have been specified as targets of operation. If the data replication function is in use, the databases are frozen without making sure that the MV and RV are in the sync state.

-ver

- Displays the version information of the command.

-?

- Displays the usage of this command.

- If the data replication function is to be used, the following options are recognized.

-mv *volume*

- Specify the volume of MV.

- For a pair in which MV and RV are configured by 1 to 1, this option can be omitted.

-mvflg *mv_flg*

- Specify the volume type specified in -mv.

- This argument must be specified together with -mv.

-rv *volume*

- Specify the volume of RV.

- For a pair in which MV and RV are configured by 1 to 1, this option can be omitted.

-rvflg *rv_flg*

- Specify the volume type specified in -rv.

- This argument must be specified together with -rv.

- For information about the volume and volume types, refer to 1.2 "Volume Types".

-file *file_name*

- To specify multiple pairs, describe pairs of MVs and RVs in *file_name*.

- It is impossible to specify a pair for data replication and pair for snapshot as operation targets together.

- When multiple pairs are specified, if an error occurs in any of the pairs, the process is canceled.

-rvuse *rv_use*

- Determine when to make the RV available. This option is effective only when the activity state of the target pair is Replicate.

- One of the following can be specified in *rv_use*.

    - immediate Makes the immediate use of the RV possible while reflecting the difference between the MV and the RV after Separate has been executed (Separate(immediate)). This function can be specified only for Volume Cloning pair.

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- complete Allows the RV to be used after Separate has been executed and the difference between the MV and the RV has been reflected (Separate(completion)).
- default Uses the setting stored in the replication operation option setting file.
- If this option is omitted, the operation is the same as the operation when default is specified.

-rvacc *rv_access*

- Specify the access restriction for RV.
- One of the following can be specified in *rv_access*.
  - ro Only reference can be performed for RV.
  - rw Reference and update can be performed for RV.
  - If this argument is omitted, the operation is the same as the operation when rw is specified.

-wait [*second*] | -nowait

- Specify whether to wait until separation is completed.
  Specifying -wait causes the state of processing to be monitored at regular intervals while waiting until separation is completed.
  When a value is specified in *second*, the monitoring time interval of the disk array becomes the specified value. The available values are 1 to 30 seconds (integer). This value can be changed in the replication operation option setting file.
- When the disk array monitoring interval is not specified, the default value is 5 seconds.
- Specifying -nowait does not cause separation to be waited for.
- If this option is omitted, the operation is the same as the operation when -nowait is specified.
- If snapshot is used, the following options are recognized.

-bv *volume*

- Specify a BV volume.
  This option can be omitted if there is only one generation (BVs and SVs correspond to each other on a 1-to-1 basis).

-bvflg *bv_flg*

- Specify the type of the volume specified with the -bv option.
  This option must be specified together with the -bv option.

-sv *volume*

- Specify an SV volume.
  The SV volume must be specified by logical disk name or relative generation number. The relative generation number must be ".-n" format. The expression ".-1" means the latest generation. Older generations can be specified in a range of ".-2" to ".-16".
  It is possible to omit specifying the SV in this option or the -cyclic option if there is only one generation (BVs and SVs correspond to each other on a 1-to-1 basis).
  For a derived SV without a generation number, only logical disk name can be specified.
-

-svflg *sv_flg*

- Specify the type of the volume specified with the -sv option.
  Either of the following SV volume types can be specified.

ld

- The SV is specified by logical disk name.

relgen

- The SV is specified by relative generation number.
- This option must be specified together with the -sv option.

-cyclic

- Selects automatically an SV for which no snapshot has been created. If there are two or more SVs for which no snapshot has been created, the SV that has the lowest logical disk number is used. If snapshots have been created for all SV generations, the SV of the oldest generation except the protected SV and derived SVs without a generation number (SV of the oldest generation through time among the SVs including the derived SVs with a generation number) is selected.
  It is possible to omit specifying SV by this option, or by the -sv and -svflg options if there is only one generation (BVs and SVs correspond to each other on a 1-to-1 basis).

-file *file_name*

- Specify sets of BVs and SVs in *file_name* to specify more than one set.
  It is impossible to specify a pair for data replication and a pair for snapshot together as operation targets.
  If an error occurs in any of the specified sets, processing is discontinued.

[Displayed Information]

The following information is displayed if a backup is created after a difference between the MV and RV is reflected on the RV, using the data replication function.

```
C:\> iSMsql_snapshotbkup -db db_name -metafile metafile_name -wait

SnapshotBackup   Start          YYYY/MM/DD hh:mm:ss
   DataBase   db_name
      MV:disk_number            ld_name                type
         volume_name
         path
      RV:disk_number            ld_name                type
         volume_name
         path
iSMsql_snapshotbkup: Info:        iSM13238: Freeze of database is started. YYYY/MM/DD
hh:mm:ss
Flush             Start          YYYY/MM/DD hh:mm:ss
Flush             Normal End   YYYY/MM/DD hh:mm:ss
Separate          Start          YYYY/MM/DD hh:mm:ss
iSMsql_snapshotbkup: Info:        iSM13239: All of database were thawed. YYYY/MM/DD
hh:mm:ss
Separating.....
Separate              Normal End  YYYY/MM/DD hh:mm:ss
SnapshotBackup   Normal End  YYYY/MM/DD hh:mm:ss
   DataBase   db_name
      MV:disk_number            ld_name                type
         volume_name
         path
      RV:disk_number            ld_name                type
         volume_name
         path

C:\>
```

Description of messages:

- SnapshotBackup Start *YYYY/MM/DD hh:mm:ss*
  Snapshot Backup start message and start date
- DataBase db_name
  Database name
- MV:disk_number ld_name type
  MV physical disk number, logical disk name, OS type
- volume_name
  MV mount point volume name
- path
  MV drive letter or NTFS folder path name
- RV:disk_number ld_name type
  RV physical disk number, logical disk name, OS type
- volume_name
  RV mount point volume name
- path
  RV drive letter or NTFS folder path name
- iSM13238: Freeze of database is started. *YYYY/MM/DD hh:mm:ss*
  Message indicating that database freezing has started, and date and time of the start
  Flush Start *YYYY/MM/DD hh:mm:ss*
  Flush start message and start date

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- Flush   Normal End *YYYY/MM/DD hh:mm:ss*

  Flush end message and end date

- Separate   Start *YYYY/MM/DD hh:mm:ss*

  Separate start message and start date

- Separating.....

  Message that appears during execution of Separate

- Separate Normal End *YYYY/MM/DD hh:mm:ss*

  Separate end message and end date

- iSM13239: All of database were thawed. *YYYY/MM/DD hh:mm:ss*

  Message indicating that all databases have been thawed, and date and time of thawing

- SnapshotBackup Normal End *YYYY/MM/DD hh:mm:ss*

  Snapshot Backup end message and end date

The following information is displayed if a backup is performed by using the snapshot function to create a snapshot from the BV to the SV.

```
C:\> iSMsql_snapshotbkup -db db_name   -metafile metafile_name

SnapshotBackup   Start              YYYY/MM/DD hh:mm:ss
   DataBase   db_name
    BV:ld_name                      type
       volume_name
       path
    SV:ld_name                      type        (generation) attribute
Delete              Start           YYYY/MM/DD hh:mm:ss
iSMsql_snapshotbkup: Info:          iSM13250: Snapshot has been deleted. SV:ld_name
Delete              Normal End      YYYY/MM/DD hh:mm:ss
iSMsql_snapshotbkup: Info:          iSM13238: Freeze of database is started. YYYY/MM/DD
hh:mm:ss
Flush               Start           YYYY/MM/DD hh:mm:ss
Flush               Normal End      YYYY/MM/DD hh:mm:ss
Create              Start           YYYY/MM/DD hh:mm:ss
Create              Normal End      YYYY/MM/DD hh:mm:ss
iSMsql_snapshotbkup: Info:          iSM13239: All of database were thawed. YYYY/MM/DD
hh:mm:ss
SnapshotBackup  Normal End  YYYY/MM/DD hh:mm:ss
   DataBase   db_name
    BV:ld_name                      type
       volume_name
       path
    SV:ld_name                      type        (generation)

C:\>
```

Description of messages:

- SnapshotBackup Start *YYYY/MM/DD hh:mm:ss*

  Message indicating that snapshot backup has been started, and date and time of the start

- DataBase *db_name*

  Database name

- BV:ld_name type

  BV logical disk name, OS type

  volume_name

  BV mount point volume name

- path

  BV drive letter or NTFS folder path name

- SV:ld_name type (generation) attribute

  SV logical disk name, OS type, relative generation number, and generation attribute
  The relative generation number of SV displayed at the start of snapshot backup is the
  one before the snapshot has been created.
  The relative generation number of SV displayed at the end of snapshot backup is the
  one after the snapshot has been created. -1 is always displayed, indicating the latest
  generation.
  If the SV has the derived attribute, an asterisk ("*") is displayed for the generation
  attribute.

  At start of snapshot backup, it is displayed if the derived attribute is granted to the
  target SV. However, on completion of the snapshot backup, the generation attribute is
  not displayed because the SV does not have the derived attribute due to the snapshot
  creation.

- iSM13250: Snapshot has been deleted. SV:*ld_name*

  Message indicating that a snapshot has been deleted, and the logical disk name of the
  target SV
  If a snapshot has been created on the target SV, it is deleted before the requested
  snapshot is created.

- iSM13238: Freeze of database is started. *YYYY/MM/DD hh:mm:ss*

  Message indicating that database freezing has stated, and date and time of the start

- Delete   Start *YYYY/MM/DD hh:mm:ss*

  Message indicating that snapshot deletion has started, and date and time of the start
  The message appears if there is a snapshot to be deleted.

- Delete   Normal End *YYYY/MM/DD hh:mm:ss*

  Message indicating that snapshot deletion has ended, and date and time of the end
  The message appears if there is a snapshot to be deleted.

- Flush   Start *YYYY/MM/DD hh:mm:ss*

  Message indicating that flushing has started, and date and time of the start

- Flush   Normal End *YYYY/MM/DD hh:mm:ss*

  Message indicating that flushing has ended, and date and time of the end

- Create   Start YYYY/MM/DD hh:mm:ss

  Message indicating that snapshot creation has started, and date and time of the start

- Create   Normal End *YYYY/MM/DD hh:mm:ss*

  Message indicating snapshot creation has ended, and date and time of the end

- iSM13239: All of database were thawed. *YYYY/MM/DD hh:mm:ss*

  Message indicating that all database freezing has ended, and date and time of the end

- SnapshotBackup Normal End *YYYY/MM/DD hh:mm:ss*

  Message indicating that snapshot backup has ended, and date and time of the end

<Using the data replication function>

- The target MV and RV must be set as a pair.

- The target MV must already be registered in the volume list.
- The command cannot be executed if the data replication function of the disk array that contains the target MV and RV is in the freeze state.
- The command can be executed only when the activity state of the target pair is the Rst/sync or Replicate state.
- The command cannot be executed if the target MV is used as the BV and the MV is in the restore state or the restore fault state for snapshot.
- Separate(immediate) function is not available for Remote Replication pair.
- The target MV must contain all data files and log files included in the database.
- The specified database name must be unique.
- A disk specified to hold a metafile must be other than the disk that contains the data files or log files of the target database.
- The disk on which a metafile is to be created must have a free space enough to hold the metafile.
- The command cannot be executed if the volume list is being created or updated.
- A dynamic disk cannot be used.
- The command cannot be used for pairs registered with an ATgroup.
- The command cannot be used in joint operation with iSM.

<Using the snapshot function>

- The target BV and SV must be in a pair.
- The target BV volume must have been registered in the volume list.
- The command cannot be executed if the data replication function of the disk array in which the target BV and SV are stored is in the freeze state.
- The command cannot be executed if the snapshot state of any SV paired with the target BV is Rst/exec.
- The command cannot be executed if the data replication function of the target BV is Restore.
- The command cannot be executed if the target BV is in the snapshot fault state or the restore fault state.
- The command cannot be executed if the target SV is connected with an LV.
- The command cannot be executed if the target SV is protected.
- The command can be executed only when the target SV is in the Not Ready state.
- The target BV must contain all data files and log files included in the database.
- The specified database name must be unique.
- A disk specified to hold a metafile must be other than the disk that contains the data files or log files of the target database.
- The disk on which a metafile is to be created must have a free space enough to hold the metafile.
- The command cannot be executed if the volume list is being created or updated.
- A dynamic disk cannot be specified.
- The command cannot be used in joint operation with iSM.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- An option or parameter is invalid.
- A condition for operation is not satisfied.
- The instruction fails due to a disk array error.
- The instruction to the Microsoft SQL Server fails.

Description of messages:

- SnapshotBackup Start YYYY/MM/DD hh:mm:ss

  Message indicating that snapshot backup has been started, and date and time of the start

- DataBase db_name

  Database name

- BV:ld_name type

  BV logical disk name, OS type

  volume_name

  BV mount point volume name

  path

  BV drive letter or NTFS folder path name

- SV:ld_name type (generation) attribute

  SV logical disk name, OS type, relative generation number, and generation attribute

  The relative generation number of SV displayed at the start of snapshot backup is the one before the snapshot has been created.

  The relative generation number of SV displayed at the end of snapshot backup is the one after the snapshot has been created. -1 is always displayed, indicating the latest generation.

  If the SV has the derived attribute, an asterisk ("*") is displayed for the generation attribute.

  At start of snapshot backup, it is displayed if the derived attribute is granted to the target SV. However, on completion of the snapshot backup, the generation attribute is not displayed because the SV does not have the derived attribute due to the snapshot creation.

- iSM13250: Snapshot has been deleted. SV:ld_name

  Message indicating that a snapshot has been deleted, and the logical disk name of the target SV

  If a snapshot has been created on the target SV, it is deleted before the requested snapshot is created.

- iSM13238: Freeze of database is started. YYYY/MM/DD hh:mm:ss

  Message indicating that database freezing has stated, and date and time of the start

  Delete   Start YYYY/MM/DD hh:mm:ss

  Message indicating that snapshot deletion has started, and date and time of the start

  The message appears if there is a snapshot to be deleted.

  Delete   Normal End YYYY/MM/DD hh:mm:ss

  Message indicating that snapshot deletion has ended, and date and time of the end

  The message appears if there is a snapshot to be deleted.

  Flush   Start YYYY/MM/DD hh:mm:ss

  Message indicating that flushing has started, and date and time of the start

  Flush   Normal End YYYY/MM/DD hh:mm:ss

  Message indicating that flushing has ended, and date and time of the end

  Create   Start YYYY/MM/DD hh:mm:ss

  Message indicating that snapshot creation has started, and date and time of the start

  Create   Normal End YYYY/MM/DD hh:mm:ss

  Message indicating snapshot creation has ended, and date and time of the end

- iSM13239: All of database were thawed. YYYY/MM/DD hh:mm:ss

  Message indicating that all database freezing has ended, and date and time of the end

  SnapshotBackup Normal End YYYY/MM/DD hh:mm:ss

  Message indicating that snapshot backup has ended, and date and time of the end

<Using the data replication function>

- The target MV and RV must be set as a pair.
- The target MV must already be registered in the volume list.
- The command cannot be executed if the data replication function of the disk array that contains the target MV and RV is in the freeze state.
- The command can be executed only when the activity state of the target pair is the Rst/sync or Replicate state.
- The command cannot be executed if the target MV is used as the BV and the MV is in the restore state or the restore fault state for snapshot.
- Separate(immediate) function is not available for Remote Replication pair.
- The target MV must contain all data files and log files included in the database.
- The specified database name must be unique.
- A disk specified to hold a metafile must be other than the disk that contains the data files or log files of the target database.
- The disk on which a metafile is to be created must have a free space enough to hold the metafile.
- The command cannot be executed if the volume list is being created or updated.
- A dynamic disk cannot be used.
- The command cannot be used for pairs registered with an ATgroup.
- The command cannot be used in joint operation with SnapSAN Manager.

<Using the snapshot function>

- The target BV and SV must be in a pair.
- The target BV volume must have been registered in the volume list.

- The command cannot be executed if the data replication function of the disk array in which the target BV and SV are stored is in the freeze state.
- The command cannot be executed if the snapshot state of any SV paired with the target BV is Rst/exec.
- The command cannot be executed if the data replication function of the target BV is Restore.
- The command cannot be executed if the target BV is in the snapshot fault state or the restore fault state.
- The command cannot be executed if the target SV is connected with an LV.
- The command cannot be executed if the target SV is protected.
- The command can be executed only when the target SV is in the Not Ready state.
- The target BV must contain all data files and log files included in the database.
- The specified database name must be unique.
- A disk specified to hold a metafile must be other than the disk that contains the data files or log files of the target database.
- The disk on which a metafile is to be created must have a free space enough to hold the metafile.
- The command cannot be executed if the volume list is being created or updated.
- A dynamic disk cannot be specified.
- The command cannot be used in joint operation with SnapSAN Manager.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- An option or parameter is invalid.
- A condition for operation is not satisfied.
- The instruction fails due to a disk array error.
- The instruction to the Microsoft SQL Server fails.

iSMsql_snapshotrst (Windows)

[Name]

    iSMsql_snapshotrst

Recovers the Microsoft SQL Server database.

[Synopsis]

```
iSMsql_snapshotrst -db dbname  -metafile metafile_name
  [-server instance_name]
  [{-uid userid -pass [password] | -input}]
  [-dmkpass dmkpassword]
  [-remod restore_mode [-refile restore_file]]
  [-norestore  [-move os_file_name[,...]]]
  [-nocheck]
  [{-mv volume -mvflg mv_flg [-rv volume -rvflg
   rv_flg] | -file file_name }]
  [-cprange copy_range] [-cpmode copy_mode]
  [-mode operation_mode] [-rvacc rv_access]
  [{-wait [second] | -nowait}]
iSMsql_snapshotrst -dbfile dbfile_name -metafolder metafolder_name
  [-norestore]
  [-nocheck]
  [{-mv volume -mvflg mv_flg [-rv volume -rvflg
   rv_flg] | -file file_name }]
  [-cprange copy_range] [-cpmode copy_mode]
  [-mode operation_mode] [-rvacc rv_access]
  [{-wait [second] | -nowait}]
iSMsql_snapshotrst -db dbname  -metafile metafile_name
  [-server instance_name]
  [{-uid userid -pass [password] | -input}]
  [-dmkpass dmkpassword]
  [-remod restore_mode [-refile restore_file]]
  [-norestore  [-move os_file_name[,...]]]
  [-nocheck]
  [{-bv volume -bvflg bv_flg [-sv volume -svflg
   sv_flg] | -file file_name}]
  [{-wait | -nowait}]
  [-derivsv derivsv_mode]
iSMsql_snapshotrst -dbfile dbfile_name -metafolder metafolder_name
  [-norestore]
  [-nocheck]
  [{-bv volume -bvflg bv_flg [-sv volume -svflg
   sv_flg] | -file file_name}]
  [{-wait | -nowait}]
  [-derivsv derivsv_mode]
iSMsql_snapshotrst -ver
iSMsql_snapshotrst -?
```

[Description]

The iSMsql_snapshotrst command identifies the recovery target database from the specified metafile. It also restores from the RV to the MV if the data replication function is in use or from the SV to the BV if the snapshot function is in use.

After Restore has been completed, this command recovers the Microsoft SQL Server database.

Options

The iSMsql_snapshotrst command recognizes the following options.

- -db *dbname* Specify the database name.

- -dbfile *dbfile_name* To simultaneously perform Snapshot Restore on multiple databases, describe the database names and the option specification for each database in *dbfile_name*.

  When multiple databases are specified, Snapshot Restore is simultaneously performed on all of the databases.

  When multiple databases are specified, if an error occurs in any of the databases, the process is canceled.

- -metafile *metafile_name* Specify the name of the file that stores the metafile with its absolute path name.

  It is, however, impossible to specify a metafile that is on the same disk as for the data files or log files of the snapshot restore target database.

- metafolder *metafolder_name* To simultaneously perform Snapshot Restore on multiple databases, specify the name of the folder that stores the metafile with its absolute path name.

  It is, however, impossible to specify a metafile that is on the same disk as for the data files or log files of the snapshot restore target database.

- -server *instance_name* Specify a computer name and an instance name for connecting to a named instance. Specify the computer name and the instance name in the following format.

  computer_name\instance_name

  If this option is omitted, a connection is made to the predetermined instance. The computer name must be either a local computer name, or a virtual computer name in the MSCS (Microsoft Cluster Server) or MSFC (Microsoft Failover Cluster) environment.

- -uid *userid* Specifies the user ID for connecting to the Microsoft SQL Server.

  If this option is omitted, the system uses the user name and password for the Windows login account.

- -pass [*password*] Specify a password for connecting to the Microsoft SQL Server.

  This option must be specified when -uid is specified.

  When *password* is omitted, the system recognizes that there is no *password*.

- -input Enter a user ID and a password from the input screen when connecting to the Microsoft SQL Server.

  The password can be hidden.

- -dmkpass dmkpassword If the database is encrypted and the database master key is also encrypted with a password, specify that password.

  If this option is omitted, the system will operate assuming that the master database key is not encrypted with a password or the database is not encrypted.

- -remod *restore_mode* Specify the mode during database recovery.

  restore_mode

  One of the following can be specified in *restore_mode*.

  - recovery

  Recovers the target database.

  - norecovery

  Recovers the target database in the state so that the transaction log is applicable.

- standby

  Recovers the target database as a standby database.

  If this option is omitted, the operation is the same as the operation when recovery is specified.

- -refile *restore_file*

  Specify the standby database undo file (standby file).

  This option must be specified when standby is specified in -remod.

- -norestore

  Used to recover the database without restoring the MV or BV.
  Specifying this option causes the following options related to the data replication and snapshot functions to be ignored.

Options related to the data replication function:

-mv, -mvflg, -rv, -rvflg, -file, -mode, -cprange, -cpmode, -rvacc, -wait, -nowait

Options related to the snapshot function:

- -bv, -bvflg, -sv, -svflg, -file, -wait, -nowait, -derivsv
- -move *os_file_name*[,...]

  When the -norestore option is specified, this command executes Restore by using a physical file that has a different path name from the backed up physical file.

  As a file name specified in *os_file_name*, specify the database's data file and log file with their absolute path names by separating them by a comma.

- -nocheck

  Used if only some databases placed on an MV or BV are to be operated. No check is made to see if all databases on the MV or BV have been specified as targets of operation.

- -ver Displays the version information of the command.

- -? Displays the usage of this command.

  If data replication is to be used, the following options are recognized.

- -mv *volume*

  Specify the volume of MV.

  For a pair in which MV and RV are configured by 1 to 1, this option can be omitted.

- -mvflg *mv_flg*
- Specify the volume type specified in -mv.
- This argument must be specified together with -mv.
- -rv *volume*

  Specify the volume of RV.

  For a pair in which MV and RV are configured by 1 to 1, this option can be omitted.

- -rvflg *rv_flg*

  Specify the volume type specified in -rv.

  This argument must be specified together with -rv.

  For information about the volume and volume types, refer to 1.2 "Volume Types".

- -file *file_name*

  To specify multiple pairs, describe pairs of MVs and RVs in *file_name*.

  It is impossible to specify a pair for data replication and pair for snapshot as operation targets together.

  When multiple pairs are specified, if an error occurs in any of the pairs, the process is canceled.

- -cprange *copy_range*

  Specify the range of Restore from the RV to the MV.

  One of the following can be specified in *copy_range*.

  diff Restores only updates to the RV since Separate from the MV to the RV.

  full Restores all area of the RV to the MV regardless of updates to the RV since Separate.

  If this argument is omitted, the operation is the same as the operation when diff is specified.

- -mode *operation_mode*

  Specify the RV operation mode during Restore execution.

  One of the following can be specified in *operation_mode*.

  - update Restores the updates to the MV while reflecting the update to the RV. After Restore has been completed, the mode switches to the Sync State(rst/sync).

  - protect Restores the update to the MV without reflecting the update to the RV. After Restore has been completed, the RV is automatically separated and the mode switches to the Separated state.

  - default Uses the setting stored in the replication operation option setting file.

  If this argument is omitted, the operation is the same as the operation when default is specified.

- -cpmode *copy_mode*

  Specify the Copy Control State for reflecting updates to the MV to the RV.

  One of the following can be specified in *copy_mode*.

  - sync Synchronous mode

  - semi Semi-synchronous mode

  - bg Background copy mode

  If this argument is omitted, the operation is the same as the operation when sync is specified.

- -rvacc *rv_access*

  Specify the access restriction for the RV.

  One of the following can be specified in *rv_access*.

  - nr Access to the RV is not allowed.

  - ro Only reference can be performed for the RV.

  If this argument is omitted, the operation is the same as the operation when nr is specified.

- -wait [*second*] | -nowait

  Specify whether to wait for the completion of Restore.
  Specifying -wait causes the state of processing to be monitored at regular intervals while waiting until restoration is completed.

If a value is specified in *second*, the monitoring time interval of the disk array becomes the specified value. The available values are 1 to 30 seconds (integer). This value can be changed in the replication operation option setting file.

When the disk array monitoring interval is not specified, the default value is 5 seconds.

Specifying -nowait does not cause a wait to occur for the completion of separation.

If this option is omitted, the operation is the same as the operation when -nowait is specified.

If snapshot is used, the following options are recognized.

- -bv *volume*

  Specify a BV volume.
  For explanations about volumes and their types, refer to 1.2 "Volume Types".
  This option can be omitted if there is only one generation (BVs and SVs correspond to each other on a 1-to-1 basis).

- -bvflg *bv_flg*

  Specify the type of the volume specified with the -bv option.
  This option must be specified together with the -bv option.
  For explanations about volumes and their types, refer to 1.2 "Volume Types".

- -sv *volume*

  Specify an SV volume.
  The SV volume must be specified by logical disk name or relative generation number. The relative generation number must be ".-n" format. The expression ".-1" means the latest generation. Older generations can be specified in a range of ".-2" to ".-16".
  It is possible to omit specifying the SV in this option if there is only one generation (BVs and SVs correspond to each other on a 1-to-1 basis).
  For a derived SV without a generation number, only logical disk name can be specified.

- -svflg *sv_flg*

  Specify the type of the volume specified with the -sv option.
  Either of the following SV volume types can be specified.

- ld The SV is specified by logical disk name.

- relgen The SV is specified by relative generation number.

  This option must be specified together with the -sv option.

- -file *file_name*

  Specify sets of BVs and SVs in *file_name* to specify more than one set.
  It is impossible to specify a pair for data replication and a pair for snapshot as operation targets together.
  If an error occurs in any of the specified sets, processing is discontinued.

- -wait | -nowait

  Specify whether to wait until restoration is completed.
  Specifying -wait causes the completion of restoration to be waited for.
  Specifying -nowait starts restoration but does not cause the completion of restoration to be waited for.
  If this option is omitted, the command behaves in the same manner as when -wait is specified.
  If the data replication function is used, specifying -wait allows a monitoring time interval for the disk array to be specified in seconds. If the snapshot function is in use, no monitoring time interval need to be specified. An attempt to specify one is ignored.

- -derivsv *derivsv_mode*

    Specify whether to retain the snapshot data of derived generation. Either of the following can be specified in *derivsv_mode*.

    - keep Retains the snapshot data of the derived generation.

    - delete Automatically deletes the snapshot data of the derived generation.

    - default Uses the setting stored in the replication operation option setting file.

    If this argument is omitted, the operation is the same as the operation when default is specified.

[Displayed Information]

The following information is displayed if database recovery is performed by waiting until restoration from the RV to the MV is completed, using the data restoration function.

```
C:\> iSMsql_snapshotrst -db db_name   -metafile metafile_name -wait

SnapshotRestore Start                   YYYY/MM/DD hh:mm:ss
    DataBase   db_name
      MV:disk_number                    ld_name       type
          volume_name
          path
      RV:disk_number                    ld_name       type
          volume_name
          path
Restore         Start                   YYYY/MM/DD hh:mm:ss
Restoring.....
Restore         Normal End              YYYY/MM/DD hh:mm:ss
SnapshotRestore Normal End              YYYY/MM/DD hh:mm:ss
    DataBase   db_name
      MV:disk_number                    ld_name       type
          Volume_name
          Path
      RV: disk_number                   ld_name       type
          Volume_name
          Path

C:\>
```

Description of messages:

- SnapshotRestore Start *YYYY/MM/DD hh:mm:ss*

    Snapshot Restore start message and start date

- DataBase *db_name*

    Database name

- MV:disk_number ld_name type

    MV physical disk number, logical disk name, OS type

- volume_name

    MV mount point volume name

- path

    MV drive letter or NTFS folder path name

- RV:disk_number ld_name type

  RV physical disk number, logical disk name, OS type

  volume_name

  RV mount point volume name

- path

  RV drive letter or NTFS folder path name

- Restore Start *YYYY/MM/DD hh:mm:ss*

  Message indicating the start of restoration for which the data replication function is used, and date and time of the start

- Restoring.....

  Message indicating that restoration is in progress, using the data replication function

  The message appears if the completion of restoration is waited for.

  Restore Normal End *YYYY/MM/DD hh:mm:ss*

  Restore end message and end date

  SnapshotRestore Normal End *YYYY/MM/DD hh:mm:ss*

  Snapshot Restore end message and end date

The following information is displayed when database recovery is performed using the snapshot function for restoration from the SV to the BV.

```
C:\> iSMsql_snapshotrst -db db_name   -metafile metafile_name

SnapshotRestore Start            YYYY/MM/DD hh:mm:ss
   DataBase   db_name
   BV:ld_name                    type
       volume_name
       path
   SV:ld_name                    type      (generation) attribute
Restore         Start            YYYY/MM/DD hh:mm:ss
Restore         Normal End       YYYY/MM/DD hh:mm:ss
SnapshotRestore Normal End       YYYY/MM/DD hh:mm:ss
   DataBase   db_name
   BV:ld_name type
       volume_name
       path
   SV:ld_name                    type      (generation) attribute

C:\>
```

Description of messages:

- SnapshotRestore Start *YYYY/MM/DD hh:mm:ss*

  Message indicating the start of snapshot restoration, and date and time of the start

- DataBase *db_name*

  Database name

- BV:ld_name type

  BV logical disk name and OS type

  volume_name

  BV mount point volume name

  path

  BV drive letter or NTFS folder path name

- SV:ld_name type (generation) attribute

  SV logical disk name, OS type, and relative generation number, and generation attribute

  If the SV has the derived attribute, an asterisk "*" is displayed for the generation attribute.

- Restore Start YYYY/MM/DD hh:mm:ss

  Message indicating the start of snapshot-based restoration, and date and time of the start

- Restore Normal End *YYYY/MM/DD hh:mm:ss*

  Message indicating the end of snapshot-based restoration, and date and time of the end

  This message appears if the completion of restoration is waited for.

- SnapshotRestore Normal End *YYYY/MM/DD hh:mm:ss*

  Message indicating the end of snapshot restoration, and date and time of the end

<Using the data replication function>

- The target MV and RV must be set as a pair.
- The target MV must already be registered in the volume list.
- The command cannot be executed if the data replication function of the disk array in which the target MV and RV are stored is in the freeze state.
- The activity state of the target pair is Separate State. The command can be executed only when the activity state of the target pair is Separated.
- If the target MV is used as the BV for the snapshot function, the snapshot state for all SVs paired with the BV must be snapshot-inactive.
- The command cannot be executed if the target MV is used as the BV and the MV is in the restore state or the restore fault state for snapshot.
- The Overland Mirroring cannot be specified for the pair volumes that are allocated in the same disk array. To specify the Overland Mirroring, use the pair volumes that are allocated in different disk arrays.
- Performing restoration requires that the target RV must contain all data files and log files included in the database.
- The specified database name must be unique.
- A disk specified to hold a metafile must be other than the disk that contains the data files or log files of the target database.
- The command cannot be executed if the volume list is being created or updated.
- A dynamic disk cannot be used.
- The target MV and RV must have been unmounted.
- The command cannot handle any pairs registered with the ATgroup.
- The command cannot be used in joint operation with iSM.

<Using the snapshot function>

- The target BV and SV must be in a pair.
- The target BV volume must have been registered in the volume list.
- The command cannot be executed if the data replication function of the disk array in which the target BV and SV are stored is in the freeze state.
- The snapshot state of the target BV and SV must be snapshot-active.
- The command cannot be executed if the target BV is in the snapshot fault state or the restore fault state.
- If there is a protected SV whose generation is newer than the target SV, the command cannot be executed with the specification that the snapshot data of the derived generation is automatically deleted.
- If the command was executed with the specification that the snapshot data of the derived generation is automatically deleted, it automatically deletes the snapshot data of generations newer than the target SV.
- If the target BV is used as the MV and in the Replication or Restore state of data replication function, the command cannot be executed.
- The command cannot be executed if the target BV or SV is linked to an LV.
- The command can be executed only when the SV is in the Not Ready state.
- Performing restoration requires that the target SV must contain all data files and log files included in the database.
- The specified database name must be unique.
- A disk specified to hold a metafile must be other than the disk that contains the data files or log files of the target database.
- The command cannot be executed if the volume list is being created or updated.
- A dynamic disk cannot be used.
- The target BV must have been unmounted.
- The command cannot be used in joint operation with iSM.

[Return Values]

0: Normal termination

1: Abnormal termination

This command terminates abnormally in the following cases.

- An option or parameter is invalid.
- A condition for operation is not satisfied.
- The instruction fails due to a disk array error.
- The instruction to the Microsoft SQL Server fails.

Operation Setting (WIN)

Operation Option Setting File (Windows)

On the Windows system, various operations can be specified for individual ControlCommand commands by using the operation option setting file.

The operation option setting file corresponds to the replication operation option setting file for ReplicationControl, the option setting file for SnapControl, the option setting file for PowerControl, and the option setting file for ProtectControl.

In a Windows Server 2008 environment in which User Account Control (UAC) is enabled, to log on as a user other than the user belonging to the OS local system administrators group and edit the option setting file, start the text editor or the like to be used by the system administrator and then perform the task.The operation option setting file is described below.

[File Location and Name]

`%SystemRoot%\ismvol\iSMrpl.ini`
There is a shortcut for the above file in %SystemRoot%\iSMrpl.ini.

[Description]

[TRACELOG] section

Specifies operations regarding event log, command trace, and operation trace for ControlCommand commands.

Event log

- RPLSYSLOG=0
- Outputs the event log (default).
- If you want to output the event log, you do not have to set RPLSYSLOG.
- RPLSYSLOG=1
- Doesn't output the event log.

Error level

Specify whether or not to output the event log for each error severity level.

This is valid only when event log output has been set.

- RPLSYSLOGLV=EWI
  - Outputs informational, warning, and error messages to the event log (default).
- RPLSYSLOGLV=EW
  - Outputs warning and error messages to the event log.
- RPLSYSLOGLV=E
  - Outputs error messages to the event log.

Command Trace

RPLTRACEFILENUM=Number of log files

- Specify the maximum number of log files that can be saved as command trace.
- If the size of a log file reaches the upper file size limit specified in RPLTRACEFILEMAXSIZE, the use of the file is discontinued, and another file is put in use. This switching is sequential and automatic. The switching occurs within the maximum specified number of log files.
- If you do not want to have any operation trace output, specify the number of log files as 0.
- If RPLTRACEFILENUM is omitted, up to 5 (default) log files are created and put in use sequentially.

RPLTRACEFILEMAXSIZE=Log file size

- Specify the maximum size (in kilobyte units) of a log file to be saved as command trace.
- Specify a value greater than or equal to 200 (kilobytes) as the maximum log file size. If a value less than 200 is specified, each created log file will have a size of 200 kilobytes.
- The size of a log file is checked at the start of command execution. If the log file is larger than specified, a new log file is put in use. For this reason, the actual file size becomes larger than specified.
- If RPLTRACEFILEMAXSIZE is omitted, each created log file will have a maximum size of 200 kilobytes (default).
- If RPLTRACEFILEMAXSIZE is specified as 0, no command trace log data is output.

Operation Trace

`RPLLOGFILENUM=Number of log files`

- Specify the maximum number of log files that are stored as the operation trace.
- When the size of the log file becomes the upper limit of the file size specified by the RPLLOGFILEMAXSIZE environment variable, the system automatically uses another file within the specified maximum number of files.
- If you do not want the operation trace to be output, specify "0" for the number of log files.
- If neither RPLLOGFILENUM nor RPLLOG is specified, up to 10 (default) log files are created, and each log file is used sequentially.

`RPLLOGFILEMAXSIZE=Log file size`

- Specify the maximum log file size, in units of kilobytes, that is stored as the operation trace.
- Specify a value that is equal to or greater than 200 (kilobytes). If a value less than 200 (kilobytes) is specified, log files of up to 200 kilobytes (default) each are created.
- The system checks the size of the log file at the start of executing each command, and if the size is beyond the preset value, the system changes the value
- Accordingly, the file size may not be quite the same as the specified value.
- If the RPLLOG setting is valid, the RPLLOGFILEMAXSIZE setting is ignored.
- If RPLLOGFILEMAXSIZE is not specified, the system creates log files of up to 400 kilobytes (default) each.
- If you specify "0" for RPLLOGFILEMAXSIZE, the operation trace log data will not be output.

RPLLOG=Number of days

- This setting becomes valid if RPLLOGFILENUM is omitted. This parameter setting is ignored if RPLLOGFILENUM is specified.

- In "Number of Days", specify the expiration date to delete data saved in the trace file.

- Data for which the period specified in RPLLOG has elapsed since the day the data was recorded is deleted at execution of the command.

- If RPLLOG is specified as 0, no operation trace log file is output.

- When RPLLOG is specified, an overhead for searching or deleting log files occurs at execution of command immediately after the date is changed. Therefore, for controlling the output amount of trace file, using RPLLOGFILENUM and RPLLOGFILEMAXSIZE is recommended.

[IOCONTROL] section

Specifies operations regarding various I/O issue controls to the disk array for individual ControlCommand functions.

I/O issue path

- Specify the I/O issue path to the disk array. This parameter setting is invalid for the WORM operation (`iSMpc_protect` and `iSMpc_release` commands) so that it always operates with the default value (DIRECT).

- IOPATH=DIRECT

- Directly issues the replication operation I/O to the disk array.

- This is the default value when the IOPATH parameter is not specified.

- IOPATH=MANAGER

- Connects to the iSM currently in operation on the same server and allows the SnapSAN Manager issue the I/O to the disk array.

Connection Port Number

- Specify a socket port number for connecting to the SnapSAN Manager.

- IOPORT_MANAGER=`socket port number`

- This setting is valid when MANAGER is specified as IOPATH.

- This setting is valid for logical disk information display (`iSMrc_ldlist` and `iSMrc_sense` commands), replication operation (`iSMrc_replicate`, `iSMrc_separate`, `iSMrc_restore`, `iSMrc_change`, `iSMrc_wait`, `iSMrc_query`, and `iSMrc_rvmode` commands), pair operation (`iSMrc_pair` command), ATgroup building (`iSMrc_atg` command), and disk array operation (`iSMrc_arrayinfo` command).

- If the IOPORT_MANAGER parameter is not specified, the system uses socket port number 8030 (default).

- The socket port number to be specified must be the same as the environment setting on the iSM side (port number to be used by the replication management).

SNAP_IOPORT_MANAGER=socket port number

- This setting is valid when MANAGER is specified as IOPATH.

- This setting is valid for the snapshot operation (`iSMsc_create`, `iSMsc_delete`, `iSMsc_restore`, `iSMsc_wait`, `iSMsc_svguard`, and `iSMsc_query` commands), link operation (`iSMsc_link`, `iSMsc_unlink`, and `iSMsc_linkinfo` commands).

- If the SNAP_IOPORT_MANAGER parameter is not specified, the system uses socket port number 8060 (default).

- The socket port number to be specified must be the same as the environment setting on the iSM side (port number to be used by the snapshot management).

Data Being Received Message Output

- Specify whether or not to output the message indicating that data is being received from the iSM when the `iSMrc_ldlist` command is executed in joint operation with iSM.
- RPL_RECV_MSG=`USE`
- Does not output the Data Being Received message (default).
- The default value when the RPL_RECV_MSG parameter is not specified.
- RPL_RECV_MSG=UNUSE
- Does not output the Data Being Received message.

[WAIT] section

- Specifies operations regarding process wait

Monitoring Time Interval

RPL_WATCHDEV=*second*

- A value as a monitoring time interval is determined for second of the `-wait` [*second*] option of the `iSMrc_replicate`, `iSMrc_separate`, `iSMrc_restore`, `iSMsql_snapshotbkup`, and `iSMsql_snapshotrst` commands, or the `-interval` *second* option of the `iSMrc_wait` command.
- A value 1 to 30 seconds can be specified.
- If the RPL_WATCHDEV parameter is not specified, the default is 5 seconds.
- SNAP_WATCHDEV=*second*
- A value as a monitoring time interval is determined for second of the `-interval` second option of the `iSMsc_wait` command.
- A value 1 to 30 seconds can be specified.
- If the SNAP_WATCHDEV parameter is not specified, the default is 5 seconds.

Wait limit time

RPL_LIMWATCHDEV=*second*

- Specify a wait time limit (in seconds) to be used if the `-limit` option is omitted from the `iSMrc_wait` command.
- If RPL_LIMWATCHDEV parameter is omitted, no limit is placed on the wait process.
- SNAP_`LIMWATCHDEV`=*second*
- Specify a wait time limit (in seconds) to be used if the `-limit` option is omitted from the `iSMsc_wait` command.
- If SNAP_LIMWATCHDEV parameter is omitted, no limit is placed on the wait process.

Wait Process Message Output

Determine whether to output a wait process message when the `-wait` option of `iSMrc_replicate`, `iSMrc_separate`, `iSMrc_restore`, `iSMsql_snapshotbkup`, and `iSMsql_snapshotrst` commands are specified or when `iSMrc_wait` command is executed.

- Message "`Replicating...`" that is out by the `iSMrc_replicate` command
- Message "`Separating...`" that is out by the `iSMrc_separate` command
- Message "`Restoring...`" that is out by the `iSMrc_restore` command

- Message "`Waiting...`" that is out by the `iSMrc_wait` command
- Message "`Separating.`" that is out by the `iSMsql_snapshotbkup` command
- Message "`Restoring.`" that is out by the `iSMsql_snapshotrst` command

RPL_WAITMSG=USE

- Outputs a wait process message.
- The default value when the RPL_WAITMSG parameter is not specified.

RPL_WAITMSG=UNUSE

Does not output a wait process message.

Determine whether to output messages during the `iSMsc_wait` command execution wait process.

SNAP_WAITMSG=USE

Outputs a wait process message.
The default value when the SNAP_WAITMSG parameter is not specified.

SNAP_WAITMSG=UNUSE

Does not output a wait process message.

[CHECK] section

- Specifies operations regarding disk operations.

Number of Partitions

- Specifies a restriction on the number of partitions.
- A disk containing only one partition or only one logical volume is called single partition.
- A disk containing two or more partitions or logical volumes is called multiple partitions.

PARTITION=SINGLE

- Enables the command only for single partition.
- The default value when the PARTITION parameter is not specified.

PARTITION=MULTI

- Enables the command for multiple partitions
- To ensure data consistency for all the partitions on the disk, be very careful in executing the command.

GPT disk

- Specifies a restriction on the GPT disk.
- `GPTDISK=UNUSE`
- Operations for the GPT disk are not allowed. (A default value when the setting is omitted.)
- `GPTDISK=USE`
- Operations for the GPT disk are allowed. (An initial value when ControlCommand is installed.)

[FILESYSTEMOPERATION] section

Specifies operations regarding file system operations.

Rv Access Restriction Operation

- Specifies the RV access restriction and mount point operations related to the `iSMrc_umount`, `iSMrc_mount`, and `iSMrc_scan` commands.

UMOUNT_RVACC=KEEP

Neither unmounting nor mounting an RV changes its access restriction (default).

UMOUNT_RVACC=NOTREADY

- On Windows 2000, the `iSMrc_umount` command unmounts an RV after deleting its mount point and changing its access restriction to the Not Ready state. When an RV is mounted, the `iSMrc_mount` command is used to release it from the Not Ready state automatically. Specifying a mount point volume name and mount point (drive letter or NTFS folder name) together for the target volume makes the volume mounted at the specified point.
  When unmounting an RV volume in a multiple-partition configuration, to unmount the specified volume, volumes in other partitions are internally unmounted before the access restriction of the specified RV is set to the Not Ready state. It becomes impossible to reference or update any volume (partitions) on the disk of interest. From this time on, it is impossible to access other partitions on the disk for reference or update purposes and to operate them, using the `iSMrc_flush` command. Therefore, care must be taken in following the procedure of use and operation. When re-starting a server with an RV unmounted, the RV in the Not Ready state cannot be recognized by OS. In this case, note that it is necessary to make OS recognize the RV with the `iSMrc_scan` command after a server is started.
  The `iSMrc_umount` command terminates normally if the access restriction of the RV of interest is already the Not Ready state.

- On Windows Server 2003 or Windows Server 2008, the `iSMrc_umount` command unmounts an RV after deleting its mount point to make it impossible to mount. When an RV is mounted, the `iSMrc_mount` command is used to specify a mount point volume name and a mount point (drive letter or NTFS folder name) together so that the volume can be mounted at the specified mount point.

- Only one mount point (drive letter or NTFS folder name) must have been specified for the target volume. A volume cannot be unmounted if no mount point is specified for it or if more than one mount point is specified for it. Therefore, this setting cannot be applied to an operation procedure such as deleting all mount points of the volume using the D option of the MOUNTVOL command before unmounting. In addition, if more than one mount point has been set for a volume, it is necessary to delete all but one mount point using the D option of the MOUNTVOL command before unmounting. When using this setting, check the operation procedure and review it as required.

- Before scanning a device, the `iSMrc_scan` command releases volumes from the Not Ready state if their access restriction has been set to the Not Ready state in unmounting.

[RETRY] section

- Specifies how to control retry if a failure occurs at disk operation.

Retry operation specification of the `iSMrc_mount` command

- Specifies retry operations to be performed if an attempt to execute the `iSMrc_mount` command fails.

MOUNTRTCOUNT=*count*

- In *count*, specify the number of retries of the `iSMrc_mount` command.
- The default value is 3.

MOUNTRTTIME=*time*

In *time*, specify the retry time interval of the `iSMrc_mount` command in seconds.
The default value is 3 seconds.

Retry operation specification of the `iSMrc_umount` command

- Specifies operations regarding retry performed when the execution of the `iSMrc_umount` command fails.

UMOUNTRTCOUNT=*count*

- In *count*, specify the number of retries of the `iSMrc_umount` command.
- The default value is 3.

UMOUNTRTTIME=*time*

- In *time*, specify the retry time interval of the `iSMrc_umount` command in seconds.
- The default value is 3 seconds.

Retry control for Remote Replication on low-speed line

- There is no guarantee of line quality for a best-effort line, and a temporary link failure of the Remote Replication might occur. At the same time, the command that performs the Remote Replication operation is in error during a link failure.
- The iSMrc_replicate, iSMrc_restore, iSMrc_separate, iSMrc_query, and iSMrc_wait commands provide a retry control function to enhance the continuity a command operation until the link automatically recovers, by performing a retry operation within the command (supported when IOPATH=DIRECT is specified and not supported when IOPATH=MANAGER is specified).
- To use the retry control, an instruction from a user by setting
- this operation is required. This instruction is available only for an Remote Replication pair that uses a low-speed line and a remote operation, but is ignored by Volume Cloning, which does not perform remote operation, or Remote Replication using a normal line.

RPL_LIM_RETRY_FOR_LOW_SPEED_LINK = *time*

- Specify the target of a retry timeout in seconds for a command retry control after a link failure occurs on a low-speed line.
- The specifiable range is 0 to 86400 seconds.
- If the RPL_LIM_RETRY_FOR_LOW_SPEED_LINK parameter is not specified, the default value is 0 seconds.
- This parameter instructs a value assuming a recovery waiting time after a link failure. It is not for instructing an end time of a command.

RPL_SCSI_RETRY_CNT_FOR_LOW_SPEED_LINK = *count*

- Specify the number of additional retries, using the same control path, to perform immediately after the control I/O fails within the command due to link failure.
- The specifiable range is 0 to 20 times.
- If the RPL_SCSI_RETRY_CNT_FOR_LOW_SPEED_LINK parameter is not specified, the default value is 11 times (Windows).
- Because load increases if the number of retries is left to the default value, reconsider the value to about 3 times when
- instructing to perform the retry control.

RPL_SCSI_RETRY_INTERVAL_FOR_LOW_SPEED_LINK = *retry time interval*

- Specify the retry time interval in seconds when the control I/O fails within the command due to link failure.
- The specified range is 0 to 600 seconds.
- If the RPL_SCSI_RETRY_INTERVAL_FOR_LOW_SPEED_LINK parameter is not specified, the default value is 0 seconds.
- Because load increases if the retry time interval is left to the default value, reconsider the value to about 5 seconds when instructing to perform the retry control.
- The retry control is performed as follows:

  [RPL_SCSI_RETRY_INTERVAL_FOR_LOW_SPEED_LINK (interval: seconds) × (RPL_SCSI_RETRY_CNT_FOR_LOW_SPEED_LINK + 1 (number of times)) × number of logical paths that issued I/O]

- The above count is considered as one set of retries. If the link failure does not resolve during this one set of retries, this one set of retries is additionally performed until the timeout specified by RPL_LIM_RETRY_FOR_LOW_SPEED_LINK is reached.
- If this specification is used, the starting of a replication operation within the command or the command response might be delayed depending on the specified value and the line state.
- Therefore, before using this specification, check the time restriction of the command caller job or whether there is enough operating time.
- SQL Option, Replication Navigator, and other software products that use ControlCommand may also be affected. Some software products have restrictions on the command response time (for example, the separate timeout for Replication Navigator for Windows is 30 seconds). When instructing to perform the retry control, be sure that the retry control will keep the restrictions.

[SCAN_WAITTIME]

Specifies operations regarding the iSMrc_scan command.

Waiting operation specification of the iSMrc_scan command
Specifies the waiting time for issuing the iSMrc_scan command.
RPLSCAN_WAITTIME=*time*

- Specifies the waiting time after executing the scan command in seconds.
- If RPLSCAN_WAITTIME
- parameter is not specified, the default value is 30 seconds.

[RESTORE]

- Specifies operation performed when Restore is executed.

RV operation mode

- Specify an operation mode for RV when restoration is executed by the iSMrc_restore command.

MODE=UPDATE

- Restoration is performed while the updated data of the MV is being reflected into the RV.
- The default is UPDATE.

MODE=PROTECT

- Restoration is performed without the updated data of the MV being reflected into the RV. The updated data is managed as difference.On completion of restoration, it is automatically separated and transited into the Separated state. To use this function, you need to purchase Volume Cloning or Replication and Mirroring and then unlock the license of the products.

Operation regarding derived generation

- Specify whether to retain or automatically delete the derived generation at restoration by the `iSMsc_restore` command.

SNAP_RST_DERIVED=DELETE

The derived generation auto delete mode. When restoration from SV of any intermediate generation is executed, the SVs of later generation than the restored one (derived generations) are automatically deleted.

SNAP_RST_DERIVED=KEEP

The derived generation retain mode. When restoration from SV of any intermediate generation is executed, the SVs of later generation than the restored one (derived generations) are retained.

SNAP_RST_DERIVED=DEFAULT

Whether to automatically delete or retain the derived generations depends on the disk array function setting. (Default)

The default value at Snapshots is the derived generation retain mode (KEEP) and the default value prior to it is the derived generation auto delete mode (DELETE).

The default value when the SNAP_RST_DERIVED parameter is not specified.

[SEPARATE] section

Specifies operation performed when Separate is executed.

RV use start time

- Determine when to make the RV available after Separate execution by the `iSMrc_separate` and `iSMsql_snapshotbkup` commands.

RVUSE=IMMEDIATE

- After Separate execution, the RV is immediately available while the difference between the MV and RV contents is being reflected into the RV. This function is available only for the Volume Cloning pair, and to use it, you need to purchase Volume Cloning or later and then unlock the license of the products.

RVUSE=COMPLETE

- After Separate execution, the RV becomes available when the difference between the MV and RV contents has been reflected into the RV.
- The default is COMPLETE.

[ATGROUP]

Specifies changes to the operation regarding the ATgroup operation of ReplicationControl/DisasterRecovery.

Pair Information Outputting At Processing Start and End

- Specify the operation regarding the pair information output at processing start and end for the messages, which are output to the console when the processing is started by the ATgroup operations by the `iSMrc_replicate`, `iSMrc_separate`, `iSMrc_restore`, `iSMrc_change`, and `iSMrc_wait` commands or when the wait processing is terminated.

RPL_ATGPAIRMSG=OUTPUT

Outputs the information on the pair of the target ATgroup at start/end of processing for the ATgroup to the console. (Default value at ReplicationControl/DisasterRecovery).

RPL_ATGPAIRMSG=NOOUTPUT

Does not output the information on the pair of the target ATgroup at start/end of processing for the ATgroup to the console. (Default value at ControlCommand).

[SQL OPTION]

- Specifies changes to the operation of the ReplicationControl SQL Option.

Database Freeze Start/end Message Output Control

- Specify whether to output a message indicating the start or end of database freeze state.

DBFREEZELOG=ON

Outputs a start message (iSM13238) and end message (iSM13239) to an event log file when the database, respectively, enters and exits the freeze state.

DBFREEZELOG=OFF

Does not outputs a start message (iSM13238) or end message (iSM13239) to an event log file when the database, respectively, enters and exits the freeze state (default).

Environment Variables (UNIX)

The UNIX system uses environment variables to specify various operations for the individual ControlCommand commands.

The environment variables are described below.

Command Environment Variable (LANG)

- Specify an environment variable compatible with a language and characters to be used.

Syslog Message Environment Variable

RPLSYSLOG

- Specify whether to output the syslog message.

- When you want the syslog message to be output, do not specify this environment variable (default) or specify "0" for this environment variable.

- If you do not want the syslog message to be output, specify "1" for this environment variable.

Command Trace Environment Variables

RPLTRACEFILENUM

- Specify the maximum number of log files that can be saved as command trace.
- If the size of a log file reaches the upper file size limit specified in RPLTRACEFILEMAXSIZE, the use of the file is discontinued, and another file is put in use. This switching is sequential and automatic. The switching occurs within the maximum specified number of log files.
- If you do not want the operation trace to be output, specify "0" for this environment variable.
- If this environment variable is omitted, up to 5 (default) log files are created and put in use sequentially.

RPLTRACEFILEMAXSIZE

- Specify the maximum size (in kilobyte units) of a log file to be saved as command trace. This setting is valid if RPLTRACEFILENUM is specified as 1 or greater.
- Specify a value greater than or equal to 200 (kilobytes) as the maximum log file size. If a value less than 200 is specified, each created log file will have a size of 200 kilobytes.
- The size of a log file is checked at the start of command execution. If the log file is larger than specified, a new log file is put in use. For this reason, the actual file size becomes larger than specified.
- If this environment variable is omitted, each created log file will have a maximum size of 200 kilobytes (default).
- If this environment variable is specified as 0, no command trace log data is output.

Operation Trace Environment Variables

RPLLOGFILENUM

- Specify the maximum number of log files that are stored as the operation trace.
- When the size of the log file becomes the upper limit of the file size specified by the RPLLOGFILEMAXSIZE environment variable, the system automatically uses another file within the maximum number of specified files.
- If you do not want the operation trace to be output, specify "0" for this environment variable.
- If neither this environment variable nor RPLLOG is specified, up to 10 (default) log files are created, and each log file is used sequentially.

RPLLOGFILEMAXSIZE

- Specify the maximum log file size, in units of kilobytes, that is stored as the operation trace. This setting is valid when a value that is equal to or greater than one is specified for the RPLLOGFILENUM environment variable.
- Specify a value that is equal to or greater than 200 (kilobytes). If a value less than 200 (kilobytes) is specified, log files of up to 200 kilobytes (default) each are created.
- The system checks the size of the log file at the start of executing each command, and if the size is beyond the preset value, the system changes the value
- . Accordingly, the file size may not be quite the same as the specified value.
- The setting of this environment variable is ignored if the setting of the RPLLOG environment variable is valid.
- If this environment variable is not specified, the system creates log files of up to 400 kilobytes (default) each.

- If you specify "0" for this environment variable, the operation trace log data will not be output.

RPLLOG

- This setting is valid if RPLLOGFILENUM is omitted. This parameter setting is ignored if RPLLOGFILENUM is specified.
- In "Number of Days", specify the expiration date for the log data stored in the operation trace file.
- Data that has been logged in the operation trace file and whose specified
- data storage period has been expired is deleted when the command is executed.
- If you specify "0" for this environment variable, the operation trace log data will not be output.
- When RPLLOG is specified, an overhead for searching or deleting log files occurs at execution of command immediately after the date is changed. Therefore, for controlling the output amount of trace file, using RPLLOGFILENUM and RPLLOGFILEMAXSIZE is recommended.

Environment Variables Regarding I/o Issue Control

RPL_IOPATH

- Specify the I/O issue path to the disk array.
- One of the following can be specified:

  DIRECT Directly issues the I/O to the disk array. This is the default value when this environment variable is not specified.

  MANAGER Connects to the iSM currently in operation on the same server and allows the iSM issue the I/O to the disk array.

- This environment variable is invalid for the WORM operation (`iSMpc_protect` and `iSMpc_release` commands) so that it always operates with the default value (DIRECT).

RPL_IOPORT_MANAGER

- Specify a socket port number for connecting to the iSM if the RPL_IOPATH environment variable is specified as MANAGER.
- This setting is valid for logical disk information display (`iSMrc_ldlist` and `iSMrc_sense` commands), replication operation (`iSMrc_replicate`, `iSMrc_separate`, `iSMrc_restore`, `iSMrc_change`, `iSMrc_wait`, `iSMrc_query`, and `iSMrc_rvmode` commands), pair operation (`iSMrc_pair` command), ATgroup building (`iSMrc_atg` command) and disk array operation (`iSMrc_arrayinfo` command).
- If this environment variable is not specified, the system uses socket port number 8030 (default).
- The socket port number to be specified must be the same as the
- environment setting on the iSM side (port number to be used by the replication management).

SNAP_IOPORT_MANAGER

- Specify a connection port number of the socket for connecting to the iSM, if MANAGER is specified as RPL_IOPATH.
- This setting is valid for the snapshot operation (`iSMsc_create`, `iSMsc_delete`, `iSMsc_restore`, `iSMsc_wait`, `iSMsc_svguard`, and `iSMsc_query` commands) and link operation (`iSMsc_link`, `iSMsc_unlink`, and `iSMsc_linkinfo` commands).

- If this environment variable is not specified, the system uses socket port number 8060 (default).
- The socket port number to be specified must be the same as the environment setting on the iSM side (port number to be used by the snapshot management).

RPL_RECV_MSG

- Specify whether to output the following receive processing message indicating that data is being received from the iSM when the `iSMrc_ldlist` command is executed in joint operation with iSM.
- The "Receiving..." message output by the `iSMrc_ldlist` command
- One of the following can be specified:
  - UNUSEDoes not output the Data Being Received message.
  - USEOutputs the Data Being Received message. This is the default value when this environment variable is not specified.

Environment Variables Regarding Wait Process Controls

RPL_WATCHDEV

- If the `-wait` option of the `iSMrc_replicate`, `iSMrc_separate`, or `iSMrc_restore` command is omitted, specify a value from 1 to 30, by the second, as the monitoring time interval.
- If the `-interval` option of the `iSMrc_wait` command is omitted, specify a value from 1 to 30, by the second, as the monitoring time interval.
- If this environment variable is not specified, the monitoring time interval is five seconds (default).

SNAP_WATCHDEV

- If the `-interval` option of the `iSMsc_wait` command is omitted, specify a value from 1 to 30, by the second, as the monitoring time interval.
- If this environment variable is not specified, the monitoring time interval is five seconds (default).

RPL_LIMWATCHDEV

- Specify a wait limit time in seconds if the `-limit` option is omitted from the `iSMrc_wait` command.
- If this environment variable is omitted, no limit is placed on the wait process (default).

SNAP_LIMWATCHDEV

- Specify a wait limit time in seconds if the `-limit` option is omitted from the `iSMsc_wait` command.
- If this environment variable is omitted, no limit is placed on the wait process (default).

RPL_WAITMSG

- Specify whether to output the following wait process messages when the `-wait` option of the `iSMrc_replicate`, `iSMrc_separate`, or `iSMrc_restore` command is specified and when the `iSMrc_wait` command is issued.
  - The "Replicating..." message output by the `iSMrc_replicate` command
  - The "Separating..." message output by the `iSMrc_separate` command
  - The "Restoring..." message output by the `iSMrc_restore` command
  - The "Waiting..." message output by the `iSMrc_wait` command

- One of the following can be specified:
    - UNUSEDoes not output a wait process message.
    - USEOutputs a wait process message. This is the default value when this environment variable is not specified.

SNAP_WAITMSG

- Specify whether to output the following wait process message when the `iSMsc_wait` command is issued.
    - "Waiting..." message output by the `iSMsc_wait` command
- One of the following can be specified:
    - UNUSE Does not output a wait process message.
    - USE Outputs a wait process message. This is the default value when this environment variable is not specified.

Environment Variables Retry Control Remote Replication on Low-speed Line

- There is no guarantee of line quality for a best-effort line, and a temporary link failure of the Remote Replication might occur. At the same time, the command that performs the Remote Replication operation is in error during a link failure.

- The iSMrc_replicate, iSMrc_restore, iSMrc_separate, iSMrc_query, and iSMrc_wait commands provide a retry control function to enhance the continuity a command operation until the link automatically recovers, by performing a retry operation within the command (supported when IOPATH=DIRECT is specified and not supported when IOPATH=MANAGER is specified).

- To use the retry control, an instruction from a user by setting this operation is required. This instruction is available only for an Remote Replication pair that uses a low-speed line and a remote operation, but is ignored by Volume Cloning, which does not perform remote operation, or Remote Replication using a normal line.

RPL_LIM_RETRY_FOR_LOW_SPEED_LINK

- Specify the target of a retry timeout in seconds for a command retry control after a link failure occurs on a low-speed line.

- The specifiable range is 0 to 86400 seconds.

- If the RPL_LIM_RETRY_FOR_LOW_SPEED_LINK environment variable is not specified, the default value is 0 seconds.

- This parameter instructs a value assuming a recovery waiting time after a link failure. It is not for instructing an end time of a command.

RPL_SCSI_RETRY_CNT_FOR_LOW_SPEED_LINK

- Specify the number of additional retries, using the same control path, to perform immediately after the control I/O fails within the command due to link failure.

- The specifiable range is 0 to 20 times.

- If the RPL_SCSI_RETRY_CNT_FOR_LOW_SPEED_LINK environment variable is not specified, the default value is 5 times (Unix).

- Because load increases if the number of retries is left to the default value, reconsider the value to about 1 time when

- instructing to perform the retry control.

RPL_SCSI_RETRY_INTERVAL_FOR_LOW_SPEED_LINK

- Specify the retry time interval in seconds when the control I/O fails within the command due to link failure.

- The specified range is 0 to 600 seconds.
- If the RPL_SCSI_RETRY_INTERVAL_FOR_LOW_SPEED_LINK environment variable is not specified, the default value is 0 seconds.
- Because load increases if the retry time interval is left to the default value, reconsider the value to about 5 seconds when instructing to perform the retry control.

  The retry control is performed as follows:

```
[RPL_SCSI_RETRY_INTERVAL_FOR_LOW_SPEED_LINK (interval: seconds) ×
(RPL_SCSI_RETRY_CNT_FOR_LOW_SPEED_LINK + 1 (number of times)) × number
of logical paths that issued I/O]
```

- The above count is considered as one set of retries. If the link failure does not resolve during this one set of retries, this one set of retries is additionally performed until the timeout specified by RPL_LIM_RETRY_FOR_LOW_SPEED_LINK is reached.
- If this specification is used, the starting of a replication operation within the command or the command response might be delayed depending on the specified value and the line state. Therefore, before using this specification, check the time restriction of the command caller job or whether there is enough operating time.
- FileSystem Option, Replication Navigator, and other software products that use ControlCommand may also be affected. Some software products have restrictions on the command response time (in the case of FileSystem Option, for example, the filesystem freeze timeout at separation is 60 seconds). When instructing to perform the retry control, be sure that the retry control will keep the restrictions.

Environment Variable Restore Function

RPL_RST_MODE

- Specify operations regarding RV operation mode conducted when the -mode option is omitted from the iSMrc_restore command or when the default value is specified in the -mode option.
- One of the following can be specified:
  - UPDATE Performs Restore while reflecting the updated data of the MV into the RV. When the Restore is completed, the state changes to Sync State (rst/sync). This is the default value when this environment variable is not specified.
  - PROTECT Performs Restore without reflecting the updated data of the MV into the RV. When the Restore is completed, Separate is automatically executed and then the state changes to the Separated state. To use this function, you need to purchase Volume Cloning or Replication and Mirroring and then unlock the license of the products.

SNAP_RST_DERIVED

- Specify operations regarding derived generation at restoration by the iSMsc_restore command.
- One of the following can be specified:
  - DELETE The derived generation auto delete mode. When restoration from SV of any intermediate generation is executed, the SVs of later generation than the restored one (derived generations) are automatically deleted.
  - KEEP The derived generation retain mode. When restoration from SV of any intermediate generation is executed, the SVs of later generation than the restored one (derived generations) are retained.

- DEFAULT Whether to automatically delete or retain the derived generations depends on the disk array function setting. the default value at snapshots ver3 is the derived generation retain mode (keep) and the default value prior to it is the derived generation auto delete mode (delete). The default value when the environment variable is not specified.

Environment Variable Separate Function

RPL_SEP_RVUSE

- Specify operations regarding RV available time conducted when the `-rvuse` option is omitted from the `iSMrc_separate` command or when the default value is specified in the `-rvuse` option.
- One of the following can be specified:
  - IMMEDIATE After Separate execution, the RV is immediately available while the difference between the MV and RV contents is being reflected into the RV. This function is available only for the Volume Cloningpair, and to use it, you need to purchase Volume Cloning and unlock the license of the product.
  - COMPLETE After Separate execution, the RV becomes available when the difference between the MV and RV contents has been reflected into the RV. This is the default value when this environment variable is not specified.

Environment Variable Sense Function

RPL_SENSE_VERTICAL_INDICATE

- Specify the display format of the information when the `-protect` option is omitted from the `iSMrc_sense` command.
- One of the following can be specified:
  - OFFDisplays the display items horizontally. They are displayed in the same format as ReplicationControl and SnapControl. (Default value)
  - ONDifferent display item is displayed in a different line. They are displayed vertically.

Environment Variable ATgroup Operation

RPL_ATGPAIRMSG

- Specify the operation regarding the pair information output at processing start and end for the messages, which are output to the console when the processing is started by the ATgroup operations by the `iSMrc_replicate`, `iSMrc_separate`, `iSMrc_restore`, `iSMrc_change`, and `iSMrc_wait` commands or when the wait processing is terminated.
- One of the following can be specified:
  - OUTPUT Outputs the information on the pair of the target ATgroup at start/end of processing for the ATgroup to the console. (Default value).
  - NOOUTPUT Does not output the information on the pair of the target ATgroup at start/end of processing for the ATgroup to the console. (Default value).

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